



Project Specification Manual

Volume 1

Sierra Madre Library Redesign and Improvements Sierra Madre, CA Project Number: FC82306



SUBMITTAL TYPE: BIDDING DOCUMENTS

ISSUE DATE: JULY 17, 2024



316 West 2nd Street | Penthouse | Los Angeles, CA 90012
TSK Project Number: 23-025.00

SECTION 000102 - PROJECT INFORMATION

PART 1 GENERAL

1.01 PROJECT IDENTIFICATION

- A Project Name: Sierra Madre Library Redesign and Improvements, .
- B TSK Project No.: 23-025.00.
- C Owner's Project No.: FC82306.
- D Project Address:
 - 400 W Sierra Madre Boulevard.
 - Sierra Madre, CA 91024.
- E The Owner, hereinafter referred to as Owner: City of Sierra Madre.
- F Owner's Project Manager: Arnulfo Yanez, Deputy Director of Public Works
 - 1. Department: Public Works.
 - 2. Address:
 - 3. City, State, Zip: Sierra Madre CA 91024.
 - 4. Phone: (626) 355-7135 ext. 813.
 - 5. E-mail: ayanez@cityofsierramadre.com.

1.02 PROJECT DESCRIPTION

- A Summary Project Description: Summary Project Description: Library significant improvement project. Existing library interior retrofit to accommodate current programs, staffing needs and meet ADA standards. Upgrades to building envelope to meet Title 24 and improve envelope efficiency including insulation, roofing membrane, efficient opening systems (storefronts, doors and windows). At South elevation, the Library will be expanded 41 feet or approximately 3000sf per floor. Existing structure to stay in place and to be prepared for expansion tie in per structural engineer. The site layout, driveways and sidewalks will be updated as required to meet ADA standards and parking lot will be reconfigured to follow. Repairs to existing exterior façade and planters as required. New landscaping throughout the site. .
- B Contract Scope: Construction, demolition, renovation, and facility operations during occupancy.
- C Contract Terms: Lump sum (fixed price, stipulated sum).

1.03 PROJECT CONSULTANTS

- A The Architect, hereinafter referred to as Architect: TSK Architects.
 - Architect's Project Manager: Crystal Wong
 - Address: 316 W 2nd St.
 - City, State, Zip: Los Angeles, CA 90012
 - Phone: 213.886.9848.
 - E-mail: crystal.wong@tska.com.

1.04 PROCUREMENT DOCUMENTS

- A Availability of Documents: Complete sets of procurement documents may be obtained:
 - 1. From Owner at the Project Manager's address listed above.

PART 2 PRODUCTS - NOT USED.

PART 3 EXECUTION - NOT USED.

END OF SECTION 000102

Project Information - 000102

SECTION 000110 - SPECIFICATION INDEX

VOLUME 1

DIVISION 00 -- PROCUREMENT AND CONTRACTING REQUIREMENTS

000101 - Project Title Page
000102 - Project Information
000107 - Seals Page - Not Included with this Submittal.
000110 - Specification Index

OWNER'S PROCUREMENT AND CONTRACTING REQUIREMENTS - .

001000 - Notice Inviting Sealed Bid
002000 - Instruction to Bidders
004000 - Bid Proposal and Documents
005000 - Agreement
006000 - Project Forms
 Bond Forms
 Payment Bond
 Performance Bond
 Maintenance Bond
 Certificate and Other Forms
 Non-Collusion Affidavit
 Workers' Compensation Certificate
 Insurance Endorsement
 Statement Regarding Insurance Coverage
 Statement Regarding Contractor's Licensing Laws
007000 - Standard Specifications
008000 - Special Provisions

TECHNICAL SPECIFICATIONS

DIVISION 01 -- GENERAL REQUIREMENTS

011000 - Summary
012300 - Alternates
012500 - Substitution Procedures
012600 - Contract Modification Procedures
012613 - Request for Information
012900 - Price and Payment Procedures
013100 - Project Management and Coordination
013200 - Construction Progress Documentation
013300 - Submittal Requirements
014000 - Quality Requirements
014100 - Regulatory Requirements
014216 - Definitions
015000 - Temporary Facilities and Controls

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015639 - Temporary Tree and Plant Protection
015723 - Temporary Storm Water Pollution Control (LESS THAN 1 AC)
016000 - Product Requirements
017300 - Execution Requirements
017329 - Cutting and Patching
017800 - Closeout Requirements and Submittals
017836 - Warranties and Bonds
017900 - Demonstration and Training
019113 - General Commissioning Requirements

DIVISION 02 -- EXISTING CONDITIONS

For Site Preparation and Earthwork, see Division 31
For Pavements and Site Improvements, see Division 32
For Site Utilities, see Division 33
024100 - Selective Demolition

DIVISION 03 -- CONCRETE

031000 - Concrete Forming and Accessories
032000 - Concrete Reinforcing
033000 - Cast-in-Place Concrete
033511 - Concrete Floor Finishes

DIVISION 04 -- MASONRY

042100 - Clay Masonry Units
042200 - Concrete Unit Masonry

DIVISION 05 -- METALS

051200 - Structural Steel Framing
051210 - Welding
053100 - Steel Decking
054000 - Structural Cold-Formed Metal Framing
055000 - Metal Fabrications
055100 - Metal Stairs
055133 - Metal Ladders
055213 - Pipe and Tube Railings
057300 - Decorative Metal Railings

DIVISION 06 -- WOOD, PLASTICS, AND COMPOSITES

062000 - Finish Carpentry
064100 - Architectural Wood Casework
066116 - Solid Surfacing Fabrications

DIVISION 07 -- THERMAL AND MOISTURE PROTECTION

070150.19 - Preparation for Re-Roofing

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- 071300 - Sheet Waterproofing
- 072100 - Building Insulation
- 072500 - Weather Barriers
- 074646 - Fiber-Cement Siding
- 075419 - Polyvinyl-Chloride Roofing
- 076200 - Sheet Metal Flashing and Trim
- 077200 - Roof Accessories
- 078100 - Spray Applied Fire Resistive Materials
- 078400 - Firestopping
- 079200 - Joint Sealants

DIVISION 08 -- OPENINGS

- 081113 - Hollow Metal Doors and Frames
- 081416 - Flush Wood Doors
- 084313 - Aluminum Entrances and Storefront Systems
- 087100 - Door Hardware
- 088000 - Glazing

DIVISION 09 -- FINISHES

- 090561 - Common Work Results for Flooring Preparation
- 092116 - Gypsum Board Assemblies
- 092216 - Non-Structural Metal Framing
- 092236 - Lath
- 092400 - Cement Plastering
- 093000 - Tiling
- 095100 - Acoustical Ceilings
- 096500 - Resilient Flooring, Wall Base and Accessories
- 096720 - Resinous Flooring Systems
- 096813 - Tile Carpeting
- 099113 - Exterior Painting
- 099123 - Interior Painting
- 099600 - Anti-Graffiti Coatings

DIVISION 10 -- SPECIALTIES

- 101400 - Signage
- 102113.17 - Phenolic Toilet Compartments
- 102601 - Wall and Corner Guards
- 102800 - Toilet Room Accessories
- 104300 - Emergency Aid Specialties
- 104400 - Fire Protection Specialties

DIVISION 11 -- EQUIPMENT

- 118129 - Facility Fall Protection

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DIVISION 12 -- FURNISHINGS

122400 - Window Shades
129300 - Site and Street Furnishing

DIVISION 13 -- SPECIAL CONSTRUCTION (NOT USED)

DIVISION 14 -- CONVEYING EQUIPMENT

142400 - Hydraulic Elevators

VOLUME 2

DIVISION 21 -- FIRE SUPPRESSION

211313 - Fire-Suppression Sprinkler Systems

DIVISION 22 -- PLUMBING

220500 - Plumbing Common Work
220513 - Plumbing Materials and Methods
220553 - Plumbing Identification
220700 - Plumbing Insulation
221000 - Plumbing

DIVISION 23 -- HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

230130 - HVAC Air Duct Cleaning
230500 - Common Work Results for HVAC
230513 - Basic HVAC Materials and Methods
230548 - HVAC Sound, Vibration and Seismic Control
230553 - HVAC Identification
230700 - HVAC Insulation
232013 - Above Ground HVAC Piping
233000 - Air Distribution
238000 - Heating, Ventilating and Air Conditioning Equipment
238100 - Floor Wall Mounted Heat Pumps
238129 - Variable Refrigerant Volume HVAC Systems

DIVISION 26 -- ELECTRICAL

260500 - Common Work Results Electrical
260513 - Basic Electrical Materials Methods
260519 - Low-Voltage Wires (600 Volt AC)
260526 - Grounding and Bonding
260533 - Raceways Boxes Fittings Supports
260800 - Electrical Systems Commissioning

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260923 - Lighting Control Systems
261000 - Service Entrance

262413 - Switchboards
262416 - Panelboards
262419 - Motor-Control Center Control Devices
265000 - Lighting

DIVISION 27 -- COMMUNICATIONS

270500 - Common Work Results for Communications
270526 - Grounding and Bonding for Communications Systems
270529 - Hangers and Supports for Communications Systems
270533 - Conduits and Backboxes for Communication Systems
270536 - Cable Trays for Communications Systems
270539 - Surface Raceways for Communications Systems
270543 - Underground Ducts and Raceways for Communications Systems
270553 - Identification for Communications Systems
271000 - Structured Cabling, Basic Materials and Methods
271113 - Communications Entrance Protection
271116 - Communication Cabinets, Racks, Frames and Enclosures
271119 - Communications Termination Blocks and Patch Panels
271123 - Communications Cable Management
271500 - Communications Horizontal Cabling
275225 - Portable Assistive Listening System

DIVISION 28 -- ELECTRONIC SAFETY AND SECURITY

281600 - Intrusion Detection Systems

283100 - Fire Detection and Alarm

DIVISION 31 -- EARTHWORK

311000 - Site Clearing
312000 - Earth Moving

DIVISION 32 -- EXTERIOR IMPROVEMENTS

320190 - Operation and Maintenance of Planting
321216 - Hot-Mix Asphalt Paving
321236 - Emulsified Slurry Seal
321313 - Concrete Paving
321314 - Exposed Aggregate Concrete Paving
321373 - Concrete Paving Joint Sealants
323219 - Masonry Unit Retaining Walls
323353 - Site Formed Concrete
328400 - Planting Irrigation

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DIVISION 33 -- UTILITIES

331100 - Water Utility Distribution Piping
333100 - Sanitary Utility Sewerage Piping
334100 - Storm Utility Drainage Piping
334600 - Subdrainage

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APPENDICES

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Appendix B - Fire Flow Report and Fire Sprinkler Cut Sheets
Appendix C - Structural Calculations
Appendix D - Lead Assessment Report

END OF SECTION 000110

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NOTICE INVITING BIDS AND CONTRACT DOCUMENTS

for

**SIERRA MADRE LIBRARY
PROJECT NO. FC82306
IN THE CITY OF SIERRA MADRE, CALIFORNIA**

Prepared by:

City of Sierra Madre
Arnulfo Yanez
Director of Public Works
232 W. Sierra Madre Boulevard
Sierra Madre, CA 91024

Vertex Companies, LLC
Natalie Hazard
Construction Manager
959 South Coast Drive
Costa Mesa, CA 92626

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PROJECT NO. FC82306
IN THE CITY OF SIERRA MADRE, CALIFORNIA**

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SECTION A – NOTICE INVITING SEALED BIDS

**SIERRA MADRE LIBRARY
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CALENDAR OF EVENTS*

Bid Package available starting	<u>2nd day of August, 2024</u>
Pre-Bid Job Walk	9th day of August, 2024
Bid Due Date and Time	12th day of September, 2024
Bid Opening.....	12th day of September, 2024
Bid Results/Contractor Selection	24th day of September, 2024
Council approval of Contract.....	8th day of October, 2024
New Contract in Effect	10th day of October, 2024
Construction Start Date, not earlier than.....	24th day of October, 2024
Construction End Date, not later than.....	27th day October, 2025

* All dates are subject to change.

00 10 00 NOTICE INVITING SEALED BIDS

**SIERRA MADRE LIBRARY
PROJECT NO. FC82306
IN THE CITY OF SIERRA MADRE, CALIFORNIA**

PUBLIC NOTICE IS HEREBY GIVEN that the City of Sierra Madre as AGENCY, invites sealed bids for the above stated project and will receive such bids online at www.Projectdog.com, up to the hour of 1:00 p.m., on Thursday the 12th day of September, 2024. The bids will be publicly posted on projectdog.com at 1 p.m. on September 12th and publicly read at 3:00 p.m. on the 12th day of September, 2024, in the Sierra Madre City Hall Council Chambers. The date and time shall be extended by no less than 72 hours if the officer, department, or Project Manager issues any material changes, additions, or deletions to the invitation later than 72 hours prior to the bid closing.

Project Name: Sierra Madre Library rehabilitation and expansion project

Project Description: City Library significant rehabilitation and expansion project. Existing library interior retrofit to accommodate current programs, staffing needs and meet ADA standards. Upgrades to building envelope to meet Title 24 and improve envelope efficiency including insulation, roofing membrane, efficiency opening systems (storefronts, doors and windows). At south elevation, the Sierra Madre Library will be expanded 41 ft or approximately 3,000 SF per floor. Existing structure to stay in place and be prepared for expansion tie-in. The site layout, driveways and sidewalks will be updated as required to meet ADA standards and the parking lot will be reconfigured. Repairs to existing exterior façade and planters as required. New landscaping throughout the site.

Engineer's Estimate: \$8,000,000.00

In accordance with the provisions of California Public Contract Code § 3300, and Business and Professions Code § 7028.15(e), the AGENCY has determined that the contractor shall possess a valid Class A contractor's license at the time that the contract is awarded. Failure to possess the specified license shall render a bidder's bid as non-responsive and shall bar award of the contract to any bidder not possessing the specified license at the time of the award.

CONTRACTORS ARE REQUIRED BY LAW TO BE LICENSED AND REGULATED BY THE CONTRACTORS' STATE LICENSE BOARD. ANY QUESTIONS CONCERNING A CONTRACTOR MAY BE REFERRED TO THE REGISTRAR, CONTRACTORS' STATE LICENSE BOARD, P.O. BOX 2600, SACRAMENTO, CA 95826. At the time the contract is awarded, the contractor shall be properly licensed in accordance with the laws of this state. The first payment for work or material shall not be made unless and until the Registrar of Contractors verifies to the AGENCY that the records of the Contractors' State License Board indicate that the contractor was properly licensed at the time the contract was awarded. Any bidder or contractor not so licensed shall be subject to all legal penalties imposed by law including, but not limited to, any appropriate disciplinary action by the Contractors' State Board. Failure of the bidder to obtain proper and adequate licensing for an award of a contract shall constitute a failure to execute the contract and shall result in the forfeiture of the security of the bidder. (Public Contract Code § 20103.5)

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CONTRACTORS AND SUBCONTRACTORS ARE ALSO REQUIRED TO BE REGISTERED WITH THE CALIFORNIA DEPARTMENT OF INDUSTRIAL RELATIONS FOR ANY BID PROPOSAL SUBMITTED ON OR AFTER MARCH 1, 2015, AND FOR ANY CONTRACT FOR PUBLIC WORK ENTERED INTO ON OR AFTER APRIL 1, 2015. A contractor or subcontractor shall not be qualified to bid on, be listed on a bid proposal for, or perform any public work contract unless it is currently registered with the California Department of Industrial Relations as described in Labor Code § 1725.5.

This project is subject to the skilled and trained workforce requirements of the Public Contracts Code §§ 2600 - 2602.

Bids must be prepared on the approved bid forms in conformance with INSTRUCTIONS TO BIDDERS:

Submittal Instructions:

Bid Documents

Copies of the bid forms, plans, specifications, and contract documents shall be available online at www.Projectdog.com, Project Code **862841**. Documents are made available to all bidders in electronic form at no cost. Bidders desiring hard copies of the Drawings and Specifications shall be solely responsible for all costs related to printing and shipping of hard copy documents. Neither Owner nor Architect/Engineer shall be responsible for full or partial sets of Bidding Documents, including Addenda if any, obtained from sources other than Projectdog, Inc.

Receipt of Bids

This project is being Electronically Bid (E-Bid). All bids shall be submitted online at www.Projectdog.com. Hard copy bids will not be accepted by the Awarding Authority. Tutorials and Instructions are available online at www.Projectdog.com. For assistance, contact Projectdog, Inc. at 978.499.9014.

Preparation and Submission of Bids

Bid Forms will be posted online at www.Projectdog.com. All required Bid Forms must be completed and submitted in unrestricted PDF formatted files. The Bidder must fill-in all required fields and signatures either digitally or manually (print, fill-in, and scan to PDF).

The Bidder shall access the Projectdog.com E-Bidding System by entering the Project Code in the project locator box and then selecting "GC E-Bid" from the project's "Project Details" page. The Bidder must enter their bid price as a numeric, whole dollar value only with no punctuation. If no base bid price is applicable, Bidders are instructed to enter an amount of \$1.00 (one dollar). The E-Bidding system automatically translates the numeric value into words and displays the bid price in both figures and words on the submitted bid form.

Bidders may upload ("Add File" or "Replace File"), review ("View File"), Save, submit ("Submit my E-Bid"), or retract ("Retract my E-Bid") their E-Bid at any time prior to the designated deadline. The server clock is displayed on the project's E-Bidding page and is the time of record.

Bidders must select "Submit my E-Bid" prior to the designated deadline to officially submit their E-Bid online. Once submitted, an E-Bid cannot be edited. To modify a submitted E-Bid, Bidders must retract their submission, save any changes, and then submit the updated E-Bid. Upon submitting or retracting their E-Bid, Bidders will receive a convenience e-mail for informational purposes only. Bidders shall contact Projectdog if the email is not received.

Bidders shall review their submitted E-Bid package by selecting "View My Bid Package" from the project's E-Bidding page. Uploaded files may be reviewed individually by selecting "View File". It is also the Bidder's responsibility to ensure that their submitted bid is 100% true, complete, and accurate.

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It is also the Bidder's responsibility to confirm online that their E-Bid package has been submitted successfully. Timely submission of an E-Bid shall be the full responsibility of the Bidder.

Alternates

Each Bidder shall acknowledge Alternates by entering the dollar amount and selecting the "Add" or "Subtract" radio button necessitated by each Alternate listed in the corresponding space on the project's E-Bidding page.

If an Alternate does not involve a change in dollar value, the Bidder shall so indicate by typing "0" for the dollar value of that Alternate and by selecting the "Add" radio button in the corresponding space on the project's E-Bidding page.

Bid Security

The bid must be accompanied by a bid guarantee in the amount of 10% of the total bid by 1:00 p.m. ON THE DATE ADVERTISED FOR THE OPENING OF BIDS. More specifically, pursuant to Public Contract Code §§ 20170 and 20171, all bids for the project shall be presented, under sealed cover and shall be accompanied by one of the following forms of bidder's security in the amount of ten percent (10%) of the bid: (a) cash; (b) a cashier's check made payable to the City of Sierra Madre; (c) a certified check made payable to the City of Sierra Madre; or (d) a bidder's bond executed by an admitted surety insurer, made payable to the City of Sierra Madre and submitted with their E-Bid online at www.Projectdog.com. Such security shall be forfeited should the successful bidder to whom the contract is awarded fails to timely execute the contract and to deliver the necessary bonds and insurance certificates as specified in the contract documents.

In lieu of an insurance Bid Bond certificate submitted as outlined above, a Bid Security in the form a certified check issued by a responsible bank or trust company and made payable to the City of Sierra Madre, and a completed [Cash Bid Bond Affidavit](#) form must be received by the City of Sierra Madre before the time of bidding. In addition, the Bidder must also submit the completed Cash Bid Bond Affidavit form with their E-Bid online at www.Projectdog.com.

Bid Bond

Bidders to deliver original notarized documents to the City, such as Bid Bonds.

Withdrawal of Bids (Before Opening of Bids)

Any bid may be withdrawn (retracted) prior to the designated deadline by selecting "Retract My E-Bid" from the project's E-Bidding page. Upon retracting, the Bidder will receive a convenience e-mail for informational purposes only. It is the Bidder's responsibility to review and confirm online that their bid has been retracted successfully.

Supplemental Instructions to Bidders (E-Bid):

Projectdog, Inc

Supplemental Instructions to Bidders for Electronic Bid Projects (E-Bid)

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Sign Up

Every user of Projectdog.com has a unique username and password for their account. **MANDATORY:** All users must keep usernames and passwords **PRIVATE** and **SECURE**. Do not share accounts.

1. Go to www.Projectdog.com.
2. Select the “Sign Up” (Fig 1).
3. Complete all required form fields and press Submit.
An automatic email will be sent to the registered email.
4. Select the confirmation link in the email to complete the registration.

Fig 1

Login

1. Go to www.Projectdog.com.
2. Enter a registered email address and password (Fig 1).
3. Press Login.

Fig 2

Logoff

1. Hover over Home (Fig 2).
2. Select “Logoff”.

Forgotten Password

1. Select “Forgot your password?” (Fig 3).
2. Enter the e-mail address.
3. Select “Send Info”. An automated e-mail will be sent with the password.

Fig 3

Account Information

View and edit user contact information. To change an email address, users must register a new account. Call Projectdog to have the old account removed.

1. Hover over Home (Fig 4).
2. Click “My Information”.
3. Edit information as needed.
4. Click “Save” to finalize edits.

Fig 4

Project Details

Utilize the search page (Fig 5) or enter a Project Code (Fig 6) to view a project's "Project Details" page (Fig 7).

Fig 5

Search Project Calendar

Search All Projects Pack/Balance

Refine Search:
City: State:
Project Details Key Word:
Limit search by date:
From: 3/28/2016 To:
Amount: No Preference
Refine your search by choosing only the divisions that you are interested in!
☒ Search All Projects
☐ Division 1 ☐ Division 2 ☐ Division 3 ☐ Division 4
☐ Division 5 ☐ Division 6 ☐ Division 7 ☐ Division 8
☐ Division 9 ☐ Division 10 ☐ Division 11 ☐ Division 12
☐ Division 13 ☐ Division 14 ☐ Division 15 ☐ Division 16
☐ Division 17 ☐ General Contractor
For an explanation of which subcategories are included in each of the above divisions, click here
☐ Limit search to only projects added within the last 5 days.
☐ Limit search to only projects with documents.
Search

Fig 6

You are logged in as:
sales@projectdog.com
Enter Project Code GO
Central Company

Fig 7

Project Details Add to my Project Calendar

Code: 795198
Project Title: Page Elementary School - Phase II
Location: West Newbury, MA
Owner: [View Details](#)
Plans/Specifications Available: 06/06/12 02:00 PM
General Bid Deadline: 06/27/12 11:00 AM
Sub Bid Deadline: 06/20/12 11:00 AM
Estimated Cost: \$.7M
Incumbent Manager
Hill Orders Projectdog Phone: 978-499-9014
8 Golf Road, Suite B Fax: 978-499-9016
Newburyport MA 01950 Email: orders@projectdog.com
Manager
Michael Williams Phone: 617-241-2807
KBA Architects Fax: 617-241-2857
6 Thirteenth St Email: mwilliams@kbaarchitects.com
Charlestown Navy Yard
Charlestown MA 02129
Contract Information
Project:
Additions and Renovations to the Dr. John C. Page Elementary School.
Sub Bid Divisions: 4,5,7,8,9,15,16,GC
For an explanation of which subcategories are included in each of the above divisions, click here
Additional Information:
Project Number: 5117711, Contractor Qualification: DCAM Certificate, Contact: Mike Williams, Phone: 617-241-2807, Fax: 617-241-2857, Email: hdelaney@kbaarchitects.com, Sub Bid Categories: Masonry, Misc. Metals, Roofing, Metal Windows, Glass & Glazing, Acoustical Tile, Resilient Flooring, Painting, Plumbing, HVAC, Electrical, Additional Information: Pre-bid conference: 6/13/12 at 3:00 P.M. at the Page Elementary School, 694 Main St., West Newbury.
Project Documents
[Acquire Documents](#)
[Document Recipients](#)
[Survey](#)

Acquire Documents

Download all project documents.

1. Click "Acquire Documents" link found on a project's "Project Details" page (Fig 7).
2. Respond to the Legal Notice after reviewing.
3. Click on any file description to open, review, or save a document (Fig 8).

Users are automatically added to the project's "Document Recipients" list to receive update notifications upon viewing any document online.

Fig 8

Project# 795198 Page Elementary School - Phase II

You may download or purchase the jobs below. For free download click on the description. To order hardcopies press the order button below.

Section	Description	Type	Size K
1	All Plans	PDF	54
2	Plans: Cover & Table of Contents	PDF	2665
3	Plans: Civil	PDF	3604
4	Plans: Demolition	PDF	1238
5	Plans: Architectural	PDF	15510
6	Plans: Structural	PDF	16185
7	Plans: Fire Protection	PDF	993
8	Plans: Plumbing	PDF	1576
9	Plans: Mechanical	PDF	7411
10	Plans: Electrical	PDF	10724

Section	Description	Type	Size K
1	CD Bid Set	PDF	65
2	Specifications	PDF	10879

Adobe Acrobat Reader®
Order Hardcopy

Document Recipients

Review all plan holders who have acquired documents.

1. Click "Document Recipients" link found on a project's "Project Details" page (Fig 7).
2. All potential bidders are listed and sorted by company type (Fig 9). Click on a column title to sort alphabetically.

Fig 9

Project# 795198 Page Elementary School - Phase II

Company	Name	Address	City	State	Zip	Phone	Fax	Type
Gas System	Frank Smerczynski	34 Main Street EXT	Plymouth	MA	02360	747-747-7122	747-7222	Contractor
Enterprises Inc.	Joseph Steffano Jr	PO Box 536	East Boston	MA	02128	567-8918	567-2152	Contractor
Tn State Fire Protection LLC	Richard Baynes	84 Lake Street	Nashua	NH	03060	293-7531	603-2051	Contractor
Steelco Fence	Donald Monty	PO Box 520	Needham	MA	02494	449-8990	781-7182	Contractor (Division 02,)
D.P.Masonry, Inc.	Derek Pacheco	823-D American Legion Highway	Westport	MA	02790	768-9223	774-9221	Contractor (Division 04,)
PCM Construction	John Powers	81 Westford Rd.	Ayer	MA	02451	978-7722	978-7722	Contractor
Fernandes Masonry, Inc.	Kate Royce	1031 Phillips Road	New Bedford	MA	0274			Contractor (Division 05,)
Quinn Brothers of Essex, Inc.	Stephanie Taber	239 Western Avenue	Essex	MA	01929	768-6929	978-6148	Contractor (Division 05,)
NN PAINTING	JOSE NASCIMENTO	175 McClellan Highway	E BOSTON	MA	02128	418-5573	617-5573	Contractor (Division 05,)

Electronic Bid (E-Bid)

This project is being **Electronically Bid** at www.Projectdog.com. Hard copy bids will not be accepted by the Awarding Authority. Go to www.Projectdog.com and Login with an existing account or click [Sign Up](#) to register for free. Enter a project code or search by keyword to access the “Project Details” page. Select “Acquire Documents” to download all bidding documents.

Projectdog

Enter Project Code GO

[Home](#) [Project Central](#) [Company](#)

[Add to my Project Calendar](#)

Project Details

Code: 799090
Project Title: Ebid
Location: Newburyport, MA

Timeline

Plans/ Specifications Available: 05/22/13 10:00 AM
General Bid Deadline: 06/21/13 04:00 PM
Sub Bid Deadline: 06/19/13 04:00 PM
Estimated Cost: Negotiated

Project Owner

Sales Department
Projectdog
18 Graf Road
Suite 8
Newburyport MA US, 01950
Phone: 978-499-9014
Fax: 978-499-9014
Email: sales@projectdog.com

Document Manager

Online Orders
Projectdog
18 Graf Road, Suite 8
Newburyport MA US, 01950
Phone: 978-499-9014
Fax: 978-499-9016
Email: orders@projectdog.com

Contract Information

Project:
Ebid Test Demo for Sales Department.

Additional Information:
THIS PROJECT IS BEING ELECTRONICALLY BID AND HARD COPY BIDS WILL NOT BE ACCEPTED. The bids are to be prepared and submitted at www.Projectdog.com. Tutorials and instructions on how to complete the electronic bid documents are available online along with all project documentation.

Project Documents

[Acquire Documents](#)
[Document Recipients](#)

[GC E-Bid](#)
[Sub E-Bid](#)

How to Submit an E-Bid

Complete and save all required forms as PDF files. Please be sure to sign all required signatures either digitally or manually.

1. Select the **GC E-Bid** or **Sub E-Bid** link located on the “Project Details” page.

Subcontractors select a bidding trade;

General Contractors will not be able to submit an E-Bid until the official sub bid tabulation is released by the Awarding Authority.

2. Answer / enter / upload all required areas. Enter all dollar value amounts as a whole dollar values only.
3. Select “Submit My E-Bid.” Review the submitted bid package via the “View My Bid Package” link.

It's that simple!

Bidding Trades

Please select trade(s) you are bidding.

Section#	Description	Status	Bidding
220000	Plumbing	Incomplete	GO
230000	HVAC	Incomplete	GO
260000	Electrical	Incomplete	GO

You will not be able to Submit your bid unless all mandatory fields are complete. Please allow yourself sufficient time to upload all information. You will receive an automated email once completed. Please save this for your records.

DHCD 016128 Roof Replacement & Vinyl Siding, Project #811541

Acknowledge Addendum 0, ☐ Yes ☐ No

Bid Price (Whole Dollar)

Form for General Bid (Signature page) [Add File -](#)

Bid Bond [Add File -](#)

Bidders Reference Form [Add File -](#)

Item 2 Sub-bids as follows:

There are no Sub bids for this project.

Bid Closes in:
0 Days 2 Hours 20 Minutes 20 Seconds.

[Save](#) [Submit my E-Bid](#) [Close](#)

You will not be able to Submit your bid unless all mandatory fields are complete. Please allow yourself sufficient time to upload all information. You will receive an automated email once completed. Please save this for your records.

DHCD 016128 Roof Replacement & Vinyl Siding, Project #811541

Acknowledge Addendum 0,1, ☒ Yes ☐ No 4/6/2016

Bid Price (Whole Dollar) twenty-five thousand Dollars.

Form for General Bid (Signature page) [View File](#)

Bid Bond [View File](#)

Bidders Reference Form [View File](#)

Item 2 Sub-bids as follows:

There are no Sub bids for this project.

Bid Closes in:
0 Days 2 Hours 11 Minutes 20 Seconds.

[Retract](#) [View My Bid Package](#) [Close](#)

Sierra Madre Library Redesign and Improvements
Project No.: FC82306

https://www.projectdog.com/UploadAssistGCEBid.aspx?Description=Form%20fc

Form for General Bid Upload Assistant

Form for General Bid

File: No file chosen

Type: PDF

Size:

Add File

Click “Add File” on the E-Bid page to open the Upload Assistant window. Then click “Browse” or “Choose File” to upload a PDF file.

You will not be able to Submit your bid unless all mandatory fields are complete. Please allow yourself sufficient time to upload all information. You will receive an automated email once completed. Please save this for your records.
DHCD 016128 Roof Replacement & Vinyl Siding, Project #811541

Warning: Your Bid is not complete.

Please complete:

- Acknowledge Addendum 0,1,
- Bid Price (Whole Dollar) Invalid, numeric values only.
- Bid Bond
- Bidders Reference Form

Please complete all mandatory areas then Submit your E-Bid.

Acknowledge Addendum 0,1,	<input type="radio"/> Yes <input type="radio"/> No
Bid Price (Whole Dollar)	<input type="text" value=".00"/>
Form for General Bid (Signature page)	Replace File - View File
Bid Bond	Add File -
Bidders Reference Form	Add File -

Item 2 Sub-bids as follows:

There are no Sub bids for this project.

Bid Closes in:
0 Days 2 Hours 20 Minutes 20 Seconds.

Warning

E-Bids cannot be submitted unless all areas are complete.

Save before adding files or closing the window or E-Bid data may need to be re-entered.

Projectdog.com server time is set to industry standards at time-a.nist.gov. Bidders are encouraged to update their computer clock.

Bidders may save, submit or modify an Electronic Bid (E-Bid) at any time prior to bid close. Once submitted, a bid cannot be edited. To modify a bid the bidder must retract the bid, make any necessary changes, and then submit the bid again. Upon submitting or retracting the bidder will receive a convenience email for informational purposes only. **Bidder shall contact Projectdog if an email is not received.**

It is the bidder’s responsibility to review and confirm online that a bid has been submitted and/or retracted and that the bid is 100% true, complete and accurate. All bidders are required to review their submitted E-Bid via the “View My Bid Package” link.

If a bid is submitted prior to an addendum being issued the bidder will receive an automated email for informational purposes only stating the bidder must review the addendum, retract the bid, acknowledge all addenda, and submit the bid again. If a bidder fails to acknowledge addenda their bid may be rejected by the Awarding Authority.

Once the bid deadline has closed the E-Bid links are no longer available. All E-Bids are compiled in real time upon bid close and published forthwith on the “Project Details” page titled as “List of Bids Received”. Official bid tabulations are posted at the discretion of the Awarding Authority.

For additional assistance, call Projectdog at (978) 499-9014 (M-F, 9AM-5PM).

Bid Bond Affidavit

This document is an affidavit form that is drafted to serve as a statement wherein the person (Bidder) who signs it swears under penalty of perjury that the facts and information that are identified in this affidavit are true. **This affidavit is in lieu of an insurance Bid Bond certificate.**

Bidders submitting the Bid Bond Affidavit form and the Bid Security in the form of a cash, certified check, cashier's check, or bidder's bond issued by a responsible bank or trust company shall ensure that these documents are received by the Awarding Authority prior to the closing of the electronic bid.

Both the completed Bid Bond Affidavit form and the Bid Deposit shall be enclosed in a sealed envelope with the following information plainly marked on the outside:

DO NOT OPEN BEFORE: *[indicate DATE and TIME of bid opening]*

Project Name: _____
Project Number: _____
Bidder's Name: _____
Business Address: _____
Phone Number: _____

It is the Bidder's responsibility to ensure that the completed Bid Bond Affidavit form and Bid Security are submitted as stated above and received by the Awarding Authority prior to the closing of electronic bids. The completed Bid Bond Affidavit form must also be uploaded via the project E-bid "Bid Bond" link at www.Projectdog.com.

The Bidder understands and consents that any failure to do so whether his own or other fault may result in the rejection of said bid. The Bidder is solely responsible for the accuracy and value of the Bid Deposit. In the event that the Bid Deposit is less than the required amount as outlined in the project specifications the bid may be rejected.

Bid Deposit Amount (in figures): _____

Date: _____

Bidder's Name: _____

Business Address: _____

Signature:

Sierra Madre Library Redesign and Improvements

Project No.: FC82306

To the extent applicable, at any time during the term of the Agreement for the proposed project, the successful bidder may, at its own expense, substitute securities equivalent to the amount withheld as retention (or the retained percentage) in accordance with Public Contract Code § 22300.

Pursuant to California Civil Code § 9550, a payment bond is required to be submitted for all projects estimated in excess of \$25,000.00.

The AGENCY has determined that the proposed project is a public works project subject to the provisions of Labor Code § 1720 thereby requiring the Contractor to pay the prevailing wage rates for all work performed under the Contract. Accordingly, the proposed project is subject to compliance monitoring and enforcement by the California Department of Industrial Relations.

The AGENCY reserves the right to reject any and all bids.

If you have any questions, please contact Natalie Hazard, at (714) 465-6010.

BY ORDER OF the City Council of the City of Sierra Madre, California.

002000 SECTION B – INSTRUCTIONS TO BIDDERS

**SIERRA MADRE LIBRARY
PROJECT NO. FC82306
IN THE CITY OF SIERRA MADRE, CALIFORNIA**

002000 INSTRUCTIONS TO BIDDERS

SIERRA MADRE LIBRARY PROJECT NO. FC82306 IN THE CITY OF SIERRA MADRE, CALIFORNIA

B1.01 INSPECTION OF SITE OF WORK

Bidders are required to inspect the site of the work in order to satisfy themselves, by personal examination or by such other means as they may prefer, of the location of the proposed work and as to the actual conditions of and at the site of work. If, during the course of his/her examination, a bidder finds facts or conditions which appear to him/her to conflict with the letter or spirit of the contract documents, or with any other data furnished him/her, he/she may apply to the AGENCY in writing in accordance with **B1.04 INTERPRETATION OF CONTRACT DOCUMENTS** for additional information and explanation before submitting his/her bid.

The submission of a proposal by the bidder shall constitute the acknowledgment that, if awarded the contract, he/she has relied and is relying on his/her own examination of (a) the site of the work, (b) the access to the site, and (c) all other data, matters, and things requisite to the fulfillment of the work and on his/her own knowledge of existing services and utilities on and in the vicinity of the site of the work to be constructed under the contract, and not on any representation or warranty of the AGENCY. No claim for additional compensation will be allowed which is based upon a lack of knowledge of these items.

B1.02 EXAMINATION OF CONTRACT DOCUMENTS

Each bidder shall thoroughly examine and be familiar with legal and procedural documents, general conditions, specifications, drawings and addenda (if any). The submission of a proposal shall constitute an acknowledgment upon which the AGENCY may rely that the bidder has thoroughly examined and is familiar with the contract documents. The bidders' attention is directed to the need, if any, for special invoicing for this project. The failure or neglect of a bidder to receive or examine any of the contract documents shall in no way relieve him/her from any obligations with respect to his/her proposal or to the contract. No claim for additional compensation will be allowed which is based upon a lack of knowledge of any contract document.

B1.03 CONTRACT PERIOD/CONSTRUCTION COMPLETION DATE

Bidder's attention is called to the provisions set forth in **SECTION E, STANDARD SPECIFICATIONS** and **SECTION F, SPECIAL PROVISIONS**, particularly those pertaining to the contract period and liquidated damages for avoidable delays.

The CONTRACTOR shall begin work within fifteen (15) calendar days after the date of the Notice to Proceed, and shall diligently prosecute said work to completion before the expiration **262 WORKING DAYS**. The CONTRACTOR shall pay to the AGENCY liquidated damages in accordance with Section 6-9 of the Special Provisions (Section F) for each calendar day, or portion thereof, of delay in finishing the work in excess of the number of working days prescribed above.

B1.04 INTERPRETATION OF CONTRACT DOCUMENTS

No oral interpretations will be made to any bidder as to the meaning of the contract documents. Requests for information/interpretation (RFI) shall be made in writing and emailed to the following email address, at least ten (10) days before the scheduled bid opening:

jonathan.richert@tska.com and cc: nhazard@vertexeng.com

Interpretations by the City will be in the form of addenda to the contract documents and, when issued, will be sent as promptly as is practical to all parties to whom the contract documents have been issued. City makes no guarantee that all bidders will receive all addenda

Addenda

Addenda, if issued, will be posted to the Projectdog website and shall be accompanied by e-mail notification to every individual or firm on record as having received the Bid Documents. Hard copies of addenda will not be mailed or faxed. It shall be the sole responsibility of the Contractor to ascertain the existence of any and all addenda.

If a bid is submitted prior to an Addendum being issued, the Bidder will receive an e-mail notification for informational purposes only. The Bidder must review the addendum, retract the bid, acknowledge all addenda, and re-submit the bid. If a Bidder fails to acknowledge all addenda their bid may be rejected by the Awarding Authority.

All such addenda shall become part of the contract

B1.05 SOIL INFORMATION

Soil reports have been prepared for this project.

B1.06 PROPOSAL

Proposals shall be made on the forms enclosed in **SECTION C** of these specifications with or without removal from the bound contract documents. All proposals shall give the prices proposed, both in words and in numbers, shall give all other information requested herein, and shall be signed by the bidder or his/her authorized representative, with his/her address. If the proposal is made by an individual, his/her name, signature and mailing address must be shown; if made by firm or partnership, the name and mailing address of the firm or partnership and the signature of at least one of the general partners must be shown; if made by a corporation, the proposal shall show the name of the state under the laws of which the corporation is chartered, the name and mailing address of the corporation, and the name and title of the person who signs on behalf of the corporation. If the proposal is made by a corporation, a certified copy of the bylaws or resolution of the board of directors of the corporation shall be furnished demonstrating the authority of the officer signing the proposal to execute contracts on behalf of the corporation.

Each proposal shall be enclosed in a sealed envelope, labeled as specified in **SECTION A - NOTICE INVITING SEALED BIDS**. Bidders are warned against making erasures or alterations of any kind, and proposals which contain omissions, erasures or irregularities of any kind may be rejected. No oral, telegraphic or telephonic proposals or modifications will be considered.

In conformance with the Business and Profession Code, § 7028.15, the CONTRACTOR must state clearly his/her license number and expiration date. In addition he/she shall sign a statement that these representations were made under the penalty of perjury. This statement shall be made on the **EXPERIENCE STATEMENT** in **SECTION C**.

The CONTRACTOR will be required to pay prevailing wage pursuant to California Law, including California Labor Code §§ 1770 et seq. Copies of the prevailing rate of per diem wages are on file at the offices of the AGENCY.

B1.07 ADDENDA

Each proposal shall include specific acknowledgment in the space provided on **SECTION C - BID PROPOSAL** of receipt of all addenda issued during the bidding period. Failure to so acknowledge may result in the proposal being rejected as not responsive.

B1.08 BID PRICES

Bid prices shall include everything necessary for the completion of construction and fulfillment of the contract including, but not limited to, furnishing all materials, equipment, tools, plant and other facilities and all management, superintendence, labor and services, except as may be provided otherwise in the contract documents. In the event of a difference between a price quoted in words and a price quoted in numbers for the same quotation, the words shall be the amount bid.

In preparing bid prices, bidder represents that he/she has carefully examined the Contract Documents and the site where the work is to be performed and that he/she has familiarized himself with all local conditions and federal, state and local laws, ordinances, rules, and regulations that may affect the performance of the work in any manner. The bidder further represents that he/she has studied all surveys and investigation reports about subsurface and physical conditions pertaining to the job site, that he/she has performed such additional surveys and investigations as he/she deems necessary to complete the work at his/her bid price, and that he/she has correlated the results of all such data with the requirements of the Contract Documents. The submittal of a bid shall be conclusive evidence that the bidder has investigated and is satisfied as to the conditions to be encountered, including locality, uncertainty of weather and all other contingencies, and as to the character, quality, quantities, and scope of the work.

The plans and specifications for the work show subsurface conditions or otherwise hidden conditions as the Design Engineer supposes or believes them to exist, but is not intended or to be inferred that the conditions as shown thereon constitute a representation that such conditions are actually existent. Except as otherwise specifically provided in the Contract Documents, the AGENCY, the Design Engineer and their consultants or agents shall not be liable for any loss sustained by the CONTRACTOR as a result of any variance of such conditions as shown on the plans and the actual conditions revealed during the progress of the work or otherwise.

The CONTRACTOR shall perform an independent take-off of the plans and bid accordingly. Quantities listed in the **BID SCHEDULE** in **SECTION C** are intended only as a guide for the CONTRACTOR as to the anticipated order of magnitude of work. CONTRACTOR shall be responsible for verifying all estimated quantities. CONTRACTOR will be reimbursed for the quantity of items actually installed as required by the Contract Documents and shown on the plans to neat line and grade.

The CONTRACTOR will not be reimbursed for unauthorized work performed outside of that required by the Contract Documents.

Per Public Contract Code 20103.8 (b), the lowest bid shall be the lowest total of the bid prices on the base contract and those additive or deductive items that were specifically identified in the bid solicitation as being used for the purpose of determining the lowest bid price.

B1.09 TAXES

No mention shall be made in the proposal of sales tax, use tax, or any other tax, as all amounts bid will be deemed and held to include any such taxes which may be applicable.

B1.10 RECOGNITION OF BONDING COMPANIES

All bonding companies used by the CONTRACTOR in this contract must be recognized by the Federal Government within Circular 570. All proposals or contracts received that include bonds posted by bonding companies not recognized in Circular 570 will result in the disqualification of the bid proposal and forfeiture of the bid bond

B1.11 QUALIFICATION OF BIDDERS It is the intention of the AGENCY to award a contract to a pre-qualified bidder who furnished satisfactory evidence that he/she has the requisite experience and ability, and that he/she has sufficient capital, facilities, and plant to enable him/her to prosecute the work successfully and properly, and to complete it within the time stated in the contract.

B1.12 DESIGNATION OF SUPPLIERS AND SUBCONTRACTORS

Each proposal shall have listed on the **DESIGNATION OF SUPPLIERS AND SUBCONTRACTORS** form provided in **SECTION C** the name, California contractor license number, and Department of Industrial Relations registration number, and address of each subcontractor to whom the bidder proposes to sublet portions of the work in excess of one-half of one percent of the total amount of his/her bid. For the purpose of this paragraph, a subcontractor is defined as one who contracts with the CONTRACTOR to furnish materials and labor, or labor only for the performance of work at the site of the work or who will specially fabricate a portion of the work off the site pursuant to detailed drawings in the contract documents.

Public Contract Code § 4104 requires all bidders to list subcontractors and state the license number of all subcontractors who will perform work in excess of one-half of one percent of the total bid, or in the case of streets and highways, one-half of one percent of the total bid or \$10,000, whichever is greater.

Public Contract Code § 6109 prohibits a CONTRACTOR from performing work with a subcontractor who is debarred pursuant to Labor Code §§ 1777.1 or 1777.7.

B1.13 PROPOSAL GUARANTEE

The proposal shall be accompanied by a proposal guarantee bond duly completed on the form provided herewith by a guarantee company authorized to carry on business in the State of California for payments to the AGENCY in the sum of at least 10% of the total amount of the bid proposal, or alternatively by a certified or cashier's check payable to the AGENCY, or cash, in the sum of at least 10% of the total amount of the bid proposal. The amount payable to the AGENCY under the proposal guarantee shall be forfeited to the AGENCY in case of failure or neglect of the bidder to furnish, execute and deliver to the AGENCY the required bonds, evidence of insurance and to enter into, execute and deliver to the

AGENCY the agreement on the form provided herewith, within ten (10) days after being notified in writing by the AGENCY that the award has been made and the agreement is ready for execution.

B1.14 MODIFICATION OF PROPOSAL

A modification of a bid proposal already received will be considered only if the modification is received before the time announced for the opening of bids. All modifications shall be made online at projectdog.com, executed and submitted in the same form and manner as the original bid proposal.

B1.15 WITHDRAWAL OF PROPOSAL

A proposal may be withdrawn by a written request signed by the bidder. Such requests must be delivered to the AGENCY's designated official prior to the bid opening hour stipulated in **SECTION A – NOTICE INVITING SEALED BIDS**. Proposals may not be withdrawn after that time without forfeiture of the proposal guarantee, except as authorized by Public Contract Code sections 5100 through 5110. The withdrawal of a proposal will not prejudice the right of the bidder to submit a new proposal, providing there is time to do so.

B1.16 POSTPONEMENT OF BID OPENING

The AGENCY reserves the right to postpone the date and time for opening of bids at any time prior to the date and time announced in **SECTION A–NOTICE INVITING SEALED BIDS**.

B1.17 DISQUALIFICATION OF BIDDERS

If there is reason to believe that collusion exists among the bidders, none of the bids of the participants in such collusion will be considered. In the event that any bidder acting as a prime CONTRACTOR has an interest in more than one proposal, all such proposals will be rejected, and the bidder will be disqualified. This restriction does not apply to subcontractors or suppliers who may submit quotations to more than one bidder, and while doing so, may also submit a formal proposal as a prime CONTRACTOR.

B1.18 REJECTION OF PROPOSALS

The AGENCY reserves the right to reject any and all proposals, to waive any irregularity, and to reject any proposals which are incomplete, obscure or irregular; any proposals which omit a bid on any one or more items on which bids are required; which omit unit prices if unit prices are required; in which unit prices are unbalanced in the opinion of the AGENCY; which are accompanied by insufficient or irregular bid security; or which are from bidders who have previously failed to perform properly or to timely complete contracts of any nature.

B1.19 AWARD OF CONTRACT

The Contract will be awarded, if at all, to the lowest responsible and responsive bidder, whose bid proposal is not rejected for cause by the AGENCY. However, until an award is made, the AGENCY reserves the right to reject any or all bids, and to waive technical errors or discrepancies, if to do so is deemed to best serve the interests of the AGENCY. In no event will an award be made until all necessary investigations are made as to the responsibility and qualifications of the bidder to whom it is proposed to make such an award.

Each bidder's attention is directed to the possibility that the award of the project may be delayed for various reasons. The AGENCY reserves the right to delay the award of the project for 45 calendar days. After 45 calendar days, the low bidder may at any time request release from its bid without penalty.

The acceptance of a proposal will be evidenced by a Notice of Award of Contract in writing, delivered by mail to the bidder whose proposal is accepted. No other act of the AGENCY shall constitute acceptance of a proposal. The award of contract shall obligate the bidder whose proposal is accepted to furnish a performance bond, payment bond and maintenance bond, as well as evidence of insurance and to execute the contract set forth herein.

B1.20 RETURN OF PROPOSAL GUARANTEES

Within ten (10) calendar days after the bids are opened, the AGENCY will release the proposal guarantees accompanying the proposals which are not to be considered in making the award. Proposal guarantees for the two lowest bidders will be held until the contract has been fully executed, after which they will be returned to the respective bidders.

B2.21 EXECUTION OF CONTRACT

The contract agreement shall be executed in duplicate by the successful bidder and returned, together with the contract bonds and evidence of insurance, within ten (10) calendar days after the notification of the contract award by the AGENCY in writing. In case of failure of the successful bidder to execute the contract agreement within ten (10) calendar days after such notice, or any subsequent extension approved by AGENCY, the AGENCY at its option may consider the bidder in default, in which case the bid bond or proposal guarantee accompanying the bid shall become the property of the AGENCY. After execution by the AGENCY, one original contract shall be returned to the CONTRACTOR.

B1.22 FLEXIBILITY OF BID SCHEDULE

It is the intent of the AGENCY to award a contract to the lowest responsible and responsive bidder and the flexibility shown in the bid schedule is necessary to ensure a project within the AGENCY's budget limits and constraints.

004000 SECTION C –BID PROPOSAL AND DOCUMENTS

**SIERRA MADRE LIBRARY
PROJECT NO. FC82306
IN THE CITY OF SIERRA MADRE, CALIFORNIA**

Proposal Information and Documents:

- ☐ Bid Proposal
- ☐ Bid Schedule
- ☐ Bid Bond
- ☐ Bid Guarantee (if a Bid Bond is not provided)
- ☐ Bidder Information
- ☐
- ☐ Designation of Suppliers and Subcontractors
- ☐ Statement Regarding Insurance Coverage
- ☐ Statement Regarding Contractor's Licensing Laws
- ☐ Non-Collusion Affidavit

BID PROPOSAL

SIERRA MADRE LIBRARY PROJECT NO. FC82306 IN THE CITY OF SIERRA MADRE, CALIFORNIA

CITY OF SIERRA MADRE
232 W. SIERRA MADRE BOULEVARD
SIERRA MADRE, CA 91024

HONORABLE MAYOR AND
MEMBERS OF THE CITY COUNCIL:

The undersigned, as bidder, declares that he/she has examined all of the contract documents and specifications contained in this project manual for the above referenced project, and that he/she will contract with the AGENCY on the form of contract provided herewith to do everything necessary for the fulfillment of this contract at the price, and on the terms and conditions therein contained.

The following are included and are to be considered as forming a part of this proposal: **BID PROPOSAL, BID SCHEDULE, BID BOND, NONCOLLUSION AFFIDAVIT, BID GUARANTEE** (if submitted in lieu of Bid Bond), **BIDDER INFORMATION, EXPERIENCE STATEMENT, DESIGNATION OF SUPPLIERS & SUBCONTRACTORS, BIDDER'S STATEMENT REGARDING INSURANCE COVERAGE, and STATEMENT REGARDING CONTRACTOR'S LICENSING LAWS.**

CONTRACTOR acknowledges receipt and inclusion of addenda [REDACTED] to [REDACTED] into this bid proposal and the contract documents.

Attached is a Bid Bond duly completed by a guaranteed company authorized to carry on business in the State of California in the amount of at least 10% of the total amount of this proposal, or alternatively, there is attached a certified or cashier's check payable to the AGENCY or evidence of a cash payment to the AGENCY, in the amount of at least 10% of the total amount of our proposal.

If this proposal is accepted, we agree to sign the contract form and to furnish the Performance Bond and the Payment Bond (each to be 100% of the bid amount), the Maintenance Bond (to be 50% of the bid amount), and the required evidences of insurance within ten (10) calendar days after receiving written Notice of Award or Contract.

We further agree if our proposal is accepted and a contract for the performance of the work is entered into with the AGENCY, to so plan the work and to prosecute it with such diligence that all of the work shall be completed within the time stipulated in **SECTION E - TIME OF COMPLETION.**

NAME OF BIDDER: _____

MAILING ADDRESS: _____

TELEPHONE NO. _____

STATE CONTRACTOR'S LICENSE NO. _____

STATE OF INCORPORATION: _____

AUTHORIZED SIGNATURE: _____

TITLE: _____

DATE: _____

(If Company is a Corporation, provide corporate resolution per **B1.06 PROPOSAL** of **SECTION B – INSTRUCTION TO BIDDERS**.)

ELECTRONIC BID
Hard Copy Submissions Will Not Be Accepted
Use form provided on Projectdog.com

BID SCHEDULE

SIERRA MADRE LIBRARY PROJECT NO. FC82306 IN THE CITY OF SIERRA MADRE, CALIFORNIA

The cost of all labor, services, material, equipment and installation necessary for the completion of the work itemized under this schedule, even though not shown or specified, shall be included in the unit price for the various items shown herein. For a description of the work associated with each bid item, see **SECTION G-SPECIAL PROVISIONS**. The AGENCY reserves the right to increase or decrease the quantity of any item or omit items as may be necessary, and the same shall in no way affect or void the contract, except that appropriate additions or deductions from the contract total price will be made at the stipulated unit price in accordance with these Contract Documents.

The AGENCY reserves the right to reject any and all bids, to waive any informality in a bid, and to make awards in the interest of the AGENCY.

The CONTRACTOR shall perform an independent take-off of the plans and bid accordingly. Quantities listed in this Bid Schedule are intended only as a guide for the CONTRACTOR as to the anticipated order of magnitude of work. The CONTRACTOR shall be responsible for verifying all estimated quantities. The CONTRACTOR will be reimbursed for the quantity of items actually installed as required by the Contract Documents, including addenda, and shown on the plans to neat line and grade.

The CONTRACTOR will not be reimbursed for work performed for his convenience, or as required to adapt to field conditions, or for unauthorized work performed outside of that required by the Contract Documents.

The CONTRACTOR shall be responsible for calculating and providing totals for the bid schedule. The proposal schedule shall include all costs for labor, services, material, equipment, and installation associated with completing the work in place per the plans, specifications and details.

NAME OF BIDDER: _____

CONTRACTOR'S LICENSE NO.: _____

AUTHORIZED SIGNATURE: _____

TITLE: _____

DATE: _____

BID SCHEDULE (Continued)

**SIERRA MADRE LIBRARY
PROJECT NO. FC82306
IN THE CITY OF SIERRA MADRE, CALIFORNIA**

No.	Building Element	Bid Amount
2	Existing Conditions	
3	Concrete	
4	Masonry	
5	Metals	
6	Wood, Plastics, and Composites	
7	Thermal and Moisture Protection	
8	Openings	
9	Finishes	
10	Specialties	
11	Equipment	
14	Conveying Equipment	
21	Fire Suppression	
22	Plumbing	
23	Heating, Ventilation, and Air Conditioning	
26	Electrical	
27	Communications	
28	Electronic Safety and Security	
31	Earthwork	
	General Conditions	
	General Requirements	
	Contractor Overhead and Profit	
	Insurance and Bonds	

No.	Site Element	Bid Amount
2	Existing Conditions	
31	Earthwork	
32	Exterior Improvements	
33	Utilities	
	General Conditions	
	General Requirements	
	Contractor Overhead and Profit	
	Insurance and Bonds	

Sierra Madre Library Redesign and Improvements
Project No.: FC82306

The CONTRACTOR shall be responsible for calculating and providing element prices for the schedule. The proposal schedule shall include all costs for services, labor, materials, equipment, and installation associated in completing the work in place per the Specifications and details.

No.	Additive Element (Alternate)	Bid Amount
1		
2		
3		
4		
5		
6		

The CONTRACTOR shall be responsible for calculating and providing additive element prices for the alternate schedule. The proposal schedule shall include all costs for services, labor, materials, equipment, and installation associated in completing the work in place per the Specifications and details.

Bid Schedule Total: \$_____

Bid Schedule Total (in words):_____

(Company Name of Bidder)

(Date)

BID BOND

**SIERRA MADRE LIBRARY
PROJECT NO. FC82306
IN THE CITY OF SIERRA MADRE, CALIFORNIA**

KNOW ALL MEN BY THESE PRESENTS that Bidder_____, as PRINCIPAL, and_____, as SURETY, are held and firmly bound unto the City of Sierra Madre as AGENCY, in the penal sum of _____ dollars (\$_____), which is ten percent (10%) of the total amount bid by PRINCIPAL to AGENCY for the above stated project, for the payment of which sum, PRINCIPAL and SURETY agree to be bound, jointly and severally, firmly by these presents.

The SURETY, for value received, hereby stipulates and agrees that the obligations of said SURETY and its BOND shall be in no way impaired or affected by any extension of the time within which the AGENCY may accept such Bid; and said SURETY does hereby waive notice of any such extension.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH that, whereas PRINCIPAL is about to submit a bid to AGENCY for the above stated project, if said bid is rejected, or if said bid is accepted and a contract is awarded and entered into by PRINCIPAL in the manner and time specified, and PRINCIPAL provides the required payment and performance bonds and insurance coverages to AGENCY, then this obligation shall be null and void, otherwise it shall remain in full force and effect in favor of AGENCY.

IN WITNESS WHEREOF the parties hereto have set their names, titles, hands, and seals this day of _____, 20_.

PRINCIPAL*

SURETY*

*Provide BIDDER and SURETY name, address and telephone number and the name, title, address and telephone number for their authorized representatives. Power of Attorney must be attached.

CERTIFICATE OF ACKNOWLEDGMENT

State of California
County of _____

On _____ before me, _____, personally appeared _____ who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ (SEAL)

BID GUARANTEE

**SIERRA MADRE LIBRARY
PROJECT NO. FC82306
IN THE CITY OF SIERRA MADRE, CALIFORNIA**

Note: The following statement shall be used if other than a bid surety bond accompanies bid.

“Accompanying this proposal is a certified check or cashier’s check payable to the order of the City of Sierra Madre in the amount of _____ Dollars (\$_____) which is at least ten percent (10%) of the total amount of this bid. The proceeds of this bid guarantee shall become the property of the City of Sierra Madre provided this bid is accepted by said City, through action of its legally constituted contracting authorities, and the undersigned fails to execute a contract and furnish the required bonds and insurance within the stipulated time. Otherwise, the proceeds of this bid guarantee shall be returned to the undersigned.”

NAME OF BIDDER: _____

MAILING ADDRESS: _____

AUTHORIZED SIGNATURE: _____

TITLE: _____

DATE: _____

BIDDER INFORMATION

**SIERRA MADRE LIBRARY
PROJECT NO. FC82306
IN THE CITY OF SIERRA MADRE, CALIFORNIA**

BIDDER certifies that the following information is true and correct:

Name of Bidder: _____

Business Address: _____

Telephone: _____ FAX: _____

E-mail: _____

CONTRACTOR's License No.: _____ Date License Issued: _____

License Expiration Date: _____

The following are the names, titles, addresses, and phone numbers of all individuals, firm members, partners, joint venturers, and/or corporate officers having a principal interest in this proposal:
(Name / Title / Address / Telephone)

Any voluntary or involuntary bankruptcy judgments against any principal having an interest in this proposal are as follows: (Type of Judgment / Date)

All current and prior DBA's, aliases, and/or fictitious business names for any principal having an interest in this proposal are as follows: (Principal / DBA's / Applicable Dates)

Sierra Madre Library Redesign and Improvements

Project No.: FC82306

Prior Disqualification

Has your firm ever been disqualified from performing work for any City, County, Public or Private Contracting entity? Yes / No _____. If yes, provide the following information. (If more than once, use separate sheets):

Date: _____ Entity: _____

Location: _____

Reason: _____

Provide Status and any Supplemental Statement: _____

Has your firm been reinstated by this entity? Yes / No _____

Violations of Federal or State Law

A. Has your firm or its officers been assessed any penalties by any agency for noncompliance, violations of Federal or State labor laws and/or business or licensing regulations within the past five (5) years relating to your construction projects?

Yes / No: _____ Federal / State: _____

If "yes", identify and describe, (including status): _____

Have the penalties been paid? Yes / No: _____

Sierra Madre Library Redesign and Improvements
Project No.: FC82306

B. Does your firm or its officers have any ongoing investigations by any agency regarding violations of the State Labor Code, California Business and Professions Code or State Licensing laws?

Yes / No: _____ Codes / Laws: _____ Section / Article: _____

If "yes", identify and describe (including status): _____

I declare under penalty of perjury under the laws of the State of California that all of the representations made in this **BIDDER INFORMATION** are true and correct. Executed this _____ day of _____, 20_ , at _____, California.

Authorized Representative: Signature _____

Title _____

DESIGNATION OF SUPPLIERS AND SUBCONTRACTORS

**SIERRA MADRE LIBRARY
PROJECT NO. FC82306
IN THE CITY OF SIERRA MADRE, CALIFORNIA**

The following is a list of subcontractors and suppliers, as defined in 2-3 SUBCONTRACTS of the Standard Specifications, who will perform work or provide materials of value in excess of one-half of one percent of the total bid price or \$10,000, whichever is greater.

No subcontractor shall perform work in excess of the amount specified in 2-3 SUBCONTRACTS of the Standard Specifications, without the written approval of the AGENCY.

The CONTRACTOR is responsible to ensure that appropriate provisions are to be inserted in all subcontracts to bind subcontractors to the contract requirements as contained herein.

Each subcontractor must agree to comply with all applicable Federal, State, and local requirements.

Name, License No., and Address of Subcontractor	Employer Tax Id #	MBE/ WBE (Y/N)	Work Subcontracted	Portion of Work (% of Contract Price)

Sierra Madre Library Redesign and Improvements
Project No.: FC82306

Name, License No., and Address of Subcontractor	Employer Tax Id #	MBE/WBE (Y/N)	Work Subcontracted	Portion of Work (% of Contract Price)

These representations are made under the penalty of perjury under the laws of the State of California. The undersigned hereby certifies that each subcontractor has been notified in writing of its equal opportunity obligations.

NAME OF BIDDER: _____

AUTHORIZED SIGNATURE: _____

Date: _____

STATEMENT REGARDING INSURANCE COVERAGE

**SIERRA MADRE LIBRARY
PROJECT NO. FC82306
IN THE CITY OF SIERRA MADRE, CALIFORNIA**

The undersigned representative of Bidder hereby certifies that he/she has reviewed the insurance coverage requirements specified in **5-4 INSURANCE** of Section E, Standard Specifications and Section F, Special Provisions. Should Bidder be awarded the contract for the work, the undersigned further certifies that Bidder can meet all of these specification requirements for insurance including insurance coverage of his/her subcontractors.

NAME OF BIDDER: _____

MAILING ADDRESS: _____

AUTHORIZED SIGNATURE: _____

TITLE: _____

DATE: _____

STATEMENT REGARDING CONTRACTOR'S LICENSING LAWS

**SIERRA MADRE LIBRARY
PROJECT NO. FC82306
IN THE CITY OF SIERRA MADRE, CALIFORNIA**

[Business & Professions Code § 7028.15]

[Public Contract Code § 20103.5]

I, the undersigned, certify that I am aware of the following provisions of California law and that I, or the entity on whose behalf this certification is given, hold a currently valid California CONTRACTOR's license as set forth below:

Business & Professions Code § 7028.15:

- a) **It is a misdemeanor for any person to submit a bid to a public agency to engage in the business or act in the capacity of a CONTRACTOR within this state without having a license therefor, except in any of the following cases:**

(1) The person is particularly exempted from this chapter.

(2) The bid is submitted on a state project governed by Section 10164 of the Public Contract Code or on any local agency project governed by Section 20104 [now § 20103.5] of the Public Contract Code.

- b) If a person has been previously convicted of the offense described in this section, the court shall impose a fine of 20 percent of the price of the contract under which the unlicensed person performed contracting work, or four thousand five hundred dollars (\$4,500), whichever is greater, or imprisonment in the county jail for not less than 10 days nor more than six months, or both.

In the event the person performing the contracting work has agreed to furnish materials and labor on an hourly basis, "the price of the contract" for the purposes of this subdivision means the aggregate sum of the cost of materials and labor furnished and the cost of completing the work to be performed.

- c) This section shall not apply to a joint venture license, as required by Section 7029.1. However, at the time of making a bid as a joint venture, each person submitting the bid shall be subject to this section with respect to his/her individual licenser.
- d) This section shall not affect the right or ability of a licensed architect, land surveyor, or registered professional engineer to form joint ventures with licensed CONTRACTORS to render services within the scope of their respective practices.
- e) Unless one of the foregoing exceptions applies, a bid submitted to a public agency by a CONTRACTOR who is not licensed in accordance with this chapter shall be considered nonresponsive and shall be rejected by the public agency. Unless one of the foregoing exceptions applies, a local public agency shall, before awarding a contract or issuing a purchase order, verify that the CONTRACTOR was properly licensed when the CONTRACTOR submitted the bid. Notwithstanding any other provision of law, unless one of the foregoing exceptions applies, the registrar may issue a citation to any public officer or employee of a public entity who knowingly awards a contract or issues a purchase order to a CONTRACTOR who is not licensed pursuant to this chapter. The amount of civil penalties, appeal, and finality of such citations shall be subject to Sections

7028.7 to 7028.13, inclusive. **Any contract awarded to, or any purchase order issued to, as CONTRACTOR who is not licensed pursuant to this chapter is void.**

- f) Any compliance or noncompliance with subdivision (e) of this section, as added by Chapter 863 of the Statutes of 1989, shall not invalidate any contract or bid awarded by a public agency during which time that subdivision was in effect.
- g) A public employee or officer shall not be subject to a citation pursuant to this section if the public employee, officer, or employing agency made an inquiry to the board for the purposes of verifying the license status of any person or CONTRACTOR and the board failed to respond to the inquiry within three business days. For purposes of this section, a telephone response by the board shall be deemed sufficient.

Public Contract Code § 20103.5:

In all contracts subject to this part where federal funds are involved, no bid submitted shall be invalidated by the failure of the bidder to be licensed in accordance with the laws of this state. However, at the time the contract is awarded, the CONTRACTOR shall be properly licensed in accordance with the laws of this state. The first payment for work or material under any contract shall not be made unless and until the Registrar of CONTRACTORS verifies to the AGENCY that the records of the Contractors' State License Board indicate that the CONTRACTOR was properly licensed at the time the contract was awarded. Any bidder or CONTRACTOR not so licensed shall be subject to all legal penalties imposed by law, including, but not limited to, any appropriate disciplinary action by the Contractors' State License Board. The AGENCY shall include a statement to that effect in the standard form of pre-qualification questionnaire and financial statement. **Failure of the bidder to obtain proper and adequate licensing for an award of a contract shall constitute a failure to execute the contract and shall result in the forfeiture of the security of the bidder.**

CONTRACTOR's License Number: _____

License Expiration Date: _____

Authorized Signature: _____

Date: _____

NON-COLLUSION AFFIDAVIT

The undersigned declares:

I am the _____ of _____, the party making the foregoing bid.

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on the ____ day _____, 20 at _____, California.

CONTRACTOR's Signer's Name

CONTRACTOR's Signer's Title

CONTRACTOR's Business Name

Contractor's Business Address:

Mailing Street Address

City, State, Zip Code

Telephone #

**005000 – 006000 SECTION D – CONTRACT INFORMATION AND
DOCUMENTS**

**SIERRA MADRE LIBRARY
PROJECT NO. FC82306
IN THE CITY OF SIERRA MADRE, CALIFORNIA**

Contract Information and Documents:

- ☐ Contract Agreement
- ☐ Payment Bond
- ☐ Faithful Performance Bond
- ☐ Maintenance Bond
- ☐ Worker's Compensation Insurance Certificate
- ☐ Insurance Endorsement

AGREEMENT

SIERRA MADRE LIBRARY PROJECT NO. FC82306 IN THE CITY OF SIERRA MADRE, CALIFORNIA

THIS AGREEMENT (“AGREEMENT”) is made and entered into for the above-stated project this ____ day of _____, 20__ (*Council Action Date Here*), BY AND BETWEEN the City of Sierra Madre, a municipal corporation, hereafter designated as “AGENCY”, and **CONTRACTOR’S BUSINESS NAME**, a _____ (State) _____ (corporation, partnership, limited liability company, or other business form), hereafter designated as “CONTRACTOR.”

WITNESSETH that AGENCY and CONTRACTOR have mutually agreed as follows:

ARTICLE I: Contract Documents

The contract documents for the SIERRA MADRE LIBRARY, PROJECT NO. FC82306, shall consist of the Notice Inviting Sealed Bids, Instructions To Bidders, Bid Proposal, Bid Schedule, Standard Specifications, Special Provisions, and all referenced specifications, plans, details, standard drawings, and appendices; together with two signed copies of the AGREEMENT, two signed copies of required bonds; one copy of the insurance certificates, permits, notices, and affidavits; and also including any and all addenda or supplemental agreements clarifying, amending, or extending the work contemplated as may be required to ensure its completion in an acceptable manner (collectively referred to herein as the “Contract Documents”). All of the provisions of the Contract Documents are made a part hereof as though fully set forth herein.

ARTICLE II: Scope of Work

For and in consideration of the payments and agreements to be made and performed by AGENCY, CONTRACTOR agrees to furnish all materials and equipment and perform all work required for the above-stated project, and to fulfill all other obligations as set forth in the aforesaid Contract Documents.

AGENCY hereby employs CONTRACTOR to provide the materials, do the work, and fulfill the obligations according to the terms and conditions herein contained and referred to, for the prices provided herein, and hereby contracts to pay the same at the time, in the manner, and upon the conditions set forth in this AGREEMENT.

In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to this AGREEMENT, CONTRACTOR offers and agrees to assign to the AGENCY all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (Section 16700, et seq.) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be

made and become effective at the time the awarding body tenders final payment to CONTRACTOR, without further acknowledgment by the parties.

ARTICLE III: Compensation

A. CONTRACTOR agrees to receive and accept the prices set forth in the Bid Proposal and Bid Schedule as full compensation for furnishing all materials, performing all work, and fulfilling all obligations hereunder. In no event shall the total compensation and costs payable to CONTRACTOR under this Agreement exceed the sum of \$ _____ (_____ Dollars,) unless specifically approved in advance and in writing by AGENCY.

Such compensation shall cover all expenses, losses, damages, and consequences arising out of the nature of the work during its progress or prior to its acceptance including those for well and faithfully completing the work and the whole thereof in the manner and time specified in the aforesaid Contract Documents; and also including those arising from actions of the elements, unforeseen difficulties or obstructions encountered in the prosecution of the work, suspension or discontinuance of the work, and all other unknowns or risks of any description connected with the work. Such unforeseen difficulties or obstructions includes any act of God, the elements, strike, walkout, or any other cause beyond CONTRACTOR's reasonable control that occurs before AGENCY accepts the work as complete.

B. This AGREEMENT is subject to the provisions of Article 1.7 (commencing at Section 20104.50) of Division 2, Part 3 of the Public Contract Code regarding prompt payment of CONTRACTORS by local governments. Article 1.7 mandates certain procedures for the payment of undisputed and properly submitted payment requests within 30 days after receipt, for the review of payment requests, for notice to CONTRACTOR of improper payment requests, and provides for the payment of interest on progress payment requests which are not timely made in accordance with that Article. This AGREEMENT hereby incorporates the provisions of Article 1.7 as though fully set forth herein.

C. At the request and expense of CONTRACTOR, securities equivalent to the amount withheld shall be deposited with AGENCY, or with a state or federally chartered bank in this state as the escrow agent, who shall then pay those moneys to CONTRACTOR upon AGENCY's confirmation of CONTRACTOR'S satisfactory completion of this AGREEMENT. At any time during the term of this AGREEMENT CONTRACTOR may, at its own expense, substitute securities for funds otherwise withheld as retention (or the retained percentage) in accordance with Public Contract Code § 22300.

D. This AGREEMENT is subject to the requirements of a skilled and trained workforce; CONTRACTOR and each of its subcontractors at every tier are required to employ a certain percentage of journeypersons to perform the work, in accordance with Public Contracts Code §§ 2600 – 2602

ARTICLE IV: Labor Code

AGENCY and CONTRACTOR acknowledge that this AGREEMENT is subject to the provisions of Division 2, Part 7, Chapter 1 (commencing with Section 1720) of the California Labor Code relating to public works and public agencies and agree to be bound by all the provisions thereof as though set forth fully herein. Full compensation for conforming to the requirements of the Labor Code and with other Federal, State and local laws related to labor, and rules, regulations and ordinances which apply to any work performed pursuant to this AGREEMENT is included in the price for all contract items of work involved.

This AGREEMENT is further subject to prevailing wage law, including, but not limited to, the following:

A. The CONTRACTOR shall pay the prevailing wage rates for all work performed under the AGREEMENT. When any craft or classification is omitted from the general prevailing wage determinations, the CONTRACTOR shall pay the wage rate of the craft or classification most closely related to the omitted classification. The CONTRACTOR shall forfeit as a penalty to AGENCY \$200.00 or any greater penalty provided in the Labor Code for each Calendar Day, or portion thereof, for each worker paid less than the prevailing wage rates for any work done under the AGREEMENT in violation of the provisions of the Labor Code whether such worker is employed in the execution of the work by CONTRACTOR or by any Subcontractor under CONTRACTOR. In addition, CONTRACTOR shall pay each worker the difference between such prevailing wage rates and the amount paid to each worker for each Calendar Day, or portion thereof, for which each worker was paid less than the prevailing wage rate.

B. CONTRACTOR shall comply with the provisions of Labor Code Section 1777.5 concerning the employment of apprentices on public works projects, and further agrees that CONTRACTOR is responsible for compliance with Section 1777.5 by all of its subcontractors.

C. Pursuant to Labor Code § 1725.5, CONTRACTOR and any subcontractor must be registered with the California Department of Industrial Relations for any bid proposal submitted on or after March 1, 2015, and for any contract for public work entered into on or after April 1, 2015. Further, this project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

D. Pursuant to Labor Code § 1776, CONTRACTOR and any subcontractor shall keep accurate payroll records, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with this AGREEMENT. Each payroll record shall contain or be verified by a written declaration that it is made under penalty of perjury, stating both of the following: (1) The information contained in the payroll record is true and correct; and (2) The employer has complied with the requirements of Labor Code §§ 1811, and 1815 for any work performed by his or her employees on the public works project. The payroll records enumerated under subdivision (a) shall be certified and shall be available for inspection at all reasonable hours as required by Labor Code § 1776.

E. This AGREEMENT is further subject to 8-hour workday and wage and hour penalty law, including, but not limited to, Labor Code Sections 1810 and 1813, as follows:

CONTRACTOR shall strictly adhere to the provisions of the Labor Code regarding the 8-hour day and the 40-hour week, overtime, Saturday, Sunday and holiday work and nondiscrimination on the basis of race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, marital status, sex or sexual orientation, except as provided in Section 12940 of the Government Code. Pursuant to the provisions of the Labor Code, eight hours' labor shall constitute a legal day's work. Work performed by CONTRACTOR's employees in excess of eight hours per day, and 40 hours during any one week, must include compensation for all hours worked in excess of eight hours per day, or 40 hours during any one week, at not less than one and one-half times the basic rate of pay. CONTRACTOR shall forfeit as a penalty to AGENCY \$25.00 or any greater penalty set forth in the Labor Code for each worker employed in the execution of the work by CONTRACTOR or by any Subcontractor of CONTRACTOR, for each Calendar Day during which such worker is required or permitted to the work more than eight hours in one Calendar Day or more than 40 hours in any one calendar week in violation of the Labor Code.

F. This AGREEMENT is subject to Public Contract Code Section 6109: CONTRACTOR shall be prohibited from performing work on this project with a subcontractor who is ineligible to perform work on the project pursuant to Sections 1777.1 or 1777.7 of the Labor Code.

ARTICLE V: Work Site Conditions

A. In compliance with and pursuant to Government Code Section 4215, AGENCY shall assume the responsibility, as between the parties to this AGREEMENT, for the timely removal, relocation, or protection of existing main- or trunk-line utility facilities located on the site of any construction project that is a subject of this AGREEMENT, if such utilities are not identified by AGENCY in the plans and specifications made a part of the invitation for bids. The Contract Documents shall include provisions to compensate CONTRACTOR for the costs of locating, repairing damage not due to the failure of CONTRACTOR to exercise reasonable care, and removing or relocating such utility facilities not indicated in the plans and specifications with reasonable accuracy, and for equipment on the project necessarily idled during such work. CONTRACTOR shall not be assessed liquidated damages for delay in completion of the project, when such delay was caused by the failure of AGENCY or the owner of a utility to provide for removal or relocation of such utility facilities.

B. To the extent that the work requires trenches in excess of five feet (5') and is estimated to cost more than \$25,000, prior to any excavation, CONTRACTOR must provide the AGENCY, or a registered civil or structural engineer employed by the AGENCY to whom authority has been delegated to accept such plans, a detailed plan showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation of such trench or trenches. If such plan varies from the shoring system standards, the plan shall be prepared by a registered civil or structural engineer. Nothing in this section shall be deemed to allow the use of a shoring, sloping, or protective system less effective than that required by the Construction Safety Orders.

C. This AGREEMENT is further subject to Public Contract Code Section 7104 with regard to any trenches deeper than four feet (4') involved in the proposed work as follows:

CONTRACTOR shall promptly, and before the following conditions are disturbed, notify AGENCY, in writing, of any:

- (1) Material that CONTRACTOR believes may be hazardous waste, as defined in Section 25117 of the Health and Safety Code, which is required to be removed to a Class I, Class II, or Class III disposal site in accordance with existing law.
- (2) Subsurface or latent physical conditions at the site differing from those indicated by all available information provided prior to the deadline for submission of bids.
- (3) Unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the contract.

AGENCY shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or involve hazardous waste, and cause a decrease or increase in CONTRACTOR's cost of, or the time required for, performance of any part of the work, AGENCY shall issue a change order under the procedures described in this AGREEMENT.

In the event that a dispute arises between AGENCY and CONTRACTOR whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in CONTRACTOR's cost of, or time required for, performance of any part of the work, CONTRACTOR shall not be excused from any scheduled completion date provided in the AGREEMENT, but shall proceed with all work to be performed under the AGREEMENT. CONTRACTOR shall retain any and all rights provided either by contract or by law which pertain to the resolution of disputes and protests between the contracting parties.

ARTICLE VI: Insurance

A. With respect to performance of work under this AGREEMENT, CONTRACTOR shall maintain, and shall require all of its subcontractors to maintain, insurance as required by Section E "Standard Specifications" of the Contract Documents.

B. This AGREEMENT is further subject to Workers' Compensation obligations, including, but not limited to, California Labor Code Sections 1860 and 1861 as follows:

CONTRACTOR shall take out and maintain, during the life of this contract, Worker's Compensation Insurance for all of CONTRACTOR's employees employed at the site of improvement; and, if any work is sublet, CONTRACTOR shall require the subcontractor similarly to provide Worker's Compensation Insurance for all of the latter's employees, unless such employees are covered by the protection afforded by CONTRACTOR. CONTRACTOR and any of CONTRACTOR's subcontractors shall be required to provide AGENCY with a written statement acknowledging its obligation to secure payment of Worker's Compensation Insurance as required by Labor Code § 1861; to wit: 'I am aware of the provisions of

Section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract.' If any class of employees engaged in work under this AGREEMENT at the site of the Project is not protected under any Worker's Compensation law, CONTRACTOR shall provide and shall cause each subcontractor to provide adequate insurance for the protection of employees not otherwise protected. CONTRACTOR shall indemnify and hold harmless AGENCY for any damage resulting from failure of either CONTRACTOR or any subcontractor to take out or maintain such insurance.

Any available insurance proceeds broader than or in excess of the specified minimum insurance coverage requirements or limits shall be available to AGENCY as additional insured. Further, the requirements for coverage and limits shall be the greater of (1) the maximum coverage and limits specified in this Agreement, or (2) the broader coverage and maximum limits of coverage of any insurance policy or proceeds available to the named insured. Insurance provided by CONTRACTOR under this Contract shall not replace or substitute for CONTRACTOR's indemnification obligations in Article VII.

CONTRACTOR's insurance, including all endorsements, shall be primary to any coverage available to AGENCY. Any insurance or self-insurance maintained by AGENCY and/or its officers, employees, agents or volunteers, shall be excess of CONTRACTOR's insurance and shall not contribute with it.

ARTICLE VII: Indemnification

To the fullest extent permitted by law, CONTRACTOR shall, at its sole cost and expense, fully defend, indemnify and hold harmless AGENCY, its authorized representatives and their respective subsidiaries, affiliates, members, directors, officers, employees and agents (collectively, the "Indemnitees") from and against any and all claims, actions, demands, costs, judgments, liens, penalties, liabilities, damages, losses, and expenses, including but not limited to any fees of accountants, attorneys or other professionals (collectively "Liabilities"), arising out of, in connection with, resulting from or related to, any act, omission, fault or negligence of CONTRACTOR, CONTRACTOR's Representative, or any of its officers, agents, employees, Subcontractors or Suppliers, or any person or organization directly or indirectly employed by any of them (Collectively, the "Indemnitors"), in connection with or relating to or claimed to be in connection with or relating to the work performed under this AGREEMENT. Indemnification includes, but is not limited to, all claims, actions, demands, costs, judgments, liens, penalties, liabilities, damages, losses, and expenses arising out of, in connection with, resulting from or related to changes to the natural environment or environmental harms caused in whole or in part by work performed under this AGREEMENT.

To the fullest extent permitted by law, CONTRACTOR shall, at its sole costs and expense, fully defend, indemnify and hold harmless AGENCY, its authorized representatives and their representative subsidiaries, affiliates, members, director, officer, employees and agents, including parties that AGENCY contracts with (including other governmental agencies such as the California Department of Transportation) (collectively, the "Indemnitees") from and against

any and all claims, actions, demands, costs, judgments, liens, penalties, liabilities, damages, losses, and expenses, including but not limited to any fees of accountants, attorneys or other professionals (collectively "Liabilities"), arising out of, in connection with, resulting from or related to, any act, omission, fault or negligence of any party, person, or organization that AGENCY contracts with, in connection with or relating to or claimed to be in connection with or relating to the work performed under this AGREEMENT. Indemnification includes, but is not limited to, all claims, actions, demands, costs, judgments, liens, penalties, liabilities, damages, losses, and expenses arising out of, in connection with, resulting from or related to changes to the natural environment or environmental harms caused in whole or in part by work performed under this AGREEMENT.

If CONTRACTOR is a joint venture or partnership, each venturer or partner shall be jointly and severally liable for any and all of the duties and obligations of CONTRACTOR that are assumed under or arise out of this AGREEMENT. Each of such venturers or partners waives notice of the breach or non-performance of any undertaking or obligation of CONTRACTOR contained in, resulting from or assumed under this AGREEMENT, and the failure to give any such notice shall not affect or impair such venturer's or partner's joint and several liability hereunder.

AGENCY may request a deposit for defense costs from CONTRACTOR with respect to a claim. If AGENCY requests a defense deposit, CONTRACTOR shall provide it within 15 days of the request.

ARTICLE VIII: Binding Effect

AGENCY and CONTRACTOR each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto and to its partners, successors, assigns, and legal representatives in respect of all covenants, agreements, and obligations contained in the Contract Documents. This AGREEMENT is not assignable nor the performance of either party's duties delegable without the prior written consent of the other party. Any attempted or purported assignment or delegation of any of the rights of obligations of either party without the prior written consent of the other shall be void and of no force and effect.

ARTICLE IX: Dispute Resolution

A. All disputes arising out of this AGREEMENT are subject to a mandatory step-by-step claims submission and evaluation process as a precondition to legal action in accordance with Public Contracts Code § 9204.

B. Any court action arising out of this AGREEMENT shall be filed in the Los Angeles County Superior Court. Any alternative dispute resolution proceeding arising out of this AGREEMENT shall be heard in the County of Los Angeles.

C. AGENCY shall have full authority to compromise or otherwise settle any claim relating to this AGREEMENT or any part hereof at any time. AGENCY shall provide timely notification to CONTRACTOR of the receipt of any third-party claim relating to this AGREEMENT.

AGENCY shall be entitled to recover its reasonable costs incurred in providing the notification required by this section.

D. This AGREEMENT is further subject to the provisions of Article 1.5 (commencing at Section 20104) of Division 2, Part 3 of the Public Contract Code regarding the resolution of public works claims of less than \$375,000. Article 1.5 mandates certain procedures for the filing of claims and supporting documentation by CONTRACTOR, for the response to such claims by the AGENCY, for a mandatory meet and confer conference upon the request of CONTRACTOR, for mandatory nonbinding mediation in the event litigation is commenced, and for mandatory judicial arbitration upon the parties' failure to resolve the dispute through mediation. This AGREEMENT hereby incorporates the provisions of Article 1.5 as though fully set forth herein.

ARTICLE X: Independent CONTRACTOR

CONTRACTOR is and shall at all times remain as to AGENCY, a wholly independent CONTRACTOR. Neither AGENCY nor any of its agents shall have control of the conduct of CONTRACTOR or any of CONTRACTOR's employees, except as herein set forth. CONTRACTOR shall not at any time or in any manner represent that it or any of its agents or employees are in any manner agents or employees of AGENCY.

ARTICLE XI: Taxes

CONTRACTOR is responsible for paying all retail, sales and use, transportation, export, import, special or other taxes and duties applicable to, and assessable against any work, materials, equipment, services, processes and operations incidental to or involved in this AGREEMENT. The CONTRACTOR is responsible for ascertaining and arranging to pay such taxes and duties. The prices established in this AGREEMENT shall include compensation for any taxes the CONTRACTOR is required to pay by laws and regulations in effect as of the execution of this AGREEMENT.

ARTICLE XII: Notices

All notices and communications shall be sent in writing to the parties at the following addresses:

AGENCY:

CONTRACTOR:

Arnulfo Yanez
CITY OF SIERRA MADRE
232 W. Sierra Madre Boulevard
Sierra Madre, CA 91024

ARTICLE XIII: Entire Agreement

This AGREEMENT supersedes any and all other agreements, either oral or written, between the parties and contains all of the covenants and agreements between the parties pertaining to the work of improvements described herein. Each party to this AGREEMENT acknowledges that no representations, inducements, promises or agreements, orally or otherwise, have been made by

any party, or anyone acting on behalf of any party, which are not embodied herein, and that any other agreement, statement or promise not contained in this AGREEMENT shall not be valid or binding. Any modification of this AGREEMENT will be effective only if signed by the party to be charged.

The benefits and obligations of this AGREEMENT shall inure to and be binding upon the representatives, agents, partners, heirs, successors and assigns of the parties hereto. This AGREEMENT shall be construed pursuant to the laws of the State of California.

ARTICLE XIV: Authority to Contract

The signatories hereto represent that they are authorized to sign on behalf of the respective parties they represent and are competent to do so, and each of the parties hereto hereby irrevocably waives any and all rights to challenge signatures on these bases.

ARTICLE XV: General Provisions

A. All reports, documents or other written material (“written products” herein) developed by CONTRACTOR in the performance of this Agreement shall be and remain the property of AGENCY without restriction or limitation upon its use or dissemination by AGENCY. CONTRACTOR may take and retain copies of such written products as desired, but no such written products shall be the subject of a copyright application by CONTRACTOR.

B. In the performance of this Agreement, CONTRACTOR shall not discriminate against any employee, subcontractor, or applicant for employment because of race, color, creed, religion, sex, marital status, sexual orientation, national origin, ancestry, age, physical or mental disability, medical condition or any other unlawful basis.

C. The captions appearing at the commencement of the sections hereof, and in any paragraph thereof, are descriptive only and for convenience in reference to this Agreement. Should there be any conflict between such heading, and the section or paragraph at the head of which it appears, the section or paragraph hereof, as the case may be, and not such heading, shall control and govern in the construction of this Agreement. Masculine or feminine pronouns shall be substituted for the neuter form and vice versa, and the plural shall be substituted for the singular form and vice versa, in any place or places herein in which the context requires such substitution(s).

D. The waiver by AGENCY or CONTRACTOR of any breach of any term, covenant or condition herein contained shall not be deemed to be a waiver of such term, covenant or condition or of any subsequent breach of the same or any other term, covenant or condition herein contained. No term, covenant or condition of this Agreement shall be deemed to have been waived by AGENCY or CONTRACTOR unless in writing.

E. Each right, power and remedy provided for herein or now or hereafter existing at law, in equity, by statute, or otherwise shall be cumulative and shall be in addition to every other right, power, or remedy provided for herein or now or hereafter existing at law, in equity, by statute, or

otherwise. The exercise, the commencement of the exercise, or the forbearance of the exercise by any party of any one or more of such rights, powers or remedies shall not preclude the simultaneous or later exercise by such party of any of all of such other rights, powers or remedies.

F. CONTRACTOR shall maintain any and all ledgers, books of account, invoices, vouchers, canceled checks, and other records or documents evidencing or relating to charges for services or expenditures and disbursements charged to AGENCY under this Agreement for a minimum of three (3) years, or for any longer period required by law, from the date of final payment to CONTRACTOR under this Agreement. All such documents shall be made available for inspection, audit, and/or copying at any time during regular business hours, upon oral or written request of AGENCY. In addition, pursuant to Government Code Section 8546.7, if the amount of public funds expended under this Agreement exceeds ten thousand dollars, all such documents and this Agreement shall be subject to the examination and audit of the State Auditor, at the request of AGENCY or as part of any audit of AGENCY, for a period of three (3) years after final payment under the Agreement.

TO EFFECTUATE THIS AGREEMENT, the parties have caused their duly authorized representatives to execute this Agreement on the dates set forth below.

“CITY”
City of Sierra Madre

“CONSULTANT”
[Name of Company or Individual]

Authorized Signatories:

Signature: _____

Signature: _____

Printed: _____

Printed: _____

Title: _____

Title: _____

Date: _____

Date: _____

Attest:

Signature: _____

Printed: _____

Title: City Clerk

Date: _____

Approved as to Form:

Signature: _____

Printed: _____

Title: City Attorney

Date: _____

(EXECUTE IN DUPLICATE)

CERTIFICATE OF ACKNOWLEDGMENT

State of California
County of _____

On _____ before me, _____, personally appeared _____ who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ (SEAL)

PAYMENT BOND

SIERRA MADRE LIBRARY, PROJECT NO. FC82306

IN THE CITY OF SIERRA MADRE, CALIFORNIA

WHEREAS, the City of Sierra Madre, as AGENCY has awarded to **CONTRACTOR's Business Name**, as CONTRACTOR, a contract for the above-stated project;

AND WHEREAS, CONTRACTOR is required to furnish a bond in connection with the contract, to secure the payment of claims of laborers, mechanics, material persons, and other persons as provided by law;

NOW THEREFORE, we, the undersigned CONTRACTOR and SURETY, are held and firmly bound unto AGENCY in the sum of [**DESCRIBE IN WORDS; 100% OF TOTAL CONTRACT AMOUNT—TO BE INSERTED BY CONTRACTOR**], **(\$XXX,XXX.XX)** Dollars, which is one hundred percent (100%) of the total contract amount for the above-stated project, for which payment well and truly to be made we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION IS SUCH that if CONTRACTOR, its heirs, executors, administrators, successors, assigns or subcontractors, shall fail to pay any of the persons named in Civil Code Section 9100, or amounts due under the Unemployment Insurance Code with respect to work or labor withheld, and to pay over to the Employment Development Department from the wages of employees of the CONTRACTOR and its subcontractors pursuant to Section 13020 of the Unemployment Insurance Code, with respect to such work and labor, that the surety or sureties herein will pay for the same in an amount not exceeding the sum specified in this bond, otherwise the above obligation shall be void. In case suit is brought upon this bond, SURETY will pay reasonable attorneys' fees to the plaintiffs and AGENCY in an amount to be fixed by the court.

This bond shall inure to the benefit to any of the persons named in Civil Code Section 9100 as to give a right of action to such persons or their assigns in any suit brought upon this bond.

The SURETY hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or the specifications accompanying it shall in any manner affect SURETY's obligations on this bond. The SURETY hereby waives notice of any such change, extension, alteration or addition and hereby waives the requirements of Section 2845 of the Civil Code as a condition precedent to any remedies AGENCY may have.

(Continued on Next Page)

IN WITNESS WHEREOF the parties hereto have set their names, titles, hands, and seals as of the dates set forth below:

CONTRACTOR*	CONTRACTOR's Signer's Name, Title	_____
	CONTRACTOR's Business Name	_____
	Mailing Street Address	_____
	City, State, Zip Code	_____
	Telephone #	_____
	Date:	_____

Surety*	Surety Signer's Name / Title	_____
	Surety's Business Name	_____
	Mailing Street Address	_____
	City, State, Zip Code	_____
	Telephone #	_____
	Date:	_____

*Provide CONTRACTOR and Surety name, address and telephone number and the name, title, address and telephone number for the respective authorized representatives. Power of Attorney and Notary Acknowledgement must be attached. Seals and dates of signing must also be included.

(EXECUTE IN DUPLICATE)

CERTIFICATE OF ACKNOWLEDGMENT

State of California

County of _____

On _____ before me, _____, personally appeared _____ who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ (SEAL)

FAITHFUL PERFORMANCE BOND

**SIERRA MADRE LIBRARY, PROJECT NO. FC82306
IN THE CITY OF SIERRA MADRE, CALIFORNIA**

KNOW ALL PERSONS BY THESE PRESENTS That **CONTRACTOR's Business Name**, hereinafter referred to as "CONTRACTOR" as PRINCIPAL, and **[REDACTED]**, a corporation duly organized and doing business under and by virtue of the laws of the State of California and duly licensed for the purpose of making, guaranteeing, or becoming sole surety upon bonds or undertakings as Surety, are held and firmly bound unto the CITY OF SIERRA MADRE, CALIFORNIA, hereinafter referred to as the "AGENCY" in the sum _____ of

[DESCRIBE IN WORDS; 100% OF THE TOTAL CONTRACT AMOUNT—TO BE INSERTED BY CONTRACTOR], (\$XXX,XXX.XX) Dollars, which is one hundred percent (100%) of the total contract amount for the above stated project; lawful money of the United States of America for the payment of which sum, well and truly to be made, we bind ourselves, our heirs, executors, administrators, assigns and successors, jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH, that whereas CONTRACTOR has been awarded and is about to enter into a Contract with AGENCY to perform all work required pursuant to the contract documents for the project entitled SIERRA MADRE LIBRARY, PROJECT NO. FC82306, CONTRACT which Contract is by this reference incorporated herein, and is required by AGENCY to give this Bond in connection with the execution of the Contract;

NOW, THEREFORE, if CONTRACTOR and his or her Subcontractors shall well and truly do and perform all the covenants and obligations of the Contract on his or her part to be done and performed at the times and in the manner specified herein including compliance with all Contract specifications and quality requirements, then this obligation shall be null and void, otherwise it shall be and remain in full force and effect;

PROVIDED, that any alterations in the work to be done, or in the material to be furnished, which may be made pursuant to the terms of the Contract, shall not in any way release CONTRACTOR or the Surety thereunder, nor shall any extensions of time granted under the provisions of the Contract release either CONTRACTOR or said Surety, and notice of such alterations of extensions of the Contract is hereby waived by said Surety.

In the event suit is brought upon this Bond by AGENCY and judgment is recovered, said Surety shall pay all costs incurred by AGENCY in such suit, including a reasonable attorney's fee to be fixed by the Court.

(Continued on Next Page)

IN WITNESS WHEREOF the parties hereto have set their names, titles, hands, and seals as of the dates set forth below:

CONTRACTOR*	CONTRACTOR's Signer's Name, Title	_____
	CONTRACTOR's Business Name	_____
	Mailing Street Address	_____
	City, State, Zip Code	_____
	Telephone #	_____
	Date:	_____
Surety*	Surety Signer's Name / Title	_____
	Surety's Business Name	_____
	Mailing Street Address	_____
	City, State, Zip Code	_____
	Telephone #	_____
	Date:	_____

*Provide CONTRACTOR and Surety name, address and telephone number and the name, title, address and telephone number for the respective authorized representatives. Power of Attorney and Notary Acknowledgement must be attached. Seals and dates of signing must also be included.

(EXECUTE IN DUPLICATE)

CERTIFICATE OF ACKNOWLEDGMENT

State of California

County of _____

On _____ before me, _____, personally appeared _____ who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ (SEAL)

MAINTENANCE BOND

**SIERRA MADRE LIBRARY, PROJECT NO. FC82306
IN THE CITY OF SIERRA MADRE, CALIFORNIA**

KNOW ALL PERSONS BY THESE PRESENTS THAT WHEREAS, the City of Sierra Madre, as AGENCY has awarded to **CONTRACTOR's Business Name**, as CONTRACTOR, a contract for the above-stated project.

AND WHEREAS, CONTRACTOR is required to furnish a bond in connection with the contract guaranteeing maintenance thereof;

NOW, THEREFORE, we, the undersigned CONTRACTOR and SURETY, are held firmly bound unto AGENCY in the sum of

[DESCRIBE IN WORDS; 50% OF THE TOTAL CONTRACT AMOUNT—TO BE INSERTED BY CONTRACTOR], (\$XXX,XXX.XX) Dollars, which is fifty percent (50%) of the total contract amount for the above-stated project to be paid to AGENCY, its successors and assigns, for which payment well and truly to be made, we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH that if CONTRACTOR shall remedy without cost to AGENCY any defects which may develop during a period of one (1) year from the date of recordation of the Notice of Completion of the work performed under the contract, provided such defects are caused by defective or inferior materials or work, then this obligation shall be void; otherwise it shall be and remain in full force and effect. In case suit is brought upon this bond, SURETY will pay reasonable attorneys' fees to the AGENCY in an amount to be fixed by the court.

IN WITNESS WHEREOF the parties hereto have set their names, titles, hands, and seals as of the date set forth below:

CONTRACTOR*	CONTRACTOR's Signer's Name, Title	_____
	CONTRACTOR's Business Name	_____
	Mailing Street Address	_____
	City, State, Zip Code	_____
	Telephone #	_____
	Date:	_____
Surety*	Surety Signer's Name / Title	_____
	Surety's Business Name	_____
	Mailing Street Address	_____
	City, State, Zip Code	_____
	Telephone #	_____
	Date:	_____

*Provide CONTRACTOR and Surety name, address and telephone number and the name, title, address and telephone number for the respective authorized representatives. Power of Attorney and Notary Acknowledgement must be attached. Seals and dates of signing must also be included.

(EXECUTE IN DUPLICATE)

CERTIFICATE OF ACKNOWLEDGMENT

State of California

County of _____

On _____ before me, _____, personally appeared _____ who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature _____ (SEAL)

WORKERS' COMPENSATION INSURANCE CERTIFICATE

The CONTRACTOR shall execute the following form as required by the California Labor Code, Sections 1860 and 1861:

I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract.

Date: _____

CONTRACTOR's Business Name

By: _____
(Signature)

(Title)

Attest:

By: _____
(Signature)

(Title)

NOTE: See Section 5.4 Insurance of the Standard Specifications for insurance carrier rating requirements.

ENDORSEMENTS TO INSURANCE POLICY

Name of Insurance Company: _____

Policy Number: _____

Effective Date: _____

The following endorsements are hereby incorporated by reference into the attached Certificate of Insurance as though fully set forth thereon:

1. The naming of an additional insured as herein provided shall not affect any recovery to which such additional insured would be entitled under this policy if not named as such additional insured, and
2. The additional insured named herein shall not be held liable for any premium or expense of any nature on this policy or any extensions thereof, and
3. The additional insured named herein shall not by reason of being so named be considered a member of any mutual insurance company for any purpose whatsoever, and
4. The provisions of the policy will not be changed, suspended, canceled or otherwise terminated as to the interest of the additional insured named herein without first giving such additional insured twenty (20) days' written notice.
5. Any other insurance held by the additional insured shall not be required to contribute anything toward any loss or expense covered by the insurance, which is referred to by this certificate.
6. **The company provided insurance for this certificate is a company licensed to do business in the State of California with rating of "A" or higher and a Financial Class VII or higher as established by A.M. Best, or higher rating established by Moody's or Standard & Poor's.**

It is agreed that the City of Sierra Madre, its officers, agent, employees, TSK Architects and Vertex Companies, LLC are included as Additional Insureds under the contracts of insurance for which the Certificate of Insurance is given.

Authorized Insurance Agent

Date: _____

007000 SECTION E – STANDARD SPECIFICATIONS

SIERRA MADRE LIBRARY SPECIFICATION NO. PROJECT NO. FC82306 IN THE CITY OF SIERRA MADRE, CALIFORNIA

STANDARD SPECIFICATIONS

INCORPORATION OF GREENBOOK. The latest edition of the Standard Specifications for Public Works Construction (“SSPWC” or “Greenbook”) shall be incorporated by reference into these Standard Specifications as if fully replicated herein. These Standard Specification shall be supplemented, amended, or replaced by the Special Provision contained in Section F and G hereinbelow. To the extent that anything in the Special Provisions conflicts with the terms or requirements of the SSPWC, the Special Provisions shall control.

008000 SECTION F – SPECIAL PROVISIONS – PART 1

SIERRA MADRE LIBRARY PROJECT NO. FC82306 IN THE CITY OF SIERRA MADRE, CALIFORNIA

SPECIAL PROVISIONS – PART 1. The following provisions supplement, amend, or replaced the requirements of the Standard Specifications for Public Works Construction (“SSPWC” or “Greenbook”). To the extent that anything in these Special Provisions conflicts with the terms or requirements of the SSPWC, these Special Provisions shall control.

SECTION 1 - GENERAL

1-1 TERMS. Unless otherwise stated, the words *directed*, *required*, *permitted*, *ordered*, *instructed*, *designated*, *considered necessary*, *prescribed*, *approved*, *acceptable*, *satisfactory*, or words of like meaning, refer to actions, expressions, and prerogatives of the Engineer.

1-2 DEFINITIONS

Acceptance – The AGENCY’s formal written acceptance of a project that has been completed in all respects in accordance with the plans and specifications and any modifications thereof.

AGENCY – The City of Sierra Madre.

Agent – Shall include persons and companies, other than the CONTRACTOR, retained by the City to perform design and construction services in relation to the Work.

Board – The City Council of the City of Sierra Madre.

City – The City of Sierra Madre, California, as the AGENCY and Owner.

City Council – City Council of the City of Sierra Madre, California.

Construction Manager – Persons and/or company retained by the City to perform construction management services.

Contract Documents – Including, but not limited to: the Contract, any Addendum (which pertain to the contract documents), Notice Inviting Bids, Instructions to Bidders; Bid (including documentation accompanying the Bid and any post-bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Contract, the Bonds, the general conditions, permits from other agencies, the Special Provisions, the Plans, Standard Plans, Standard Specifications, Reference Specifications, and all Modifications issued after the execution of the Contract.

Days – Days shall mean consecutive calendar’s days unless otherwise specified.

Design Engineer – Persons and/or company retained by the City to perform engineering design services.

Due Notice – A written notification, provided in due time, of a proposed action, where the contract requires such notification within a specified time (usually 48 hours or two working days) prior to the commencement of the contemplated action.

Engineer – The City Engineer of the City of Sierra Madre, or his/her authorized representative.

Geotechnical Engineer – Person licensed to practice Soils Engineering or Geotechnical Engineering pursuant to the laws of the State of California and retained by the AGENCY during construction.

Geotextile – Synthetic fiber used in civil engineering applications, serving the primary functions of separation and filtration.

House Sewer – A sewer, wholly within private property, proposed to connect any building to a house connection sewer.

Luminaire Arm – The structural member, bracket, or mast arm, which, mounted on the standard, supports the luminaire.

Owner – City of Sierra Madre, California.

Prompt – The briefest interval of time required for a considered reply, including time required for approval by a governing body.

Proposal – See Bid.

Reference Specifications – Those bulletins, standards, rules, methods of analysis or test, codes, and specifications of other agencies, engineering societies, or industrial associations referred to in the Contract Documents. These refer to the latest edition, including amendments in effect and published at the time of advertising the project or issuing the permit, unless specifically referred to by edition, volume, or date.

Standard Plans – “Standard Plans for Public Works Construction” or “SSPWC” – Latest edition of the Southern California Chapter of the American Public Works Association.

State Standard Specifications (“SSS”) – Standard Specifications prepared by the State of California, Business and Transportation Agency, Department of Transportation.

State Standard Plans (“SSP”) – Standard Plans prepared by State of California, Business and Transportation Agency, Department of Transportation.

Storm Drain – Any conduit and appurtenances intended for the reception and transfer of storm water.

Tonne – Also referred to as “metric ton” — Represents a unit of measure in the International System of Units equal to 1,000 kilograms.

Work – That which is proposed to be constructed or done under the Contract or permit, including the furnishing of all labor, materials, equipment, and services.

Working Days – Any days, except: (1) Saturdays, Sundays, legal holidays on which Sierra Madre City Hall is closed for business; (2) days when work is suspended by the Engineer for reasons unrelated to the performance of the CONTRACTOR, and provided

in Subsection 6-6.1; and (3) days determined to be non-working in accordance with Section 6-3 "Time of Completion."

13 ABBREVIATIONS

1-3.3 Institutions. *Add the following:*

These Standard Specifications incorporate by reference the list of commonly used institution terms in the edition of the "Standard Plans for Public Works Construction" (aka the Greenbook) with the following additions:

AGCA Associated General CONTRACTORs of America

APWA American Public Works Association

CRSI Concrete Reinforcing Steel Institute

CSI Construction Specifications Institute

NFPA National Fire Protection Association

SSS State of California Standard Specifications, latest edition, Department of Transportation

SSP State of California Standard Plans, latest edition, Department of Transportation.

SSPWC Standard Specifications for Public Works Construction

14 UNITS OF MEASURE

1-4.1 General. *Add the following:*

When U.S. Standard Measures are not included in parenthesis, then the SI units shall control.

1-7 AWARD AND EXECUTION OF CONTRACT. *Add the following:*

1-7.0 Investigation of Site Conditions. Prior to submittal of the bid, Bidders must visit the site of work and complete their own investigations to satisfy themselves as to the existing conditions affecting the work to be done under these specifications. If the bidder chooses not to visit the site or conduct investigations, he will, nevertheless, be charged with the knowledge of conditions which reasonable inspection and investigation would have disclosed.

After the project is awarded, the CONTRACTOR shall carefully study and compare the Contract Documents with each other and with information available to the CONTRACTOR and furnished by the Owner and shall immediately notify the Engineer of errors, inconsistencies or omissions discovered. If the CONTRACTOR performs any construction activity knowing it involves a recognized error, inconsistency or omission in the Contract Documents without such notice to the Engineer, the CONTRACTOR shall assume appropriate responsibility for such performance and may assume responsibility for the full costs for correction.

The CONTRACTOR shall make field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the

CONTRACTOR with the Contract Documents before commencing activities. Errors, inconsistencies, or omissions discovered shall be reported to the Engineer immediately.

When existing conditions are encountered which, in the opinion of the Engineer, require temporary suspension of work for design modifications or for other determinations to be made, the CONTRACTOR shall move to other areas of work until such determinations are made at no cost to the City. No additional compensation will be allowed by reason of such temporary suspension of work, or modifications to work, except as noted in Section 3 of these Standard Specifications ("Changes in Work") for specific items of work not included in the bid. Appropriate extension of item for completion may be allowed where justification in the opinion of the Engineer.

1-7.1 General. *Add the following:*

The City reserves the right to reject any or all proposals.

The Contract will be awarded, if at all, to the lowest responsible and responsive Bidder determined as provided on the Proposal Form, whose proposal complies with all the requirements prescribed. Such award, if made, will be made within the number of days stated in the proposal form. Refusal or failure to deliver the executed contract, bonds, or insurance in the form provided in the Contract and approved by the AGENCY's attorney within the time provided herein shall be cause, at the AGENCY's option, for the annulment of the award and forfeiture of the bid security. In such event, the AGENCY may successively award the Contract to the next lowest responsible and responsive Bidder until a properly executed Contract, bonds, and insurance is obtained, or it may at any time reject all remaining bids and proceed as provided by law. The refusal or failure of a successive lowest responsible and responsive Bidder to execute the Contract may, at the AGENCY's option, result in an annulment of the award to that Bidder and the forfeiture of that Bidder's bid security. The periods of time specified above within which the award of the Contract may be made shall be subject to extension for such further period as may be agreed upon in writing between the AGENCY and the concerned Bidder.

The AGENCY reserves the right to waive any irregularities.

Within ten (10) calendar days after the date of the Notice of Award, the CONTRACTOR shall execute and return the following contract documents to the AGENCY:

- Contract Agreement (in duplicate)
- Faithful Performance Bond (in duplicate)
- Maintenance Bond (in duplicate)
- Payment Bond (in duplicate)
- Public Liability and Property Damage Insurance Certificate (two original)
- Additionally Insured Endorsement
- Workers' Compensation Insurance Certificate (two original)

A corporation to which an award is made may be required, before the Contract agreement is executed by the AGENCY, to furnish evidence of its corporate existence, of its right to enter into

contracts in the State of California, and that the officers signing the contract and bonds for the corporation have the authority to do so.

1-7.2 Contract Bonds.

The PAYMENT BOND shall remain in force until thirty-five (35) calendar days after the date of recordation of the Notice of Completion. The FAITHFUL PERFORMANCE BOND shall remain in force until the date of recordation of the Notice of Completion. The MAINTENANCE BOND shall remain in force until one (1) year after the date of recordation of the Notice of Completion.

All bonds must be accompanied by a Power of Attorney.

SECTION 2 - SCOPE OF THE WORK

2-1 WORK TO BE DONE. *Add the following:*

Any plan or method of work suggested by the AGENCY or the Engineer to the CONTRACTOR but not specified or required, if adopted or followed by the CONTRACTOR in whole or in part, shall be used at the risk and responsibility of the CONTRACTOR; and the AGENCY and the Engineer shall assume no responsibility therefore and in no way be held liable for any defects in the work which may result from or be caused by use of such plan or method of work.

2-3 RIGHT-OF-WAY. *Substitute the following:*

Rights-of-way, easements, or rights-of-entry for the Work will be provided by the AGENCY. Unless otherwise provided, the CONTRACTOR shall make arrangements, pay for, and assume all responsibility for acquiring, using, and disposing of additional work areas and facilities temporarily required. The CONTRACTOR shall fully defend, indemnify and hold harmless AGENCY, its authorized representatives and their representative subsidiaries, affiliates, members, director, officer, employees and agents, including parties that AGENCY contracts with (including other governmental agencies such as the California Department of Transportation) (collectively, the "Indemnitees") from and against any and all claims, actions, demands, costs, judgments, liens, penalties, liabilities, damages, losses, and expenses, including but not limited to any fees of accountants, attorneys or other professionals (collectively "Liabilities"), arising out of, in connection with these actions.

When the CONTRACTOR arranges for additional work areas and facilities temporarily required by him/her, he/she shall provide the AGENCY with proof that the additional work areas and/or facilities have been left in a condition satisfactory to the owner(s) of said work areas and/or facilities prior to acceptance of the work.

2-5 CONTRACTOR'S EQUIPMENT AND FACILITIES.

2-5.1 General. *Add the following:*

The CONTRACTOR shall furnish and maintain in good condition all equipment and facilities as required for the proper execution and inspection of the Work. Such equipment and facilities shall meet all requirements of applicable ordinances and laws.

A noise level limit of 85 dba at a distance of fifty (50) feet shall apply to all construction equipment on or related to the job, whether owned by the CONTRACTOR or not. The use of excessively loud warning signals shall be avoided except in those cases where required for the protection of personnel.

The CONTRACTOR shall arrange and maintain a secure storage site for all equipment and materials. All equipment and unused materials shall be returned to this site at the end of each workday.

SECTION 3 - CONTROL OF THE WORK

3-3 SUBCONTRACTORS. *Add the following:*

3-3.1 General. Each Bidder shall comply with the Public Contract Code including Sections 4100 through 4113. The following excerpts or summaries of some of the requirements of this Chapter are included below for information:

The Bidder shall set for the in the Bid, as provided in 4104:

“(a) The name, and location of the place of business, the California contractor license number, and public works contractor registration number issued pursuant to Section 1725.5 of the Labor Code of each subcontractor who will perform work or labor or render service to the prime CONTRACTOR in or about the construction of the work or improvement, or a subcontractor licensed by the State of California who, under subcontract to the prime CONTRACTOR, specially fabricates and installs a portion of the work or improvement according to detailed drawings contained in the plans and specifications, in an amount in excess of one-half of 1 percent of the prime CONTRACTOR’s total bid, or, in the case of bids or offers for the construction of streets or highways, including bridges, in excess of one-half of 1 percent of the prime CONTRACTOR’s total bid or ten thousand dollars (\$10,000), whichever is greater.”

“(b) The portion of the work which will be done by each such subcontractor under this act. The prime CONTRACTOR shall list only one subcontractor for each such portion as is defined by the prime CONTRACTOR in his bid.”

Subcontracting of more than one-half of one percent of the work for which no Subcontractor was designated in the original Bid will be allowed only in cases of public emergency or necessity and only after the Engineer makes a written finding of circumstances constituting public emergency or necessity.

The CONTRACTOR must obtain written consent of the City to substitute a Subcontractor designated in the original Bid, to permit any subcontract to be assigned or transferred, or to otherwise allow a subcontract to be performed by anyone other than the originally designated Subcontractor.

A violation of any of the above provisions will be considered a violation of the Contract, and the City may cancel the Contract and collect appropriate damages or assess the CONTRACTOR a penalty of not more than ten (10) percent of the subcontract involved.

If subcontracted work is not being performed in a satisfactory manner, the City will notify the CONTRACTOR of the need to take corrective action and the Engineer may report the facts to the City Council. Upon order by City Council and the CONTRACTOR's receipt of written instructions from the Engineer, the Subcontractor shall immediately be removed from the Work and may not again be employed on the Work.

3-3.2 Additional Responsibility. The CONTRACTOR shall perform, with its own organization, Contract work amounting to at least 50 percent of the Contract Price except that any designated "Specialty Items" may be performed by subcontract and the amount of any such "Specialty Items" so performed may be deducted from the Contract Price before computing the amount required to be performed by the CONTRACTOR with its own organization. "Specialty Items" will be identified by the AGENCY in the Bid or Proposal. Where an entire item is subcontracted, the value of work subcontracted will be based on the Contract Unit Price. When a portion of an item is subcontracted, the value of work subcontracted will be based on the estimated percentage of the Contract Unit Price. This will be determined from information submitted by the CONTRACTOR, and subject to approval by the Engineer.

3-3.3 Status of Subcontractors. All persons engaged in the Work, including Subcontractors and their employees, will be considered employees of the CONTRACTOR. The CONTRACTOR will be held responsible for their work. The AGENCY will deal directly and solely with the CONTRACTOR and make all payments to the CONTRACTOR.

3-4 AUTHORITY OF BOARD AND THE ENGINEER. *Substitute the following:*

The Board has the final authority in all matters affecting the Work. Within the scope of the Contract, the Engineer has the authority to enforce compliance with the Plans and Specifications. The CONTRACTOR shall promptly comply with instructions from the Engineer or an authorized representative.

The decision of the Engineer is final and binding on all questions relating to: quantities; acceptability of materials, equipment, or work; execution, progress or sequence of work; and interpretation of the Plans, Specifications, or other drawings. This shall be precedent to any payment under the Contract, unless otherwise ordered by the Board.

3-7 CONTRACT DOCUMENTS.

3-7.1 General. *Add the following:*

The CONTRACTOR shall ascertain the existence of any conditions affecting the cost of the Work through a reasonable examination of the Work site prior to submitting the Bid.

Existing improvements visible at the Work site, for which no specific disposition is made on the Plans, but which interfere with the completion of the Work, shall be removed and disposed of by the CONTRACTOR.

The CONTRACTOR shall, upon discovering any error or omission in the Plans or Specifications, immediately call it to the attention of the Engineer.

All final locations determined in the field, and any deviations from the Plans and Specification, shall be marked in red on the documents to show the as-built conditions. CONTRACTOR shall maintain a complete and accurate record of all changes of construction from that shown in these

plans and specifications for the purpose of providing a basis for construction record drawings. No changes shall be made without prior written approval of the Engineer. Upon completion of the Project, CONTRACTOR shall deliver this record of all construction changes to the Engineer along with a letter which declares that other than these noted changes “the Project was constructed in conformance with the Contract Documents.” Final payment will not be made until this requirement is met.

As the figured dimensions shown on the drawings and in the specifications of the Contract may not in every case agree with scaled dimensions, the figured dimensions shall be followed in preference to the scaled dimensions, and drawings to a large scale shall be followed in preference to the drawings to a small scale. Should it appear that the work to be performed, or any related matter, are not sufficiently detailed or explained in the Contract documents, the CONTRACTOR shall apply to the Engineer for such further explanations as necessary, and shall conform to such further explanations provided by the Engineer as part of the Contract to the extent that it is consistent with the terms of the Contract.

Caution: The engineer preparing these plans will not be responsible or liable for unauthorized changes to or uses of these plans. All changes to the plans must be approved in writing by the Engineer.

(a) Records of Construction Changes / As-Built. CONTRACTOR shall maintain a complete and accurate record of all changes of construction from that shown in these Plans and Specifications for the purpose of providing a basis for construction record drawings. No changes shall be made without prior written approval of the City Engineer.

Upon completion of the Project, CONTRACTOR shall deliver this record of all construction changes to the Engineer along with a letter which declares that other than these noted changes that Project was constructed in conformance with the Contract Documents.

Caution: The engineer preparing these Plans will not be responsible for, or liable for, unauthorized changes to or uses of these Plans. All changes to the Plans must be approved in writing by City Engineer.

3-7.2 Precedence of Contract Documents. *Substitute the following:*

If there is a conflict between any of the Contract Documents, the document highest in precedence shall control. The order of precedence, from highest to lowest, shall be as follows:

- 1) Permits issued by jurisdictional regulatory agencies.
- 2) Change Orders and/or Supplemental Agreements; whichever occurs last.
- 3) Contract/Agreement
- 4) Addenda.
- 5) Special Provisions.
- 6) Plans and Project Specification Manual.
- 7) Notice Inviting Bids
- 8) Instructions to Bidders
- 9) Bid/Proposal.
- 10) Standard Plans.
- 11) Standard Specifications.
- 12) Reference Specifications.

In case of difference between drawings and specification, the matter shall be promptly submitted to the Architect's Office, who shall promptly make a determination in writing. Any adjustment by the Contractor without such a determination shall be at the Contractor's own risk and expense.

3-10 SURVEYING. *Substitute the following:*

3-10.1 General. The CONTRACTOR will provide all necessary construction surveying, staking or markings for locating the limits of construction and shall comply with the provisions of 2-9 of these Standard Specifications. The CONTRACTOR shall bear all costs for restaking or marking.

Construction surveys shall be done only under the direction of the Engineer by a Registered (licensed) Land Surveyor or a Registered Civil Engineer authorized to practice land surveying within the state. The AGENCY will provide available record map information. The CONTRACTOR is responsible for obtaining all necessary record maps, centerline ties and survey notes from Los Angeles County.

The CONTRACTOR and his surveyor shall provide the Engineer with a copy of the constructing staking field notes used to construct the improvements. In addition the CONTRACTOR shall also prove a plot of the improvements to be constructed based on the surveyor's construction staking and markings prior to the installation of the improvements. The plot shall be the same scale as the improvement plans.

3-10.2 Permanent Survey Markers. The CONTRACTOR shall notify the Engineer, or the owner on a Private Contract, at least 7 days before starting work to allow for the preservation of survey monuments, lot stakes (tagged), and bench marks.

The CONTRACTOR shall protect existing survey monuments, if any exist within the work limits, during the entire project. Asphalt overlaying of existing survey monuments in the roadway will not be permitted. In the event a surveyed monument lies within an area to be cold planed, removed or reconstructed, the CONTRACTOR shall immediately notify the AGENCY's representative and protect said monument until the monument is relocated.

The CONTRACTOR shall reestablish destroyed survey monuments at the CONTRACTOR's expense.

The Engineer, or the owner at its cost, shall file a Corner Record Form referencing survey monuments subject to disturbance in the Office of the County Surveyor prior to the start of construction and also prior to the completion of construction for the replacement of survey monuments. The CONTRACTOR shall not disturb survey monuments, lot stakes (tagged), or bench marks without the consent of the Engineer or the owner on Private Contracts. The CONTRACTOR shall bear the expense of replacing any that may be disturbed without permission. Replacement shall be done only under the direction of the Engineer by Registered (licensed) Licensed Land Surveyor or a Registered Civil Engineer authorized to practice land surveying within the state.

When a change is made in the finished elevation of the pavement of any roadway in which a permanent survey monument is located, the CONTRACTOR shall adjust the monument cover to the new grade within 7 days of finished paving unless otherwise specified.

3-10.3 Line and Grade. The CONTRACTOR shall be responsible for all survey and layout of work.

The line and grades for construction will be parallel to and offset from the position of the work. From the established lines and grades, the CONTRACTOR shall extend the necessary lines and grades for construction of the work and shall be responsible for the correctness of same.

All work shall conform to the lines, elevations, and grades shown on the Plans.

Three consecutive points set on the same slope shall be used together so that any variation from a straight grade can be detected. Any such variation shall be reported to the Engineer. In the absence of such report, the CONTRACTOR shall be responsible for any error in the grade of the finished work.

Grades for underground conduits will be set at the surface of the ground. The CONTRACTOR shall transfer them to the bottom of the trench.

3-10.4 Survey Service. The Engineer will oversee surveying adequate for construction. The CONTRACTOR shall preserve construction survey stakes and marks for the duration of their usefulness. If any construction survey stakes are lost or disturbed and need to be replaced, such replacement shall be by the CONTRACTOR at his expense.

The CONTRACTOR shall notify the Engineer in writing at least 2 working days before survey services take place for the laying out of any portion of the Work. The CONTRACTOR shall dig all holes necessary for line and grade stakes.

Unless otherwise specified, stakes will be set and stationed by the CONTRACTOR for curbs, headers, sewers, storm drains, structures, and rough grade. A corresponding cut or fill to finished grade (or flowline) will be indicated on a grade sheet.

3-12 WORK SITE MAINTENANCE

3-12.1 General. *Add the following:*

The CONTRACTOR shall also abate dust nuisance by cleaning, sweeping and sprinkling with water, or other means as necessary. The use of water resulting in mud on public streets will not be permitted as a substitute for sweeping or other methods.

Materials and equipment shall be removed from the site as soon as they are no longer necessary. Before the final inspection, the site shall be cleared of equipment, unused materials, and rubbish so as to present a satisfactory clean and neat appearance. All cleanup costs shall be included in the CONTRACTOR's Bid.

Excess excavated material from catch basins or similar structures shall be removed from the site immediately. Sufficient material may remain for use as backfill if permitted by the Specifications. Forms and form lumber shall be removed from the site as soon as practicable after stripping.

3-12.1.1 Vermin Control. *Add the following:*

At the time of acceptance, structures entirely constructed under the Contract shall be free of rodents, insects, vermin, and pests. Necessary extermination work shall be arranged and paid for by the CONTRACTOR as part of the Work within the Contract time, and shall be performed by a licensed exterminator in accordance with requirements of governing authorities. The CONTRACTOR shall be liable for injury to persons or property and responsible for the elimination of offensive odors resulting from extermination operations.

3-12.3 Noise Control.

Construction Hours are: Monday through Friday 7am to 4pm, Saturday 8am through 3pm, Sunday not applicable.

3-12.6.3 Storm Water Pollution Prevention Plan (SWPPP). *Add the following:*

CONTRACTOR shall submit to the engineer a completed and signed SWPPP stormwater guidelines and proposed control measures at the preconstruction conference. The plan may utilize the practices recommended in the latest edition of the *California Storm Water Best Management Practices Handbook*, available from California Stormwater Quality Association (CSQA), and online at <http://www.cabmphandbooks.net/> . The plan shall be consistent with the construction General Permit, issued by the State Water Resources, Control Board, through submittal of the Notice of Intent (NOI).

If construction will occur between October 1 and April 15 (considered as the rainy season), a wet weather erosion control plan must be submitted. Additionally, Best Management Practices (BMPs) implemented during the AGENCY's rainy season shall include but not be limited to those appropriate for wet weather conditions.

(a) Storm Water Pollution Prevention Measures. All storm water pollution prevention measures shall be in accordance with the submitted SWPPP. In the event circumstances during the course of construction require changes to the original SWPPP, a revised plan shall be promptly submitted to the AGENCY's representative in each instance. No responsibility shall accrue to the AGENCY as a result of the plan or as a result of knowledge of the plan. All work installed by the CONTRACTOR in connection with the SWPPP but not specified to become a permanent part of the project shall be removed and the site restored in so far as practical to its original condition prior to completion of construction or when directed by the AGENCY's representative.

(b) Storm Water Pollution Prevention – Measurement And Payment. Unless otherwise indicated in the Special Provisions, measurement and payment for Storm Water Pollution Prevention Measures, as described herein, shall be included in the items of Work requiring storm water pollution prevention measures as indicated in the project Special Provisions. Such payment shall be considered full compensation for all labor, materials, tools, and equipment for completion, and implementation and compliance with the SWPPP.

3-13 COMPLETION, ACCEPTANCE, AND WARRANTY.

3-13.1 Completion. Add the following:

The Work will be inspected by the Engineer for acceptance upon receipt of the CONTRACTOR's written assertion that the Work has been completed.

3-13.3 Warranty. *Add the following:*

All work shall be warranted by the CONTRACTOR against defective workmanship and materials for a period of 1 year from the date the Work was completed. The CONTRACTOR shall replace or repair any such defective work in a manner satisfactory to the Engineer, after notice to do so from the Engineer, and within the time specified in the notice. If the CONTRACTOR fails to make such replacement or repairs within the time specified in the notice, the AGENCY may perform this work and the CONTRACTOR's sureties shall be liable for the cost thereof.

SECTION 4 - CONTROL OF MATERIALS

4-1 GENERAL. *Add the following:*

Used or secondhand materials, parts, and equipment may be used only if permitted by the Specifications.

The CONTRACTOR and all subcontractors, suppliers, and vendors shall guarantee that the entire Work will meet all requirements of this Contract as to the quality of materials, equipment, and workmanship. The CONTRACTOR, at no cost to the AGENCY, shall make any repairs or replacements made necessary by defects in materials, equipment, or workmanship that become evident within one year after the date of recordation of the Notice of Completion. Within this one-year period, the CONTRACTOR shall also restore to full compliance with the requirements of this Contract any portion of the Work which is found not to meet those requirements. The CONTRACTOR shall defend, indemnify, and hold the AGENCY, its officers, agents, and employees harmless from claims of any kind due to injuries or damages arising, directly or indirectly, from said defects or noncompliance.

The CONTRACTOR shall make all repairs, replacements, and restorations within thirty-five (35) days after the date of the Engineers' written notice.

If, in the opinion of the Engineer, the defective work is not of sufficient magnitude or importance to make the work dangerous or undesirable, or if, in the opinion of the Engineer, the removal of such work is impractical or will create conditions which are dangerous or undesirable, the AGENCY shall have the right and authority to retain such work instead of requiring it to be removed and reconstructed, but will make such deductions thereof in the payments due or to become due to the CONTRACTOR as the AGENCY may deem just and reasonable.

4-2 PROTECTION. *Add the following:*

The CONTRACTOR shall be responsible for the protection of public and private property adjacent to the Work and shall exercise due caution to avoid damage to such property.

The CONTRACTOR shall relocate, repair, replace or reestablish all existing improvements within the project limits (e.g., curbs, sidewalks, catch basins, catch basin screens, driveways, fences, walls, sprinkler systems, signs, utility installations, pavements, structures, survey monuments, landscaping, etc.) that are damaged or removed as a result of the CONTRACTOR's operations or as required by the plans and specifications.

All existing improvements, either within the right-of-way or not, including irrigation lines that are damaged by actions of the CONTRACTOR, shall be restored by the CONTRACTOR to their original or better condition at the CONTRACTOR's expense.

The CONTRACTOR shall mark, as approved by the Engineer, all survey monuments, manholes, valves, substructures, or other items that are visible on the surface and will be covered by his operations. This shall be completed prior to the start of that operation and approved by the Engineer.

Existing traffic striping, pavement markings, and curb markings shall also be considered as existing improvements and the CONTRACTOR shall repaint or replace, at the CONTRACTOR's expense, such striping or markings (except for traffic striping and pavement markings within the limits of the Work) if damaged or if their reflectivity is reduced due to construction operations.

All restoration of existing improvements must occur within the construction completion date, unless directed otherwise by the City Engineer.

Maintenance of street and traffic signal systems that are damaged, temporarily removed or relocated shall be done in conformance with the Contract Documents.

Trees, lawns, and shrubbery that are not to be removed shall be protected from damage or injury. If damaged or removed due to CONTRACTOR's operations, they shall be restored or replaced in as nearly the original condition and location as is reasonably possible. Lawns shall be reseeded and covered with suitable mulch.

The CONTRACTOR shall give reasonable notice to occupants or owners of adjacent property to permit them to salvage or relocate plants, trees, fences, sprinklers, and other improvements, within the right-of-way which are designated for removal and would be destroyed because of the Work.

All costs to the CONTRACTOR for protecting, removing, restoring, relocating, repairing, replacing, or reestablishing existing improvements shall be the responsibility of the CONTRACTOR.

4-3 INSPECTION *Add the following:*

4-3.1 General.

All other tests and inspections as required by project specifications and all Authorities having Jurisdiction.

SPECIAL INSPECTIONS

1. THE FOLLOWING ELEMENTS OF CONSTRUCTION SHALL HAVE CONTINUOUS INSPECTION BY A PROJECT INSPECTOR APPROVED BY THE JURISDICTION.
 - A. CONCRETE.
 - B. BOLTS INSTALLED IN CONCRETE.
 - C. PLACING OF REINFORCING STEEL.
 - D. ALL STRUCTURAL WELDING, INCLUDING REINFORCING STEEL.
 - E. EXPANSION ANCHORS.
 - F. EPOXY ANCHORS.
 - G. POWDER ACTUATED FASTENERS/SHOT PINS.
 - H. HIGH STRENGTH BOLTS.
 - I. SEE GEOTECHNICAL ENGINEER'S REPORT FOR SPECIFIC INSPECTION REQUIREMENTS BY A SOILS ENGINEER REPRESENTATIVE.
 - J. INSTALLATION OF METAL DECK HEADED STUDS.
 - K. NONDESTRUCTIVE TEST OF ALL CJP GROOVE WELDS.
2. ALL SPECIAL INSPECTIONS SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 1704 OF THE CODE AND ANY ADDITIONAL REQUIREMENTS STATED IN THESE DRAWINGS AND/OR THE PROJECT SPECIFICATIONS.

Electrical:

1. Ground test
2. Megger test for feeders
3. Tork testing for feeders' terminations to terminal lugs at panels and switchboard
4. Inspection by SCE on the transformer pad and associated primary and secondary conduits installation
5. Lighting control system test

Mechanical:

1. Pressure Test Piping (Inspected by city inspector)
2. TAB report (included on specs and drawings)
3. Start up (By Manufacturer)

Roof top support (Structural item)

All other tests and inspections as required by project specifications and all Authorities having Jurisdiction.

4-4 TESTING.

Per Specification Manual.

4-6 TRADE NAMES.

Along with information supplied by the CONTRACTOR regarding equivalency of the proposed item, the CONTRACTOR shall clearly identify all deviations from the specified item. Deviations discovered by the Engineer after acceptance of an "or equal" item which were not identified by the CONTRACTOR with his/her submittal shall be cause for rejection of the "or equal" item. CONTRACTOR shall be due no additional compensation in time or money for acceptance or

rejection of a proposed “or equal” item and subsequent replacement with the item specified. CONTRACTOR shall pay cost to AGENCY for items requiring more than two submittals and analysis of any shop drawing which requires more than a general review of an “or equal” item.

4-9 CONSTRUCTION MATERIALS DISPUTE RESOLUTION (Soils, Rock Materials, Concrete, Mortar and Related Materials, Masonry Materials, Bituminous Materials, Rock Products, and Modified Asphalts). In the interest of safety and public value, whenever credible evidence arises to contradict the test values of materials, the AGENCY and the CONTRACTOR will initiate, an immediate and cooperative investigation. Test values of materials are results of the materials’ tests, as defined by these Specifications or by the special provisions, required to accept the Work. Credible evidence is process observations or test values gathered using industry accepted practices. A contradiction exists whenever work acceptance or performance becomes suspect. The investigation shall allow access to all test results, procedures, and facilities relevant to the disputed work and consider all available information and, when necessary, gather new and additional information to determine the validity, the cause, and if necessary, the remedy to the contradiction. If the cooperative investigation reaches any resolution mechanism acceptable to both the AGENCY and the CONTRACTOR, the contradiction shall be considered resolved and the cooperative investigation concluded.

Whenever the cooperative investigation is unable to reach resolution, the investigation may then either conclude without resolution or continue by written notification of one party to the other requesting the implementation of a resolution process by committee. The continuance of the investigation shall be contingent upon recipient’s agreement and acknowledged in writing within 3 calendar days after receiving a request. Without acknowledgement, the investigation shall conclude without resolution. The committee shall consist of three State of California Registered Civil Engineers. Within 7 calendar days after the written request notification, the AGENCY and the CONTRACTOR will each select one engineer. Within 14 calendar days of the written request notification, the two selected engineers will select a third engineer. The goal in selection of the third member is to complement the professional experience of the first two engineers. Should the two engineers fail to select the third engineer, the AGENCY and the CONTRACTOR shall each propose 2 engineers to be the third member within 21 calendar days after the written request notification. The first two engineers previously selected shall then select one of the court proposed engineers in a blind draw.

The committee shall be a continuance of the cooperative investigation and will re-consider all available information and if necessary, gather new and additional information to determine the validity, the cause, and if necessary, the remedy to the contradiction. The committee will focus upon the performance adequacy of the material(s) using standard engineering principles and practices and to ensure public value, the committee may provide engineering recommendations as necessary. Unless otherwise agreed, the committee will have 30 calendar days from its formation to complete their review and submit their findings. The final resolution of the committee shall be by majority opinion, in writing, stamped and signed. Should the final resolution not be unanimous, the dissenter may attach a written, stamped, and signed minority opinion.

Once started, the resolution process by committee shall continue to full conclusion unless:

1. Within 7 days of the formation of the committee, the AGENCY and the CONTRACTOR reach an acceptable resolution mechanism; or
2. Within 14 days of the formation of the committee, the initiating party withdraws its written notification and agrees to bear all investigative related costs thus far incurred; or
3. At any point by the mutual agreement of the AGENCY and the CONTRACTOR.

Unless otherwise agreed, the CONTRACTOR shall bear and maintain a record for all the investigative costs until resolution. Should the investigation discover assignable causes for the contradiction, the assignable party, the AGENCY or the CONTRACTOR, shall bear all costs associated with the investigation. Should assignable causes for the contradiction extended to both parties, the investigation will assign costs cooperatively with each party or when necessary, equally. Should the investigation substantiate a contradiction without assignable cause, the investigation will assign costs cooperatively with each party or when necessary, equally. Should the investigation be unable to substantiate a contradiction, the initiator of the investigation shall bear all investigative costs. All claim notification requirements of the contract pertaining to the contradiction shall be suspended until the investigation is concluded.

SECTION 5 - LEGAL RELATIONS AND RESPONSIBILITIES

5-2 SPECIAL NOTICES.

5-2.1 Mandatory Notification Prior To Excavation. The CONTRACTOR's attention is direct to Section 4215.5 through 4217 of the Government Code of the State of California. This requires that two (2) working days prior to commencing any excavation "Underground Service Alert of Southern California" (USA) ("Digalert") shall be notified by phone, toll free 1-800-422-4133, or 811, for the assignment of an Inquiry Identification Number.

Construction CONTRACTOR shall contact all utility companies at least five (5) working days prior to commencing work and shall verify the location of any known utilities and determine whether or not a representative of each company will be present during excavation.

The known public utilities contacts are:

City of Sierra Madre, Public Works Director Arnulfo Yanez (626) 355-6615

SCE: Mrs. Shahana Brown Shahana.Brown@sce.com

So Cal Gas: Mrs. Lanae O'Shields LOShields@socalgas.com

Spectrum: Mr. Manuel Mendez Manuel.Mendez@charter.com,

The CONTRACTOR shall coordinate construction with public utility relocation activities.

The existing subsurface utilities shown have been indicated, based on the best available record information. However, to avoid or resolve any interference problems between these existing utilities and the proposed work, the CONTRACTOR shall field verify the vertical and horizontal

locations of all utilities, such as water lines and water services, electronic conduits, telephone and television cable, storm drain facilities, and all other facilities and obstructions prior to beginning any excavations. If conflicts exist, revised grades and/or alignments may be established, if required. **Such field verification shall require exposing these utilities prior to the start of construction.**

Special reference is hereby made to Section 4-2, "Protection," of the Standard Specifications with respect to the protection, repair, and replacement of existing subsurface utilities.

Additionally, the CONTRACTOR shall also notify the following local entities of his/her schedule fourteen (14) days prior to commencing work, including local refuse collectors, street sweepers, the Post Office, Public Schools, and Bus Companies:

No excavation shall commence unless the CONTRACTOR has obtained the USA Inquiry Identification Number.

5-1.2 Accuracy of Utilities Information. The locations of known existing major utilities, whether above ground or underground, are indicated on the plans. Information and data reflected in the Contract Documents with respect to underground and above ground utilities at or contiguous to the site is based upon information and data furnished to the City and the Engineer by the owners of such utilities, and the City does not assume responsibility for the accuracy or completeness thereof. The CONTRACTOR shall take all possible precautions for the protection of unforeseen utility lines to provide for uninterrupted service and to provide such special protection as may be necessary.

The CONTRACTOR shall be responsible for determining the location and depth of all underground facilities, including service connections, which may affect or be affected by his/her operations, and he/she shall include the cost to pothole all utilities within the limits of work in his/her bid. If an existing utility line, which has been marked by Underground Service Alert or is shown on the plans, is damaged by the CONTRACTOR, the CONTRACTOR shall repair the line and bear the cost thereof.

CONTRACTOR shall be aware that electrical conduits between street and traffic lights may exist beneath pavement and/or sidewalk in areas where such lights are in place and that said conduits are not shown on these plans.

In the event that the CONTRACTOR damages any existing utility lines that are not shown, shown incorrectly or the locations of which are not made known to the CONTRACTOR prior to excavation, a telephone call and written report shall be made immediately to the Utility owner, the Engineer, and to the City. If directed by the City, the CONTRACTOR shall make repairs under the provisions for changes and extra work contained in **2-7 CHANGES INITIATED BY THE AGENCY** of the Standard Specifications.

5-4 INSURANCE.

5-4.1 General. *Add The following:*

CONTRACTOR and AGENCY agree that AGENCY, its employees, agents and officials should, to the extent permitted by law, be fully protected from any loss, injury, damage, claim, lawsuit, cost, expense, attorneys fees, litigation costs, defense costs, court costs or any other cost arising out of or in any way related to the performance of this Agreement, which includes but is

not limited to, contracts with other governmental agencies such as the California Department of Transportation, which are necessary for the AGENCY to enact this Agreement or from contracts with other parties or governmental agencies, which are necessary for the AGENCY to enact this Agreement.

CONTRACTOR acknowledges that its obligation pursuant to this section extends to liability attributable to AGENCY, if that liability is less than the sole fault of AGENCY. CONTRACTOR has no obligation under this Agreement for liability proven in a court of competent jurisdiction or by written agreement between the parties to be the sole fault of AGENCY.

The obligations of CONTRACTOR under this or any other provision of this Agreement will not be limited by the provisions of any workers compensation act or similar act. CONTRACTOR expressly waives its statutory immunity under such statutes or laws as to AGENCY, its employees, agents and officials.

CONTRACTOR agrees to obtain executed indemnity agreements with provisions identical to those as set forth here in this section from each and every subcontractor, sub-tier CONTRACTOR or any other person or entity involved by, for, with or on behalf of CONTRACTOR in the performance or subject matter of this Agreement. In the event CONTRACTOR fails to obtain such indemnity obligations from others as required here, CONTRACTOR agrees to be fully responsible according to the terms of this section.

Failure of AGENCY to monitor compliance with these requirements imposes no additional obligations on AGENCY and will in no way act as a waiver of any rights hereunder. This obligation to indemnify and defend AGENCY as set forth herein is binding on the successors, assigns or heirs of CONTRACTOR and shall survive the termination of this Agreement or this section.

CONTRACTOR agrees to provide insurance in accordance with the requirements as set forth here. If CONTRACTOR uses existing coverage to comply with these requirements and that coverage does not meet the requirements set forth herein, CONTRACTOR agrees to amend, supplement, or endorse the existing coverage to do so. The following coverages will be provided by CONTRACTOR and maintained on behalf of AGENCY and in accordance with the requirements set forth herein.

5-4.2 General Liability Insurance.

Contractor shall procure and maintain for the duration of the contract, and for 2 years thereafter, insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Contractor, his agents, representatives, employees, or subcontractors.

MINIMUM SCOPE AND LIMIT OF INSURANCE

Coverage shall include and be at least as broad as:

A. Casualty Insurance: The Contractor shall procure and maintain insurance on all of its operations with companies acceptable to the State as follows:

1) The Contractor shall keep all insurance in full force and effect from the beginning of the work through contract acceptance.

2) The Contractor shall maintain completed operations coverage with a carrier acceptable to the State through the expiration of the patent deficiency in construction statute of repose set forth in Code of Civil Procedure Section 337.1.

B. Commercial General Liability (CGL): Insurance Services Office (ISO) Form CG 00 01 covering CGL on an “occurrence” basis, including products and completed operations, property damage, bodily injury and personal & advertising injury with limits no less than \$5,000,000 per occurrence. If a general aggregate limit applies, either the general aggregate limit shall apply separately to this project/location (ISO CG 25 03 or 25 04) or the general aggregate limit shall be twice the required occurrence limit.

(i) The Contractor shall carry General Liability and Umbrella or Excess Liability Insurance covering all operations by or on behalf of the Contractor providing insurance for bodily injury liability and property damage liability for the following limits and including coverage for:

- A. Premises, operations, and mobile equipment
- B. Products and completed operations
- C. Broad form property damage (including completed operations)
- D. Explosion, collapse, and underground hazards
- E. Personal injury
- F. Contractual liability

(ii) The Contractor shall not require certified Small Business subcontractors to carry Liability Insurance that exceeds the limits of these special provisions. The maximum required Liability Insurance limits of these special provisions shall apply to certified Small Business subcontractors for work performed on the project, regardless of tier. The provisions of these special provisions shall be included in all subcontracts for all tiers.

C. Automobile Liability: Insurance Services Office Form CA 0001 covering Code 1 (any auto), with limits no less than \$1,000,000 per accident for bodily injury and property damage.

D. Workers’ Compensation Insurance and Employer’s Liability Insurance: as required by the State of California, with Statutory Limits, and Employers’ Liability insurance with a limit of no less than \$1,000,000 per accident for bodily injury or disease. The Contractor shall provide Employer's Liability Insurance in amounts not less than:

- 1) \$1,000,000 for each accident for bodily injury by accident
- 2) \$1,000,000 policy limit for bodily injury by disease
- 3) \$1,000,000 for each employee for bodily injury by disease

Execution of the Articles of Agreement constitutes certification of the enclosed Workers' Compensation Insurance Affidavit, if not provided separately.

E. Builder's Risk (Course of Construction) insurance: utilizing an "All Risk" (Special Perils) coverage form, with limits equal to the completed value of the project and no coinsurance penalty provisions.

F. Contractors' Pollution Legal Liability and/or Asbestos Legal Liability and/or Errors and Omissions: with limits no less than \$1,000,000 per occurrence or claim, and \$2,000,000 policy aggregate. The Contractors Pollution Liability policy shall not contain lead-based paint or asbestos exclusions. The Contractors Pollution Liability policy shall not contain a mold exclusion, and the definition of Pollution shall include microbial matter, including mold.

If the contractor maintains broader coverage and/or higher limits than the minimums shown above for all policies, the City requires and shall be entitled to the broader coverage and/or higher limits maintained by the contractor. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the City.

Self-Insured Retentions

Self-insured retentions must be declared to and approved by the City. At the option of the City, either: the contractor shall cause the insurer shall to reduce or eliminate such self-insured retentions as respects the City, its officers, officials, agents, employees, and volunteers; or the Contractor shall provide a financial guarantee satisfactory to the City guaranteeing payment of losses and related investigations, claim administration, and defense expenses. The policy language shall provide, or be endorsed to provide, that the self-insured retention may be satisfied by either the named insured or City.

Additional Insured

The City, its officers, officials, agents, employees, and volunteers are to be covered as additional insureds on the CGL policy with respect to liability arising out of work or operations performed by or on behalf of the Contractor including materials, parts, or equipment furnished in connection with such work or operations and automobiles owned, leased, hired, or borrowed by or on behalf of the Contractor. General liability coverage can be provided in the form of an endorsement to the Contractor's insurance at least as broad as one of the following ISO ongoing operations Forms: CG 20 10 or CG 20 26 or CG 20 33 (not allowed from subcontractors), or CG 20 38; and one of the following ISO completed operations Forms: CG 20 37, 2039 (not allowed from subcontractors), or CG 20 40.

Primary Insurance

For any claims related to this project, the Contractor's insurance coverage shall be primary insurance coverage at least as broad as ISO CG 20 01 04 13 as respects the City, its officers, officials, agents, employees, and volunteers. Any insurance or self-insurance maintained by the City, its officers, officials, agents, employees, or volunteers shall be excess of the Contractor's insurance and shall not contribute with it.

Notice of Cancellation

Contractor shall provide immediate written notice if (1) any of the required insurance policies is terminated; (2) the limits of any of the required policies are reduced; (3) or the deductible or self-insured retention is increased. In the event of any cancellation or reduction in coverage or limits of any insurance, Contractor shall forthwith obtain and submit proof of substitute insurance.

Builder's Risk (Course of Construction) Insurance

Contractor may submit evidence of Builder's Risk insurance in the form of Course of Construction coverage. Such coverage shall name the City as a loss payee as their interest may appear.

If the project does not involve new or major reconstruction, at the option of the City, an Installation Floater may be acceptable. For such projects, a Property Installation Floater shall be obtained that provides for the improvement, remodel, modification, alteration, conversion or adjustment to existing buildings, structures, processes, machinery and equipment. The Property Installation Floater shall provide property damage coverage for any building, structure, machinery or equipment damaged, impaired, broken, or destroyed during the performance of the Work, including during transit, installation, and testing at the City's site.

Acceptability of Insurers

Insurance is to be placed with insurers authorized to conduct business in the state with a current A.M. Best rating of no less than A: VII, unless otherwise acceptable to the City.

Waiver of Subrogation

Contractor hereby agrees to waive rights of subrogation which any insurer of Contractor may acquire from Contractor by virtue of the payment of any loss. Contractor agrees to obtain any endorsement that may be necessary to affect this waiver of subrogation, but this provision applies regardless of whether or not the City has received a waiver of subrogation endorsement from the insurer. However, the Workers' Compensation policy shall be endorsed with a waiver of subrogation in favor of the City for all work performed by the Contractor, its employees, agents and subcontractors.

Verification of Coverage

Contractor shall furnish the City with original Certificates of Insurance including all required amendatory endorsements (or copies of the applicable policy language effecting coverage required by this clause) and a copy of the Declarations and Endorsement Page of the CGL policy listing all policy endorsements to City before work begins. However, failure to obtain the required documents prior to the work beginning shall not waive the Contractor's obligation to provide them. The City reserves the right to require complete, certified copies of all required insurance policies, including endorsements, required by these specifications, at any time.

Subcontractors

Contractor shall require and verify that all subcontractors maintain insurance meeting all the requirements stated herein, and Contractor shall ensure that City is an additional insured on insurance required from subcontractors. For CGL coverage subcontractors shall provide coverage with a form at least as broad as CG 20 38 04 13.

Special Risks or Circumstances

City reserves the right to modify these requirements, including limits, based on the nature of the risk, prior experience, insurer, coverage, or other circumstances.

SECTION 6 - PROSECUTION AND PROGRESS OF THE WORK

6-1 CONSTRUCTION SCHEDULE AND COMMENCEMENT OF WORK.

6-1.3 Pre-Construction Meeting and Submittal. A pre-construction meeting will be conducted by the City or City Representative prior to commencement of construction at a time and place designated by the City. Those attending the meeting shall include, but not be limited to, the following:

- a. The CONTRACTORs representative(s)
- b. Sub-CONTRACTORs representative(s), if needed
- c. City of Sierra Madre Director of Public Works
- d. The Architect of Record
- e. The Construction Engineers
- f. The affected utility companies' representatives
- g. City of Sierra Madre Public Works Inspectors
- h. City of Sierra Madre Construction Manager

One week prior to this meeting the CONTRACTOR shall submit the following:

1. Construction Schedule
2. Traffic Control Plan
3. Emergency Contact List
4. List of Subcontractors
5. Storm Water Pollution Prevention Plan (SWPPP)

6-1.4 Emergency Contact List. The CONTRACTOR shall provide the following information in writing and submit it with the signed contract, contract bonds and certificates of insurance. Failure to comply may result in delays in the processing of the contract documents.

1. Name of authorized representative at the job site.
2. Address and telephone number where the above person can be reached 24 hours a day.
3. Address of the nearest office of the CONTRACTOR, if any, and the name and telephone number of a person at that office who is familiar with the project.
4. Address and telephone number of the CONTRACTOR's main office and the name and telephone number of the person at that office familiar with the project.

6-2 PROSECUTION OF WORK.

As soon as possible under the provisions of the Specifications, the CONTRACTOR shall backfill all excavations and restore to usefulness all improvements existing prior to the start of the Work.

The CONTRACTOR shall submit monthly progress reports to the Engineer by the tenth day of each month. The report shall include an updated construction schedule. Any deviations from the original schedule shall be explained.

6-2.1 Traffic and Access. The CONTRACTOR's operations shall cause no unnecessary inconvenience. The access rights of the public shall be considered at all times. Unless otherwise authorized, traffic shall be permitted to pass through the Work, or an approved detour shall be provided.

Safe and adequate pedestrian and vehicular access shall be provided and maintained to: fire hydrants; commercial and industrial establishments; churches, schools and parking lots; service stations and motels; hospitals; police and fire stations; and establishments of similar nature. Access to these facilities shall be continuous and unobstructed unless otherwise approved by the Engineer.

Safe and adequate pedestrian zones and public transportation stops, as well as pedestrian crossings of the Work at intervals not exceeding 90 m (300 feet), shall be maintained unless otherwise approved by the Engineer.

Vehicular access to residential driveways shall be maintained to the property line except when necessary construction precludes such access for reasonable periods of time. If backfill has been completed to the extent that safe access may be provided, and the street is opened to local traffic, the CONTRACTOR shall immediately clear the street and driveways and provide and maintain access.

The CONTRACTOR shall cooperate with the various parties involved in the delivery of mail and the collection and removal of trash and garbage to maintain existing schedules for these services.

Grading operations, roadway excavation and fill construction shall be conducted by the CONTRACTOR in a manner to provide a reasonably satisfactory surface for traffic. When rough grading is completed, the roadbed surface shall be brought to a smooth, even condition satisfactory for traffic.

Unless otherwise authorized, work shall be performed in only one-half of the roadway at one time. One half shall be kept open and unobstructed until the opposite side is ready for use. If one-half a street only is being improved, the other half shall be conditioned and maintained as a detour.

The CONTRACTOR will be required to maintain at least one lane of traffic in each direction through the project area at all times in a manner satisfactory to the Engineer in the form of an engineered traffic control plan. The engineered traffic control plans must be signed by a California registered civil and/or traffic engineer. The plan is a required submittal for review one week prior to the pre-construction meeting.

If traffic control on the project shall be implemented by a sub-contractor, such subcontractor must specialize in Traffic Control and be approved by the City Engineer.

The CONTRACTOR shall include in its Bid all costs for the above requirements.

6-2.1.1 Notification to the Public. Affected properties will be determined by the Engineer and are, in general, those properties that fall within 500 feet of the limits of the work. CONTRACTOR shall remain aware of all adjacent property owners and take all steps necessary to minimize construction impacts and disturbances to all affected property owners. The CONTRACTOR is required to distribute the approved public notice to property owners one week prior to roadway construction. CONTRACTOR shall be responsible for all costs associated with these tasks and responsibilities in the various contract bid items.

The CONTRACTOR is required to notify the City by e-mail that public notices have been distributed. The e-mail shall be addressed to the City representative(s) designated during the pre-construction meeting. The e-mail shall be sent to the City no later than 8 a.m. on the day following distribution of the notices. The e-mail notification to the City shall contain a map showing the limits of distribution and the dates and times distributed. A separate e-mail shall be sent for each distribution. The City will use the information on the e-mails to verify that the distribution has been performed. If the distribution is not verified by the City, the City will e-mail to the CONTRACTOR's representative the locations which must be redistributed with the new information. The CONTRACTOR shall not perform work in the distribution area without e-mail notification of verification by the City of the distribution.

The CONTRACTOR shall submit a sample of a public notice for review and approval by the Engineer. The CONTRACTOR shall provide changes as directed by the City representative and submit final draft for approval.

The CONTRACTOR shall furnish and place "No Parking" signs, 12"x18" minimum size, approved by the Engineer, along the street in front of every residence and/or business affected by the work, two (2) working days in advance of any work. In rural areas, the signs shall be placed at a spacing not exceeding 400 feet. The signs shall include the day and time during which parking is prohibited. Parking restrictions shall be limited to the intervals between 8 a.m. to 5 p.m. to allow parking during the night. The CONTRACTOR shall remove these signs immediately when they are no longer needed.

If the work is delayed or rescheduled for any reason after placement of "No Parking" signs, the CONTRACTOR shall re-date the signs affected and re-notify the residents and businesses of the change via a new "door-knob" notice. If the work is delayed more than five days, the CONTRACTOR shall remove the signs and place re-dated signs two (2) days in advance of the work.

6-2.1.2 Notification to the Public Agencies. The CONTRACTOR shall notify the following Agencies 48 hours prior to working in the area within the City of Sierra Madre unless otherwise noted:

City of Sierra Madre Public Works Director - Arnulfo Yanez (626) 355-6615

City of Sierra Madre Construction Manager - Natalie Hazard (714) 465-6010

6-2.1.3 Parking Restrictions and Posting for Tow Away. No Parking signs, posted by the CONTRACTOR, shall be of heavy card stock and not less than 1.75 square feet of surface area on the face. Background color shall be white and letters shall be printed in red water resistant ink

except day, date, and time of restriction may be printed in black water resistant ink. The signs shall be printed with the words “Tow Away” and “No Parking” with a character height of not less than 2.75 inches and a stroke width of not less than 0.5 inches. The day, dated, and time of the particular restriction shall be printed or attached below the above-mentioned wording in characters of not less than 2.0 inches in height and 0.4 inches in stroke width. The day of the week shall be written out or properly abbreviated with three to four letters; date or dates or restriction shall be listed completely; the beginning and ending times shall be clearly listed on the sign.

Signs shall be mounted such that the wording “No Parking” are at an elevation at least three feet above the adjacent flowline. Signs may be tied with string to trees and power poles, taped to existing sign poles, or mounted to stakes or barricades as provided by the CONTRACTOR. The signs shall be placed as needed to control the parking of cars within the construction zone; signs shall be placed at intervals of 75 feet or less along each side of the roadway.

Signs shall be posted and maintained by the CONTRACTOR for a period of 72 hours prior to the restrictions becoming effective. The CONTRACTOR may only post parking restrictions that are effective for the duration of the Work. Upon completion of the Work, the CONTRACTOR shall promptly and completely remove and dispose all signs, stakes, and barricades. The CONTRACTOR shall promptly reset or replace all damaged or defective signs.

The CONTRACTOR shall be fully responsible for the adequate removal of all parked cars. The CONTRACTOR shall coordinate the removal of all vehicles with the Sheriff Department. The CONTRACTOR shall notify the Sheriff Communications Center upon posting of the parking restrictions for a particular street. For removal of parked vehicles, the CONTRACTOR shall notify the Sheriff Communications Center not less than two hours prior to the needed removal, stating the address nearest the parked vehicle, make, model, color and license number. The City shall not be responsible for any delay or additional costs associated with the removal of parked cars that obstruct the construction operation.

If a vehicle owner successfully contests a towing citation in court, and their citation is dismissed for causes related to the CONTRACTOR’s failure to perform the requirements of this section, the CONTRACTOR shall reimburse the City for the cost of any claims associated with the towing citation.

DEVIATIONS FROM THE REQUIREMENTS OF THIS SUBSECTION WILL BE PERMITTED ONLY ON PRIOR CONSENT OF THE ENGINEER.

6-2.1.4 Storage of Equipment and Materials in Public Streets. Construction materials shall not be stored in streets, roads, or highways for more than 5 days after unloading. All materials or equipment not installed or used in construction within 5 days after unloading shall be stored elsewhere by the CONTRACTOR at its expense unless authorized additional storage time.

Construction equipment shall not be stored at the Work site before its actual use on the Work nor for more than 5 days after it is no longer needed. Time necessary for repair or assembly of equipment may be authorized by the Engineer.

Excavated material, except that which is to be used as backfill in the adjacent trench, shall not be stored in public streets unless otherwise permitted. After placing backfill, all excess material shall be removed immediately from the site.

6-2.1.5 Street Closures, Detours, Barricades. The CONTRACTOR shall comply with all applicable State, County and City requirements for closure of streets. The CONTRACTOR shall provide barriers, guards, lights, signs, temporary bridges, flagpersons, and watchpersons. The CONTRACTOR shall be responsible for compliance with additional public safety requirements which may arise. The CONTRACTOR shall furnish and install signs and warning devices and promptly remove them upon completion of the Work.

At least 48 hours in advance of closing, partially closing or reopening, any street, alley, or other public thoroughfare, the CONTRACTOR shall notify the Police, Fire, Traffic and Engineering Departments, and comply with their requirements. Deviations must first be approved in writing by the Engineer.

The CONTRACTOR shall secure approval, in advance, from authorities concerned for the use of any bridges proposed by it for public use. Temporary bridges shall be clearly posted as to load limit, with signs and posting conforming to current requirements covering "signs" as set forth in the Traffic Manual published by the California Department of Transportation. This manual shall also apply to the street closures, barricades, detours, lights, and other safety devices required.

All traffic control barricades, signs and devices used by the CONTRACTOR shall, as a minimum, conform to the latest edition of the "California Manual on Uniform Traffic Controls Devices" ("MUTCD"). Channelization devices shall be spaced no greater than fifty (50) feet apart. The CONTRACTOR shall take additional precautions as he/she may find necessary under the circumstances.

Should the CONTRACTOR fail to provide adequate traffic control or safety barricades, and in the event a responsible individual cannot be located or refuses to perform, the AGENCY will at its option place needed devices or engage a private firm to place and maintain said barricades, which will be charged to the CONTRACTOR directly.

Full street closures will not be allowed without City Council approval.

All costs involved in the CONTRACTOR'S prosecution of the Work shall be included in the Bid.

6-2.2 Daily Reports. The CONTRACTOR shall complete a Daily Report indicating manpower, work performed, major equipment used and on standby (itemized separately), subcontractors, and similar items involved in the performance of the Work. The Daily Report shall be completed on forms prepared by the CONTRACTOR and acceptable to the Engineer and shall be submitted to the City Inspector weekly.

6-3 TIME OF COMPLETION

6-3.1 General.

The CONTRACTOR shall complete the Work within the number of Working days specified in **B1.03 of Section B - Instructions to Bidders** after the Notice to Proceed.

6-3.3 Working Day. A working day is any day within the period between the start of the Contract time as defined in 6-1.2 and the date provided for completion, or upon field acceptance by the Engineer for all work provided for in the Contract, whichever occurs first, other than:

1. Saturday,

2. Sunday,
3. any day designated as a holiday by the AGENCY,
4. any other day designated as a holiday in a Master Labor Agreement entered into by the CONTRACTOR or on behalf of the CONTRACTOR as an eligible member of a CONTRACTOR association,
5. any day the CONTRACTOR is prevented from working at the beginning of the workday for cause as defined in 6-4.1,
6. any day the CONTRACTOR is prevented from working during the first 5 hours with at least 60 percent of the normal work force for cause as defined in 6-4.1.

The CONTRACTOR's activities involving work which requires street closure, detours, and barricades shall be confined to the hours between 7:30 a.m. and 4:00 p.m. Monday through Friday. In addition, the CONTRACTOR shall not perform any Work on Saturday, Sunday, or on AGENCY-designated holidays. AGENCY-designated holidays are listed in **TABLE 1 – AGENCY-DESIGNATED HOLIDAYS** below. Deviation from these hours will be permitted upon approval of the Engineer, except in emergencies involving immediate hazard to persons or property.

Deviations from these hours will not be permitted without the prior consent of the Engineer, except in emergencies involving immediate hazard to persons or property. In the event of either a requested or emergency deviation, inspection service fees will be charged against the CONTRACTOR. Service fees will be calculated at overtime rates including benefits, overhead, and travel time; and will be deducted from the amounts due the CONTRACTOR.

Failure of the CONTRACTOR to adhere to working day requirements will result in damages being sustained by the City. Such damages are, and will continue to be, impracticable and extremely difficult to determine.

TABLE 1 – AGENCY-DESIGNATED HOLIDAYS

New Year's Day
Martin Luther King, Jr. Day
President's Day
Memorial Day
Independence Day
Labor Day
Veteran's Day
Thanksgiving Day
Day after Thanksgiving
Christmas Eve

Christmas Day

6-3.4 Restrictions on closure of traffic lanes:

No contractual work shall be performed in the public Right-of-Way during the first week of school unless approved by the City Engineer.

- A. All traffic lanes shall be open for public use on the days and at the times specified below, unless approved otherwise by the City Engineer:
 - 1. Saturdays, Sundays and AGENCY designated holidays: from 12:01 a.m. to 11:59 p.m.
 - 2. Fridays and any days preceding an AGENCY designated holiday: from 3:00 p.m. to 11:59 p.m.
 - 3. Non-construction hours: all hours when the CONTRACTOR's employees are not physically present at the construction site actively performing contract work.
- B. On those days and hours when closure of traffic lanes is not prohibited under the provisions of the preceding subparagraph A, no more than one travel lane may be closed at any time during construction hours. During any lane closure, Type II flashing arrow boards shall be used in accordance with the 2012 California MUTCD.
- C. Traffic signals shall not be placed in flash operation during the hours that traffic lanes must be kept open as defined in Paragraph A. Under no circumstances shall traffic signal be placed in flash operation without prior approval from the Project Engineer. Traffic signal will be only placed in flash operation by City personnel. CONTRACTOR shall contact the Project Engineer at least two (2) working days in advance to coordinate traffic signal service.

6-4 DELAYS AND EXTENSIONS OF TIME.

6-4.4 Written Notice and Report.

Whenever the CONTRACTOR foresees any delay in the prosecution of the work, and in any event immediately upon the occurrence of any delay which the CONTRACTOR regards as unavoidable, he/she shall notify the Engineer in writing of the probability of the occurrence of such delay and its cause so that the Engineer may take immediate steps to prevent, if possible, the occurrence or continuance of the delay, or, if prevention is not possible, may determine whether the delay is to be considered avoidable or unavoidable, how long it continues, and to what extent it will delay the prosecution and completion of the work. It will be concluded that any and all delays which have occurred in the prosecution and completion of the work have been avoidable delays, except such delays as shall have been called to the attention of the Engineer at the time of their occurrence and found by him/her to have been unavoidable. The CONTRACTOR shall make no claims

for any delay not called to the attention of the Engineer at the time of its occurrence as an unavoidable delay.

6-7 TERMINATION OF THE CONTRACT FOR DEFAULT.

6-7.1 General.

If the CONTRACTOR fails to begin delivery of material and equipment, to commence the Work within the time specified, to maintain the rate of delivery of material, to execute the Work in the manner and at such locations as specified, or fails to maintain the Work schedule which will insure the AGENCY's interest, or, if the CONTRACTOR is not carrying out the intent of the Contract, the AGENCY may serve written notice upon the CONTRACTOR and the Surety on its Faithful Performance Bond demanding satisfactory compliance with the Contract.

6-9 LIQUIDATED DAMAGES.

The CONTRACTOR agrees to forfeit and pay the AGENCY the amount of Thousand Dollars (\$1,000.00) per day for each and every day of unauthorized delay beyond the completion date, which shall be deducted from any monies due the CONTRACTOR. This payment shall be considered liquidated damages. CONTRACTOR agrees that such liquidated damages are reasonable under the circumstances existing at the time of execution of the contract, that such liquidated damages are to compensate AGENCY for losses that are difficult to measure and that such damages are not a penalty.

The AGENCY's agreement to waive a specific time provision or to extend the time for performance shall not constitute a waiver of any other time provision contained in the Contract Documents.

Failure of the CONTRACTOR to complete performance promptly within the additional time authorized in a waiver or extension of time agreement shall constitute a material breach of this Contract entitling the AGENCY to terminate this agreement.

SECTION 7 - MEASUREMENT AND PAYMENT

7-1 MEASUREMENT OF QUANTITIES FOR UNIT PRICE WORK.

7-1.1 General. *Add the following:*

The planimeter shall be considered an instrument of precision adapted to measurement of all areas.

7-3 PAYMENT

Per the Project Specification Manual, Division 01, Section 01 29 00.

SECTION 8 - FACILITIES FOR AGENCY PERSONNEL

8-6 BASIS OF PAYMENT. *Substitute the following:*

Sierra Madre Library Redesign and Improvements

Project No.: FC82306

All costs incurred in furnishing, maintaining, servicing, and removing field officers, laboratories, or bathhouse facilities required at the project site shall be included in the bid item for furnishing such facilities. If such facilities are required by the Plans or Specifications and no bid item is provided in the proposal, the costs shall be included in other items for which bids are entered. Such costs incurred in connection with offices and laboratories at plants shall be borne by the plant owners.

The first progress payment will not be approved until all facilities are in place and fully comply with the Contract Documents.

(End of Section)

SECTION G – SPECIAL PROVISIONS – PART 2 THROUGH 8

SIERRA MADRE LIBRARY PROJECT NO. FC82306 IN THE CITY OF SIERRA MADRE, CALIFORNIA

The following Special Provisions describe materials, methods of construction, and measurement and payment for items of work that are unique to the project. These provisions supplement, amend, or replaced the requirements of the Standard Specifications for Public Works Construction (“Greenbook”). To the extent that anything in these Special Provisions conflicts with the terms or requirements of the SSPWC, these Special Provisions shall control.

All costs involved shall be absorbed in the CONTRACTOR’s overall bid for the project.

PART 2 – CONSTRUCTION MATERIALS

Priority Procurement for Long Leadtime Items (Switchgear, Electrical Panels, Elevator, etc.)

PART 3 – CONSTRUCTION METHODS

PART 4 - EXISTING IMPROVEMENTS

PART 5 – PIPELINE SYSTEM REHABILITATION

PART 6 – TEMPORARY TRAFFIC CONTROL

PART 7 – STREET LIGHTING AND TRAFFIC SIGNAL SYSTEMS

PART 8 – LANDSCAPING AND IRRIGATION

Tree and Stump Removal

Potential Underground Boulder Excavation with Onsite Storage

(End of Section)

APPENDIX I

**SIERRA MADRE LIBRARY
PROJECT NO. FC82306
IN THE CITY OF SIERRA MADRE, CALIFORNIA**

[For State or Federally funded projects, attach specific funding requirements here and refer to these requirements in Part 1 – Special Provisions)

None are apparent at this time.

APPENDIX II

**SIERRA MADRE LIBRARY
PROJECT NO. FC82306
IN THE CITY OF SIERRA MADRE, CALIFORNIA**

[Add attachments such as maps, details, public notice, or other contract documents.]

NAME OF ATTACHMENTS (PROJECT MAP, DETAILS, ETC.)

and

PUBLIC NOTICE, if applicable

None are applicable.

SECTION 011000 - SUMMARY

PART 1 GENERAL

1.01 PROJECT

- A Project Name: Sierra Madre Library Redesign and Improvements
- B The Project consists of the construction of the renovation of the existing Sierra Madre Library built in 1954 with a two-story addition on the south side of the building.

1.02 CONTRACT DESCRIPTION

1.03 DESCRIPTION OF ALTERATIONS WORK

- A Scope of demolition and removal work is indicated on drawings and specified in Section 024100.
- B Scope of alterations work is indicated on drawings.
- C Plumbing: Alter existing system and add new construction.
- D HVAC: Alter existing system and add new construction.
- E Electrical Power and Lighting: Alter existing system and add new construction.
- F Fire Suppression Sprinklers: New fire suppression sprinkler system.
- G Fire Alarm: New fire alarm system.
- H Security System: New security system.
- I Owner will remove the following items before start of work:
 - 1. Please refer to Construction Documents.
- J Contractor is required to remove and deliver the following to Owner prior to start of work:
 - 1. Please refer to Construction Documents.
- K Contractor is required to remove and store the following prior to start of work, for later reinstallation by Contractor:
 - 1. Please refer to Construction Documents.

1.04 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.

1.05 CONTRACTOR USE OF SITE AND PREMISES

- A Construction Operations: Limited to areas noted on Drawings.
 - 1. Locate and conduct construction activities in ways that will limit disturbance to site.
- B Arrange use of site and premises to allow:
 - 1. Work by Others.
 - 2. Use of site and premises by the public.
- C Provide access to and from site as required by law and by Owner:
 - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- D Existing building spaces may not be used for storage.
- E Time Restrictions:
 - 1. Limit conduct of especially noisy exterior work to the hours of TBD.
 - 2. Limit conduct of the hours of TBD.
- F Utility Outages and Shutdown:

Summary - 011000

Sierra Madre Library Redesign and Improvements

Project No.: FC82306

1. Prevent accidental disruption of utility services to other facilities.

1.06 WORK SEQUENCE

- A Coordinate construction schedule and operations with Owner.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 011000

Summary - 011000

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.01 SUMMARY

- A This Section consists of:
 - 1. Submission procedures for scheduled Alternates.
 - 2. Documentation of changes to Contract Sum and Contract Time.
- B The description of Alternates herein below and through the Specifications are intended to set the intent and to describe the major work only. Such descriptions are not to be taken as limiting the work required under any of the alternates, and all work required to carry out the intent of each of the accepted Alternates shall be done without cost additional to that agreed upon as the alternate price. Review all Construction Documents to determine full scope and description of each alternate.

1.02 REQUIREMENTS

- A Submit Alternates with full description of the proposed alternate and the affect on adjacent or related components.
- B Alternates quoted on Bid Forms will be reviewed and accepted or rejected at the Owner's option. Accepted alternates will be identified in the Owner-Contractor Agreement.
- C Coordinate related work and modify surrounding work to integrate the Work of each Alternate.

1.03 SELECTION AND AWARD OF ALTERNATES

- A Indicate variation of Bid Price for Alternates described below and list where provided for Bid Form or any supplement to it, which requests a difference in Contract Price by adding to or deducting from the base bid price.
- B The lowest responsible and eligible bid will be determined on the basis of the base bid, adjusted by such alternate or alternates as may be included in the award of the Contract in the sole discretion of the Awarding Authority.

1.04 SCHEDULE OF ALTERNATES

- A ALTERNATE 1 – Storytime Casework per Add Alternate Schedule on Sheet G0.00
- B ALTERNATE 2 – Monument Sign per Add Alternate Schedule on Sheet G0.00
- C ALTERNATE 3 – Site Furniture per Add Alternate Schedule on Sheet G0.00
- D ALTERNATE 4 – Planting Pots per Add Alternate Schedule on Sheet G0.00
- E ALTERNATE 5 – Future EV Charging Electrical per Add Alternate Schedule on Sheet G0.00

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 012300

Alternates - 012300

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

- A Section includes:
 - 1. Administrative and procedural requirements for substitutions.

1.02 RELATED REQUIREMENTS

- A Section 013000 - Administrative Requirements: Project meetings, photographs, documentation, reports, and drawing coordination.
- B Section 013300 - Submittal Requirements: Submittal procedures.
- C Section 016000 - Product Requirements: Fundamental product requirements, product options, delivery, storage, and handling and requirements for submitting comparable product submittals for products by listed manufacturers.

1.03 DEFINITIONS

- A Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.04 SUBMITTALS

- A See Section 013300 - Submittal Requirements, for submittal procedures.
- B Substitution Requests: Submit (1) electronic copy of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
- C Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - 1. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
 - 2. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate Contractors, that will be necessary to accommodate proposed substitution.
 - 3. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
- D Product Data, including drawings and descriptions of products and fabrication and installation procedures.
- E Samples, where applicable or requested.
- F Certificates and qualification data, where applicable or requested.
- G List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.

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- H Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
- I Research reports evidencing compliance with building code in effect for Project, and applicable code organization.
- J Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
- K Cost information, including a proposal of change, if any, in the Contract Sum.
- L Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
- M Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

1.05 QUALITY ASSURANCE

- A Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.06 PROCEDURES

- A Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.01 SUBSTITUTIONS

- A Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
 - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B Substitutions for Convenience: Architect will consider requests for substitution if received within 30 days after the Notice of Award. Requests received after that time may be considered or rejected at discretion of Architect.

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1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.
 - b. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - c. Requested substitution does not require extensive revisions to the Contract Documents.
 - d. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - e. Substitution request is fully documented and properly submitted.
 - f. Requested substitution will not adversely affect Contractor's construction schedule.
 - g. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - h. Requested substitution is compatible with other portions of the Work.
 - i. Requested substitution has been coordinated with other portions of the Work.
 - j. Requested substitution provides specified warranty.
 - k. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION

3.01 SUBSTITUTION SUBMITTAL PROCEDURES

- A Instructions to Bidders specifies time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.
- B Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
- C Substitution request must be completed with all required information. Incomplete substitution requests will be returned with no action taken.
- D Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
- E Submit 1 copy (electronic) of request for substitution for consideration. Limit each request to one proposed substitution.
- F Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
- G Substitution request does not replace the required submittal. Submittals for any items accepted through the Substitution Request procedure are still required.

3.02 ARCHITECTS ACTION

- A If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution.
- B Architect will notify Contractor of acceptance or rejection of proposed substitution within:
 1. 14 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.

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C Forms of Acceptance:

1. Architect's Supplemental Instructions (ASI) for minor changes in the Work.
2. Notice of Clarifications (NOC)
3. Construction Change Directive:
 - a. Architect may issue a directive, signed by Owner, instructing Contractor to proceed with a change for subsequent inclusion in a Change Order.
 - b. Documentation will describe changes in Work and designate method of determining any change to Contract Sum or Contract Time. Promptly execute change.
4. Change Orders:
 - a. AIA Document G701.

D The Architect will notify Contractor in writing of decision to accept or reject request.

3.03 CLOSEOUT ACTIVITIES

- A See Section 017800 - Closeout Procedures and Submittals, for closeout submittals.
- B Include completed Substitution Request Forms as part of the Project record. Include both approved and rejected Requests.

END OF SECTION 012500

Substitution Procedures - 012500

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

- A This Section specifies administrative and procedural requirements for handling and processing Contract modifications.

1.02 RELATED SECTIONS :

- A Section 012500 - Substitution Procedures: For administrative procedures for handling requests for substitutions made after Contract award.

1.03 DEFINITIONS

- A Modification: A Modification is defined as one of the following:
 1. An Architect's Supplemental Instruction; (ASI)
 2. Notice of Clarification; (NOC)
 3. A Change Order; (CO)
 4. A Construction Change Directive; (CCD)
 5. Or a written amendment to the Contract signed by Owner, Architect, and Contractor.

1.04 MINOR CHANGES IN THE WORK

- A Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time in the form of an ASI.

1.05 CHANGE ORDER REQUESTS

- A Owner-Initiated Change Order Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
 2. Within 10 days after receipt of Change Order Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 3. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 4. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 5. Include costs of labor and supervision directly attributable to the change.
 6. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- B Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a Change Order Request to Architect.
 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to

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substantiate quantities.

3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 012500 - Substitution Procedures if the proposed change requires substitution of one product or system for product or system specified.

1.06 CHANGE ORDER PROCEDURES

- A On Owner's approval of a Change Order Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701. Change Orders may only be approved if the Architect agrees and signs the Change Order form.

1.07 CONSTRUCTION CHANGE DIRECTIVE

- A Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION 012600 012600

Contract Modification Procedures - 012600

SECTION 012613 - REQUEST FOR INFORMATION

PART 1 GENERAL

1.01 SUMMARY

- A Section Includes: Requirements for Request for Information / Interpretation (RFI).

1.02 DEFINITIONS

- A Request For Information / Interpretation (RFI):
1. A document submitted by the Contractor requesting clarification of a portion of the Contract Documents, hereinafter referred to as RFI.
 2. A properly prepared Request for Information / Interpretation shall include a detailed written statement that indicates the specific Drawing or Specification in need of clarification and the nature of the clarification requested.
 - a. Prepare using an electronic version of the Document Each page of attachments to the RFI shall bear the RFI number at the upper left corner.
 - 1) Use AIA G716 - Request for Information . OR
 - 2) Use CSI/CSC Form 13.2A - Request for Interpretation.
 - b. Drawings shall be identified by sheet number and detail number or location on the drawing sheet.
 - c. Specifications shall be identified by section number, article, paragraph and page number.
 3. Requests for Information: Request made by Contractor concerning items not indicated on drawings or contained in Project Manual that is necessary to properly perform the work.
 4. Requests for Interpretation: Request made by Contractor in accordance with Owner's Representative's third party obligations to the contract for construction.
 5. Clouding of the specific item on a drawing or within the specification in question is expected.
- B Improper RFI's: RFI's that are not properly prepared will be returned without review.
- C Frivolous RFI's:
1. RFI's that request information that is clearly shown on the Contract Documents.
 2. Frivolous RFI's may be returned unanswered or may be processed by the Architect at the Architect's standard hourly rate. The Architect will charge the Owner, and such costs will be deducted from monies still due the Contractor. The Owner and Contractor will be notified by the Architect prior to the processing of frivolous RFI's.

1.03 CONTRACTOR'S REQUESTS FOR INFORMATION

- A RFI's shall be originated by the Contractor and is responsible for reviewing, numbering sequentially, and forwarding all RFI's to the Architect of Record with one (1) copy to Owner.
1. RFI's from subcontractors or material suppliers shall be submitted through, reviewed by, and signed by the Contractor prior to submittal to the Architect.
 2. RFI's from subcontractors or material suppliers sent directly to the Owner's Representative, Architect or the Architect's consultants shall not be accepted.
- B Content of the RFI:
1. Forms shall be completely filled in, all request shall be typed.
 2. Include a detailed, legible description of item needing interpretation and the following:
 - a. Project Name.
 - b. Date.
 - c. Name of Contractor, and authoring company.
 - d. Name of Architect or Engineer.

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- e. RFI number.
 - 1) RFI's shall be submitted in numerical order with no breaks in the consecutive numbering.
 - 2) Each page of attachments to RFI's shall bear the RFI number and shall be consecutively numbered in chronological order.
 - 3) If an RFI is resubmitted, it **MUST** have the same number as the original RFI with a suffix identifying it as a resubmittal, for example RFI-002-1, RFI-002-A, or RFI-002-R1.
 - f. Specification Section number and title and related paragraphs, as appropriate.
 - g. Drawing number and detail references, as appropriate.
 - h. Field dimensions and conditions, as appropriate.
 - i. Contractor's suggested solution(s):
 - 1) If Contractor's solution(s) impact the Contract Time, Contractor shall state impact in the RFI.
 - 2) All RFI's must have potential schedule and budget impact noted, when applicable.
 - j. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.
 - k. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.
- C Software-Generated RFIs: Software-generated form with substantially the same content as indicated above.
- 1. Attachments shall be electronic files in Adobe Acrobat or BlueBeam PDF format.
- D RFI's may be submitted by Email.
- 1. Address for Email will be distributed by the Architect at the PreConstruction Conference.
- E When the Contractor is unable to determine from the Contract Documents, the material, process or system to be installed, the Architect shall be requested to make a clarification of the indeterminate item as follows:
- 1. Contractor shall prepare and submit an RFI to the Architect of Record with one (1) copy to Owner.
 - 2. RFI's may not be sent directly to the Architect's Consultants. All RFI's shall be sent directly to the Architect.
 - 3. Non-compliance Reports, Inspection Reports, Substitution Requests, Submittal Requests and Confirmations shall not be submitted as an RFI.
- F Contractor shall carefully study the Contract Documents to assure that the requested information is not available therein. RFI's which request information available in the Contract Documents will be deemed either "improper" or "frivolous" as noted above.
- G Contractor shall endeavor to keep the number of RFI's to a minimum.
- H In cases where RFI's are issued to request clarification of coordination issues, for example, pipe and duct routing, clearances, specific locations of work shown diagrammatically and similar items, the Contractor shall prepare a complete layout of a suggested solution using drawings or sketches drawn to scale, and submit same with the RFI. RFI's which fail to include a suggested solution will be returned unanswered with a requirement that the Contractor submit a complete request.
- I RFI's shall NOT be used for the following purposes:
- 1. To request approval of submittals

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2. To request approval of substitutions,
 3. To request changes which are known to entail additional cost or credit.
 4. To request different methods of performing work other than those drawn and specified.
 5. To request additional time to be added to the Project schedule.
- J In the event the Contractor believes that an RFI response by the Architect results in additional cost or time, Contractor shall not proceed with the work indicated by the RFI until a Construction Change Directive (CCD) is prepared and approved. RFI's shall not automatically justify a cost increase in the work or a change in the project schedule.
1. Answered RFI's shall not be construed as an approval to perform the additional work.
 2. Unanswered RFI's will be returned with a stamp or notation "Not Reviewed".
- K Contractor shall prepare and maintain a log of RFI'S, and at any time requested by the Architect and Owner, Contractor shall furnish copies of the log showing outstanding RFI'S. Contractor shall note unanswered RFI's in the log. Logs shall be reviewed as part of weekly construction meetings.
- L It is the Contractor's responsibility to allow for a reasonable review period for each RFI. Unless an expedited review is requested and agreed upon by the Owner's Representative, Architect of Record and the Contractor prior; Contractor shall allow no less than 7 Working days review and response time for RFI'S.
1. RFI's shall state requested date/time for response. However, this requested date/time for response is not a guarantee that the RFI will be answered by that date/time if that date/time is too expeditious.

1.04 ARCHITECT'S RESPONSE TO RFI'S

- A Review Time: Architect will respond and return RFIs to Contractor within seven Working 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. Architect may determine that additional time is required to respond, and notify contractor in writing of additional days required.
 2. If a review is required of multiple consultants, then the review and response period shall be 7 Working days.
 3. The Architect will endeavor to respond in a timely fashion to RFI's.
 4. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.
- B Architect will respond to RFI's on one of the following forms:
1. Properly prepared RFI's:
 - a. Response directly upon Request for Information / Interpretation form.
 - 1) Response to properly prepared RFI's may or may not be made directly upon the RFI form as deemed appropriate by the Architect.
 - b. Architect's Supplemental Instruction (ASI).
 - c. Request for Proposal (RFP).
 - d. Construction Change Directive (CCD).
 2. Improper or Frivolous RFI's:
 - a. Notification of Processing Fee(s).
 - b. Unanswered RFI's will be returned with a stamp or notation: "Not Reviewed".

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION 012613

Request for Information - 012613

SECTION 012900 - PRICE AND PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

- A Schedule of Values.
- B Applications for payment.
 - 1. Procedures for application for payment.
 - 2. Initial application for payment.
 - 3. Monthly application for payment.
 - 4. Application for payment at substantial completion.
 - 5. Final payment application.
- C Payment for stored materials.
- D Change procedures.

1.02 COORDINATION

- A Coordinate the Schedule of Values and Applications for Payment with the General Contractor Construction Manager's construction schedule, list of subcontractors, and submittal schedule.
- B The General Contractor Construction Manager's construction schedule and submittal schedule are included in Section 013300 - SUBMITTAL REQUIREMENTS.

1.03 SCHEDULE OF VALUES

- A Coordinate preparation of the Schedule of Values with preparation of the General Contractor Construction Manager's Construction Schedule. Schedule of values shall reflect project phasing.
 - 1. Schedule of values shall be used only as basis for General Contractor Construction Manager's application for payment.
 - 2. Breakdown schedule of values into separate line items, each having a value of not more than \$25,000.
- B Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:
 - 1. General Contractor Construction Manager's construction schedule.
 - 2. Application for Payment form.
 - a. List of subcontractors.
 - b. List of products.
 - c. List of principal suppliers and fabricators.
 - d. Schedule of submittals.
- C Submit typewritten schedule of values to the Architect at least 10 days prior to submitting first application for payment.
- D Sub-Schedules: Where the Work is separated into phases that require separately phased payments, provide sub-schedules showing values correlated with each phase of payment.
- E Identification: Include the following Project identification on the Schedule of Values:
 - 1. Project name and location.
 - 2. Name of the Architect.
 - 3. Project number.
 - 4. General Contractor Construction Manager's name and address.
 - 5. Date of submittal.
- F Arrange the Schedule of Values in a tabular form with separate columns to indicate the following for each item listed:
 - 1. Generic name.

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2. Related Specification Section.
 3. Name of subcontractor.
 4. Name of manufacturer or fabricator.
 5. Name of supplier.
 6. Change Orders (numbers) that have affected value.
 7. Dollar value.
 8. Percentage of Contract Sum to the nearest one-hundredth percent, adjusted to total 100 percent.
- G Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Break principal subcontract amounts down into several line items.
1. Upon request by Architect, submit data that will substantiate values given.
- H Round amounts off to the nearest whole dollar; the total shall equal the Contract Sum.
1. Indicate retainage as a separate line item, as a negative number.
- I For each part of the Work where an Application for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed, provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
- J Unit Cost Allowances: Show line item value of unit cost allowances as a product of unit cost times measured quantity as estimated from the best indication in the Contract Documents.
- K Margins of Cost: Show line items for indirect costs, and margins on actual costs, only to the extent that such items will be listed individually in Applications for Payment. Each item in the Schedule of Values and Applications for Payment shall be complete including its total cost and proportionate share of general overhead and profit margin.
- L At the General Contractor Construction Manager's option, temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown as separate line items in the Schedule of Values or distributed as general overhead expense.
- M Schedule Updating: Update and resubmit the Schedule of Values when Change Orders or Construction Change Directives result in a change in the Contract Sum.
- N Payment requisitions shall summarize subtotals for each CSI division corresponding to divisions in the contract specifications.
1. All line items on the payment requisitions must account to a MSBA payment code that correlates to a CSI division number. Indicate MSBA payment code on requisition at each CSI number.

1.04 PROCEDURES FOR APPLICATIONS FOR PAYMENT

- A Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect and paid for by the Owner.
1. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional requirements.
- B Payment Application Times: Each progress payment date is as indicated in the Agreement. The period of construction Work covered by each Application or Payment is the period indicated in the Agreement.
- C Payment Application Forms: Use AIA Document G 702 and Continuation Sheets G 703 as the form for Application for Payment.
- D Application Preparation: Complete every entry on the form, including notarization and execution by person authorized to sign legal documents on behalf of the Owner. Incomplete applications will be returned without action.

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1. Entries shall match data on the Schedule of Values and General Contractor Construction Manager's Construction Schedule. Use updated schedules if revisions have been made.
 2. Include amounts of Change Orders and Construction Change Directives issued prior to the last day of the construction period covered by the application.
 3. Monthly Applications for Payment shall include a separate summary of the invoiced costs by division and follow the MSBA Cost Classification Codes Summary form. The General Contractor Construction Manager shall fill in the amounts which shall tie the subtotals for each division in the requisition itself.
- E Transmittal: Submit 3 executed copies of each Application for Payment to the Architect by means ensuring receipt within 24 hours.
- F Transmit each copy with a transmittal form listing attachments, and recording appropriate information related to the application in a manner acceptable to the Architect.

1.05 INITIAL APPLICATION FOR PAYMENT

- A Administrative actions and submittals that must precede or coincide with submittal of the first Application for Payment include the following:
1. List of Trade Subcontractors and subcontractors.
 2. List of principal suppliers and fabricators.
 3. Schedule of Values.
 4. General Contractor Construction Manager's Construction Schedule (preliminary if not final).
 5. Schedule of principal products.
 6. Schedule of unit prices.
 7. Submittal Schedule (preliminary if not final).
 8. List of General Contractor Construction Manager's staff assignments.
 9. List of General Contractor Construction Manager's principal consultants.
 10. Copies of building permits.
 11. Copies of authorizations and licenses from governing authorities for performance of the Work.
 12. Initial progress report.
 13. Report of pre-construction meeting.
 14. Data needed to acquire Owner's insurance.
 15. Initial settlement survey and damage report, if required.

1.06 MONTHLY APPLICATION FOR PAYMENT

- A Administrative actions and submittals that must precede or coincide with submittal of the period Application for payment, include the following:
1. As-built record documents, required documents and submittal records on site.
 2. General Contractor Construction Manager's construction schedule, updated, with corrective action plan as applicable.
 3. Weekly up-to-date, accurate, certified submission of payroll records.
 - a. Payroll records shall include photocopies of each employee's OSHA card and identification of pay grade cross referenced to payroll records when submitted. Failure to provide accurate information may delay processing of application for payment.
 4. Pre-installation meeting conducted in accordance with Section 013100, prior to first billing for any activity.
 5. Material Status Report.
 6. Stored Materials forms.

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- a. All materials stored off-site shall be properly warehoused, protected, insured, and identified as specific to the project. The General Contractor Construction Manager shall provide timely access to the stored materials for inspection prior to submission of any application for payment. Payment shall be contingent on agreement by the Owner's Project Representative and the Architect.
7. Submittal Schedule and submittal status reports.
8. Monthly Progress report and Notarized Progress report Statement from the General Contractor Construction Manager's project manager stating that the work is on schedule and that the General Contractor Construction Manager will meet the Substantial Completion date for the Work and the Substantial Completion dates for every portion thereof as established under Construction Phasing Schedule Section.
9. Construction progress photographs.

1.07 APPLICATION FOR PAYMENT AT SUBSTANTIAL COMPLETION:

- A Following issuance of the Certificate of Substantial Completion, submit an Application for Payment; this application shall reflect any Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- B Administrative actions and submittals that shall proceed or coincide with this application include:
 1. Occupancy permits and similar approvals.
 2. Warranties (guarantees) and maintenance agreements.
 3. Test/adjust/balance records.
 4. Maintenance instructions.
 5. Meter readings.
 6. Start-up performance reports.
 7. Change over information related to Owner's occupancy, use, operation and maintenance.
 8. Final cleaning.
 9. Application for reduction of retainage, and consent of surety.
 10. Advice on shifting insurance coverage.
 11. Final progress photographs.
 12. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.
 13. Final summary of Project waste and diversion report in compliance with Section 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

1.08 FINAL PAYMENT APPLICATION

- A Administrative actions and submittals which must precede or coincide with submittal of the final payment Application for Payment include the following:
 1. Completion of Project Closeout requirements.
 2. Completion of items specified for completion after Substantial Completion.
 3. Assurance that unsettled claims will be settled.
 - a. Assurance that Work not complete and accepted will be completed without undue delay.
 4. Transmittal of required Project construction records to Owner.
 5. Certified property survey.
 6. Proof that taxes, fees and similar obligations have been paid.
 7. Removal of temporary facilities and services.
 8. Removal of surplus materials, rubbish and similar elements.
 9. Change of door locks to Owner's access.

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1.09 PAYMENT FOR STORED MATERIALS

- A Provide supporting documentation for the value of stored materials. Acceptable form of supporting documentation include a certified and notarized invoice from the manufacturer or supplier which indicates the actual amount due, including discounts to which the General Contractor Construction Manager may be entitled, and the date which the invoice was paid.
- B Provide notice to Architect 48 hours in advance, and provide transportation for Architect and Clerk to the site where materials are stored to permit inspection of the materials.
- C With Application for Payment, submit notarized certificate of title and evidence of insurance for materials stored off-site.
- D With each subsequent Application for Payment, indicate in the appropriate columns the value of stored material which has been taken from off-site location and brought to the project site. Provide supporting documentation.

1.10 CHANGE PROCEDURES

- A The Architect will advise of minor change in the Work not involving adjustment to Contract Sum/Price or Contract Time as authorized under the General and Supplementary Conditions of Contract, by issuing supplemental instructions on AIA Form G710.
- B The Architect may issue a Proposal Request or Notice of Change which 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 request price will be considered valid. The General Contractor Construction Manager will prepare and submit an estimate within 10 days.
- C The General Contractor Construction Manager may propose changes by submitting a request for change to the Architect describing the proposed change and its full effect on the Work. Include a statement describing the reason for the change, and the effect on the Contract Sum/Price and Contract Time and full documentation and a statement describing the effect on Work by separate or other contractors. Document any requested substitutions in accordance with Section 012500 - SUBSTITUTION PROCEDURES.
- D Stipulated Sum/Price Change order:
 - 1. Based on Proposal Request or Notice of Change and General Contractor Construction Managers price quotation or General Contractor Construction Managers request for a Change Order as approved by the Architect.
- E Unit Price Change Order:
 - 1. For a pre-determined unit prices and quantities, the Change Order will be executed on a fixed unit price basis. For unit costs or quantities of units of work which are not pre-determined, execute Work under a Construction
 - a. Change Directive. Changes in Contract Sum/Price or Contract Time will be computed as specified for Time and Material Change Order.
- F Construction Change Directive:
 - 1. Architect may issue a directive on AIA Form G713 Construction Change Directive signed by the Owner instructing the General Contractor Construction Manager to proceed with a change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work and designate method of determining any change in Contract Sum/Price or Contract Time.
 - 2. Promptly execute the change.
- G Time and Material Change Order:
 - 1. Submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract. Architect will determine the change allowable

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- in Contract Sum/Price and Contract Time as provided in the Contract Documents.
- 2. Maintain detailed records of work done on Time and Material basis. Document each quotation for a change in cost or time with sufficient data to allow evaluation of proposed changes and to substantiate changes in the Work.
- H Documentation of change in Contract Sum/Price and Contract Time:
 - 1. Change order Forms: AIA G701 Change Order.
 - 2. Maintain detailed records. Document each quotation for a change in cost or time with sufficient data to allow evaluation of the quotation.
 - 3. On request, provide additional data to support computations:
 - 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 document.
 - 4. Support each claim for additional costs and for work done on a time and material basis, with additional information:
 - a. Origin and date of claim.
 - b. Dates and times work was performed, and by whom.
 - c. Time records and wage rates paid.
 - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
- I Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 012900

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SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.01 SUMMARY

- A Project coordination.
- B Project site administration.
- C Project meetings.

1.02 RELATED REQUIREMENTS

- A Section 013200 - Construction Progress Documentation
- B Section 013300 - Submittal Procedures..
- C Section 017800 - Closeout Procedures and Submittals: Requirements for Project Record Drawings (As-built drawings).
- D Section 024100 - Selective Demolition

1.03 GENERAL PROJECT COORDINATION

- A Coordination: The General Contractor's Construction Manager is fully responsible for coordinating the Work of this Contract including scheduling and submittals. Work and other activities included in various Sections to assure efficient and orderly sequence of installation of interdependent construction elements. The Construction Manager is responsible for coordinating actual installed location and interface of work, and to make provisions to accommodate items scheduled for later installation.
- B Where installation of one component depends on installation of other components before or after its own installation, schedule activities in the sequence required to obtain efficient installation with the least amount of alterations, or cutting and patching, to completed Work.
 - 1. The Construction Manager shall be responsible to uncover work completed in order to install ill-timed work, at no additional cost to the Owner.
- C Where space is limited, coordinate installation of different components to assure maximum accessibility for maintenance, service and repair.
- D Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- E Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service such equipment.
- 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 in preparation for Substantial Completion and Owner's occupancy.
- 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.

1.04 UTILITIES, MECHANICAL AND ELECTRICAL COORDINATION

- A Coordinate all Work of this Project. Provide full and complete coordination for utilities, mechanical and electrical work in Divisions 11, and 21 through 28, with Work of other Divisions.
 - 1. Each Construction Manager shall compare his drawings and specifications with those of other Trades and report any discrepancies between them to the Construction Manager.

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The Construction Manager shall obtain from the Architect written instructions for changes necessary in the mechanical or electrical work, to ensure that all work is installed in coordination and cooperation with other Trades installing interrelated work. Before installation, each Construction Manager shall make proper provisions to avoid interferences in a manner approved by the Architect. All changes required in the work of each Construction Manager caused by his negligence, shall be corrected by him at his own expense, to the Architect's satisfaction.

- B Give all advance notice to public utility companies required by law, and provide proper disposition, subject to Architect's approval of all existing pipe lines, conduits, sewers, drains, poles, wiring, and other utilities that in any way interfere with the Work, whether or not they are specifically shown on the Drawings.
- C Coordination regarding existing utilities:
 - 1. Notify Owner and appropriate authorities when coming across an unknown utility line(s), and await decision as to how to dispose of same.
 - 2. When an existing utility line must be cut and plugged or capped, moved, or relocated, or has become damaged, notify the Owner and Utility company involved, and assure the protection, support, or moving of utilities to adjust them to the new work.
 - 3. The General Contractor Construction Manager shall be responsible for all damage caused to existing, active utilities located within the limits of this Contract, whether or not such utilities are shown on the Drawings, including resultant damages or injuries to persons or properties.
- D General coordination of piping, ductwork, conduits and equipment:
 - 1. The Contract Drawings are diagrammatic only intending to show general runs and general locations of piping, ductwork, equipment and sprinkler heads. Determine exact routing and location of individual systems prior to fabrication of components or installation.
 - a. Piping runs requiring pitch have "right-of-way" over those systems what do not pitch.
 - b. System components whose elevations cannot be changed have "right-of- way" over those components whose elevations can be changed.
 - 2. Adjust locations of piping, ductwork, conduits and equipment to accommodate new work with interferences anticipated and as encountered during installation.
 - a. Locate piping, conduits and ductwork to be clear of swinging doors, access doors, and clear for unimpeded equipment access.
 - 3. Provide all offsets, transitions and changes of direction for all systems, as may be required to maintain proper clearances for headroom, and as may be required for coordination with other "fixed-in-place" building components (such as structural systems).
 - a. Furnish all vents, drains and similar accessories as may be required for offsets, transitions and changes of direction.
 - 4. Provide openings in the work for penetration of mechanical and electrical work.
 - 5. Coordinate final locations of ceiling mounted devices (including air distribution devices, thermostats, heaters, control devices, sprinkler heads and similar work) with reflected ceiling plans. Review locations with Architect and obtain approval of all devices prior to installation.

1.05 COORDINATION DOCUMENTS

- A General: Prepare coordination drawings for areas where close coordination is required for installation of products and materials fabricated off-site by separate entities, and where limited space necessitates maximum utilization of space for efficient installation of different components.
 - 1. Coordination Drawings include, but are not necessarily limited to:

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- a. Structure.
 - b. Partition/room layout.
 - c. Ceiling layout and heights.
 - d. Light fixtures.
 - e. Access panels.
 - f. Sheet metal, heating coils, boxes, grilles, diffusers, and similar items.
 - g. All heating piping and valves.
 - h. Smoke and fire dampers.
 - i. Soil, waste and vent piping.
 - j. Major water.
 - k. Rain water drainage piping.
 - l. Major electrical conduit runs, panelboards, feeder conduit and racks of branch conduit.
 - m. Above ceiling miscellaneous metal.
 - n. Sprinkler piping and heads.
 - o. All equipment, including items in the Contract as well as OFCI and OFI items.
 - p. Equipment located above finished ceiling requiring access for maintenance and service. In locations where acoustical lay-in ceilings occur, indicate areas in which the required access area may be greater than the suspended grid system.
 - q. Seismic Restraints.
- B Timing: Prior to fabricating materials or beginning work, supervise and direct the creation of one complete set of coordination drawings showing complete coordination and integration of work, including, but not limited to, structural, architectural, mechanical, plumbing, fire protection, elevators, and electrical disciplines.
- C Intent: Coordination drawings are for the General Contractor Construction Manager's use during construction and are not to be construed as replacing shop drawings or record drawings. Architect's review of submitted coordination drawings shall not relieve the Construction Manager from his overall responsibility for the coordination of the Work of the Contract.
- D Base sheets: General Contractor Construction Manager shall prepare and provide one accurately scaled set of building coordination drawing "base sheets" on reproducible transparencies showing all architectural and structural work. Base sheets shall be at appropriate scale; congested areas and sections through vertical shafts shall be at larger scale.
- 1. Base sheets shall be at appropriate scale of not less than 1/4 inch scale (1/4" = 1'-0"), congested areas and sections through vertical shafts shall be at larger scale.
 - a. Highlight all fire rated and smoke partitions.
 - b. Indicate horizontal and vertical dimensions to avoid interference with structural framing, ceilings, partitions, and other services.
 - c. Indicate elevations relative to finish floor for bottom of ductwork and piping and conduit (6 inches and greater in diameter).
 - d. Indicate the main paths for the installation of, equipment from mechanical and electrical rooms.
 - 2. CAD Files: Architect's CAD drawings will be made available on CD-ROM for use by Construction Manager. Additionally, each party receiving drawings will be required to sign a use and liability waiver.
- E General Contractor's Construction Manager shall circulate coordination drawings to the following subcontractors and any other installers whose work might conflict with other work. Each of these subcontractors shall accurately and neatly show actual size and location of respective equipment and work. Each subcontractor shall note apparent conflicts, suggest alternate solutions, and return drawings to the Construction Manager.

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1. Elevator subcontractor.
 2. Plumbing subcontractor.
 3. Fire protection subcontractor.
 4. Heating ventilating and air conditioning subcontractor(s).
 5. Electrical discipline subcontractors.
 6. Control system subcontractors.
- F Review and modify and approve coordination drawings in cooperation with individual installers and Construction Manager to assure conflicts are resolved before work in field is begun and to ensure location of work exposed to view is as indicated or as approved by Architect.
1. The General Contractor Construction Manager shall stamp, sign and submit coordination drawing originals to Architect for review.
 2. Do not commence work in areas described in the coordination drawings until receipt of Architect's comments.

1.06 GENERAL PROJECT ADMINISTRATION

- A Prepare memoranda for distribution to each party involved outlining required coordination procedures. Include required notices, reports, and attendance at meetings.
- B Prepare similar memoranda for the Owner and separate Owner Construction Managers where coordination of their Work is required.
- C Conduct conferences among General Contractor Construction Manager, subcontractors and others concerned with the Work, to establish and maintain coordination and schedules, and to resolve coordination matters in dispute.
- D Administrative Procedures: Coordinate scheduling and timing of administrative procedures with other activities to avoid conflicts and ensure orderly progress. Such activities include:
1. Preparation of schedules.
 2. Installation and removal of temporary facilities.
 3. Delivery and processing of submittals.
 4. Progress meetings.
 5. Project Closeout activities.

1.07 SITE MOBILIZATION CONFERENCE

- A Prior to commencement of the Work, schedule a meeting at a meeting room provided by the General Contractor Construction Manager.
- B The Architect may, prior to commencement of the Work, schedule a meeting at a meeting room provided by the Owner.
1. Attendance is required by Owner, Owner's Project Manager, Architect, engineering consultants, Construction Managers' Project Manager and Superintendent, Construction Manager's LEED Representative, and other major subcontractors, applicators, installers and suppliers. Other persons are required to attend as the Architect may direct or the Construction Manager may wish to have present.
 2. Items of Agenda:
 - a. Use of premises by Owner, General Contractor Construction Manager, subcontractors, and subcontractors.
 - b. Owner's requirements and partial occupancy considerations,
 - c. Temporary utilities provided by General Contractor Construction Manager.
 - d. Barricading and protection of the public, dust barriers.
 - e. Survey and building layout.
 - f. Wetlands protection.
 - g. Potentially difficult areas of work.

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- h. Project coordination.
- i. Construction waste management and recycling procedures.
- j. Security and housekeeping procedures.
- k. Construction schedules.
- l. Delivery routes, access to site.
- m. Work hours.
- n. Work beyond Contract Limit.
- o. Procedures for the following:
 - 1) Proposal requests.
 - 2) Architect's Supplemental Instructions
 - 3) Requests for Information.
 - 4) Changes.
 - 5) Submittals.
 - 6) Applications for payment.
- p. Procedures for testing and inspection.
- q. Indoor air quality standards and testing requirements.
- r. Quality Control.
- s. Sustainability product requirements and procedures.
- t. Procedures for maintaining record documents.
- u. Requirements for equipment start-up.
- v. Inspection and acceptance of equipment put into service during construction period.

1.08 PRE-INSTALLATION/PRE-FABRICATION CONFERENCES

- A When required in individual specification sections and prior to commencing the work of that trade, the General Contractor Construction Manager shall convene a pre-installation conference at the work site, if possible, on the same day as weekly progress meeting.
- B Notify Architect and Owner's Project Manager a minimum of one week in advance of meeting date.
- C Attendance is required by General Contractor Construction Manager's Project Manager and Superintendent, and parties directly affecting, or affected by, work of the Section.
 - 1. General Contractor Construction Manager shall include discussions on waste management goals and requirements in all pre-fabrication meetings conducted with subcontractors, fabricators, and vendors.
 - 2. General Contractor Construction Manager shall include discussions on Owner's environmental/sustainability goals, procedures and requirements in all prefabrication meetings conducted with subcontractors, fabricators, and vendors.

1.09 COORDINATION MEETINGS

- A In addition to other specified meetings and additional meetings. General Contractor Construction Manager shall hold project coordination meetings, at least monthly at regularly schedule times. Hold meetings more frequently when necessary to ensure full coordination of work. Request representation at each meeting by every entity involved in coordination or planning for work of the entire project. Conduct meetings in a similar manner to progress meetings, to resolve coordination problems.
- B Keep minutes of coordination meetings and distribute copies to all attendees, related parties and to Owner, Owner's Project Manager, Architect and its engineering consultants within 3 business days following meeting. Coordination meetings shall continue on an appropriate schedule, even after completion of coordination drawings by Construction Manager, to review progress and resolve minor conflicts not identified in the coordination drawings.

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- C The following trades shall participate in coordination meetings, preparation of coordination drawings and reviews. Additional trades shall participate as the Construction Manager deems necessary for proper coordination of the Work.
 - 1. Concrete work.
 - 2. Masonry.
 - 3. Structural steel, light gage metal framing and metal fabrications.
 - 4. Rough carpentry.
 - 5. Air and vapor barrier work.
 - 6. Finish wall and ceiling construction.
 - 7. Food service equipment
 - 8. Elevators.
 - 9. Fire protection systems
 - 10. Plumbing systems, including roof drainage, waste and vent systems and distribution.
 - 11. Ductwork including appurtenances and equipment
 - 12. HVAC piping
 - 13. HVAC equipment and controls.
 - 14. Electrical lighting, power, communications and signaling, fire detection and related systems.
 - 15. Excavation, site utilities and site improvements.
- D All adjustments necessary to achieve full coordination shall be determined in a timely manner, so as not to delay the work. Include time necessary for consideration by the Architect and the Owner's Project Manager for proposed modifications. No claim for additional compensation for extension of time arising from delays due to failure of Construction Manager to identify potential conflicts requiring coordination in a timely manner or from additional work made necessary by such failure will be valid.

1.10 PROGRESS MEETINGS

- A The Architect or its representative will schedule and administer meetings throughout the progress of the Work; make arrangements for meetings, prepare agenda with copies for participants, preside at meetings, record minutes and distribute copies within one week to Construction Manager, Owner and participants of meeting only. Construction Manager is responsible for distribution to subcontractors, vendors, suppliers and others who are affected by decisions made.
 - 1. Scheduled Frequency of Meetings: Weekly.
- B Attendance: Required are General Contractor Construction Manager's Project Manager and Project Superintendent, and each Subcontractor, applicator, installer, and supplier whose work is ongoing or scheduled. Owner, Architect, engineering consultants, and other persons are required to attend as the Architect may direct. Subcontractors, vendors, suppliers shall be present at meetings upon request of Construction Manager.
 - 1. Attendee Authority: Subcontractors and supplier representatives present at meetings shall have authority to act for and make commitments for, the entity which they represent.
 - 2. Restricted Attendance: Owner and Architect reserve the right to expel or exclude from any Progress Meeting any person(s) or company representative(s) without statement of reason or excuse.
 - 3. Attendance of Architect's Consultants: General Contractor Construction Manager shall make an attendance request for specific Architect's consultants and engineers at least 72 hours in advance of the meeting. Clearly identify in the request all consultant related issues and topics to be discussed at the meeting. The Architect will decide if its consultant or engineer will attend.

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4. Attendance of Owner's Independent Consultants: General Contractor Construction Manager shall make an attendance request for specific Owner's consultants at least 72 hours in advance of the meeting. Clearly identify in the request all consultant related issues and topics to be discussed at the meeting. The Owner will decide if its consultant will attend.
- C Items of Agenda:
 1. Review minutes of previous meetings.
 2. Review of Work progress.
 3. Field observations, problems, and decisions.
 4. Identifications of problems which impede planned progress.
 5. Review of submittals schedule and status of submittals.
 - a. Review of environmental/sustainability related submittals, schedule and status.
 6. Review of off-site fabrication and delivery schedules.
 7. Maintenance of progress schedule.
 8. Corrective measures to regain projected schedules.
 9. Coordination of projected progress.
 10. Maintenance of quality and work standards.
 11. Progress of Work to be adjusted under coordination requirements, and effect of proposed changes on progress schedule and coordination.
 12. Review of construction waste management and recycling performance, material quantities disposed and diverted for recycling.
 13. Other business relating to Work.

1.11 SPECIAL MEETINGS AND BUILDING COMMITTEE MEETINGS

- A Special Project Meetings held by the General Contractor Construction Manager: The General Contractor Construction Manager shall conduct special project meetings throughout the course of the Work. Special Project Meetings are those held in addition to the regularly scheduled progress meetings. The Architect and Owner are not required to attend these meetings.
 1. Special meeting issues may include, but are not limited to:
 - a. Safety issues.
 - b. Labor issues.
 2. Construction waste management and recycling issues.
- B Environmental Quality Review Meetings: The General Contractor Construction Manager shall conduct special Environment Quality review meetings throughout the course of the Work.
 1. Meetings may be held in conjunction with dates of Project Progress Meetings. The General Contractor Construction Manager shall notify both the Owner and Architect at least 7 days in advance of the meeting dates. The Construction Manager along with any requested or necessary subcontractors, applicators, vendors or material suppliers shall attend.
 2. Meeting shall include the following topics:
 - a. Review of construction waste management and recycling.
 - b. Review of sustainability / environmental related submittals and update on LEED Certification progress.
 - c. Review of indoor air quality testing.
- C Building Committee Meetings: General Contractor Construction Manager is advised of obligation to attend Building Committee Meetings (held in evenings) as requested by Owner or Architect, at no additional cost to the Contract.
- D Additional Special Meetings requested by the Architect or Owner: The General Contractor Construction Manager along with any requested or necessary subcontractors, applicators,

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vendors or material suppliers shall attend additional meetings when requested by the Architect or Owner as they deem necessary. Such meetings may be convened on short notice if conditions at the project site so require and attendance is mandatory. The Architect and Owner are not limited as to the number of additional meetings that may be requested or the agenda for such meetings.

PART 2 - PRODUCTS (NOT USED)**PART 3 - EXECUTION (NOT USED)**

END OF SECTION 013100

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SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.01 SUMMARY

- A Survey and layout data.
- B Critical Path Method (CPM) scheduling of the Work.
- C Contract progress reporting.
 - 1. Construction schedule updates.
 - 2. Daily construction reports.
 - 3. Special Reports - Unusual Event Reporting.
- D Work Documentation:
 - 1. Periodic site observations.
 - 2. Verification of built tolerances.
 - 3. Construction progress photographs.

1.02 SURVEY AND LAYOUT DATA

- A Prior to starting any construction work, stake out all limits of cut and fill, the limits of proposed walkways and site improvements. Promptly upon completion of layout work and before any construction work is begun on the site, notify the Architect and Owner's Project Manager, who shall conduct a field inspection of the stakeout. The Architect reserves the right to adjust the location of such layouts as it deems necessary to comply with the intent of the Contract Documents.

1.03 CRITICAL PATH METHOD (CPM) SCHEDULING OF THE WORK

- A Definitions:
 - 1. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - a. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
 - b. Predecessor activity is an activity that must be completed before a given activity can be started.
 - 2. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
 - 3. Critical Path: The longest continuous chain of activities through the network schedule that establishes the minimum overall Project duration and contains no float.
 - 4. Event: The starting or ending point of an activity.
 - 5. Float: The measure of leeway in starting and completing an activity.
 - a. Float time is not for the exclusive use or benefit of either Owner or General Contractor Construction Manager, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Date of Substantial Completion.
 - b. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the following activity.
 - c. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
 - 6. Fragnet: An amplified portion of the CPM schedule, to study a special sequence or establish a difficult time estimate, showing its predecessors, successors and impacts.

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7. Major Area: A story of construction, a separate building, or a similar significant construction element.
 8. Milestone: A key or critical point in time for reference or measurement.
 9. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.
- B General CPM Requirement: The General Contractor Construction Manager shall develop and maintain a Network Diagram to demonstrate fulfillment of the contract requirements and shall utilize the plan for scheduling, coordinating and monitoring the Work (including all activities of subcontractors, equipment vendors and suppliers). A conventional Critical Path Method (CPM) Precedence Diagramming Method (PDM) technique will be utilized to satisfy both time and cost applications.
- C Preliminary CPM Schedule: Submit for Architect's and Owner's review Critical Path Method (CPM) construction schedule in triplicate within 45 calendar days after date of commencement stated on Notice to Proceed. Revise and resubmit when required.
1. Before the first progress payment can be approved, the General Contractor
 2. Construction Manager must have an approved CPM Schedule as described herein. It is the General Contractor Construction Manager's responsibility to submit the CPM schedule with sufficient time for review by the Owner and Architect and any re-submittals and corresponding reviews that may be necessary prior to approval of the first requisition.
 3. Software: Provide to the Architect one complete and legal copy of all software used to prepare the CPM Progress Schedule. Include documentation and user manuals. Software and CPM provided by the General Contractor Construction Manager shall be fully compatible and useable with Microsoft's "Windows" operating system. Software provided to the Architect will be used solely for "this project only".
 4. Supporting data: Submit the following supporting data in addition to the CPM Network Plots
 - a. The proposed number of working days per week.
 - b. The holidays to be observed during the life of the contract (by day, month, and year).
 - c. The planned number of shifts per day.
 - d. The number of hours per shift.
 - e. List the major construction equipment to be used on the site, describing how each piece relates to and will be used in support of the submitted network diagram work activities/events.
- D CPM Progress Schedule shall be as described below:
1. Network Diagram Plots, General: The network diagram shall be an activity or arrow diagram. The diagram shall show relationships between the various activities. Exercise sufficient care to produce a clear, legible and accurate network diagram. Group activities related to specific physical areas of the project, on the network diagram for ease of understanding and simplification. Provide a key plan on each network diagram sheet showing the project area associated with the work activities/events shown on that sheet.
 2. Work Activities (not less than 200 lines), as a minimum include:
 - a. All major, and critical minor portions of the work.
 - 1) Break up the work into activities/events of a duration no longer than 20 work days each, except as to non-construction activities/events (for example: procurement of materials, delivery of equipment, curing times) and any other activities/events for which the Architect may approve the showing of a longer duration.
 - b. Fabrication and delivery time for each item requiring off site fabrication.
 - c. Each mock-up and in-place sample.

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- d. Temporary facilities and controls.
3. Show not only the activities/events for actual construction work for each trade category of the project, but also trade relationships to indicate the movement of trades from one area, floor, or building, to another area, floor, or building, for at least five trades who are performing major work under this contract.
4. Identify all events on which the work is dependent on actions of Architect and Owner, including:
 - a. Submittal of shop drawings, equipment schedules, samples, color submission, coordination drawings, templates, fabrication and material delivery times.
 - b. Architect/Engineer's review of shop drawings, equipment schedules, samples and templates as defined under Section 01 33 00. General Contractor Construction Manager shall additionally schedule and allow for in the CPM Progress Schedule time for Architect's response to General Contractor Construction Manager's request for clarifications and interpretations of the Contract Documents. Time required for such activity, up to 10 or more days, is part of the normal construction process and is not a valid reason for extension of Contract Time, nor increase in the Contract Amount.
 - c. Delivery times of equipment furnished under separate Contracts with Owner, where the General Contractor Construction Manager has responsibility for installation or coordination.
 - d. Interruption of Owner's existing utilities, delivery of Owner furnished products (OFI and OFCI), rough-in drawings for OFI and OFCI products, project phasing and Owner's scheduling and use of site requirements.
 - e. Test, balance and adjust various systems and pieces of equipment, maintenance and operation manuals, instructions and preventive maintenance tasks.
5. Activity Descriptive Information: identify the following for each work activity/event:
 - a. Activity/Event ID number. (Uniquely number each activity/event. The network diagram should be generally numbered in sequence; left to right; top to bottom, and omitting numbers ending in 3, 6, and 9.)
 - b. Concise description of activity (35 characters or less including spaces preferred).
 - c. Work location code, coordinated with key plan.
 - d. Performance responsibility or trade code using defined and approved abbreviations.
 - e. Nodes that correspond to the activities on the network diagram.
 - f. Original Duration
 - g. Remaining Duration
 - h. Baseline Total Float
 - i. Start Variance to Baseline
 - j. Finish Variance to Baseline
 - k. Duration (in work days.)
 - l. Early Start (calendar day).
 - m. Early Finish (calendar day)
 - n. Total float time.
 - o. Manpower required (average number of men per day).
- E CPM Submittal Requirements: have approved an updated CPM prior to the approval of each progress payment.
 1. Electronic info shall be in compressed Primavera, (PDM) format
 2. Plots and reports required:
 - a. Network diagram plots.
 - 1) Bar chart plot.
 - 2) Time logic plot.

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- 3) Critical Path items of work only plot.
 - 4) Float Path plots.
 - 5) Early start and finish plot.
 - 6) Late start and finish plot
 - 7) Individual monthly activity plots for each month for the duration of the entire Contract.
 - b. Activity List.
 - c. Shop drawing and sample submittal schedule.
 3. Updates: Update and reissue the CPM Progress Schedule in coordination with each application for progress payment. Submission of complete and accurate monthly CPM Progress Schedules is a pre-requisite to the Architect's Certificate of Payment. The updated CPM; shall include the items specified herein above, in addition the updated CPM shall show the following:
 - a. Changes to the Contract and their effect on the schedule and Activity/event costs.
 - b. Delays in submittals, or deliveries, or work stoppage are encountered which make rescheduling of the work necessary
 - c. Revisions to schedule to reflect actual prosecution and progress of the Project. Show current status of activities completed or partially completed. Identify actual start dates and finish dates for each activity.
 - d. Modifications to the General Contractor Construction Manager's plan of action for future activities.
- F Special CPM Progress Schedule Meetings: The Owner may require additional special CPM review meetings at any time during the Contract to review the CPM Progress Schedule updates.
- G Responsibility for Project Completion:
1. Whenever it becomes apparent from the current progress review meeting or the updated CPM progress schedule that phasing or contract completion dates will not be met, the General Contractor Construction Manager shall execute some or all of the following remedial actions:
 - a. Increase construction manpower in such quantities and trades as necessary to eliminate the backlog of work.
 - b. Increase the number of working hours per shift, shifts per working day, working days per week (pending approval of Owner), the amount of construction equipment, or any combination of the foregoing to eliminate the backlog of work.
 - c. Reschedule the work in conformance with the specification requirements.
 2. Prior to proceeding with any of the above actions, the General Contractor Construction Manager shall notify and obtain approval from the Owner's Representative for the proposed schedule changes. If such actions are approved, the CPM revisions shall be incorporated by the General Contractor Construction Manager into the network diagram before the next update, at no additional cost to the Owner.
- H Extension of Contract Time: Each time an extension of Contract Time is requested, submit the request with justification and evidence supporting the request and submit a completely revised and updated CPM Project Schedule showing the impact of the proposed extension of Contract Time on the Progress Schedule. General Contractor Construction Manager Time may only be adjusted by Change Order issued by the Owner.

1.04 CONTRACT PROGRESS REPORTING

- A Daily construction reports: Prepare a daily construction report, submit duplicate copies to the Architect at weekly intervals. Record the following information concerning events at the site:

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1. List of Subcontractors and subcontractors at the site, and approximate count of personnel.
 2. Accidents, unusual events, and emergency procedures.
 3. High and low temperatures, general weather conditions (when exterior work is in progress)
 4. Meetings and significant decisions.
 5. Stoppages, delays, shortages, losses.
 6. Emergency procedures.
 7. Orders and requests of governing authorities.
 8. Change Orders received and implemented.
 9. Services connected, disconnected.
 10. Meter readings and similar recordings.
 11. Equipment or system tests and start-ups.
 12. Partial Completions/occupancies.
 13. Substantial completions authorized.
- B Special Reports:
1. Unusual Event Reporting: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by General Contractor Construction Manager's personnel, evaluation of results or effects, and similar pertinent information.
- C Look ahead activity reports: Prepare each week throughout the term of construction a listing of upcoming construction activities. Each weekly report shall include a listing of planned construction activities for the upcoming 2 weeks (14 calendar days). Submit a Look Ahead Activity Report at each job meeting to all participants. If no meeting is planned on a given week, mail the reports directly to both Architect/Engineer and Owner's Project Manager.
1. Maintain a record of all Look Ahead Activity Reports in a 3-ring binder in the General Contractor Construction Manager's field office and make available for review by Architect/Engineer and Owner's Project Manager.
 2. Unusual Event Reporting: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by General Contractor Construction Manager's personnel, evaluation of results or effects, and similar pertinent information.

1.05 WORK DOCUMENTATION - PERIODIC SITE OBSERVATIONS

- A Observe and maintain a record of tests. Record the following:
1. Specification section number, product(s), and name of subcontractor or installer.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 013200

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SECTION 013300 - SUBMITTAL REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Delegated-Design Services.
- B Submittals:
 - 1. Submittal Schedule.
 - 2. Submittals for Review.
 - 3. Submittals for Information.
 - 4. Submittals for Project Closeout.
 - 5. Number of copies of submittals.
 - 6. Submittal procedures.
- C Engineered Deferred Submittals.

1.02 RELATED REQUIREMENTS

- A Section 011000 - Summary :
- B Section 012500 - Substitution Procedures: For Substitution Requests.
- C Section 013216 - Construction Progress Schedule: Form, content, and administration of schedules.
- D Section 014000 - Quality Requirements: for Testing Agency Submittals.
- E Section 016000 - Product Requirements : for requirements for submitting comparable product submittals for products by listed manufacturers.
- F Section 019113 - General Commissioning Requirements : Additional procedures for submittals relating to commissioning.
 - 1. Where submittals are indicated for review by both Architect and the Commissioning Authority, submit one extra and route to Architect first, for forwarding to the Commissioning Authority.
 - 2. Where submittals are not indicated to be reviewed by Architect, submit directly to the Commissioning Authority; otherwise, the procedures specified in this section apply to commissioning submittals.

1.03 DELEGATED-DESIGN SERVICES

- A Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of General Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file and three paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to General Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.
- C Refer to Paragraph 3.08 - Engineered Deferred Submittals.

PART 2 PRODUCTS - NOT USED.

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PART 3 EXECUTION

3.01 SUBMITTALS SCHEDULE

- A After the General Contractor's Construction Schedule has been developed and accepted, prepare a complete schedule of submittals.
 - 1. Two weeks after notice to proceed, General Contractor shall prepare the Submittals Requirements Schedule in detail:
 - a. Use one line per item for each section and paragraph number
 - b. Provide one copy for the Owner and one copy for the Architect of Record.
 - c. Obtain Architect of Record's and Project Manager's approvals
 - 2. Coordinate the Submittal Schedule with the General Contractor's Construction Schedule, Schedule of Values, Subcontracts, list of products and other pertinent information.
 - 3. Coordinate submittals into logical groupings to facilitate interrelation of several items:
 - a. Finishes which involve Architect of Record selection of colors, textures or patterns.
 - b. Associated items which require correlation for efficient function or for installation.
 - c. Provide:
 - 1) All submittals required by a particular section at one time.
 - 2) Shop drawings, schedules, product data, coordination drawings, samples, color charts and other information as required (whether listed or not) for Architect of Record's complete evaluation.
 - 3) Define the deferred submittal schedule.
 - d. Incomplete information or partial submittals will be cause for rejection.
 - 4. Prepare the schedule in chronological order and provide the following:
 - a. Scheduled date for the initial submittal.
 - b. Section number per this specification.
 - c. Submittal category (Shop Drawing, Product Data or Sample).
 - d. Name of General Contractor.
 - e. Description of the part of the work covered by this submittal.
 - f. Date required for this submittal to be returned but not less than the stipulated date herein.
- B After approval of the Submittal Schedule, distribute in print and electronically in pdf format to the Owner's representative, Architect, subcontractors and all other parties required to comply with the dates indicated in the Submittal Schedule.
 - 1. Submit the Submittal Schedule within 10 days of the date required for submittal of the General Contractor's Construction Schedule.
- C Update and reissue the Submittal Schedule after revised dates, agreed upon by the affected parties, have been approved.
- D Submittal schedule shall be updated periodically to reflect changes in the construction schedule.

3.02 SUBMITTALS FOR REVIEW

- A Submittals shall be numbered according to Architect's Project Manual of Specifications.
- B When the following are specified in individual sections, submit them for review:
 - 1. Product data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - a. Submit only pages which are pertinent. Mark each copy of standard printed data to identify relevant products and the related Specification Section and Article Number.
 - b. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.

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- c. Mark each copy of each submittal to show which products and options are applicable.
2. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Performance characteristics and capacities
 - d. Finishes:
 - 1) Standard color charts.
 - e. Component parts
 - f. Statement of compliance with specified referenced standards.
 - g. Testing by recognized testing agency.
 - h. Application of testing agency labels and seals.
 - i. Notation of coordination requirements.
 - j. Other information as required by the individual specification sections
 - k. Availability and delivery time information.
3. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Dimensions
 - e. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 - f. Modify manufacturer's standard schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the Work. Delete information that is not applicable.
 - g. Submit Product Data before or concurrent with Samples.
 - h. Submit Product Data in the following format:
 - 1) PDF electronic file.
- C Shop drawings: Submit newly prepared Project-specific information, drawn accurately to scale.
 1. Do not reproduce Contract Documents or copy standard product information as the basis of Shop Drawings.
 - a. Submittals received on the Architect's Titleblock will be automatically rejected.
 2. Present in a clear and thorough manner Job Specific shop drawings. (Generic shop drawings will be rejected.) Title each drawing sheet with Project Name and Number; identify each element of the drawings by reference to Sheet Number and Detail, Specification Section, Schedule or Room Number listed in the Contract Documents and CAD Standards Manual.
 3. Standard information prepared without specific reference to the Project is not a Shop Drawing.
 4. Identify field dimensions; show relation to adjacent or critical features of Work or Products.
 5. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.

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6. Scale Required: Unless otherwise specifically directed by Architect of Record, make all shop drawings accurate to a scale sufficiently large enough to show all pertinent features of the item and its methods of connection to the Work.
 7. Submit Shop Drawings in the following format:
 - a. PDF electronic file.
 8. Provide a 5" x 4" blank space on each submittal sheet or sample label for Architect of Record's review stamp.
- D Samples for Selection:
1. Provide 4 of each sample or color chart.
 2. Submit full range of manufacturer's standard finishes, except when more restrictive requirements are specified, indicating colors, textures, and patterns, for Architect of Record's selection. ALL color charts shall be originals, no photocopies allowed.
 3. Submit samples to illustrate functional characteristics of products, including parts and attachments.
 4. Label each sample with Project Name and Number, Interior Design Specification Number (as applicable), and Room Number.
 5. Mock-up: Provide field samples of finishes and assemblies at the site as required by individual specification sections.
 - a. Install each sample or assembly complete and finished.
 - b. Locate as directed by the Owner or Architect of Record.
 - c. Acceptable mock-up may or may not remain as part of the Work at the Architect of Record's discretion.
- E Samples for Verification:
1. Provide 4 of each sample or color chart.
 2. Submit full range of manufacturer's standard finishes, except when more restrictive requirements are specified, indicating colors, textures, and patterns, for Architect of Record's selection. ALL color charts shall be originals, no photocopies allowed.
 3. Submit samples to illustrate functional characteristics of products, including parts and attachments.
 4. Label each sample with Project Name and Number, Interior Design Specification Number (as applicable), and Room Number.
- F Samples will be reviewed only for aesthetic, color, or finish selection.
1. Submit sample of material in size, finish, texture and color as required by the specific specification section and indicating the range of any variations that may occur.
- G After review, provide copies and distribute in accordance with Article 3.06 **Submittal Procedures** article below and for record documents purposes described in Section 017800 - Closeout Procedures and Submittals.
- H Fire Alarm/Fire Sprinkler System Shop Drawings shall be submitted to submittal to the Architect whose approval shall be obtained prior to the submittal to the state and local Fire Marshall.

3.03 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.

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- B Submit for Architect's knowledge as Contract Administrator or for Owner. No action will be taken.

3.04 SUBMITTALS FOR PROJECT CLOSEOUT:

- A Submit for Owner's benefit during and after project completion and in accordance with Section 017800 - Closeout Procedures and Submittals.
- B When the following are specified in individual sections, submit them at project closeout:
 - 1. Project record documents.
 - 2. Operation and maintenance data.
 - 3. Warranties & Bonds
 - 4. Other types as indicated.

3.05 NUMBER OF COPIES OF SUBMITTALS

- A 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 Documents for Information: Submit one electronic copy to Architect of Record.
- C Extra Copies at Project Closeout: See Section 017800 - Closeout Procedures and Submittals . Make one reproduction of submittal originally reviewed. Submit one extra of submittals for information.
- D Samples: Submit the number specified in individual specification sections or (3) of each if no specific number is specified in the specific section; one of which will be retained by Architect.
 - 1. After review, produce duplicates.
 - 2. Retained samples will not be returned to Contractor unless specifically so stated.

3.06 SUBMITTAL PROCEDURES

- A General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
- B Schedule submittals to expedite the Project and coordinate submission of related items. The General Contractor is solely responsible for coordinating the delivery of submittals, including any necessary corrections and resubmittals, to assure that Architect of Record approval can be obtained without delaying the Work. The General Contractor shall start the submittal process within three weeks after award or as required to meet the Contract Schedule requirements.
- C General: Electronic copies of the digital files of the Construction Documents may be made available by the Architect for the General Contractor's use in the preparation of the Submittals. The Architect nor the General Contractor shall be obligated to use such documents in the preparation of the Submittals.
 - 1. Transfer of the digital files from the Architect to the General Contractor shall be subject to the Terms and Conditions of a Digital File Transfer Agreement at the time of such transfer.
 - 2. The use of the digital files prepared by the Architect in the preparation of the Shop Drawings shall not in any way obviate the recipient's responsibility for the proper checking and coordination of dimensions, field conditions, details, member sizes, gauges, quantities, and any other condition as required to facilitate complete and accurate fabrication and erection.
- D Transmit each submittal with approved form.
- E Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
- F Identify Owner's Representative, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

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- G Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
- H General Contractor Review:
 - 1. Review submittals (prior to sending to Architect of Record) to determine and verify field measurements, field construction criteria, manufacturer's catalog numbers, and conformance of submittal with requirements of Contract Documents.
 - 2. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.
 - 3. Coordinate submittals with requirements of Work and Contract Documents.
 - 4. Sign or initial each sheet of shop drawings and product data or each sample label to certify compliance with the requirements of Contract Documents using a submittal stamp with the following information incorporated:
 - a. General Contractor Submittal Approval
 - b. By making this Submittal No. _____, (Insert General Contractor's Name) does hereby approve said submittal and does certify that it has determined and verified all materials, field measurements and field construction criteria related thereto, and has checked and coordinated the information within this submittal with the requirements of the Work and Contract Documents.
 - c. Signed for the General Contractor: _____ Date: _____.
- I Submittal Mark-ups:
 - 1. Submittals shall be marked-up as follows:
 - a. Contractor Comments: Make all Contractor comments in "Blue" ink.
 - b. Design Team will make all comments in "Red" ink.
- J Identify Project number, General Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy. Architect will not review submittals that do not bear the General Contractor's approval stamp and will return them without action.
- K Apply General 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.
- L All submittals **NOT** made through the General General Contractor will be rejected.
- M The Architect will return unsolicited submittals without action.
- N No portion of the Work which requires a shop drawing or sample submission shall be commenced until the submission has been reviewed and returned as approved by Architect of Record.
- O Deliver physical submittals to Architect at business address.
- P For each submittal for the initial review, allow 10 days excluding delivery time to and from the Contractor.
 - 1. For concurrent review of submittals by Consultants, Owner and other parties, allow 5 additional days excluding time to and from the Contractor.
 - 2. Extension of review time shall not constitute a basis to automatically extend the Contract time.
- Q For each resubmittal, allow for 10 days excluding time to and from the General Contractor.
- R Submittals and Samples shall be submitted in a timely manner to allow for resubmittal and not cause a delay in the Work.
- S Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.

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- T Provide space of approximately 5" x 4" for Contractor and Architect review stamps.
 - 1. General Contractor shall include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Project number.
 - d. Name and address of Architect.
 - e. Name and address of General Contractor.
 - f. Name and address of Subcontractor.
 - g. Name and address of Supplier.
 - h. Name of Manufacturer.
 - i. Unique identifier, including revision number(s).
 - j. Number and title of appropriate Specification Section.
 - k. Drawing number and detail references, as appropriate.
 - l. Other necessary identification.
 - 2. Architect shall mark the action stamp indicating the action taken.
- U When revised for resubmission, identify all changes made since previous submission.
 - 1. The General Contractor shall make any corrections required by the Architect of Record and resubmit.
 - a. The General Contractor shall direct specific attention in writing or on the resubmitted shop drawings to revisions other than the correction(s) required by Architect of Record on previous submissions.
 - b. When revised for resubmission, identify all changes made since previous submission.
 - c. The revised submittal will be identified with the original submittal number plus a suffix to mark it as a resubmittal, i.e. 099900.001-R1, 099900.001a or 099900.001A. If not so identified, the resubmittal will be returned as revise and resubmit with the proper number.
 - d. Should the Contractor's resubmittals be returned as Revise and Re-submit after (3) reviews by the Architect; any further reviews may be processed by the Architect, at the Architect's standard hourly rate. The Architect will charge the Owner, and such costs will be deducted from monies still due the Contractor. The Architect will notify the Owner and Contractor prior to the processing of deficient Submittals.
- V Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.h
- W Electronic submittals must be provided in a Portable Document Format (.pdf) file when submitted electronically.
 - 1. Prepare file for submittal by converting it to PDF using BlueBeam Revu, latest version. Legible scanned PDF files of plain paper documents are acceptable, but PDF sets created by electronically converting files using BlueBeam Revu are preferable. Scanned documents are more difficult to annotate, are usually less legible, and produce larger attachment sizes.
 - 2. Ensure that sheets are ready to print out to a PDF format on the appropriate sheet size, with no additional formatting required by the viewer, and with all required information.
 - 3. Electronic signatures and stamps must be utilized on electronic submittals where signatures and stamps are required in Section 3.01 Submittal Schedule items A.1-4 and Section 3.6 Submittal Procedures items A-W above.
- X Substitutions will not be considered when they are indicated or implied on shop drawings, product data submittals or samples without a separate written request complying to the requirement in Section 012500 - Substitution Procedures.

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- Y Maintain one (1) set of all approved submittals at the Project Site in the General Contractors office.

3.07 SUBMITTAL REVIEW

- A Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.
- B Review Time: Architect will respond and return Submittals to Contractor within 10 Working days of receipt. For the purpose of establishing the start of the mandated response period, Submittals received after 3:00 PM will be considered as having been received on the following regular working day.
1. Architect may determine that additional time is required to respond, and notify contractor in writing of additional days required.
 2. If a review is required of multiple consultants, then the review and response period shall be 14 Working days.
 3. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.
- C Submittals for Information: Architect will acknowledge receipt and review. See below for actions to be taken.
- D Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
1. Notations may be made directly on submitted items and/or listed on appended Submittal Review cover sheet.
- E Architect's and consultants' actions on items submitted for review:
1. Authorizing purchasing, fabrication, delivery, and installation:
 - a. "Approved", or language with same legal meaning.
 - b. "Approved as Noted, Resubmission not required", or language with same legal meaning.
 - 1) At Contractor's option, submit corrected item, with review notations acknowledged and incorporated.
 - c. "Approved as Noted, Resubmit for Record", or language with same legal meaning.
 - 1) Resubmit corrected item, with review notations acknowledged and incorporated. Resubmit separately, or as part of project record documents.
 - 2) Non-responsive resubmittals may be rejected.
 2. Not Authorizing fabrication, delivery, and installation:
 - a. "Revise and Resubmit".
 - 1) Resubmit revised item, with review notations acknowledged and incorporated.
 - 2) Non-responsive resubmittals may be rejected.
 - b. "Rejected".
 - 1) Submit item complying with requirements of Contract Documents.
- F Architect's and consultants' actions on items submitted for information:
1. Items for which no action was taken:
 - a. "Received" - to notify the 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 Contractor.

3.08 ENGINEERED DEFERRED SUBMITTALS:

- A Definition: Per 2022 California Building Code (CBC) (Section 107.3.4.1).

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1. *"Portions of the design that are not submitted at the time of the (permit) application and that are to be submitted to the building official within a specified period."*
- B Documents for deferred submittal items shall be submitted to the registered design professional in responsible charge [EOR], (through the Architect of Record), who shall review them and forward them, (through the General Contractor), to the building official with a notation indicating that the deferred documents have been reviewed and found to be in general conformance to the design of the building.
- C Contractor is responsible for making all submittals of deferred items to the Building Officials, (AHJ).
- D Refer to deferred submittal items on the Construction Documents.
- E Deferred Submittals include but are not limited to the following list. Provide as applicable to the Project.
 1. Acoustical ceiling suspension system – with manufacturer instructions required.
 2. Exterior wall framing systems.
 3. Emergency call system.
 4. Exit illumination.
 5. Through-penetration fire stop systems and Spray fireproofing submittal data.
 6. Metal guardrails and handrails.
 7. Pre-cast concrete structural members or panels.
 8. Shelving systems and steel storage racks
 9. Specialty retaining walls.
 10. Wooden, steel, or composite floor or roof trusses.
 11. Elevator shop drawings including guide rails and support brackets.
- F Deferred submittal documents and drawings must be submitted and approved prior to the construction/installation of the deferred item.
- G All pre-engineered, pre-fabricated, pre-manufactured or other products designed after issuance of a permit must be designed for loads and deflection criteria as required by the applicable edition of the California Building Code (CBC).

END OF SECTION 013300

Submittal Requirements - 013300

SECTION 014000 - 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 Contractor's construction-related professional design services.
- F Contractor's design-related professional design services.
- G Control of installation.
- H Mock-ups.
- I Tolerances.
- J Manufacturers' field services.
- K Defect Assessment.

1.02 RELATED REQUIREMENTS

- A Section 013000 - Administrative Requirements:
- B Section 013300 - Submittal Requirements: Deferred Submittals
- C Section 014216 - Definitions.
- D Section 014533 - Code-Required Special Inspections and Procedures
- E Section 016000 - Product Requirements:

1.03 REFERENCE STANDARDS

- A ASTM C1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants; 2008 (Reapproved 2023).
- B ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation; 2017.
- C ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2023.
- D ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2019.
- E ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2021.
- F ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2021.
- G ASTM E699 - Standard Specification for Agencies Involved in Testing, Quality Assurance, and Evaluating of Manufactured Building Components; 2016.
- H IAS AC89 - Accreditation Criteria for Testing Laboratories; 2021.

1.04 DEFINITIONS

- A Contractor's Quality Control Plan: Contractor's management plan for executing the Contract for Construction.
- B Contractor's Professional Design Services: Design of some aspect or portion of the project by party other than the design professional of record. Provide these services as part of the Contract for Construction.
 - 1. Design Services Types Required:
 - a. Construction-Related: Services Contractor needs to provide in order to carry out the Contractor's sole responsibilities for construction means, methods, techniques, sequences, and procedures.

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- b. Design-Related: Design services explicitly required to be performed by another design professional due to highly-technical and/or specialized nature of a portion of the project. Services primarily involve engineering analysis, calculations, and design, and are not intended to alter the aesthetic aspects of the design.
- C Design Data: Design-related, signed and sealed drawings, calculations, specifications, certifications, shop drawings and other submittals provided by Contractor, and prepared directly by, or under direct supervision of, appropriately licensed design professional.

1.05 CONTRACTOR'S CONSTRUCTION-RELATED PROFESSIONAL DESIGN SERVICES

- A Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.
- B Provide such engineering design services as may be necessary to plan and safely conduct certain construction operations, pertaining to, but not limited to the following:
 - 1. Temporary sheeting, shoring, or supports.
 - 2. Temporary scaffolding.
 - 3. Temporary bracing.
 - 4. Temporary falsework for support of spanning or arched structures.
 - 5. Temporary foundation underpinning.
 - 6. Temporary stairs or steps required for construction access only.
 - 7. Temporary hoist(s) and rigging.
 - 8. Investigation of soil conditions to support construction equipment.

1.06 CONTRACTOR'S DESIGN-RELATED PROFESSIONAL DESIGN SERVICES

- A Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.
- B Base design on performance and/or design criteria indicated in individual specification sections.
 - 1. Submit a Request for Information to Architect if the criteria indicated are not sufficient to perform required design services.
- C Scope of Contractor's Professional Design Services: Provide for the following items of work:
 - 1. Structural Design: Include physical characteristics, engineering calculations, and resulting dimensional limitations as described in Section 084313 - Aluminum Entrances and Storefront Systems.
 - 2. Structural Design of Seismic Controls: As described in Section 210548 - Vibration and Seismic Controls for Fire Suppression Piping and Equipment.
 - 3. Sprinkler Layout: Coordinate with ceiling installation, detailed pipe layout, and hydraulic calculations as described in Section 211300 - Fire-Suppression Sprinkler Systems.

1.07 SUBMITTALS

- A See Section 013300 - Submittal Requirements, for submittal procedures.
- B Designer's Qualification Statement: Submit for Architect's knowledge as contract administrator, or for Owner's information.
 - 1. Include information for each individual professional responsible for producing, or supervising production of, design-related professional services provided by Contractor.
 - a. Full name.
 - b. Professional licensure information.
 - c. Statement addressing extent and depth of experience specifically relevant to design of items assigned to Contractor.
- C 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

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Contract Documents, or for Owner's information.

1. Include calculations that have been used to demonstrate compliance to performance and regulatory criteria provided, and to determine design solutions.
 2. Include required product data and shop drawings.
 3. Include a statement or certification attesting that design data complies with criteria indicated, such as building codes, loads, functional, and similar engineering requirements.
 4. Include signature and seal of design professional responsible for allocated design services on calculations and drawings.
- D Test Reports: After each test/inspection, promptly submit (within 24 hours) two copies:
1. Distribution:
 - a. 1 copy to the Architect.
 - b. 1 copy to the Structural Engineer.
 - c. 2 copies to the Contractor.
 - d. 1 copy to the Owner's Representative.
 2. 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 the Architect, Owner's Representative, or the Contractor; provide interpretation of results.
 3. 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.
- E Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.
- F 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.
- G 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.
- H Erection Drawings: Submit drawings for Architect's benefit as contract administrator or for Owner.

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1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.
2. Data indicating inappropriate or unacceptable Work may be subject to action by Architect or Owner.

1.08 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. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
 3. Qualification Statement: Provide documentation showing testing laboratory is accredited under IAS AC89.
- B Designer Qualifications: Where professional engineering design services and design data submittals are specifically required of Contractor by Contract Documents, provide services of a Professional Engineer experienced in design of this type of work and licensed in California.
- C Contractor's Quality Control (CQC) Plan:
1. Prior to start of work, submit a comprehensive plan describing how contract deliverables will be produced. Tailor CQC plan to specific requirements of the project. Include the following information:
 - a. Management Structure: Identify personnel responsible for quality. Include a chart showing lines of authority.
 - b. Management Approach: Define, describe, and include in the plan specific methodologies used in executing the work.

1.09 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.

1.10 MOCK-UPS

- A Before installing portions of the Work where mock-ups are required, construct mock-ups in location and size indicated for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work. The purpose of mock-up is to demonstrate the proposed range of aesthetic effects and workmanship.
- B Accepted mock-ups establish the standard of quality the Architect will use to judge the Work.

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- C Integrated Exterior Mock-ups: Construct integrated exterior mock-up as indicated on drawings. Coordinate installation of exterior envelope materials and products as required in individual Specification Sections. Provide adequate supporting structure for mock-up materials as necessary.
- D Provide supervisory personnel who will oversee mock-up construction. Provide workers that will be employed during the construction at Project.
- E Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.
- F Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- G Obtain Architect's approval of mock-ups before starting work, fabrication, or construction.
 - 1. Architect will issue written comments within seven (7) working days of initial review and each subsequent follow up review of each mock-up.
 - 2. Make corrections as necessary until Architect's approval is issued.
- H Accepted mock-ups shall be a comparison standard for the remaining Work.
- I 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.
- J Where possible salvage and recycle the demolished mock-up materials.

1.11 TESTING AND INSPECTION AGENCIES AND SERVICES

- A Contractor shall employ and pay for services of an independent certified testing agency acceptable to the Architect and Owner to perform specified testing and inspections required to be performed and paid for by the Contractor.
- B As indicated in individual specification sections, Owner or Contractor shall employ and pay for services of an independent testing agency to perform other specified testing.
- C Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- D Contractor Employed Agency:
 - 1. Testing agency: Comply with requirements of ASTM E329, ASTM E543, ASTM E699, ASTM C1021, ASTM C1077, ASTM C1093, and ASTM D3740.
 - 2. Inspection agency: Comply with requirements of ASTM D3740 and ASTM E329.
 - 3. Laboratory Qualifications: Accredited by IAS according to IAS AC89.
 - 4. Laboratory: Authorized to operate in California.
 - 5. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.
 - 6. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST established Measurement Assurance Program, under a laboratory measurement quality assurance program.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

- A Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B Comply with manufacturers' instructions, including each step in sequence.
- C Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

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- 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 Before installing portions of the Work where mock-ups are required, construct mock-ups in location and size indicated for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work. The purpose of mock-up is to demonstrate the proposed range of aesthetic effects and workmanship.
- B Accepted mock-ups establish the standard of quality the Architect will use to judge the Work.
- C Integrated Exterior Mock-ups: Construct integrated exterior mock-up as indicated on drawings. Coordinate installation of exterior envelope materials and products as required in individual Specification Sections. Provide adequate supporting structure for mock-up materials as necessary.
- D Provide supervisory personnel who will oversee mock-up construction. Provide workers that will be employed during the construction at Project.
- E Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.
- F Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- G Obtain Architect's approval of mock-ups before starting work, fabrication, or construction.
 - 1. Architect will issue written comments within seven (7) working days of initial review and each subsequent follow up review of each mock-up.
 - 2. Make corrections as necessary until Architect's approval is issued.
- H Architect will use accepted mock-ups as a comparison standard for the remaining Work.
- I 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.
- J Where possible salvage and recycle the demolished mock-up materials.

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 See individual specification sections for testing and inspection required. The following list is only intended to be a guide for the Contractor to aid in determining the testing requirements for the Project. The requirements specified in each specific section shall take precedence over this list and this list is not to be interpreted as being a complete list.
 - 1. 033000 - Cast-in-Place Concrete
 - 2. 042000 - Unit Masonry

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3. 075419 - PVC Thermoplastic Single-Ply Roofing
 4. 078400 - Firestopping
 5. 079200 - Joint Sealants
 6. 084313 - Aluminum Entrances and Storefront Systems
 7. 088000 - Glass
 8. Division 9 - Flooring Sections regarding moisture content of concrete floors.
- B Testing Agency Duties:
1. Test samples of mixes submitted by Contractor.
 2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
 3. Perform specified sampling and testing of products in accordance with specified standards.
 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 5. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
 6. Perform additional tests and inspections required by Architect.
 7. Attend preconstruction meetings and progress meetings.
 8. Submit reports of all tests/inspections specified.
- C Limits on Testing/Inspection Agency Authority:
1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 2. Agency may not approve or accept any portion of the Work.
 3. Agency may not assume any duties of Contractor.
 4. Agency has no authority to stop the Work.
- D Contractor Responsibilities:
1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
 3. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
 - c. To facilitate tests/inspections.
 - d. To provide storage and curing of test samples.
 4. Notify laboratory 24 hours minimum, in advance, prior to expected time for operations requiring testing/inspection services.
 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- E Re-testing required because of non-conformance to specified requirements shall be performed by the same agency.
1. Re-testing required because of non-compliance with specified requirements shall be paid for by 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

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surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance equipment as applicable, and to initiate instructions when necessary.

- B Such Manufacturer's personnel shall be accompanied by the Contractor during his time at the site.
- C Submit qualifications of observer to Architect 30 days in advance of required observations.
 - 1. Observer subject to approval of Owner.
- D 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 General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
 - 2. Comply with the Contract Document requirements for Section 017329 - Cutting and Patching.
- B Protect construction exposed by or for quality-control service activities.
- C Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.
- D Replace Work or portions of the Work not complying with specified requirements.
- E If, in the opinion of Architect, it is not practical to remove and replace the work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION 014000

Quality Requirements - 014000

SECTION 014100 - REGULATORY REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY OF REFERENCE STANDARDS

- A Section includes: Regulatory requirements applicable to this project.
- B Specific reference in the Specifications to codes and regulations or requirements of regulatory agencies shall mean the latest printed edition of each adopted by the regulatory agency in effect at the time of the opening of Bids, except as may be otherwise specifically stated in the Contract Documents.
- C Should any conditions develop not covered by the Contract Documents wherein the finished Work will not comply with current codes, a Change Order detailing and specifying the required Work shall be submitted to and approved by City before proceeding with the Work.

1.02 STANDARDS AND CODES

- 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 29 CFR 1910 - Occupational Safety and Health Standards; Current Edition.
- D NFPA 1 - Fire Code; 2021, with Errata (2022).
- E NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G Elevator Code: ASME 17.1 Elevators and Escalators.
- H The 2022 Triennial Edition of Title 24 California Building Standards Code (Cal. Code Regs., Title 24).
 - 1. The current edition of Title 24 includes:
 - Part 1 – California Administrative Code.
 - Part 2 – California Building Code, Volumes 1 and 2, based on the 2021 International Building Code.
 - Part 3 – California Electrical Code, based on the 2020 National Electrical Code.
 - Part 4 – California Mechanical Code, based on the 2021 Uniform Mechanical Code.
 - Part 5 – California Plumbing Code, based on the 2021 Uniform Plumbing Code.
 - Part 6 – California Energy Code.
 - Part 7 – Currently vacant.
 - Part 9 – California Fire Code, based on the 2021 International Fire Code.
 - Part 10 – California Existing Building Code, based on the 2021 International Existing Building Code.
 - Part 11 – California Green Building Standards Code, also known as CALGreen
 - Part 12 – California Referenced Standards Code.

1.03 RELATED REQUIREMENTS

- A Section 014000 - Quality Requirements.

1.04 QUALITY ASSURANCE

- A Contractor shall comply with all codes, laws, ordinances, rules and regulations applicable to the Work, which shall have full force and effect as though printed in full in these Specifications. Code, laws, ordinances, rules and regulations are not furnished to Contractor, because Contractor is assumed to be familiar with these requirements.

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1.05 PRECEDENCE

- A Where Drawings or Specifications require or describe products or execution of better quality, higher standard or greater size than required by applicable codes, ordinances and standards, Drawings and Specifications shall take precedence so long as such increase is legal.
- B Where no requirements are identified on Drawings or in Specifications, comply with all requirements of applicable codes, ordinances and standards of governing authorities having jurisdiction.
- C Conflicts between referenced regulatory requirements: Comply with the one establishing the more stringent requirement.
- D Conflicts between referenced regulatory requirements and Contract Documents: Comply with the one establishing the more stringent requirement.

1.06 COMPLIANCE WITH AMERICANS WITH DISABILITIES ACT

- A Contractor acknowledges that, pursuant to the Americans with Disabilities Act (ADA), programs, services, and other activities provided by a public entity to the public, whether directly or through a contractor, must be accessible to the disabled public. Contractor shall provide the services specified in the Contract Documents in a manner that complies with the ADA and any and all other applicable federal, state, and local disability rights legislation. Contractor agrees not to discriminate against disabled persons in the provision of services, benefits, or activities provided under this Agreement and further agrees that any violation of this prohibition on the part of Contractor, its employees, agents, or assigns shall constitute a material breach of the Contract Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 014100

Regulatory Requirements - 014100

SECTION 014216 - 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.
- G Connect: To make the complete necessary utility connection (water, sewer, gas, electricity, etc.) from the building utility to the piece of equipment to allow that piece of equipment to function as intended (e.g., a gas connection for an oven or cooktop).
- H "Approved equal", "or equal" shall mean as approved and accepted by the Architect and/or Owner.
- I "As necessary" means essential to the completion of the work.
- J "As required" means as required by the contract documents.
- K "As selected", "as approved" or words of similar import mean as selected by, as approved by, or as accepted by the Architect and/or Owner.
- L "As shown", "as detailed", "as indicated" or words of similar import mean as indicated on the drawings.
- M "Clear" shall mean to hold to a dimension certain.
- N "Concealed" means not visible in the finished work.
- O "Exposed" means visible in the finished work.
- P "Shall" means mandatory.
- Q "Days" means calendar days.
- R "Working Days" means work days and does not include legal holidays as defined by the Contract.

1.03 OWNER FURNISHED - OWNER INSTALLED ITEMS (OFOI)

- A General: The terms "Furnish," "Install," and "Connect" shall be as defined in Paragraph 1.02 of this Section.
- B Items furnished and installed by the Owner: Refer to Contract for OFOI items.
- C Contractor's Responsibilities:
 - 1. Contractor shall give the Owner written notification, stating the date(s) when the Owner Furnished items must be received at the job site to insure Project completion in accordance with the established schedule. Such dates shall be shown on the schedule.
 - 2. Contractor is responsible for the coordination and interface of the Owner-Furnished and Installed Items (OFOI) with the Work of this Contract to provide all necessary mechanical and electrical rough-ins, openings, supports, dimensions, clearances, etc., required for a

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complete and functional installation.

1.04 OWNER FURNISHED - CONTRACTOR INSTALLED ITEMS (OFCI)

- A General: The terms "Furnish," "Install," and "Connect" shall be as defined in Paragraph 1.02 of this Section.
- B Items furnished by the Owner and installed by the Contractor: Refer to Contract for OFCI items.
- C Owner's Responsibilities:
 - 1. Arrange for and deliver Owner reviewed Shop Drawings, Product Data, and Samples, to the Contractor.
 - 2. Arrange and pay for product delivery to site.
 - 3. Upon delivery, inspect products jointly with Contractor.
 - 4. Immediately upon observing the product, submit any claims for transportation damage and replace damaged, defective, or deficient items.
 - 5. Arrange for Manufacturers' warranties, inspections and service.
- D Contractor's Responsibilities:
 - 1. Contractor shall provide a written schedule to the Owner, indicating when the Owner-Furnished items must be received at the project site to insure the Project completion in accordance with the established schedule. Such dates shall be shown on the schedule.
 - 2. Review of the Owner-reviewed Shop Drawings, Product data, and Samples.
 - 3. Receive and unload products at the site. Inspect for completeness or damage jointly with the Owner.
 - 4. Handle, store, assemble, install, protect, connect and finish products including furnishing lubricants and fluids and other procedures necessary to cause products to be operative and serviceable.
 - 5. Contractor shall be responsible for the coordination with the Owner- Furnished items and to provide for all of the necessary mechanical and electrical rough-ins, openings, supports, dimensions, clearances, etc. required for a complete and functional installation.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 014216

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SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Dewatering
- B Temporary utilities.
- C Temporary telecommunications services.
- D Temporary sanitary facilities.
- E Temporary Controls: Barriers, enclosures, and fencing.
- F Security requirements.
- G Vehicular access and parking.
- H Waste removal facilities and services.
- I Project identification sign.
- J Field offices.

1.02 REFERENCE STANDARDS

- A ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- B ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.

1.03 DEWATERING

- A Provide temporary means and methods for dewatering all temporary facilities and controls.

1.04 TEMPORARY UTILITIES

- A Owner will provide the following:
 - 1. Electrical power and metering, consisting of connection to existing facilities.
 - 2. Water supply, consisting of connection to existing facilities.
- B Existing facilities may be used.
- C Use trigger-operated nozzles for water hoses, to avoid waste of water.

1.05 TELECOMMUNICATIONS SERVICES

- A Provide equivalent equipment and connections for Owner's field office.

1.06 TEMPORARY SANITARY FACILITIES

- A Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B Maintain daily in clean and sanitary condition.

1.07 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.

1.08 FENCING

- A Construction: Commercial grade chain link fence.

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

1.09 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.

1.10 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. Insulated to R 13.
 - 2. STC rating of 35 in accordance with ASTM E90.
 - 3. Maximum flame spread rating of 75 in accordance with ASTM E84.
- C Paint surfaces exposed to view from Owner-occupied areas.

1.11 SECURITY

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

1.12 VEHICULAR ACCESS AND PARKING

- A Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
- B Coordinate access and haul routes with governing authorities and Owner.
- C Provide and maintain access to fire hydrants, free of obstructions.
- D Provide means of removing mud from vehicle wheels before entering streets.
- E Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.
- F Do not allow vehicle parking on existing pavement.

1.13 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.

1.14 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.

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1.15 FIELD OFFICES

- A Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack, and drawing display table.
- B Provide space for Project meetings, with table and chairs to accommodate 6 persons.
- C Locate offices a minimum distance of 30 feet from existing and new structures.

1.16 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.
- C Clean and repair damage caused by installation or use of temporary work.
- D Restore existing facilities used during construction to original condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 015000

Temporary Facilities and Controls - 015000

SECTION 015639 – TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes: Protection and pruning of existing trees prior to site clearing operations.
 - 1. Include maintenance recommendations for care and protection of trees affected by construction after completing the work.
- B. Referenced Sections
 - 1. Section 013300 - Submittal Procedures.
 - 2. Section 017419 - Construction Waste Management Procedures.
 - 4. Section 311000 - Site Clearing.
 - 5. Section 312000 - Earth Moving.
 - 6. Section 320190 - Landscape Maintenance.
 - 7. Section 329000 - Planting.

1.02 REFERENCES

- A. ASTM International (ASTM):
 - 1. D 448 - Classification for Sizes of Aggregate for Road and Bridge Construction.
 - 2. D 5268 - Specification for Topsoil Used for Landscaping Purposes.
 - 3. F 567 - Practice for Installation of Chain-Link Fence.
- B. California Code of Regulations (CCR):
 - 1. CBSC, Title 24, Part 11 - California Green Building Standards Code (CALGreen), 2019 edition.
- C. National Arborist Association/American Standards Institute (NAA/ANSI):
 - 1. A300 (Part 1)-2001 - Tree Pruning.
 - 2. Z133.1-2000 - Pruning, Trimming, Repairing, Maintaining and Removing Trees, and Cutting Brush--Safety Requirements.

1.03 DEFINITIONS

- A. *Caliper*: Diameter of a trunk measured by a diameter tape or the average of the smallest and largest diameters at 6 inches above the ground for trees up to, and including, 4-inch size; and 12 inches above the ground for trees larger than 4-inch size.
- B. *Plant-Protection Zone*: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Contract Drawings.
- C. *Tree-Protection Zone (TPZ)*: Area surrounding individual trees or groups of trees to be protected during construction, and indicated on Drawings.
- D. *Vegetation*: Trees, shrubs, groundcovers, grass, and other plants.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with grading operations to stockpile topsoil from location indicated on Contract Drawings.

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- B. Preinstallation Conference: Conduct conference at the Project site with Owner/representative and Architect, as noted below.
 - 1. Before commencing tree protection and trimming, meet with representatives of authorities having jurisdiction, Owner, Architect, consultants, and other concerned entities. Review tree protection and trimming procedures and responsibilities. Notify participants at least three working days prior to convening conference. Record discussions and agreements and furnish a copy to each participant.
 - a. Construction schedule. Verify availability of materials, personnel, and equipment needed to make progress and avoid delays.
 - b. Enforcing requirements for protection zones.
 - c. Arborist's responsibilities.
 - d. Contractor responsibilities
 - e. Field quality control.

1.05 SUBMITTALS

- A. Product Data: In accordance with Section 013300, submit product data for each type of product specified.
- B. Samples for Verification: For each type of the following:
 - 1. Organic Mulch: 1 quart volume of organic mulch; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch.
 - 2. Protection-Zone Fencing: Assembled Samples of manufacturer's standard size made from full-size components.
 - 3. Protection-Zone Signage: Full-size Samples of each size and text, ready for installation.
- C. Tree Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.
 - 1. Species and size of tree.
 - 2. Location on site plan. Include unique identifier for each.
 - 3. Reason for pruning.
 - 4. Description of pruning to be performed.
 - 5. Description of maintenance following pruning.
- D. Qualification Data: For qualified arborist and tree service firm.
- E. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.
- F. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.
- G. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.
 - 1. Use sufficiently detailed photographs or videotape.
 - 2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

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1.06 QUALITY ASSURANCE

- A. Tree Service Qualifications: Engage an experienced tree service firm that has successfully completed tree protection and trimming work similar to that required for this Project and that will maintain an experienced, qualified Arborist on the Project site on a full-time basis during execution of the work.
 - 1. Arborist Qualifications: An Arborist certified by the International Society of Arboriculture (ISA) and licensed in the jurisdiction where the Project is located.
 - 2. Qualification data for firms and persons to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
 - 3. Arborist will be approved by Landscape Architect.
- B. Certifications: Certification by a qualified Arborist that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged. *Refer to Section 329000.

1.07 PROJECT CONDITIONS

- A. The following practices are prohibited within tree protection zones:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Foot traffic.
 - 4. Erection of sheds or structures.
 - 5. Impoundment of water.
 - 6. Excavation or trenching or digging unless otherwise indicated.
 - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
 - 8. Do not direct vehicle or equipment exhaust toward protection zones.
 - 9. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

PART 2 - PRODUCTS

2.01 REGULATORY REQUIREMENTS

- A. Regulatory Requirements:
 - 1. Tree Pruning Standards: Comply with the NAA/ANSI A300 (Part 1) for pruning standards except where more stringent requirements are indicated.
 - 2. Comply with NAA/ANSI Z133.1 for safety requirements related to tree protection and trimming.
 - 3. Root pruning shall be done in the presence of an Arborist as noted in Article 3.05.
- B. Waste Management: Comply with CALGreen 5.408.1 - Construction Waste Management. Establish a construction waste management plan for the diverted material.

2.02 MATERIALS

- A. Topsoil: Natural or cultivated top layer of the soil profile or manufactured topsoil complying with ASTM D 5268; containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 1 inch, and free of weeds, roots, and toxic and other non-soil materials.
 - 1. Obtain topsoil only from well-drained sites where topsoil is 4 inches deep or more; do not obtain from bogs or marshes.
 - 2. Refer to Section 329000 for material requirements.

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- B. Filter Fabric: Manufacturer's standard, non-woven, pervious, geotextile fabric composed of polypropylene, nylon, or polyester fibers.
- C. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:
 - 1. Type: Wood and bark chips.
 - 2. Size Range: 1/2" inch minimum, 1" maximum.
 - 3. Color: Natural.
- D. Protection-Zone Fencing: Fencing fixed in position and meeting one of the following requirements. Previously used materials may be used when approved by Architect.
 - 1. Chain-Link Protection-Zone Fencing: 5' high, Galvanized-steel fencing fabricated from minimum 2-inch opening, 0.148-inch diameter wire chain-link fabric; with pipe posts, minimum 2-3/8-inch OD line posts, and 2-7/8-inch OD corner and pull posts; with 1-5/8-inch OD top rails and 0.177-inch diameter bottom tension wire; with tie wires, hog ring ties, and other accessories for a complete fence system.
 - 2. High-visibility utility (snow) type fencing, minimum four feet (4'-0") high, consisting of a vinyl meshed fabric in a bright orange color.
 - a. Posts-Metal or wood, sufficient in gauge and size to support the fabric material in a taut and plumb condition. Posts shall be subject to approval by the landscape architect.
 - b. Gates: Single swing access gates matching material and appearance of fencing, to allow for maintenance activities within protection zones; leaf width 24 inches.
- E. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes pre-punched and reinforced; legibly printed with nonfading lettering and as follows:
 - 1. Size: as required
 - 2. Text: TREE PROTECTION ZONE - KEEP OUT. NO UNAUTHORIZED ENTRY. NO STORAGE OF VEHICLES, MATERIALS, OR DEBRIS. NO DUMPING OF CHEMICALS, SLURRY, PAINT, AND OIL.
 - 3. Lettering: 3-inch high minimum, black characters on white background.
- F. Drainage Fill: Selected crushed stone, or crushed or uncrushed gravel, washed, ASTM D 448, size 24, with 90 to 100 percent passing a 2-1/2-inch sieve and not more than 10 percent passing a 3/4-inch sieve.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- B. For the record, prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

3.02 PREPARATION

- A. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated. Tie a 1-inch blue-vinyl tape around each tree trunk at 54 inches above the ground.
- B. Temporary Protection:
 - 1. Provide temporary fencing, barricades, or other suitable guards located outside the drip line (outer perimeter of branches) to protect remaining trees and other plants from damage.

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2. Install barricade fencing to protect trees within the project site that are indicated to be left in place and that might be damaged during site clearing operations. Erect fence outside dripline of branches of individual trees or follow the outer dripline of branches of clumps of trees. Restore trees scarred or damaged by Contractor's equipment or operations to their original condition, or replace, as determined by the Architect. Restoration procedures will be subject to the acceptance of the Architect prior to initiation of those procedures.
- C. Protect tree root systems from damage due to noxious materials caused by run-off or spillage while mixing, placing, or storing construction materials. Protect root systems from flooding, eroding, soil compaction, or excessive wetting caused by dewatering operations.
- D. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated.
 1. Apply 3-inch average thickness of organic mulch. Do not place mulch within 6 inches of tree trunks.
- E. Do not store construction materials, debris, or excavated material within the drip line of remaining trees. Do not permit vehicles or foot traffic within the drip line and prevent soil compaction over root systems.
- F. Do not allow construction equipment to idle for extended periods of time in vicinity of or upwind of plants to remain.

3.03 TREE AND PLANT PROTECTION ZONES

- A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people and animals from easily entering protected area except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.
 1. Chain-Link Fencing: Install to comply with ASTM F 567 and with manufacturer's written instructions.
 2. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Architect.
 3. Access Gates: Install as required; adjust to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- B. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Architect. Install one sign spaced approximately every 35 feet on protection-zone fencing, but no fewer than four signs with each facing a different direction.
- C. Maintain protection zones free of weeds and trash.
- D. Replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.
- E. Maintain protection-zone fencing and signage in good condition as acceptable to Architect and remove when construction operations are complete and equipment has been removed from the site.

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1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

3.04 EXCAVATION

- A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 312000.
- B. Install shoring or other protective support systems to minimize sloping or benching of excavations.
- C. Do not excavate within tree drip line, unless otherwise indicated.
- D. Where excavation for new construction is required within tree drip lines, hand excavate to minimize damage to root systems. Use narrow-tine spading forks and comb soil to expose roots.
 1. Redirect roots in backfill areas wherever possible. If encountering large, main lateral roots, expose beyond excavation limits as required to bend and relocate without breaking. If encountered immediately adjacent to location of new construction and relocation is not practical, cut roots approximately 3 inches back from new construction.
 2. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition and temporarily support and protect roots from damage until they are permanently relocated and covered with earth.
- E. Where utilities trenches are required within tree drip lines, hand excavate under or around tree roots or tunnel under or around the roots by drilling, auger boring, pipe jacking, or digging by hand.
 1. Root Pruning: Do not cut main lateral roots or tap roots; cut only smaller roots that interfere with installation of new work. Cut roots with sharp pruning instruments; do not break or chop.
 2. Do not cut roots 2 inches or larger within an area equal to 5 times the tree trunk diameter measured at the base of the tree unless otherwise directed by the Architect or Arborist.

3.05 ROOT PRUNING

- A. Prune roots that are affected by temporary and permanent construction. Prune roots as follows:
 1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
 2. Cut Ends: Do not paint cut root ends. Coat cut ends of roots more than 1-1/2 inches in diameter with emulsified asphalt or other coating formulated for use on damaged plant tissues as approved by the arborist.
 3. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
 4. Cover exposed roots with burlap and water regularly.
 5. Backfill as soon as possible according to requirements in Section 312000.
- B. Root Pruning at Edge of Protection Zone: Prune roots 12 inches outside of the protection zone, by cleanly cutting all roots to the depth of the required excavation.
- C. Root Pruning within Protection Zone: Clear and excavate by hand to the depth of the required excavation to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

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3.06 CROWN PRUNING

- A. Prune branches that are affected by temporary and permanent construction. Prune branches as follows:
 - 1. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by arborist. All pruning shall be done under supervision of Arborist.
 - 2. Pruning Standards: Prune trees according to ANSI A300 (Part 1) and the following:
 - a. Type of Pruning: Cleaning, Thinning, Raising, Reduction.
 - 3. Cut branches with sharp pruning instruments; do not break or chop.
 - 4. Do not apply pruning paint to wounds.
- B. Chip removed branches and dispose of off-site.

3.07 REGRADING

- A. Grade Lowering: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by Arborist.
 - 1. Root Pruning: Prune tree roots exposed during grade lowering. Do not cut main lateral roots or tap roots; cut only smaller roots. Cut roots with sharp pruning instruments; do not break or chop. All root pruning shall be done in the presence of the Arborist.
- B. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- C. Minor Fill: Where existing grade is 4 inches or less below elevation of finish grade shown, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.

3.08 FIELD QUALITY CONTROL

- A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.09 TREE REPAIR AND REPLACEMENT

- A. Promptly repair trees damaged by construction operations to prevent progressive deterioration.
 - 1. Submit details of proposed root cutting and tree and shrub repairs.
 - 2. Have arborist perform the root cutting, branch pruning, and damage repair of trees and shrubs.
 - 3. Treat damaged trunks, limbs, and roots according to arborist's written instructions.
 - 4. Perform repairs within 24 hours.
 - 5. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by Architect.
- B. Remove and replace trees indicated to remain that are more than 66 percent dead, in an unhealthy condition before the end of the corrections period, or are damaged during construction operations and that the Arborist or Landscape Architect determines to be incapable of restoring to a normal growth pattern or acceptable visual appearance.
 - 1. Provide new trees of same size and species as those being replaced for each tree that measures 4 inches or smaller in caliper size.
 - 2. Provide one new tree(s) of 6-inch caliper size for each tree being replaced that measure more than 4 inches in caliper size.
 - a. Species: Species selected by Landscape Architect.
 - 3. Plant new trees as specified in Section 329000 and maintain in as specified Section 320190.

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C. Damages:

1. Contractor shall compensate Owner for trees that cannot be replaced with equal caliper, size, and species. Amount of compensation shall be equal to \$1000 per inch difference in caliper size between the original tree and the replacement tree.
2. Contractor shall also be assessed fees based on the International Society of Arboriculture (ISA) recommended rates for:
 - a. Injury to trunks, limbs, or root systems, or...
 - b. The value of trees requiring removal subsequent to injury or treatment that varies from these Specifications.

- D. Soil Aeration: Where directed by Landscape Architect, aerate surface soil compacted during construction. Aerate 10 feet beyond drip line and no closer than 36 inches to tree trunk. Drill 2-inch diameter holes a minimum of 12 inches deep at 24 inches o.c. Backfill holes with an equal mix of native soil and sand.

3.10 DISPOSAL OF WASTE MATERIALS

- A. Burning is not permitted on Owner's property.
- B. Disposal: Remove excess excavated material, displaced trees, trash, wood chips, and other debris from Project.

END OF SECTION

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SECTION 015723 - TEMPORARY STORM WATER POLLUTION CONTROL

PART 1 GENERAL

1.01 PERFORMANCE

- A Minimum Water Quality Protection Requirements
 - 1. The Contractor is required to meet the following minimum standards of good housekeeping:
 - a. Eroded sediments and other pollutants must be retained on site and may not be transported from the site via sheetflow, swales, area drains, natural drainage, or wind.
 - b. Stockpiles of earth and other construction-related materials must be protected from being transported from the site by wind or water.
 - c. Fuels, oils, solvents, and other toxic materials must be stored in accordance with their listing and are not to contaminate the soil nor the surface waters. All approved toxic storage containers are to be protected from the weather. Spills must be cleaned up immediately and disposed of in a proper manner. Spills may not be washed into the drainage system.
 - d. Excess or waste concrete may not be washed into the public way or any drainage system. Provisions shall be made to retain concrete wastes on-site until they can be appropriately disposed of or recycled.
 - e. Trash and construction-related solid wastes must be deposited into a covered receptacle to prevent contamination of rainwater and dispersal by wind.
 - f. Sediments and other materials may not be tracked from the site by vehicle traffic. The construction entrance roadways must be stabilized so as to inhibit sediments from being deposited into the public ways. Accidental depositions must be swept up immediately and may not be washed down by rain or by any other means.
- B Erosion Control Plan (ECP)
 - 1. The Contractor shall refer to the prepared Erosion Control Plan (ECP) and implement Best Management Practices (BMPs) necessary to control stormwater pollution from sediments, erosion and construction materials leaving the construction site.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

TEMPORARY STORM WATER POLLUTION CONTROL - 015723

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- A Section 012500 - Substitution Procedures: Substitutions made during procurement and/or construction phases.
- B Section 017419 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting product selection, packaging and substitutions.

1.02 SUBMITTALS

- A Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- B Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 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:

2.02 PRODUCT OPTIONS

- A Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

- A See Section 012500 - Substitution Procedures.

3.02 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.

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- 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.

3.03 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.
- 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 016000

Product Requirements - 016000

SECTION 017300 - EXECUTION REQUIREMENTS

PART 1 -GENERAL

1.01 SUMMARY

- A Section includes: General procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. General installation of products.
 - 4. Progress cleaning.
 - 5. Starting and adjusting.
 - 6. Protection of installed construction.
 - 7. Correction of the Work.
 - 8. Adjustment of the Work
 - 9. Final Cleaning
 - 10. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS

- A Section 01 30 00 - Administrative Requirements: For Coordination Drawing requirements.
- B Section 01 40 00 - Quality Requirements:
- C Section 01 50 00 - Temporary Facilities and Controls: Temporary exterior enclosures.
- D Section 017329 - Cutting and Patching.
- E Section 01 78 00 - Closeout Procedures and Submittals:
- F Section 01 78 36 - Warranties and Bonds:
- G Section 024100 - Selective Demolition: For Pre-Demolition Meetings.
- H Individual Product Specification Sections:
 - 1. Advance notification to other sections of openings required in work of those sections.
 - 2. Limitations on cutting structural members.

1.03 REFERENCE STANDARDS

- A NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

1.04 SUBMITTALS

- A See Section 013300 - Submittal Requirements, for submittal procedures.
- B Certificates: Submit certificate signed by land surveyor or professional engineer certifying that location and elevation of improvements comply with requirements.
- C Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- D Project Record Documents: Accurately record actual locations of capped and active utilities.

1.05 QUALIFICATIONS

- A For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in California.

1.06 PROJECT CONDITIONS

- A Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

Execution Requirements - 017300

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- B Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- C Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- D 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.
- E 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.
- F Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
 - 1. At All Times: Excessively noisy tools and operations will not be tolerated inside the building at any time of day; excessively noisy includes jackhammers.
 - 2. Outdoors: Limit conduct of noisy exterior work to hours approved by the Owner's Representative.
 - 3. Indoors: Limit conduct of noisy interior work to hours approved by the Owner's Representative.

1.07 COORDINATION

- A Verify all dimensions and conditions at the site.
- B Coordinate the Work of this section with all trades.
- C 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.
- D Notify affected utility companies and comply with their requirements.
- E 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.
- F Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown 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.
- G In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- H Coordinate completion and clean-up of work of separate sections.
- I 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.
- J All work, including materials and workmanship, shall conform to the requirements of applicable local codes, laws, ordinances, the adopted building codes, ANSI A117.1 - Guidelines for Accessible & Useable Buildings and Facilities, and ADAAG- ADA Accessibility Guidelines for Buildings & Facilities.
- K 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.

Execution Requirements - 017300

PART 2 PRODUCTS

2.01 MATERIALS

- A Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
 - 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the maximum allowable VOC levels.

PART 3 EXECUTION

3.01 EXAMINATION

- A Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
- B Before construction, verify the location and points of connection of utility services.
- C Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
 - 1. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- D Acceptance of Conditions:
 - 1. Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations. Start of work means acceptance of existing conditions.
 - 2. 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.
- E Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- F Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- G Examine and verify specific conditions described in individual specification sections.
- H Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or mis-fabrication.
- I Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
- J Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.
- K Notify Owner and Architect of discrepancies prior to commencement of Work.

3.02 PREPARATION

- A Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

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- B Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.03 CONSTRUCTION LAYOUT

- A Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B General: Engage a land surveyor or professional engineer to lay out the Work using accepted surveying practices.
 - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 3. Inform installers of lines and levels to which they must comply.
 - 4. Check the location, level and plumb, of every major element as the Work progresses.
 - 5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
 - 6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
 - 7. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
 - 8. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
 - 9. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.04 FIELD ENGINEERING

- A Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
- B Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
 - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.

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3.05 INSTALLATION

- A General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level, unless otherwise indicated.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
- B 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.
- C Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- D Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- E Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- F Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
 - 4. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.
- G Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- H Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- I Make neat transitions between different surfaces, maintaining texture and appearance.

3.06 PROGRESS CLEANING

- A General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - 4. Site: Maintain Project site free of waste materials and debris.
 - 5. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - a. Remove liquid spills promptly.
 - b. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
 - 6. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning

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materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

7. Concealed Spaces: Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
8. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
9. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
10. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
11. Limiting Exposures: Supervise construction operations to assure that no part of the construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.
12. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.07 STARTING AND ADJUSTING

- A Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.08 CORRECTION OF THE WORK

- A Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Section 017329 - Cutting and Patching.
 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
 2. Restore permanent facilities used during construction to their specified condition.
 3. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
 4. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
 5. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

3.09 DEMONSTRATION AND INSTRUCTION

- A Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.

3.10 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.

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- E Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

3.11 ADJUSTING

- A Adjust operating products and equipment to ensure smooth and unhindered operation.
- B Testing, adjusting, and balancing HVAC systems: Refer to Drawings.

3.12 FINAL CLEANING

- A General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B Execute final cleaning prior to Substantial Completion.
 - 1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.
- C Use cleaning materials that are nonhazardous.
- D Clean interior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- E Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- F Remove tools, construction equipment, machinery, and surplus material from Project site.
- G Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances.
 - 1. Avoid disturbing natural weathering of exterior surfaces.
 - 2. Restore reflective surfaces to their original condition.
- H Remove debris and surface dust from limited access spaces, including plenums, shafts, equipment vaults, and similar spaces.
- I Sweep concrete floors broom clean in unoccupied spaces.
- J Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
- K Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
- L Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- M Replace filters of operating equipment. Clean exposed surfaces of diffusers, registers, and grills.
- N Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
 - 1. Clean HVAC system in compliance with NADCA Standard; 21. Provide written report on completion of cleaning.
- O Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
- P Clean debris from roofs, gutters, downspouts, and drainage systems.
- Q Clean site; sweep paved areas, rake clean landscaped surfaces.
- R Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.

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- S Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.
- T Clean Owner-occupied areas of work.
- U Provide Project Manager with clean material's MSDS sheets.

3.13 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 017300

Execution Requirements - 017300

SECTION 017329 - CUTTING AND PATCHING

PART 1 GENERAL

1.01 SUMMARY

- A This section specifies the cutting and patching of nominally completed and/or previously existing work in order to accommodate the coordination of Work, to install other Work, to uncover other Work for access or inspection, to obtain samples for testing, or for similar purposes; and excludes integral cutting and patching during the manufacturing, fabricating, erecting, and installing of individual units of Work, including attendant excavation and backfill necessary to complete the Work.
- B Refer to other sections of the Specifications for specific cutting and patching requirements and limitations applicable to individual units of work.
 - 1. Comply with NFPA 51B standard for fire prevention in use of cutting and welding processes.

1.02 RELATED SECTIONS

- A Section 017300 - Execution Requirements : For final cleaning requirements.
- B Section 070150.19 - Preparation for Re-Roofing.
- C Section 078400 - Firestopping: For patching fire rated construction.
- D Section 024100 - Selective Demolition.

1.03 DEFINITIONS

- A Cutting: Removal of existing construction necessary to permit installation or performance of other Work.
- B Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.04 SUBMITTALS

- A See Section 013300 - Submittal Requirements, for submittal procedures.
- B Minimum 2 week notification in advance of executing any cutting or alterations, submit written request(s) to the Owner for consent to proceed with cutting which affects:
 - 1. Work of Owner or other trades.
 - 2. Structural value or integrity of any element of the Project.
 - 3. Integrity or effectiveness of weather exposed or moisture resistant elements or systems.
 - 4. Efficiency, operational life, maintenance or safety of operational elements.
 - 5. Visual qualities of sight exposed elements.
 - 6. Owner operations.
- C Product Data:
 - 1. Submit manufacturer's product data for the protective compound to be applied to core-drilled surfaces and cut concrete surfaces
- D Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
 - 1. Necessity: Describe why cutting and patching cannot be avoided.
 - 2. Changes to Existing Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
 - 3. Description of proposed Work:
 - a. Scope of cutting, patching, alteration, or excavation.

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- b. Trades which will execute Work.
 - c. Products proposed to be used.
 - d. Extent of refinishing to be done.
4. Dates: Indicate when cutting and patching will be performed.
5. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted.
6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
7. Cost proposal, when applicable.
8. Written permission of trades whose Work will be affected.
9. Architects Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.05 QUALITY ASSURANCE

- A Structural Elements: Do not cut and patch structural elements without written approval from Structural Engineer.
- B Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include (but are not limited to) the following:
 1. Primary LRT operational, systems, and equipment (trackwork, ductbank, signals, ticket vending/validator, CCTV, variable message boards, Overhead Catenary System etc.).
 2. Utility systems piping, drains (storm and sanitary) and plumbing.
 3. Communication systems (fiber optic).
 4. Electrical wiring systems (lighting, etc.) and vaults.
- C Miscellaneous Elements: Do not cut and patch the following elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
 1. Water, moisture, or vapor barriers.
 2. Joint material.
 3. Membranes and flashings.
 4. Exterior curtain-wall construction.
 5. Equipment supports.
 6. Piping, ductwork, vessels, and equipment.
 7. Noise-and vibration-control elements and systems.
 8. Handrails and fences.
- D Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
 1. If possible, retain original Installer or fabricator to cut and patch exposed Work listed below. If it is impossible to engage original Installer or fabricator, engage another recognized, experienced, and specialized firm.
 - a. Processed concrete finishes.

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- b. Stonework and stone masonry.
- c. Ornamental metal.
- d. Matched-veneer woodwork.
- e. Preformed metal panels.
- f. Roofing.
- g. Firestopping.
- h. Window wall system.
- i. Stucco and ornamental plaster.
- j. Terrazzo.
- k. Finished wood flooring.
- l. Fluid-applied flooring.
- m. Aggregate wall coating.
- n. Wall covering.
- o. HVAC enclosures, cabinets, or covers.

1.06 PAYMENT FOR COSTS

- A Cost caused by ill-timed or defective Work or Work not conforming to Contract Documents, including costs for additional services of Architect and Engineer to be paid by Contractor.
- B Cost of Work done on written instructions of Architect, other than defective or nonconforming Work, will be paid by Owner on approval by the Owner, on approval of written Change Order. Provide written cost proposals prior to proceeding with cutting and patching proposed by Architect.

1.07 WARRANTY

- A See Section 017836 – Warranties and Bonds; for additional warranty requirements.
- B Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 PRODUCTS

2.01 MATERIALS

- A General: Comply with requirements specified in other Sections of these Specifications.
- B Provide for replacement of Work removed.
- C Where required patch materials are not specified, use materials which will result in equal or better work than work being cut and patched in terms of performance characteristics and visual effects.
- D In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to the Architect for the visual and functional performance of in-place materials.
- E Compound Applied to Core-Drilled Surfaces and Cut Concrete Surfaces:
 - 1. After core-drilling and before installing the utility or equipment through the penetration, coat exposed concrete and steel with solvent-free, two-component, epoxy protective coating.
 - 2. Product and Manufacturer: Provide one of the following:
 - a. Sikagard 62, by Sika Corporation.
 - b. Or approved equal.

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- F Product Substitution: For any proposed change in materials, submit request for substitution described in Section 013300.

PART 3 EXECUTION

3.01 EXAMINATION

- A Inspect existing conditions of Work, including elements subject to movement or damage during cutting and patching, and excavating and backfilling. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
- B Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.
- D Report unsatisfactory or questionable conditions in writing to Owner and Architect and Engineer. Do not proceed with work until further instructions are received.

3.02 PREPARATION

- A Contractors shall be responsible for exact location and size of all holes, sleeves, and openings required to be cut, formed, built-in or necessary for their work.
- B Temporary Support: Provide shoring, bracing and supports as necessary to maintain structural integrity of work.
- C Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- D Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

3.03 PERFORMANCE

- A General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
 - 2. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances and finishes as shown on Drawings and as specified.
 - 3. Fit Work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces. Conform to fire code requirements for penetrations and maintain integrity of fire walls and ceilings.
 - 4. Restore Work which has been cut or removed. Install new products to provide completed Work in accordance with requirements of Contract Documents and as required to match surrounding areas and surfaces.
 - 5. Execute excavating and backfilling by methods which prevent damage to other work and settlement as specified in Section 312323.
- B Coring: Core-drill holes to be cut through concrete and masonry walls, slabs, or arches, unless otherwise accepted by Engineer in writing.
 - 1. Perform coring with non-impact rotary tool using diamond core-drills. Size holes for pipe, conduit, sleeves, equipment or mechanical seals, as required, to be installed through the penetration.
 - 2. Do not core-drill through electrical conduit or other utility lines embedded in walls or slabs without approval of Engineer. To extent possible, avoid cutting reinforcing steel in slabs

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- and walls.
- 3. Protection:
 - a. Protect existing equipment, utilities, and adjacent areas from water and other damage covered by core-drilling operations.
 - b. After core-drilling and before installing the utility or equipment through the penetration, coat exposed concrete and steel with protective coating material indicated in Paragraph 2.01.E of this Section. Apply protective coating in accordance with manufacturer's instructions.
- C Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete, Stucco and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 5. Proceed with patching after construction operations requiring cutting are complete.
 - 6. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
 - 7. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 - 8. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - 9. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - 10. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
 - 11. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.
- D Concrete Masonry Units: Provide new materials of same texture, color, and size. Toothing new masonry into existing. Match joint size, profile and color to existing.
- E Floor Finishes:
 - 1. Cut back and reinstall including carpeting and pad to accommodate installation of doors and trim. Provide new tack strips, trim and padding as required for a complete and finished installation.

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2. Patch wood flooring with compatible species of wood. Finish with stain to match existing, and three coats of polyurethane floor varnish.
 3. Patch concrete terrazzo floors where required with compatible material to provide a finished installation.
- F Electrical: Extend existing electrical devices where application of new drywall or installation of new duct enclosures is required. Devices include lights, fans, receptacles, switches, telephone jacks, cable TV jacks, thermostats, smoke detectors, audio jacks and other electrical systems. Provide new plaster rings, boxes and wiring as needed and in conformance with electrical codes.
- G Drywall: Patch drywall with new materials to provide a level surface with texture to match adjacent surface. Use metal trim at corners. Where drywall butts dissimilar materials, use metal "LC" trim that is taped into drywall leaving a finished appearance with no metal showing. Use perforated joint tape and ready mixed joint compound on joints.
- H Plaster: Provide an even surface of uniform finish, color, texture, and appearance. Match texture of adjacent surface. Remove existing wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
- I Stucco: Mix and apply stucco in two coats to match existing texture. Provide new wire lath and corner beads if required by conditions. If existing stucco is an integral color material provide new stucco in matching integral color.
- J Painting: Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire wall surface containing the patch to the edges of natural breaks. Provide additional coats until patch blends with adjacent surfaces.
- K Existing Hardware Removal: Where existing window and door frames remain in openings that have new products installed, complete the following:
1. Remove existing hardware and hardware parts which are no longer in use.
 2. Patch holes remaining after removal. Fill holes more than 1/4 inch deep with wood infill, glued in place. Holes less than 1/4 inch deep may be filled with wood or with spackle.
 3. Patch to blend with existing surface. Sand smooth and paint to match.

3.04 CLEANING

- A Refer also to Section 017300 - Execution Requirements for final cleaning requirements.
- B Cleaning and Restoration:
1. Clean areas and spaces where cutting, coring, or patching were performed.
 2. Clean piping, conduit, and similar constructions before applying paint or other finishing materials.
 3. Restore damaged coverings of pipe and other utilities to original condition.

END OF SECTION 017329

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SECTION 017800 - CLOSEOUT PROCEDURES AND SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Administrative and procedural requirements for contract closeout including, but not limited to the following: (as part of Set of Manuals & Documents for Commissioning process) Inspection procedures including Pre-Functional Checklists and Pre-Substantial Checklists.
- B Functional Testing Procedures (part of Commissioning process)
- C Project record documents.
- D Operation and maintenance data.
- E Substantial Completion procedures.
- F Closeout requirements for specific construction activities are included in the appropriate Sections in Divisions 1 through 48 and shall be coordinated with this Section

1.02 RELATED REQUIREMENTS

- A Section 013000 - Administrative Requirements
- B Section 017300 - Execution Requirements
- C Section 017836 - Warranties and Bonds.
- D Section 017900 - Demonstration and Training
- E Individual Product Sections: Specific requirements for operation and maintenance data.
- F Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

- A See Section 013300 - Submittal Requirements, for submittal procedures.
- B Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
 - 1. Provide duplicate, notarized copies of the documents required in the Final Completion and Final Payment article of the General Conditions.
- C Operation and Maintenance Data:
 - 1. Submit two copies 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 two sets of revised final documents in final form within 10 days after final inspection.

1.04 SUBSTANTIAL COMPLETION

- A Definition: Substantial Completion is that condition which occurs when the Owner accepts the certification of the Architect that construction is sufficiently complete in accordance with the Contract Documents so that the Project may be occupied for the use for which it is intended.
- B Contractor Notification: When Contractor considers work substantially complete, and after the building commissioning and training, submit written declaration to the Architect that Work or designated portion thereof, is substantially complete. Include list of items to be completed or corrected.
- C Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete with request.

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1. Prepare a list of items to be completed and corrected (Contractor's punch list), the value of items on the list, and reasons why the Work is not complete.
 2. Advise Owner of pending insurance changeover requirements.
 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 5. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 6. Prepare and submit: Completed Commissioning Manual including but not limited to - Summary by specification # Record of Approved Submittals and Samples, Project Record Documents (including but not limited to As-Built Record Drawings, As-Built Record Specifications, Operating and Maintenance Manuals, Certification of No Asbestos Products Incorporated in Project, Completed Punch Lists, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
 7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 8. Complete startup testing of systems.
 9. Submit test/adjust/balance records and Specification compliant Final Report.
 10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 11. Advise Owner of changeover in heat and other utilities.
 12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 13. Complete final cleaning requirements, including touchup painting.
 14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
 15. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
 16. Prior to preliminary Substantial Completion and Inspection - Submit:
 - a. Operating and Maintenance Data
 - b. Keys and keying schedule
 - c. Guarantees, Warranties and Bonds
 - d. Completed pre-substantial completion checklists
- D Preliminary Inspection: Architect will make a preliminary inspection within 7 business days after receipt of Contractor's declaration.
- E Submit a written request for inspection for Substantial Completion. Upon receipt of request, Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion A.I.A. Document G704 or similar, after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for final completion.
- F Upon determining that Work is substantially complete, Architect will:

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1. Punch List: Prepare a punch list of items to be completed or corrected, as determined by the inspection.
 2. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
 - a. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
 - b. Include the following information at the top of each page:
 - 1) Project name.
 - 2) Date.
 - 3) Name of Architect and Construction Manager.
 - 4) Name of Contractor.
 - 5) Page number.
 - c. Submit list of incomplete items in the following format:
 - 1) PDF electronic file.
 3. Certificate: Prepare and process a certificate of substantial completion, containing:
 - a. Date of substantial completion.
 - b. Punchlist of items to be completed or corrected.
 - c. The time within which punchlist items shall be completed or corrected.
 - d. Date and time the Owner will take occupancy of Project or designated portion thereof.
 - e. Responsibilities of Owner and Contractor for:
 - 1) Insurance.
 - 2) Utilities.
 - 3) Operation and maintenance of mechanical, electrical and other systems.
 - 4) Maintenance and cleaning.
 - 5) Security.
 - f. Signatures of:
 - 1) Architect.
 - 2) General Contractor.
 - 3) Owner.
 - 4) Prime Contractor.
- G Contractor is responsible for the following:
1. Corrections: Complete all Work listed for completion or correction within designated time.
 2. Final Cleaning: Perform final cleaning.
- H Occupancy: Using Agency will occupy Project or designated portions thereof under provisions stated in the Certificate of Substantial Completion.
- I Complete All Work: At time of inspection, should substantial completion not be certified, Contractor shall complete the Work and resubmit declaration in accordance with the requirements of this Section.

1.05 FINAL ACCEPTANCE

- A Preliminary Procedures: Before requesting final inspection for determining final completion, complete the following:
1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and complete operations where required.
 2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.

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3. Submit certified copy of the Architect's final inspection list of items to be completed or corrected, endorsed and dated by the Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by the Architect.
 4. Submit consent of surety to final payment.
 5. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 6. Submit pest-control final inspection report and warranty.
 7. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
- B Final Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect and Construction Manager will either proceed with inspection with Contractor or/and as appropriate notify Contractor of unfulfilled requirements to ensure completion of all Contract requirements.
- C Closeout Documents: Architect will prepare and process closeout documents when all Work is considered finally complete in accord with Contract Document requirements including all Deliverable Documentation.
- D Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
- E Re-inspection Procedure:
1. The Architect will re-inspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Architect.
 2. Upon successful completion of re-inspection, the Architect will prepare a certificate of final acceptance. If the Work is incomplete, the Architect will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance. When necessary, reinspection will be repeated.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CLOSEOUT PROCEDURES

- A Accompany Project Manager on preliminary inspection to determine items to be listed for completion or correction in Contractor's Notice of Substantial Completion.
- B Accompany Project Manager on preliminary final inspection.

3.02 CLOSEOUT SUBMITTALS

- A Make submittals that are required by governing or other authorities.
1. Provide copies to Architect and Owner.
- B Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in Contractor's Notice of Substantial Completion.
- C Notify Architect when work is considered ready for Substantial Completion.
- D Submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's review.
- E Owner will occupy all of the building as specified in Section 011000.
- F Correct items of work listed in executed Certificates of Substantial Completion and comply with requirements for access to Owner-occupied areas.
- G Accompany Project Coordinator on preliminary final inspection.

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- H Notify Architect when work is considered finally complete.
- I Complete items of work determined by Architect's final inspection.

3.03 PROJECT RECORD DOCUMENTS

- A Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed shop drawings, product data, and samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
 - 7. Inspection Reports.
 - 8. Laboratory Test Records.
 - 9. Field Test Reports and Records.
 - 10. Factory Test Reports and Records.
- B Ensure entries are complete and accurate, enabling future reference by Owner.
- C Maintain for record purposes at a location approved by the Architect /Owner, electronic files for those shop drawings and other documents which are required to be submitted electronically. Ensure that backups of electronic files are made on a regular basis and stored at a remote location.
- D Store record documents separate from documents used for construction.
- E Record information concurrent with construction progress.
- F Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and modifications.
- G Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured depths of foundations in relation to finish first floor datum.
 - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 4. Field changes of dimension and detail.
 - 5. Details not on original Contract drawings.
- H Final Punchlist.
- I Receipt from AHJ regarding substantial completion and certificate of occupancy.

3.04 OPERATION AND MAINTENANCE DATA

- A Owner's Manual: Prior to final payment, provide three copies (two printed and one digital) hard-back, loose-leaf binders, and a "pdf" format file of same, containing the following required submittals and any others required in other Sections, suitably typed, indexed and labeled for ready reference, to the Owner with notification to the Architect of each transmittal and an affidavit that the Manual is complete and in accordance with the Project Specifications.
- B 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.
- C Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

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1. Warranties and certifications.
 2. Affidavit from General Contractor and subcontractors on use of asbestos free materials.
 3. Maintenance and operating instructions and parts list.
 4. List of extra materials delivered to Owner, signed by Owner's representative.
 5. Other items required by the Specifications.
- D Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- E Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.05 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A For Each Product, Applied Material, and Finish:
1. Product data, with catalog number, size, composition, and color and texture designations.
 2. Information for re-ordering custom manufactured products.
- 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 Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- D Additional information as specified in individual product specification sections.
- E 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.
- F Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

3.06 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A For Each Item of Equipment and Each System:
1. Description of unit or system, and component parts.
 2. Identify function, normal operating characteristics, and limiting conditions.
 3. Include performance curves, with engineering data and tests.
 4. Complete nomenclature and model number of replaceable parts.
- B Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- D Include color coded wiring diagrams as installed.
- E Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- F Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- G Provide servicing and lubrication schedule, and list of lubricants required.
- H Include manufacturer's printed operation and maintenance instructions.
- I Include sequence of operation by controls manufacturer.

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- J Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- K Provide control diagrams by controls manufacturer as installed.
- L Provide Contractor's coordination drawings, with color coded piping diagrams as installed.
- M Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- N Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- O Include test and balancing reports.
- P Additional Requirements: As specified in individual product specification sections.

3.07 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 Submit two draft copies of the Operation and Maintenance Manuals a minimum of 14 days prior to requesting the inspection for Substantial Completion or the scheduled date for Substantial Completion, whichever is earliest.
- D Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- E Prepare data in the form of an instructional manual.
- F Prior to the final payment, submit to the Owner, one binder with the required information identified in this section.
- G 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.
- H Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- I Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- J 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.
- K 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.
- L Text: Manufacturer's printed data, or typewritten data on 24 pound paper.
- M Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- N Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.
- O Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
 - 1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.
 - 2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:

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- a. Significant design criteria.
 - b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
- 3. Part 3: Project documents and certificates, including the following:
 - a. Shop drawings and product data.
 - b. Air and water balance reports.
 - c. Certificates.
 - d. Photocopies of warranties and bonds.
- P Provide a listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.
- Q Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect, Consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

3.08 SPARE PARTS AND MAINTENANCE MATERIALS

- A Deliver spare parts, extra stock, tools and other items specified in individual specification sections to the Owner with a copy of the transmittal to the Architect. Label with manufacturer's name and model number where applicable. Obtain a signed and dated receipt from the Owner of this transfer.

END OF SECTION 017800

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SECTION 017836 - WARRANTIES AND BONDS

PART 1 GENERAL

1.01 SECTION INCLUDES:

- A Warranties and bonds:

1.02 SUMMARY

- A This Section includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.
 - 1. Refer to the General Conditions and Standard Construction Management Agreement for additional terms and requirements affecting the Work.
- B Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.
- C Manufacturer's warranties will begin upon Final Acceptance by Owner. Equipment was used, started or operated during construction period. "Acceptance" will be mutually agreed by Owner, Architect, Engineer and Owners Representative.

1.03 RELATED SECTIONS

- A Section 013000 - Administrative Requirements
- B Section 013300 - Submittal Requirements: Submittals procedures, Shop drawings, product data, and samples.
- C Section 017800 - Closeout Procedures and Submittals: 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.

1.04 DEFINITIONS

- A Standard product warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
- B Special warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.05 WARRANTY REQUIREMENTS

- A Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.
- B Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefitted from use of the Work through a portion of its anticipated useful service life.

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- D Owner's Recourse: Expressed warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.
 - 1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
- E Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the Owner reserves the right to refuse to accept the Work, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.

1.06 SUBMITTALS

- A See Section 013300 - Submittal Requirements, for submittal procedures.
- B Submit written warranties to the Architect prior to the date certified for Substantial Completion. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Architect.
 - 1. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Architect within 15 days of completion of that designated portion of the Work.
- C When the Contract Documents require the Contractor, or the Contractor and a subcontractor, supplier or manufacturer to execute a special warranty, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner, through the Architect, for approval prior to final execution.
- D 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, to Project Manager.
 - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment, to Project Manager.
 - 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, to Project Manager.
- E Form of Submittal: At Final Completion compile 2 copies of each required warranty properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
- F Bind warranties and bonds in heavy-duty, commercial-quality, durable 3-ring, vinyl-covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 - 1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address, and telephone number of the Installer.
 - 2. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project title or name, and name, address and telephone number of the Contractor and equipment supplier; and name of responsible company principal.

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3. When warranted construction requires operation and maintenance manuals, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 LIST OF WARRANTIES

- A Schedule: Provide warranties on products and installations as specified in individual Sections in Divisions 2 through 28.

3.02 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 the 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 submission.
- E Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.
- F Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.
- G Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION 017836

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SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.01 SUMMARY

- A Demonstration of products and systems to be commissioned and where indicated in specific specification sections.
- B Training of Owner personnel in operation and maintenance is required for:
 - 1. All software-operated systems.
 - 2. HVAC systems and equipment.
 - 3. Plumbing equipment.
 - 4. Electrical systems and equipment.
 - 5. Conveying systems.
 - 6. Landscape irrigation.
 - 7. Items specified in individual product Sections.
- C Training of Owner personnel in care, cleaning, maintenance, and repair is required for:
 - 1. Roofing, waterproofing, and other weather-exposed or moisture protection products.
 - 2. Finishes, including flooring, wall finishes, ceiling finishes.
 - 3. Fixtures and fittings.
 - 4. Items specified in individual product Sections.

1.02 RELATED REQUIREMENTS

- A Section 017800 - Closeout Procedures and Submittals: Operation and maintenance manuals.
- B Section 019113 - General Commissioning Requirements: Additional requirements applicable to demonstration and training.
- C Other Specification Sections: Additional requirements for demonstration and training.

1.03 SUBMITTALS

- A See Section 013000 - Administrative Requirements, for submittal procedures; except:
 - 1. Make all submittals specified in this section, and elsewhere where indicated for commissioning purposes, directly to the Commissioning Authority.
 - 2. Submit one copy to the Commissioning Authority, not to be returned.
 - 3. Make commissioning submittals on time schedule specified by Commissioning Authority.
 - 4. Submittals indicated as "Draft" are intended for the use of the Commissioning Authority in preparation of overall Training Plan; submit in editable electronic format, Microsoft Word 2003 preferred.
- B Draft Training Plans: Owner will designate personnel to be trained; tailor training to needs and skill-level of attendees.
 - 1. Submit to Architect for transmittal to Owner.
 - 2. Submit to Commissioning Authority for review and inclusion in overall training plan.
 - 3. Submit not less than four weeks prior to start of training.
 - 4. Revise and resubmit until acceptable.
 - 5. Provide an overall schedule showing all training sessions.
 - 6. Include at least the following for each training session:
 - a. Identification, date, time, and duration.
 - b. Description of products and/or systems to be covered.
 - c. Name of firm and person conducting training; include qualifications.
 - d. Intended audience, such as job description.
 - e. Objectives of training and suggested methods of ensuring adequate training.
 - f. Methods to be used, such as classroom lecture, live demonstrations, hands-on, etc.

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- g. Media to be used, such as slides, hand-outs, etc.
 - h. Training equipment required, such as projector, projection screen, etc., to be provided by Contractor.
- C Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.
 - 1. Include applicable portion of O&M manuals.
 - 2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
 - 3. Provide one extra copy of each training manual to be included with operation and maintenance data.
- D Training Reports:
 - 1. Identification of each training session, date, time, and duration.
 - 2. Sign-in sheet showing names and job titles of attendees.
 - 3. List of attendee questions and written answers given, including copies of and references to supporting documentation required for clarification; include answers to questions that could not be answered in original training session.
 - 4. Include Commissioning Authority's formal acceptance of training session.
- E Video Recordings: Submit digital video recording of each demonstration and training session for Owner's subsequent use.
 - 1. Format: DVD Disc.
 - 2. Label each disc and container with session identification and date.

1.04 QUALITY ASSURANCE

- A Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
 - 1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
 - 2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 DEMONSTRATION - GENERAL

- A Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Owner.
- B Demonstrations conducted during Functional Testing need not be repeated unless Owner personnel training is specified.
- C Demonstration may be combined with Owner personnel training if applicable.
- D Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
 - 1. Perform demonstrations not less than two weeks prior to Substantial Completion.
 - 2. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- E Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
 - 1. Perform demonstrations not less than two weeks prior to Substantial Completion.

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3.02 TRAINING - GENERAL

- A Commissioning Authority will prepare the Training Plan based on draft plans submitted.
- B Conduct training on-site unless otherwise indicated.
- C Owner will provide classroom and seating at no cost to Contractor.
- D Do not start training until Functional Testing is complete, unless otherwise specified or approved by the Commissioning Authority.
- E Provide training in minimum two hour segments.
- F The Commissioning Authority is responsible for determining that the training was satisfactorily completed and will provide approval forms.
- G Training schedule will be subject to availability of Owner's personnel to be trained; re-schedule training sessions as required by Owner; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.
- H Review of Facility Policy on Operation and Maintenance Data: During training discuss:
 - 1. The location of the O&M manuals and procedures for use and preservation; backup copies.
 - 2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
 - 3. Typical uses of the O&M manuals.
- I Product- and System-Specific Training:
 - 1. Review the applicable O&M manuals.
 - 2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
 - 3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.
 - 4. Provide hands-on training on all operational modes possible and preventive maintenance.
 - 5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
 - 6. Discuss common troubleshooting problems and solutions.
 - 7. Discuss any peculiarities of equipment installation or operation.
 - 8. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
 - 9. Review recommended tools and spare parts inventory suggestions of manufacturers.
 - 10. Review spare parts and tools required to be furnished by Contractor.
 - 11. Review spare parts suppliers and sources and procurement procedures.
- J Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

END OF SECTION 017900

SECTION 019113 - GENERAL COMMISSIONING REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

- A Commissioning is intended to achieve the following specific objectives; this section specifies the Contractor's responsibilities for commissioning:
 - 1. Verify that the work is installed in accordance with Contract Documents and the manufacturer's recommendations and instructions, and that it receives adequate operational checkout prior to startup: Startup reports and Prefunctional Checklists executed by Contractor are utilized to achieve this.
 - 2. Verify and document that functional performance is in accordance with Contract Documents: Functional Tests executed by Contractor and witnessed by the Commissioning Authority are utilized to achieve this.
 - 3. Verify that operation and maintenance manuals submitted to Owner are complete: Detailed operation and maintenance (O&M) data submittals by Contractor are utilized to achieve this.
 - 4. Verify that the Owner's operating personnel are adequately trained: Formal training conducted by Contractor is utilized to achieve this.
- B Commissioning, including Functional Tests, O&M documentation review, and training, is to occur after startup and initial checkout and be completed before Substantial Completion.
- C The Commissioning Authority directs and coordinates all commissioning activities; this section describes some but not all of the Commissioning Authority's responsibilities.
- D The Commissioning Authority is employed by Owner.
- E The Commissioning Authority is employed by Construction Manager on behalf of Owner.

1.02 SCOPE OF COMMISSIONING

- A The following are to be commissioned:
- B Building envelope:
 - 1. Thermal and moisture integrity.
 - 2. Air tightness.
- C Structural systems.
- D Elevating and conveying systems.
- E Fire Protection Systems.
- F Plumbing Systems:
 - 1. Water heaters.
 - 2. Booster pumps.
 - 3. Laboratory gas systems.
 - 4. Medical gas systems.
 - 5. Landscape irrigation.
- G HVAC System, including:
 - 1. Major and minor equipment items.
 - 2. Piping systems and equipment.
 - 3. Ductwork and accessories.
 - 4. Terminal units.
 - 5. Control system.
 - 6. Sound control devices.
 - 7. Vibration control devices.
 - 8. Variable frequency drives.
- H Special Ventilation:

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1. Fume hoods.
2. Laboratory pressurization.
3. Specialty fans.
4. Egress pressurization.
- I Integrated Automation.
- J Electrical Systems:
 1. Power quality.
 2. Emergency power systems.
 3. Uninterruptible power systems.
 4. Lighting controls other than manual switches.
- K Electronic Safety and Security:
 1. Security system, including doors and hardware.
 2. Fire and smoke alarms.
- L Communications:
 1. Voice and data systems.
 2. Public address/paging.
- M Other equipment and systems explicitly identified elsewhere in Contract Documents as requiring commissioning.
- N Sound Transmission Class-rated interior partitions.
- O Indoor Air Quality Procedures: The Commissioning Authority will coordinate; Contractor will execute; see Section 015719 - Temporary Environmental Controls.

1.03 RELATED REQUIREMENTS

- A Section 013329.02 - Sustainable Design Reporting - LEED v4: Reporting requirements relating to commissioning.
- B Section 015719 - Temporary Environmental Controls: Precautions and procedures; smoking room testing; building flush-out.
- C Section 017000 - Execution and Closeout Requirements: General startup requirements.
- D Section 017800 - Closeout Procedures and Submittals: Scope and procedures for operation and maintenance manuals and project record documents.
- E Section 017900 - Demonstration and Training: Scope and procedures for Owner personnel training.
- F Section 019114 - Commissioning Authority Responsibilities.
- G Section 230800 - Commissioning of HVAC: HVAC control system testing; other requirements.
- H Section 250800 - Commissioning of Integrated Automation.

1.04 REFERENCE STANDARDS

- A ANSI/RESNET/ICC 301 - Standard for the Calculation and Labeling of the Energy Performance of Dwelling and Sleeping Units Using an Energy Rating Index; 2019.
- B ANSI/RESNET/ICC 380 - Standard for Testing Airtightness of Building, Dwelling Unit, and Sleeping Unit Enclosures; Airtightness of Heating and Cooling Air Distribution Systems; and Airflow of Mechanical Ventilation Systems; 2019.
- C ASHRAE Std 202 - Commissioning Process for Buildings and Systems; 2018, with Addendum (2023).
- D ASTM E336 - Standard Test Method for Measurement of Airborne Sound Attenuation Between Rooms in Buildings; 2023.
- E ASTM E779 - Standard Test Method for Determining Air Leakage Rate by Fan Pressurization; 2019.

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- F ASTM E1827 - Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door; 2022.
- G CSI/CSC MF - Masterformat; 2016.
- H NEBB S110 - Whole Building Technical Commissioning of New Construction; 2019.
- I PEI (Samples) - Sample Forms for Prefunctional Checklists and Functional Performance Tests; Current Edition.

1.05 SUBMITTALS

- A See Section 013000 - Administrative Requirements, for submittal procedures; except:
 - 1. Make all submittals specified in this section, and elsewhere where indicated for commissioning purposes, directly to the Commissioning Authority, unless they require review by Architect; in that case, submit to Architect first.
 - 2. Submit one copy to the Commissioning Authority, not to be returned.
 - 3. Make commissioning submittals on time schedule specified by Commissioning Authority.
 - 4. Submittals indicated as "Draft" are intended for the use of the Commissioning Authority in preparation of Prefunctional Checklists or Functional Test requirements; submit in editable electronic format, Microsoft Word 2010 preferred.
 - 5. As soon as possible after submittals made to Architect are approved, submit copy of approved submittal to the Commissioning Authority.
- B Product Data: If submittals to Architect do not include the following, submit copies as soon as possible:
 - 1. Manufacturer's product data, cut sheets, and shop drawings.
 - 2. Manufacturer's installation instructions.
 - 3. Startup, operating, and troubleshooting procedures.
 - 4. Fan and pump curves.
 - 5. Factory test reports.
 - 6. Warranty information, including details of Owner's responsibilities in regard to keeping warranties in force.
- C Manufacturers' Instructions: Submit copies of all manufacturer-provided instructions that are shipped with the equipment as soon as the equipment is delivered.
- D Startup Plans and Reports.
- E Completed Prefunctional Checklists.
- F Commissioning Issues Log:
 - 1. Construction observations.
 - 2. Supporting photographs.
- G HERS Rating Report: Include the following mandatory completed reports for ENERGY STAR Certified Homes:
 - 1. Rater Design Review Checklist.
 - 2. Rater Field Checklist.
 - 3. HVAC Commissioning Checklist.
 - 4. Water Management System Builder Requirements.
- H Field-test report of partitions for noise isolation.

1.06 QUALITY ASSURANCE

- A Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.
- B HERS (Home Energy Rating System) Rater: Residential Energy Services Network (RESNET) certified professional.

PART 2 PRODUCTS

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2.01 TEST EQUIPMENT

- A Provide all standard testing equipment required to perform startup and initial checkout and required Functional Testing; unless otherwise noted such testing equipment will NOT become the property of Owner.
- B Provide all standard testing equipment required to perform building envelope air tightness testing; unless otherwise noted such testing equipment will NOT become the property of Owner.
- C Calibration Tolerances: Provide testing equipment of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified. If not otherwise noted, the following minimum requirements apply:
 - 1. Temperature Sensors and Digital Thermometers: Certified calibration within past year to accuracy of 0.5 degree F and resolution of plus/minus 0.1 degree F.
 - 2. Pressure Sensors: Accuracy of plus/minus 2.0 percent of the value range being measured (not full range of meter), calibrated within the last year.
 - 3. Calibration: According to the manufacturer's recommended intervals and when dropped or damaged; affix calibration tags or keep certificates readily available for inspection.
- D Equipment-Specific Tools: Where special testing equipment, tools and instruments are specific to a piece of equipment, are only available from the vendor, and are required in order to accomplish startup or Functional Testing, provide such equipment, tools, and instruments as part of the work at no extra cost to Owner; such equipment, tools, and instruments are to become the property of Owner.
- E Dataloggers: Independent equipment and software for monitoring flows, currents, status, pressures, etc. of equipment.
 - 1. Dataloggers required to for Functional Tests will be provided by the Commissioning Authority and will not become the property of Owner.

PART 3 EXECUTION

3.01 COMMISSIONING PLAN

- A Commissioning Authority has prepared the Commissioning Plan.
 - 1. Attend meetings called by the Commissioning Authority for purposes of completing the commissioning plan.
 - 2. Require attendance and participation of relevant subcontractors, installers, suppliers, and manufacturer representatives.
- B Contractor is responsible for compliance with the Commissioning Plan.
- C Commissioning Plan: The commissioning schedule, procedures, and coordination requirements for all parties in the commissioning process.
 - 1. Commissioning will be phased (by floors, for example) to minimize the total construction time.
- D Basis of Design Documentation (BOD): Detailed documentation of the functional requirements of the project; descriptions of the systems, components, and methods chosen to meet the design intent; assumptions underlying the design intent.
 - 1. Basis of Design Documentation is to be prepared by Architect.
 - 2. Basis of Design Documentation is to be prepared by Design-Builder.
- E Commissioning Schedule:
 - 1. Submit anticipated dates of startup of each item of equipment and system to Commissioning Authority within 60 days after award of Contract.
 - 2. Re-submit anticipated startup dates monthly, but not less than 4 weeks prior to startup.

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3. Prefunctional Checklists and Functional Tests are to be performed in sequence from components, to subsystems, to systems.
4. Provide sufficient notice to Commissioning Authority for delivery of relevant Checklists and Functional Test procedures, to avoid delay.

3.02 DOCUMENTATION IDENTIFICATION SYSTEM

- A Give each submitted form or report a unique identification; use the following scheme.
- B Type of Document: Use the following prefixes:
 1. Startup Plan: SP-.
 2. Startup Report: SR-.
 3. Prefunctional Checklist: PC-.
 4. Functional Test Procedure: FTP-.
 5. Functional Test Report: FTR-.
- C System Type: Use the first 4 digits from CSI/CSC MF (Master Format), that are applicable to the system; for example:
 1. 2300: HVAC system as a whole.
 2. 2320: HVAC Piping and Pumps.
 3. 2330: HVAC Air Distribution.
- D Component Number: Assign numbers sequentially, using 1, 2, or 3 digits as required to accommodate the number of units in the system.
- E Test, Revision, or Submittal Number: Number each successive iteration sequentially, starting with 1.
- F Example: PC-2320-001.2 would be the Prefunctional Checklist for equipment item 1 in the HVAC piping system, probably a pump; this is the second, revised submittal of this checklist.

3.03 STARTUP PLANS AND REPORTS

- A Startup Plans: For each item of equipment and system for which the manufacturer provides a startup plan, submit the plan not less than 8 weeks prior to startup.
- B Startup Reports: For each item of equipment and system for which the manufacturer provides a startup checklist (or startup plan or field checkout sheet), document compliance by submitting the completed startup checklist prior to startup, signed and dated by responsible entity.
- C Submit directly to the Commissioning Authority.

3.04 PREFUNCTIONAL CHECKLISTS

- A A Prefunctional Checklist is required to be filled out for each item of equipment or other assembly specified to be commissioned.
 1. No sampling of identical or near-identical items is allowed.
 2. These checklists do not replace manufacturers' recommended startup checklists, regardless of apparent redundancy.
 3. Prefunctional Checklist forms will not be complete until after award of the contract; the following types of information will be gathered via the completed Checklist forms:
 - a. Certification by installing contractor that the unit is properly installed, started up, and operating and ready for Functional Testing.
 - b. Confirmation of receipt of each shop drawing and commissioning submittal specified, itemized by unit.
 - c. Manufacturer, model number, and relevant capacity information; list information "as specified," "as submitted," and "as installed."
 - d. Serial number of installed unit.

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- e. List of inspections to be conducted to document proper installation prior to startup and Functional Testing; these will be primarily static inspections and procedures; for equipment and systems may include normal manufacturer's start-up checklist items and minor testing.
 - f. Sensor and actuator calibration information.
- 4. All preliminary Prefunctional Checklists are included in Contract Documents; the Commissioning Authority has the authority to modify these and will furnish final versions as applicable.
- 5. A preliminary list of Prefunctional Checklists is attached, to indicate anticipated scope.
- 6. PECl (Samples) found at <http://www.peci.org/library/mcpjgs.htm> indicate anticipated level of detail for Prefunctional Checklists.
- B Contractor is responsible for filling out Prefunctional Checklists, after completion of installation and before startup; witnessing by the Commissioning Authority is not required unless otherwise specified.
 - 1. Each line item without deficiency is to be witnessed, initialed, and dated by the actual witness; checklists are not complete until all line items are initialed and dated complete without deficiencies.
 - 2. Checklists with incomplete items may be submitted for approval provided the Contractor attests that incomplete items do not preclude the performance of safe and reliable Functional Testing; re-submission of the Checklist is required upon completion of remaining items.
 - 3. Individual Checklists may contain line items that are the responsibility of more than one installer; Contractor shall assign responsibility to appropriate installers or subcontractors, with identification recorded on the form.
 - 4. If any Checklist line item is not relevant, record reasons on the form.
 - 5. Contractor may independently perform startup inspections and/or tests, at Contractor's option.
 - 6. Regardless of these reporting requirements, Contractor is responsible for correct startup and operation.
 - 7. Submit completed Checklists to Commissioning Authority within two days of completion.
 - 8. See Section 017000 - Execution and Closeout Requirements for additional general startup requirements.
- C Commissioning Authority is responsible for furnishing the Prefunctional Checklists to Contractor.
 - 1. Initial Drafts: Contractor is responsible for initial draft of Prefunctional Checklist where so indicated in Contract Documents.
 - 2. Provide all additional information requested by Commissioning Authority to aid in preparation of checklists, such as shop drawing submittals, manufacturers' startup checklists, and O&M data.
 - 3. Commissioning Authority may add any relevant items deemed necessary regardless of whether they are explicitly mentioned in Contract Documents or not.
 - 4. When asked to review the proposed Checklists, do so in a timely manner.
- D Commissioning Authority Witnessing: Required for:
 - 1. Each piece of primary equipment, unless sampling of multiple similar units is allowed by the commissioning plan.
 - 2. A sampling of non-primary equipment, as allowed by the commissioning plan.
- E Deficiencies: Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to Owner.

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1. If difficulty in correction would delay progress, report deficiency to the Commissioning Authority immediately.

3.05 FUNCTIONAL TESTS

- A A Functional Test is required for each item of equipment, system, or other assembly specified to be commissioned, unless sampling of multiple identical or near-identical units is allowed by the final test procedures.
- B Contractor is responsible for execution of required Functional Tests, after completion of Prefunctional Checklist and before closeout.
- C Commissioning Authority is responsible for witnessing and reporting results of Functional Tests, including preparation and completion of forms for that purpose.
- D Contractor is responsible for correction of deficiencies and re-testing at no extra cost to Owner; if a deficiency is not corrected and re-tested immediately, the Commissioning Authority will document the deficiency and the Contractor's stated intentions regarding correction.
 1. Deficiencies are any condition in the installation or function of a component, piece of equipment or system that is not in compliance with Contract Documents or does not perform properly.
 2. Use the standard form provided with copies submitted to Owner and Contractor.
 3. When the deficiency has been corrected, the Contractor completes the form certifying that the item is ready to be re-tested and returns the form to the Commissioning Authority; the Commissioning Authority will reschedule the test and the Contractor shall re-test.
 4. Identical or Near-Identical Items: If 10 percent, or three, whichever is greater, of identical or near-identical items fail to perform due to material or manufacturing defect, all items will be considered defective; provide a proposal for correction within 2 weeks after notification of defect, including provision for testing sample installations prior to replacement of all items.
 5. Contractor shall bear the cost of Owner and Commissioning Authority personnel time witnessing re-testing.
 6. Contractor shall bear the cost of Owner and Commissioning Authority personnel time witnessing re-testing if the test failed due to failure to execute the relevant Prefunctional Checklist correctly; if the test failed for reasons that would not have been identified in the Prefunctional Checklist process, Contractor shall bear the cost of the second and subsequent re-tests.
- E Functional Test Procedures:
 1. Some test procedures are included in Contract Documents; where Functional Test procedures are not included in Contract Documents, test procedures will be determined by the Commissioning Authority with input by and coordination with Contractor.
 2. Examples of Functional Testing:
 - a. Test the dynamic function and operation of equipment and systems (rather than just components) using manual (direct observation) or monitoring methods under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint).
 - b. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc.
 - c. Systems are run through all the HVAC control system's sequences of operation and components are verified to be responding as the sequence's state.
 - d. Traditional air or water test and balancing (TAB) is not Functional Testing; spot checking of TAB by demonstration to the Commissioning Authority is Functional

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Testing.

3. Some preliminary Functional Test procedures are included in Contract Documents; the Commissioning Authority has the authority to modify these and will furnish final versions as applicable.
 4. A preliminary list of Functional Tests is attached, to indicate anticipated scope.
 5. PECL (Samples) found at <http://www.peci.org/library/mcpags.htm> indicated anticipated level of detail for Functional Tests.
- F Deferred Functional Tests: Some tests may need to be performed later, after substantial completion, due to partial occupancy, equipment, seasonal requirements, design or other site conditions; performance of these tests remains the Contractor's responsibility regardless of timing.
- G Factory Tests: Commissioning Authority and Contractor are responsible for coordinating testing of equipment at the factory by factory personnel, to ensure compliance with commissioning requirements.
- H Field Tests By Others: Where Functional Tests are indicated as to be performed by others not subject to Contract Documents, those tests are not subject to these commissioning requirements.

3.06 SENSOR AND ACTUATOR CALIBRATION

- A Calibrate all field-installed temperature, relative humidity, carbon monoxide, carbon dioxide, and pressure sensors and gauges, and all actuators (dampers and valves) on this piece of equipment shall be calibrated. Sensors installed in the unit at the factory with calibration certification provided need not be field calibrated.
- B Calibrate using the methods described below; alternate methods may be used, if approved by Commissioning Authority and Owner beforehand. See PART 2 for test instrument requirements. Record methods used on the relevant Prefunctional Checklist or other suitable forms, documenting initial, intermediate and final results.
- C All Sensors:
1. Verify that sensor location is appropriate and away from potential causes of erratic operation.
 2. Verify that sensors with shielded cable are grounded only at one end.
 3. For sensor pairs that are used to determine a temperature or pressure difference, for temperature make sure they are reading within 0.2 degree F of each other, and for pressure, within tolerance equal to 2 percent of the reading, of each other.
 4. Tolerances for critical applications may be tighter.
- D Sensors Without Transmitters - Standard Application:
1. Make a reading with a calibrated test instrument within 6 inches of the site sensor.
 2. Verify that the sensor reading, via the permanent thermostat, gauge or building automation system, is within the tolerances in the table below of the instrument-measured value.
 3. If not, install offset, calibrate or replace sensor.
- E Sensors With Transmitters - Standard Application.
1. Disconnect sensor.
 2. Connect a signal generator in place of sensor.
 3. Connect ammeter in series between transmitter and building automation system control panel.
 4. Using manufacturer's resistance-temperature data, simulate minimum desired temperature.
 5. Adjust transmitter potentiometer zero until 4 mA is read by the ammeter.

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6. Repeat for the maximum temperature matching 20 mA to the potentiometer span or maximum and verify at the building automation system.
 7. Record all values and recalibrate controller as necessary to comply with specified control ramps, reset schedules, proportional relationship, reset relationship and P/I reaction.
 8. Reconnect sensor.
 9. Make a reading with a calibrated test instrument within 6 inches of the site sensor.
 10. Verify that the sensor reading, via the permanent thermostat, gauge or building automation system, is within the tolerances in the table below of the instrument-measured value.
 11. If not, replace sensor and repeat.
 12. For pressure sensors, perform a similar process with a suitable signal generator.
- F Sensor Tolerances for Standard Applications: Plus/minus the following maximums:
1. Watthour, Voltage, Amperage: 1 percent of design.
 2. Pressure, Air, Water, Gas: 3 percent of design.
 3. Air Temperatures (Outside Air, Space Air, Duct Air): 0.4 degrees F.
 4. Relative Humidity: 4 percent of design.
 5. Barometric Pressure: 0.1 inch of Hg.
 6. Flow Rate, Air: 10 percent of design.
 7. Flow Rate, Water: 4 percent of design.
 8. Flow Rate, Steam: 3 percent of design.
 9. AHU Wet Bulb and Dew Point: 2.0 degrees F.
 10. Hot Water Coil and Boiler Water Temperature: 1.5 degrees F.
 11. Cooling Coil, Chilled and Condenser Water Temperatures: 0.4 degrees F.
 12. Combustion Flue Temperature: 5.0 degrees F.
 13. Oxygen and CO2 Monitors: 0.1 percentage points.
 14. CO Monitor: 0.01 percentage points.
 15. Natural Gas and Oil Flow Rate: 1 percent of design.
- G Critical Applications: For some applications more rigorous calibration techniques may be required for selected sensors. Describe any such methods used on an attached sheet.
- H Valve/Damper Stroke Setup and Check:
1. For all valve/damper actuator positions checked, verify the actual position against the control system readout.
 2. Set pump/fan to normal operating mode.
 3. Command valve/damper closed; visually verify that valve/damper is closed and adjust output zero signal as required.
 4. Command valve/damper to open; verify position is full open and adjust output signal as required.
 5. Command valve/damper to a few intermediate positions.
 6. If actual valve/damper position does not reasonably correspond, replace actuator or add pilot positioner (for pneumatics).
- I Isolation Valve or System Valve Leak Check: For valves not associated with coils.
1. With full pressure in the system, command valve closed.
 2. Use an ultra-sonic flow meter to detect flow or leakage.

3.07 TEST PROCEDURES - GENERAL

- A Provide skilled technicians to execute starting of equipment and to execute the Functional Tests. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem-solving.

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- B Provide all necessary materials and system modifications required to produce the flows, pressures, temperatures, and conditions necessary to execute the test according to the specified conditions. At completion of the test, return all affected equipment and systems to their pre-test condition.
- C Sampling: Where Functional Testing of fewer than the total number of multiple identical or near-identical items is explicitly permitted, perform sampling as follows:
 - 1. Identical Units: Defined as units with same application and sequence of operation; only minor size or capacity difference.
 - 2. Sampling is not allowed for:
 - a. Major equipment.
 - b. Life-safety-critical equipment.
 - c. Prefunctional Checklist execution.
 - 3. XX = the percent of the group of identical equipment to be included in each sample; defined for specific type of equipment.
 - 4. YY = the percent of the sample that if failed will require another sample to be tested; defined for specific type of equipment.
 - 5. Randomly test at least XX percent of each group of identical equipment, but not less than three units. This constitutes the "first sample."
 - 6. If YY percent of the units in the first sample fail, test another XX percent of the remaining identical units.
 - 7. If YY percent of the units in the second sample fail, test all remaining identical units.
 - 8. If frequent failures occur, resulting in more troubleshooting than testing, the Commissioning Authority may stop the testing and require Contractor to perform and document a checkout of the remaining units prior to continuing testing.
- D Manual Testing: Use hand-held instruments, immediate control system readouts, or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the "observation").
- E Simulating Conditions: Artificially create the necessary condition for the purpose of testing the response of a system; for example apply hot air to a space sensor using a hair dryer to see the response in a VAV box.
- F Simulating Signals: Disconnect the sensor and use a signal generator to send an amperage, resistance or pressure to the transducer and control system to simulate the sensor value.
- G Over-Writing Values: Change the sensor value known to the control system in the control system to see the response of the system; for example, change the outside air temperature value from 50 degrees F to 75 degrees F to verify economizer operation.
- H Indirect Indicators: Remote indicators of a response or condition, such as a reading from a control system screen reporting a damper to be 100 percent closed, are considered indirect indicators.
- I Monitoring: Record parameters (flow, current, status, pressure, etc.) of equipment operation using dataloggers or the trending capabilities of the relevant control systems; where monitoring of specific points is called for in Functional Test Procedures:
 - 1. All points that are monitored by the relevant control system shall be trended by Contractor; at the Commissioning Authority's request, Contractor shall trend up to 20 percent more points than specified at no extra charge.
 - 2. Other points will be monitored by the Commissioning Authority using dataloggers.
 - 3. At the option of the Commissioning Authority, some control system monitoring may be replaced with datalogger monitoring.
 - 4. Provide hard copies of monitored data in columnar format with time down left column and at least 5 columns of point values on same page.

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5. Graphical output is desirable and is required for all output if the system can produce it.
6. Monitoring may be used to augment manual testing.

3.08 BUILDING ENVELOPE COMMISSIONING

- A General: Comply with the following procedural requirements:
 1. NEBB S110 Whole Building Technical Commissioning of New Construction.
 2. ASTM E779 Standard Test Method for Determining Air Leakage Rate by Fan Pressurization.
 3. ASTM E1827 Standard Test Methods for Determining Airtightness of Buildings Using an Orifice Blower Door.
 4. ANSI/RESNET/ICC 301 Standard for the Calculation and Labeling of the Energy Performance of Low-Rise Residential Buildings using an Energy Rating Index.
 5. ANSI/RESNET/ICC 380 Standard for Testing Airtightness of Building Enclosures, Airtightness of Heating and Cooling Air Distribution Systems, and Airflow of Mechanical Ventilation Systems.
- B Verify that the building envelope has been sufficiently completed for testing to commence.
- C Conduct ongoing inspections as construction progresses to document satisfactory installation conditions. related to thermal and moisture integrity of the building envelope that become concealed upon completion of construction.
- D Submit a detailed narrative of proposed pressure test procedures prior to the test. Include a plan view showing proposed installation locations (personnel doors or other similar openings) for blower doors (or flexible ducts for trailer-mounted fans, if used).
- E Avoid testing on days forecast to experience high winds, rain, or snow.
- F Test the completed building and demonstrate that the air leakage rate of the building envelope does not exceed the specified requirements.
 1. Use equipment and methods necessary to produce indoor/outdoor pressure differential of 0.2 inches w.g..
 2. Use RESNET accredited software to document salient features of project's building envelope and to calculate the HERS Index Score.
- G Determine location and nature of undesirable air leakage pathways using methods specified in ASTM E1186-17 Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems.
- H Deficiencies: Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to Owner.
 1. If difficulty in correction would delay progress, report deficiency to the Commissioning Authority immediately.
 2. Insulation for remedying building envelope deficiencies evidenced as excessive air leakage is specified in Section 072100.
 3. Air barriers for remedying building envelope deficiencies evidenced as excessive air leakage are specified in Section 072700.
 4. Sealants for remedying building envelope deficiencies evidenced as excessive air leakage are specified in Section 079200.

3.09 FIELD TESTING AND COMMISSIONING OF PARTITIONS FOR NOISE ISOLATION

- A Conduct testing of partitions requiring a specific STC class indicated on drawings and/or in various specifications sections. Comply with ASTM E336 for testing methods, including requirements of Annex A1 for reduction of flanking sound transmission.
- B Confirm that the FSTC values are not less than 67 percent of design STC values.

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- C Deficiencies: Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to Owner.
 - 1. If difficulty in correction would delay progress, report deficiency to the Commissioning Authority immediately.
 - 2. Sealants for remedying flanking sound transmission deficiencies evidenced as excessive air leakage are specified in Section 079200.

3.10 OPERATION AND MAINTENANCE MANUALS

- A See Section 017800 - Closeout Procedures and Submittals for additional requirements.
- B Add design intent documentation furnished by Architect to manuals prior to submission to Owner.
- C Submit manuals related to items that were commissioned to Commissioning Authority for review; make changes recommended by Commissioning Authority.
- D Commissioning Authority will add commissioning records to manuals after submission to Owner.

END OF SECTION 019113

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SECTION 024100 - SELECTIVE DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Selective demolition of building elements for alteration purposes.
- B The extent of selective demolition/removal work required is shown by notes and graphic information on the drawings, and may be summarized, but not by way of limitation, as the removal of existing assemblies from the building exterior and interior, the removal of existing mechanical and electrical systems (to the extent indicated), the removal of existing construction (to the extent indicated) from the building and removal work at existing adjacent construction, as necessary to receive or provide for new construction.
 - 1. Note that while the Drawings show the intent of the scope of demolition work, the Contractor shall review the scope and identify to himself or herself the full extent of the demolition work and associated work to be included in the scope to fully execute the design and contract documents.

1.02 RELATED REQUIREMENTS

- A Section 011000 - Summary: Limitations on Contractor's use of site and premises.
- B Section 011000 - Summary: Sequencing and staging requirements.
- C Section 011000 - Summary: Description of items to be salvaged or removed for re-use by Contractor.
- D Section 015000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- E Section 016000 - Product Requirements: Handling and storage of items removed for salvage and relocation.
- F Section 017300 - Execution Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.
- G Section 017329 - Cutting and Patching.
- H Section 070150.19 - Preparation for Re-Roofing: Removal of existing roofing, roof insulation, flashing, trim, and accessories.
- I Section 090561 - Common Work Results for Flooring Preparation.
- J Section 312200 - Grading: Rough and fine grading.
- K Section 312323 - Fill: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

1.03 REFERENCE STANDARDS

- A 29 CFR 1926 - Safety and Health Regulations for Construction; Current Edition.
- B ANSI/ASSE A10.6; 2006 - Safety Requirements for Demolition Operations - American National Standard for Construction and Demolition Operations.
- C NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2022, with Errata (2021).

1.04 DEFINITIONS

- A Demolition: Complete removal and legal off-site disposal of existing facilities specified or indicated, "Remove".
- B Salvage: Complete removal, by methods, which prevent damage or destruction of any items indicated to be relocated (or salvaged) and subsequent relocation and reinstallation in an area designated by Owner.

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- C Remove & Dispose: Remove to an approved off site facility and legally dispose of items noted in Contract documents.
- D Remove and Salvage: Items indicated to be removed and salvaged remain Owner's property. Remove, clean, and pack or crate items to protect against damage. Identify contents of containers and deliver to Owner's designated storage area.
- E Remove and Reinstall: Remove items indicated; clean, service, and otherwise prepare for reuse; store and protect against damage. Reinstall items in locations indicated.
- F Existing to Remain: Protect construction indicated to remain against damage and soiling during demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and then cleaned and reinstalled in original locations.

1.05 SUBMITTALS

- A See Section 013300 - Submittal Requirements, for submittal procedures.
- B Shop Drawings:
 - 1. Drawings of temporary structural support locations and calculations sealed by a Structural Engineer registered in the State of California.
 - 2. Demolition Plan: Submit demolition plan as required by OSHA and local AHJs.
 - a. Indicate extent of demolition, removal sequencing, bracing and shoring, and location and construction of barricades and fences.
 - b. Demolition firm qualifications.
- C Schedule of Selective Demolition Activities: Indicate the following:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 - 3. Coordination for shutoff, capping, and continuation of utility services.
 - 4. Use of elevator and stairs.
 - 5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work
- D Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

1.06 QUALITY ASSURANCE

- A Demolition Firm Qualifications: Company specializing in the type of work required.
 - 1. Minimum of 10 years of documented experience.
- B Permits and Licenses: Contractor shall obtain all necessary permits and licenses for performing the Work and shall furnish a copy of same to the County prior to commencing the Work. The Contractor shall comply with the requirements of the permits
- C Notices: Contractor shall issue written notices of planned demolition to companies or local authorities owning utility conduit, wires, or pipes running to or through the project site. Copies of said notices shall be submitted to the County.
- D Utility Services: Contractor shall notify utility companies or local authorities furnishing gas, water, electrical, telephone, or sewer service to remove any equipment in the structures to be demolished and to remove, disconnect, cap, or plug their services to facilitate demolition.
- E Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- F The Contractor shall comply with the requirements of applicable Federal and State regulations regarding the demolition of structures including ANSI/ NFPA 251 - Building Construction and

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Demolition Operations and ANSI 10.2 Safety Code, ANSI 10.6 Safety Requirements for Demolition.

1.07 MATERIAL OWNERSHIP

- A Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain the Owner's property, demolished materials shall become the Contractor's property and shall be removed from the site with further disposition at the Contractor's option.

1.08 PREDEMOLITION MEETINGS

- A Pre-demolition Conference: Conduct conference at Project site.
 - 1. Inspect and discuss condition of construction to be selectively demolished.
 - 2. Review structural load limitations of existing structure.
 - 3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
 - 5. Review areas where existing construction is to remain and requires protection.
 - 6. Coordinate Owner requirements for ongoing building operations.
 - 7. Schedule and mark items for demolition.

1.09 SEQUENCING

- A Submit schedule indicating proposed sequence of operations for selective demolition work to Project Manager for review prior to start of work. Include coordination for shutoff, capping, and continuation of utility services, and details for dust and noise control.
 - 1. Coordinate the scheduling of work of Section with the work of other sections.

1.10 PROJECT CONDITIONS

- A Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- B Protections: Ensure safe passage of persons around area of demolition. Conduct operations to prevent damage to adjacent buildings, structures, and other facilities and injury to persons.
 - 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
 - 2. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and Architect.
 - 3. Provide shoring, bracing, or support to prevent movement, settlement, or collapse of structure or other work to remain.
 - 4. Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.
 - 5. Protect floors with suitable coverings when necessary.
- C Damages: Promptly repair damages caused to adjacent tenant spaces by demolition work as directed by the Architect at no cost to Owner.
- D Owner assumes no responsibility for condition of areas to be selectively demolished.
 - 1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- E Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

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F Hazardous Materials:

1. Asbestos Containing Materials (ACM):
 - a. It is not expected that asbestos hazardous materials will be encountered in the Work. If constructions suspected of containing Asbestos Containing Materials (ACM) are encountered, do not disturb; immediately notify Architect and Owner. ACM materials will be removed by Owner under a separate contract.
2. Lead Containing Paint:
 - a. It is not expected that lead containing paint is present. If constructions suspected of containing lead containing paint are encountered, do not disturb; immediately notify Architect and Owner. ACM materials will be removed by Owner under a separate contract.
3. Other Hazardous Materials:
 - a. The existing fire exit signs, fire alarm lights, emergency lights, fluorescent lights, may have the potential to contain hazardous materials such as Polychlorinated Biphenyls (PCBs), Mercury (halide) filaments, batteries and/or radioactive material (tritium).
 - b. The Contractor is responsible for removing, transporting, and legal disposal in a landfill designated for these hazardous materials

PART 2 PRODUCTS

2.01 MATERIALS

- A Carefully remove salvageable items such as light fixtures, grilles, doors, hardware, plumbing fixtures, other items which are not specifically indicated for reuse, but which may have salvage value to the Owner.
 1. Demolished materials and equipment shall be stockpiled in an area designated by the Owner, in a manner that the Owner may determine those items which have salvage value to the Owner.
 2. Those materials, which are not salvaged by the Owner, shall become the possession of the Contractor and shall be immediately removed from the site.
- B Carefully remove materials (in whole or in part as required) that are scheduled for reuse. Store and protect for reinstallation the materials identified by the owner.

PART 3 EXECUTION

3.01 DEMOLITION

- A Remove other items indicated, for salvage, relocation, recycling, and re-use as shown in the Drawings.
 1. Refer to Mechanical and Plumbing Drawings for demolishing, cutting, patching, or relocating plumbing and mechanical items.
 2. Refer to Electrical Drawings for demolishing, cutting, patching, or relocating electrical items.
- B Fill excavations, open pits, and holes in ground areas generated as result of removals, using specified fill; compact fill as specified in Section 312200.

3.02 EXAMINATION

- A Existing Facilities: Protect existing facilities and structures designated to remain, temporarily or permanently, from damage during demolition or construction activities'. Repair items damaged during demolition or construction activities to their original condition, or replace with new. Do not overload structural elements or pavements to remain. Provide new supports and reinforcement for existing construction weakened by demolition and/or removal work. Repairs,

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reinforcement or structural replacement shall be approved by Architect or Owner's Representative.

- B When unanticipated mechanical, electrical, or structural elements that conflict with the intended function or design are encountered, investigate and measure the nature and extent of the conflict. Promptly submit a written report to the Architect.

3.03 PREPARATION

- A Notify affected utility companies before starting work and comply with their requirements.
 - 1. Mark location of utilities.
 - 2. Identify, disconnect, remove and cap designated utilities within demolition areas.
- B Provide, erect, and maintain temporary barriers and security devices where required and as indicated on drawings.
- C Protect existing landscaping materials, appurtenances, and structures which are not to be demolished.
- D Protect benchmarks and existing work from damage or displacement.
- E Prevent movement or settlement of adjacent structures.
- F Obtain written permission from adjacent property owners when demolition equipment will traverse, infringe upon or limit access to their property.
- G Protection of existing building exterior:
 - 1. Erect weatherproof closures for exterior openings. Maintain exit requirements.
 - 2. Protect from weather openings cut in existing roof for new work, or where existing roofing is removed to allow new construction to join existing.
 - 3. Install temporary deck of exterior grade plywood and wood skids, or other material approved by Architect, for material and personnel traffic over existing roofing, to protect existing roof and surrounding surfaces from damage. Repair damage caused to the roof and other items.
- H Dustproof Partitions:
 - 1. Erect and maintain as required to prevent spread of dust, fumes and smoke to other parts of the building.
 - 2. On completion, remove partitions and repair damage surfaces to match adjacent surfaces.
- I Roofing Removal: During the removal of the existing parapets and roofing, provide proper protection from falling objects. Maintain interior of building rain and water protection.
 - 1. Refer also to Section 070150.19 - Preparation for Re-Roofing.

3.04 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 - 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.

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4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame cutting operations. Maintain fire watch and portable fire suppression devices during flame cutting operations.
 - a. Maintain adequate ventilation when using cutting torches.
 - b. Wherever a cutting torch or other equipment that might cause a fire is used, provide and maintain fire extinguishers nearby ready for immediate use. Instruct all possible users in use of fire extinguishers.
 - c. Keep hydrants clear and accessible at all times. Prohibit debris from accumulating within a radius of 4500 mm (15 feet) of fire hydrants.
5. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of offsite.
6. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
7. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
8. Dispose of demolished items and materials promptly.
- B Comply with other requirements specified in Section 017300.
- C 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.
- D Do not begin removal until receipt of notification to proceed from Owner.
- E Do not begin removal until built elements to be salvaged or relocated have been removed.
- 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.
- H Perform demolition in a manner that maximizes salvage and recycling of materials.
 1. Dismantle existing construction and separate materials.

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2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

3.05 EXISTING UTILITIES

- A Coordinate work with utility companies. Notify utilities before starting work, comply with their requirements, and obtain required permits.
- B Protect existing utilities to remain from damage.
- C Do not disrupt public utilities without permit from authority having jurisdiction.
- D Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
- E Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
- F Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- G Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.
- H Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone. Identify and mark, in same manner as other utilities to remain, utilities to be reconnected.

3.06 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 015000 in locations indicated on drawings.
 - 2. Provide sound retardant partitions of construction and 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 Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight. See Section 070150.19 - Preparation for Re-Roofing for new roofing requirements.
 - 1. Remove existing roof membrane, flashings, copings, and roof accessories.
 - 2. Remove existing roofing system down to substrate.
- E 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.
- F Services including, but not limited to, HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications: Remove existing systems and equipment as indicated.
 - 1. Maintain existing active systems to remain in operation, and maintain access to equipment and operational components.
 - 2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.

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3. See Section 011000 - Summary for limitations on outages and required notifications.
 4. Verify that abandoned services serve only abandoned facilities before removal.
 5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings. Remove back to source of supply where possible, otherwise cap stub and tag with identification.
- G Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
1. Arrange to shut off indicated utilities with utility companies.
 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
 - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
 - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
 - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.
- H Refrigerant: Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.
- I 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.

3.07 STRUCTURE DEMOLITION

- A Begin demolition at top of building and proceed to lowest basement floor, without using explosives.
- B Demolish structure above each floor level without damaging supporting members on lower levels.
- C Remove foundation walls and footings to a minimum of 2'-0" below finished grade beyond area of new construction.
- D Remove concrete slabs on grade as indicated in Drawings.

3.08 PATCHING AND REPAIRS

- A General: Promptly repair damage to adjacent construction caused by selective demolition operations.
- B Patching and Repairs: Comply with Section 017329 - Cutting and Patching.

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1. Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
 2. Completely fill holes and depressions in existing masonry walls that are to remain with an approved masonry patching material applied according to manufacturer's written recommendations.
- C Finishes: Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.
- D Floors and Walls: Where walls or partitions that are demolished extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
- E Ceilings: Patch, repair, or re-hang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

3.09 DEBRIS AND WASTE REMOVAL

- A Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.
- B Remove debris, junk, and trash from site.
- 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 024100

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SECTION 031000 - CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.01 SUMMARY

- A Section Includes:
 - 1. Design and construction of formwork for concrete, unless specified otherwise.
 - 2. Setting in forms, all anchor bolts, metal inserts, sleeves, etc., embedded in concrete.
 - 3. Miscellaneous concrete work, including but not limited to areaways, cast-in-place valve boxes, pits, splash blocks, equipment bases, and other items as shown or required to complete all Work.
- B Related Sections:
 - 1. Division 03, Section 03 20 00 "Reinforcement for Concrete"
 - 2. Division 03, Section 03 30 00 "Cast-in-Place Concrete"
 - 3. Division 05, Section 05 31 00 "Steel Decking"

1.02 SUBMITTALS

- A Shop Drawings: Submit shop drawings showing form pattern layouts of all exposed exterior and interior concrete dimensioned to precisely locate grooves, form panel jointing, tie hole layout and spacing, and similar features. Review and approval will not include form strength and adequacy.
- B Record Document: Keep an accurate record of the dates of removal of forms, form shores and reshores, and furnish copies to the Engineer.

1.03 QUALITY ASSURANCE

- A Construct forms according to ACI 347 "Recommended Practice for Concrete Formwork", and conforming to tolerances specified in ACI 301, "Specifications for Structural Concrete for Buildings," as applicable, unless exceeded by code requirements or otherwise indicated or specified.
- B Prior to construction of formwork for concrete beams and slabs above grade, Contractor shall conduct a meeting at the site to determine and define all cambers required for the project. The Architect, Structural Engineer of record, General Contractor and Contractor's formwork installer shall be in attendance at this meeting.
- C Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01, Section 01 31 13 "Project Coordination."

1.04 DELIVERY, STORAGE, AND HANDLING

- A Deliver materials for forms in timely manner to ensure uninterrupted progress.
- B Store materials by methods that prevent damage and permit ready access for inspection and identification.

PART 2 PRODUCTS

2.01 MATERIALS

- A Form lumber: Unless otherwise indicated or specified, use WCLIB "Construction" grade or better, WWPA No. 1 or better, unless otherwise indicated or specified.
- B Form plywood: Unless otherwise indicated or specified, use PS 1-83, Group I, Exterior Grade B-B Plyform or better, minimum 5-ply and 3/4 inch thick for exposed locations and not less than 5/8 inch thick for unexposed locations, grade marked, not mill oiled, Plywood having medium or high density overlay is acceptable.

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- C Coated form plywood: For exposed painted concrete, plastic overlaid plywood of grade specified above, factory coated with a form coating and release agent equal to "Noxcrete," unless otherwise indicated or specified.
- D Tube forms: Burke "SmoothTube," Sonoco "Seamless Sonotubes," Alton Building Products "Sleek Seamless Standard Wall," or equal, type leaving no marks in concrete, 1-piece lengths for full required heights.
- E Joist forms: Approved steel or molded plastic types as required.
- F Form ties: Prefabricated rod, flat band, wire, internally threaded disconnecting type, or equal, not leaving metal within 1-1/2 inch of concrete surface.
- G Form coating: Non-staining clear coating free from oil, silicone, wax, not grain-raising, "Formshield" by A.C. Horn, Inc., "Debond Form Coating" by L&M Construction Chemicals, Inc., or "Cast-Off" by Sonneborn Building Products. Where form liners are used, provide form coatings recommended by form liner manufacturer.

PART 3 EXECUTION

3.01 WORKMANSHIP

- A Rigidly construct forms to prevent cement paste leakage, sagging, displacement or bulging between studs. Use clean, sound, approved form material, coated with specified materials only, not oil. Provide backing on all plywood joints.
- B Sides of all pile caps, footings and grade beams shall be formed, unless permission is obtained to place concrete directly against earth. Where this permission is granted, the footing or grade beam dimension shall be increased 3 inches. Remove formwork prior to backfilling operations.

3.02 FORM ERECTION AND REMOVAL

- A Construction: Coat forms with the specified resin coating, not form oil. Construct forms to exact shapes, sizes, lines, and dimensions required to obtain level, plumb, and straight surfaces. Provide openings, offsets, keys, reglets, anchorages, recesses, moldings, chamfers, blocking, screeds, drips, bulkheads, and all other required features. Make forms easily removable without hammering or prying against concrete. Space forms apart with metal spreaders. Construct forms to accurate alignment, location and grades, and provide against sagging, leakage of cement paste, or displacement occurring during and after placing of concrete. Coordinate installation of inserts and anchors in forms according to Shop Drawings and requirements for work of other sections.
- B Camber: Place suitable jacks, wedges, or similar means to induce camber and to correct settlement in forms before and during concrete placing. Camber shall be as determined in pre-installation meeting specified above. In general, formwork shall be capable of accommodating camber of 1/8 inch per 10 feet of span plus 1/4 inches.
- C Corners and Angles: Provide 3/4 inch by 3/4 inch beveled chamfer strips for all exposed concrete corners and angles, unless otherwise indicated. Form concealed concrete corners and angles square, unless otherwise indicated.
- D Reglets and Rebates: Form required reglets and rebates to receive frames, flashing, and other equipment. Obtain required dimensions, details, and precise positions for work to be installed under other sections and form concrete accordingly.
- E Form Joints: Unless otherwise indicated or specified, fill joints to produce smooth surfaces, intersections, and arrises. Use polymer foam or equivalent fillers at joints and where forms abut or overlap existing concrete to prevent leakage of cement paste.
- F Recesses, Drips, and Profiles: Provide smooth milled wood or preformed rubber or plastic shapes of types shown and required.
- G Cleanouts and Cleaning: Provide temporary openings in all wall forms and other vertical forms for cleaning and inspection. Clean forms and surfaces to receive concrete prior to placing.

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- H Re-Use: Clean and recondition form material before re-use, unless more stringent requirements are indicated or specified.
- I Form Removal: All formwork removal is made at contractor's own risk. Do not remove concrete forms until concrete attains sufficient strength to support its own weight and all superimposed loads as determined by testing field cured concrete cylinders, but not sooner than specified in ACI 347, paragraph 3.7.2.3, or as indicated or specified elsewhere. Load supporting forms may not be removed before the concrete has attained 75 percent of required 28 day compressive strength, and no sooner than 7 days provided construction is reshored.
 - 1. Reshore structural members as specified below because of design requirements or construction conditions to permit successive construction.
 - 2. Remove formwork progressively so unbalanced loads are not imposed on the structure.
 - 3. Avoid damage concrete surfaces during form removal.
 - 4. Store reusable forms for exposed architectural concrete to prevent damage to contact surfaces.
 - 5. Remove formwork in same sequence as concrete placement to achieve similar concrete surface coloration.
 - 6. Where sequencing of work or construction access conditions requires delayed pours of one or more bays of otherwise continuous slabs, form work and shoring shall remain in place for two floor bays continuously either side of the leave-out areas until leave-out areas are poured and have cured as indicated above in 3.2.J.
- J Reshoring:
 - 1. Reshoring of not less than half the full required shoring shall be added under last placed floor over which full shoring is to be placed for the next floor above. Leave reshoring in place for at least 7 days after the floor above is placed, but in no case remove reshoring until next concrete placing has attained a compressive strength equal to 75 percent of that required for the 28 day age as determined by control test cylinders specified hereinafter.
 - 2. Record: Maintain a form and shoring removal record.
- K Shoring for Tributary Loads: Set temporary shoring for structural steel beams supporting cast-in-place concrete slabs. Such shoring is not required where beams are partially or totally encased with concrete nor for steel beams supporting concrete or masonry walls resting on the beams.

3.03 FORMWORK TOLERANCES

- A Deflection: Limit deflection of forming surfaces from concrete pressure to $L/240$, unless otherwise indicated or specified.
- B Finish Lines: Position formwork to maintain hardened concrete finish lines within following permissible deviations, unless otherwise indicated or specified:
 - 1. Variation from Plumb:
 - a. In 10 feet: 1/4 inch
 - b. In any story or 20 feet: 3/8 inch
 - c. In 40 feet or more: 3/4 inch
 - 2. Variation from Level or Grades Indicated:
 - a. In 10 feet: 1/4 inch
 - b. In any bay or 20 feet maximum: 3/8 inch
 - c. In 40 feet or more: 3/4 inch
 - 3. Cross-Sectional Dimensions:
 - a. Minus 1/4 inch
 - b. Plus 1/2 inch
- C Building Lines: Variation of linear building lines from established position in plan and related position of columns, walls and partitions:
 - 1. In any bay or 10 feet maximum: 1/2 inch
 - 2. In 40 feet or more: 1 inch

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- D Slab Openings: Variations in size and location of sleeves and slab openings shall not exceed 1/4 inch.

3.04 SURVEY AND ADJUSTMENT

- A Check forms before and during placement of concrete, using an instrument, and make corrections as work proceeds.

3.05 EMBEDDED PIPING AND ROUGH HARDWARE

- A Where work of other sections requires openings for passage of pipes, conduits, ducts, and other inserts in the concrete, obtain all dimensions and other information. All necessary pipe sleeves, anchors, or other required inserts shall be accurately installed as part of the work of other sections, according to following requirements.
- B Pipes: Pipes other than conduits are not permitted in structural concrete except where specifically approved by the Owner's Representative.
- C Conduits: Conduits larger than 1-1/2-inch diameter shall not be embedded in structural concrete except where specifically approved by the Owner's Representative. Space embedded conduits at a minimum of 3 diameters on centers. Conduits shall not displace or interrupt reinforcing bars or impair the strength of the structure. Where located in slabs, conduits shall be routed within the middle 1/3 of the slab thickness; provide chairing or other acceptable means of support to position conduits at required elevations and to secure conduits during concrete placement. Conduits may be embedded in walls only if the outside diameter does not exceed 1/4 the wall thickness, are spaced no closer than 3 diameters on centers, and do not impair the strength of the structure.
 - 1. Clusters of Conduits:
 - a. Clusters of conduits embedded in a concrete slab shall not exceed 6 conduits per cluster and each conduit per cluster shall be individually spaced as per the above requirements. Conduit clusters exceeding this requirement shall be reviewed and approved by the Owner's Representative prior to the installation of the conduits.
 - b. If more than one conduit cluster is required in a specific area of the slab, routing and spacing of the clusters shall be reviewed and approved by the Owner's Representative prior to the installation of the conduits. In no case shall conduit clusters be spaced closer than 3'-0" center-to-center of clusters.
- D Sleeves: Pipe sleeves may pass through slabs or walls if not exposed to rusting or other deterioration and are of uncoated or galvanized iron or steel. Provide sleeves of diameter large enough to pass any hub or coupling on pipe, including any insulation.

3.06 FIELD QUALITY CONTROL

- A Inspection: Obtain inspection and approval of forms before placing structural concrete.

END OF SECTION

Concrete Forming and Accessories - 031000

SECTION 032000 - CONCRETE REINFORCING

PART 1 GENERAL

1.01 SUMMARY

- A Section Includes:
 - 1. Reinforcing bars for cast-in-place concrete.
 - 2. Reinforcing mesh for cast-in-place concrete.
 - 3. Accessories, including but not limited to, chairs and tie wires.
 - 4. Reinforcing bars for site-cast precast concrete and concrete tilt-up walls.
 - 5. Miscellaneous concrete work, including but not limited to areaways, cast-in-place valve boxes, pits, splash blocks, equipment bases, and other items as shown or required to complete all work.
- B Related Sections:
 - 1. Division 03, Section 03 11 00 "Concrete Forming."
 - 2. Division 03, Section 03 30 00 "Cast-in-Place Concrete."
- C Measurement and Payment:
 - 1. No separate measurement and payment will be made for any of the items in this Section or shown on the Drawings. Items indicated in the Specifications or Drawings will be considered incidental to and included in the prices for other items provided in Bid Form.

1.02 SUBMITTALS

- A Shop Drawings: Submit for review and approval by the Engineer prior to fabrication. Shop drawings to include complete layouts, sections, and details for congested conditions, typical bending diagrams and offsets, splice lengths and locations, proposed layout where vertical and horizontal bars intersect, locations of form ties for architectural concrete, and wherever welding is proposed, detailed to conform to AWS-D1.4 and code requirements.
 - 1. Submit proposed coupler and proposed location. Supply manufacturer's calculations and supporting data.
- B Mill test reports: Submit prior to placement of concrete.
- C Welding Certificates: Submit certificates of certified welders.
- D Product Data: Chemical analysis for bars to be welded, in accordance with code.

1.03 QUALITY ASSURANCE

- A Source Quality Control: Refer to Division 01, Section 01 45 00 "Quality Control" for general requirements and to following paragraphs for specific procedures. Testing Laboratory shall perform following conformance testing, shall select test samples of bars, ties, and stirrups from the material at the site or from place of distribution, each sampling including at least two 18-inch long pieces, and perform the following tests in accordance with applicable ASTM requirements:
 - 1. Identified Bars: If samples are obtained from bundles as delivered from the mill, identified as to heat number, accompanied by mill analyses and mill test reports, and properly tagged with Identification Certificate so as to be readily identified, perform one tensile and one bend test for each 10 tons or fraction thereof of each size of bars. Submit mill reports when samples are selected.
 - 2. Unidentified Bars: When positive identification of reinforcing bars cannot be made and when random samples are obtained, perform tests for each 2.5 tons or fraction thereof, one tensile and one bend test from each size of bars.
- B Certification of Welders: All welding both in shop and in field shall be performed by certified welders. No welding of reinforcement shall be allowed unless specifically approved by the Engineer.
- C Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01, Section 01 31 13 "Project Coordination."

Concrete Reinforcing - 032000

1.04 DELIVERY, STORAGE AND HANDLING

- A Bundle bars, tag with identification, and transport and store so as not to damage any material. Use metal tags indicating size, length and other marking shown on placement drawings. Maintain tags after bundles are broken.

1.05 COORDINATION

- A Coordinate vertical and horizontal placement of reinforcing bars, splices, and chairs in architectural concrete with formwork tie locations indicated on Drawings and approved shop drawings for architectural concrete.

1.06 EXTRA MATERIAL

- A Furnish and install reinforcing steel in addition to quantities shown on drawings. This additional steel shall be installed during construction, in sizes and locations as directed. Provide unit price for purpose of adjusting contract price to reflect quantity of extra material actually used.

PART 2 PRODUCTS

2.01 MATERIALS

- A Recycled Content of Steel Products: Provide products with an average recycled content of steel products of at least 70 percent post-consumer recycled content plus 15 percent pre-consumer recycled content.
- B Reinforcing bars: ASTM A706, Grade 60, unless otherwise indicated on drawings.
- C High Strength Reinforcing Bars: ASTM A1035-04 low-carbon, chromium steel bars, 100 ksi minimum yield strength.
- D Reinforcing mesh: ASTM A185, mesh size and gauge as shown, 60 ksi minimum tensile strength. Provide mesh in flat sheets only.
- E Tie wire: ASTM A82, Annealed copper-bearing steel, 16 gauge minimum.
- F Prestressing Strand: ASTM A 416/A 416M, Grade 270 (Grade 1860), uncoated, 7-wire, low-relaxation strand.
- G Chairs and similar support items:
 - 1. Standard manufactured products conforming to CRSI Manual of Standard Practice.
 - 2. Use dense precast concrete supports with embedded wire ties for reinforcement placed on grade. Elsewhere, use wire bar supports.
- H Welding electrodes: AWS D1.4, Table 5.1 and 5.5 low hydrogen electrodes, E9018 for Grade 60 steel.

2.02 FABRICATION OF REINFORCING BARS

- A Comply with CRSI "Manual of Standard Practice for Reinforced Concrete Construction" for fabrication of reinforcing steel.
- B Bending and Forming: Fabricate bars of the indicated sizes and bend and form to required shapes and lengths by methods not injurious to materials. Do not heat reinforcement for bending. Bend bars No. 6 size and larger in the shop only. Bars with unscheduled kinks or bends are subject to rejection. Use only tested and approved bar materials.

- C Welding: Use only ASTM A 706 steel where welding is proposed. Perform welding, where shown or approved, by the direct electric arc process in accordance with AWS D1.4 using specified low-hydrogen electrodes. Preheat 6 inches each side of joint. Protect joints from drafts during the cooling process; accelerated cooling is prohibited. Do not tack weld bars. Clean metal surfaces to be welded of all loose scale and foreign material. Clean welds each time electrode is changed and chip burned edges before placing welds. When wire brushed, the completed welds must exhibit uniform section, smooth welded metal, feather edges without undercuts or overlays, freedom from porosity and clinkers, and good fusion and penetration into the base metal. Cut out welds or parts of welds found defective with chisel and replace with proper welding. Prequalification of welds shall be in accordance with Code.

PART 3 EXECUTION

3.01 INSTALLATION OF REINFORCING

- A Provide additional reinforcing bars at wall and slab openings as required. Before placing bars, and again before concrete is placed, clean bars of loose mill scale, oil, or any other coating that might destroy or reduce bond.
- B Securing in Place: Accurately place bars and wire tie in precise position where bars cross. Bend ends of wire ties away from the forms. Wire tie bars to corners of ties and stirrups. Support bars according to the current edition of "Recommended Practice for Placing Bar Supports" of Concrete Reinforcing Steel Institute, using approved accessories and chairs. Place precast concrete cubes with embedded wire ties to support reinforcing steel bars in concrete placed on grade and in footings. Use care not to damage vapor retarders where they occur.
- C Exposed Concrete Surfaces: Provide stainless steel or exterior quality vinyl plastic tipped chairs, bolsters, and accessories where exposed on exterior or interior concrete surfaces not to be painted or permanently covered.
- D Clearances: Maintain minimum clear distances between reinforcing bars and face of concrete as indicated or directed.
- E Splices: Do not splice reinforcing bars at the points of maximum stress except where indicated. Lap splices as shown or required to develop the full strength or stress of bars. Stagger splices in horizontal wall bars at least 48 inches longitudinally in alternate bars and opposite faces.
- F Field Welding of Bars: As specified for fabrication.
- G Maintaining Bars In Position: Take adequate precautions to assure that reinforcing position and spacing is maintained during placement of concrete.
- H Reinforcing Mesh: Lap splice shall include 3 cross-wires but not less than 12 inches. Wire tie at splices and support the same as specified for bars.
- I Splice Devices:
1. Install in accordance with manufacturer's written instructions in locations approved on shop drawings.
 2. Splice in a manner developing at least 125 percent of the yielding strength of the bar.

3.02 FIELD QUALITY CONTROL

- A Inspection: Obtain inspection and approval of reinforcing before concrete is placed.
- B Welding Inspection. Whether welding is done in the shop or at the site, perform welding of reinforcing bars under inspection by certified welding inspector.

END OF SECTION

Concrete Reinforcing - 032000

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes for footing, grade beam, slab-on-grade, concrete topping, fill-in of holes, retaining wall, concrete curb and concrete equipment base pad.
- B Related Requirements:
 - 1. Section 03 20 00 "Concrete Reinforcing"

1.03 DEFINITIONS

- A Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.
- B W/C Ratio: The ratio by weight of water to cementitious materials.

1.04 PREINSTALLATION MEETINGS

- A Preinstallation Conference: Conduct conference at the project site.
 - 1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
 - a. Contractor's superintendent.
 - b. Independent testing agency responsible for concrete design mixtures.
 - c. Ready-mix concrete manufacturer.
 - d. Concrete Subcontractor.
 - e. Retain first subparagraph below if special concrete finishes are included in Project.
 - f. Special concrete finish Subcontractor.
 - 2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, shoring and reshoring procedures, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, methods for achieving specified floor and slab flatness and levelness floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

1.05 ACTION SUBMITTALS

- A Product Data: For each type of product.
- B Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
 - 1. Include the following for each mix design:

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- a. Supporting strength test data not more than 12 months old. At the Engineer's request, reports from the independent testing agencies may be required to document the test data. Reports from the independent testing agencies will be required if fly ash is used in the design mix.
 - b. Statistical analysis in compliance with ACI 301.
 - c. Gradation of fine and coarse aggregates not more than 90 days old (ASTM C 33). No substitution of aggregate type or size from those submitted will be permitted.
 - d. Proportions of all ingredients, including all admixtures added either at time of batching or at job site. Aggregate weights shall be based upon saturated surface dry conditions.
 - e. Water/cement ratio.
 - f. Slump (ASTM C 143): When high range water-reducing admixtures are used, slump before and after addition of admixture are required.
 - g. Air content of freshly mixed concrete (ASTM C 231).
 - h. Material Certificates for the following:
 - i. Cementitious Materials
 - j. Admixtures
 - k. Certification that all ingredients in each mix design are compatible
 - l. Locations or intended use of each mix design.
 - m. Source of all materials.
2. Indicate amounts of mixing water to be withheld for later addition at Project site.
- C Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- D Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
1. Location of construction joints is subject to approval of the Architect.
- E Samples: For waterstops, vapor retarder.

1.06 INFORMATIONAL SUBMITTALS

- A Qualification Data: For Installer and Supplier.
- B Welding certificates.
- C Material Certificates: For each of the following, signed by manufacturers:
1. Cementitious materials.
 2. Admixtures.
 3. Form materials and form-release agents.
 4. Steel reinforcement and accessories.
 5. Fiber reinforcement.
 6. Waterstops.
 7. Curing compounds.
 8. Floor and slab treatments.
 9. Bonding agents.
 10. Adhesives.
 11. Vapor retarders.
 12. Semirigid joint filler.
 13. Joint-filler strips.
 14. Repair materials.
- D Material Test Reports: For the following, from a qualified testing agency:
1. Aggregates: Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.

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- E Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer, detailing fabrication, assembly, and support of formwork.
 - 1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and reshoring installation and removal.
- F Floor surface flatness and levelness measurements indicating compliance with specified tolerances.
- G Field quality-control reports.
- H Minutes of preinstallation conference.

1.07 QUALITY ASSURANCE

- A Mockups: Before casting architecturally visible concrete, build mockups to verify selections made under sample submittals and to demonstrate typical joints, surface finish, texture, tolerances, and standard of workmanship.
- B Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- C Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- D Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
 - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
 - 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade II.
- E Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M.
- F Source limitations: Obtain each type of class of cementitious material of the same brand from the same manufacturer's plant obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

1.08 PRECONSTRUCTION TESTING

- A Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on concrete mixtures.

1.09 DELIVERY, STORAGE, AND HANDLING

- A Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
- B Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

1.10 FIELD CONDITIONS

- A Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- B Hot-Weather Placement:** Comply with ACI 301 and as follows:
1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

1.11 EXTRA MATERIAL

- A** Provide 5 tons of reinforcing steel in additions to quantities shown on drawings. This additional steel shall be installed during construction, in sizes and locations as directed by the SEOR. Provide unit price for purpose of adjusting contract price to reflect quantity of extra material actually used. All unused material shall be credited to the owner based upon agreed unit prices.

PART 2 PRODUCTS

2.01 CONCRETE, GENERAL

- A** ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
1. ACI 301
 2. ACI 117

2.02 FORM-FACING MATERIALS

- A** Smooth-Formed Finished Concrete: Form-facing panels that provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
1. Plywood, metal, or other approved panel materials.
 2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - a. High-density overlay, Class 1 or better.
 - b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
 - c. Structural 1, B-B or better; mill oiled and edge sealed.
 - d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.
 3. Overlaid Finnish birch plywood.
- B** Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C** Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
- D** Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation.

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- E Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.
- F Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- G Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
- H Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- I Form Ties: Factory-fabricated, removable or snap-off glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish units that leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
 - 2. Furnish ties that, when removed, leave holes no larger than 1 inch in diameter in concrete surface.
 - 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.03 STEEL REINFORCEMENT

- A Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 60 percent
- B Reinforcing Bars: ASTM A 615/A 615M, Grade 60 to Grade 80, as indicated in structural drawings, deformed.
- C Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.
- D Steel Bar Mats: ASTM A 184/A 184M, fabricated from ASTM A 615/A 615M, Grade 60 deformed bars, assembled with clips.
- E Plain-Steel Wire: ASTM A 1064/A 1064M, as indicated in structural drawings.
- F Deformed-Steel Wire: ASTM A 1064/A 1064M.
- G Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.
- H Deformed-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, flat sheet.
- I Galvanized-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from galvanized-steel wire into flat sheets.
- J Provide

2.04 REINFORCEMENT ACCESSORIES

- A Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
- B Epoxy-Coated Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, ASTM A 775/A 775M epoxy coated.
- C Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775/A 775M.
- D Zinc Repair Material: ASTM A 780/A 780M.
- E Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - 1. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

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2.05 CONCRETE MATERIALS

- A Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- B Cementitious Materials:
 - 1. Portland Cement: ASTM C 150/C 150M, Type II/V, gray.
 - 2. Fly Ash: ASTM C 618, Class F.
 - 3. Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.
 - 4. Blended Hydraulic Cement: ASTM C 595/C 595M, Type IS, portland blast-furnace slag.
- C Normal-Weight Aggregates: ASTM C 33/C 33M, coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
 - 1. Maximum Coarse-Aggregate Size: 1-1/2 inches at foundations, 3/8 inch at areas of congestion, nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- D Lightweight Aggregate: ASTM C 330/C 330M, 3/4-inch nominal maximum aggregate size.
- E Air-Entraining Admixture: ASTM C 260/C 260M.
- F Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
 - 7. Air-Entraining Admixture: ASTM C 260/C 260M.
- G Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494/C 494M, Type C.
 - 1. Products:
 - a. Axim Italcementi Group, Inc.; CATEXOL CN-CI.
 - b. BASF Construction Chemicals – Building Systems; Rheocrete CNI.
 - c. Euclid Chemical Company (The); Eucon, CIA.
 - d. Grace Construction Products, W.R. Grace & Co.; DCI.
 - e. Sika Corporation; Sika CNI.
- H Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.
 - 1. Available Products:
 - a. BASF Construction Chemicals – Building Systems; Rheocrete 222+.
 - b. Cortec Corporation; MCI 2000 or 2005NS.
 - c. Grace Construction Products, W.R. Grace & Co.; DCI-S.
 - d. Sika Corporation; FerroGard-901.
- I Water: ASTM C 94/C 94M and potable.

2.06 WATERSTOPS

- A Chemically Resistant Flexible Waterstops: Thermoplastic elastomer rubber waterstops, for embedding in concrete to prevent passage of fluids through joints; resistant to oils, solvents, and chemicals. Factory fabricate corners, intersections, and directional changes.

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1. Profile: as indicated..
2. Dimensions: 6 inches by 3/8 inch thick , nontapered.
- B Flexible PVC Waterstops: CE CRD-C 572 for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.
 1. Profile: as indicated..
 2. Dimensions: 6 inches by 3/8 inch thick , nontapered.
- C Sheet Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape. ASTM D2103, polyethylene sheeting, clear, 10 mil minimum thickness, impact strength greater than 70 grams per mil, 10 foot minimum width. Provide minimum 2-inch-wide waterproof plastic self-adhering tape for sealing edges and ends of sheeting. Vinyl Water Barrier shall be Moistop by Fortifiber Corp, or approved equal.
 1. Products:
 - a. Fortifiber Building Systems Group; Moistop Ultra 15
 - b. Meadows, W.R., Inc; Perminator 15 mil.
 - c. Raven Industries Inc.; Vapor Block 15.
 - d. Reef Industries, Inc; Griffolyn 15 Green
 - e. Stego Industries, LLC; Stego Wrap 15 mil Class A.

2.07 FLOOR AND SLAB TREATMENTS

- A Slip-Resistive Emery Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive, crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials with 100 percent passing 3/8-inch sieve.
- B Slip-Resistive Aluminum Granule Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of not less than 95 percent fused aluminum-oxide granules.
- C Emery Dry-Shake Floor Hardener: Unpigmented, factory-packaged, dry combination of portland cement, graded emery aggregate, and plasticizing admixture; with emery aggregate consisting of no less than 60 percent of total aggregate content.
- D Metallic Dry-Shake Floor Hardener: Unpigmented, factory-packaged, dry combination of portland cement, graded metallic aggregate, rust inhibitors, and plasticizing admixture; with metallic aggregate consisting of no less than 65 percent of total aggregate content.
 1. Color: As selected by Architect from manufacturer's full range
- E Unpigmented Mineral Dry-Shake Floor Hardener: Factory-packaged dry combination of portland cement, graded quartz aggregate, and plasticizing admixture.
 1. Surfex by The Euclid Chemical Company
 2. Tycron by Kaufman Products, Inc.
 3. Quartz Tuff by Dayton Superior
 4. Or approved equal
- F Pigmented Mineral Dry-Shake Floor Hardener: Factory-packaged, dry combination of portland cement, graded quartz aggregate, color pigments, and plasticizing admixture. Use color pigments that are finely ground, nonfading mineral oxides interground with cement.
 1. Color: As selected by Architect from manufacturer's full range.

2.08 CURING MATERIALS

- A Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- B Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C Water: Potable.

2.09 RELATED MATERIALS

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- A Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.
- B Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 according to ASTM D 2240.
- C Bonding agent in "Bonding Agent" Paragraph below may be used directly from container or as an admixture in cement or sand-cement slurries and rubbing grout.
- D Bonding Agent: ASTM C 1059/C 1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.
- E Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
 - 1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- F Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C 150/C 150M, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
 - 4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.
- G Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C 150/C 150M, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
 - 4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.
- H Compressible Foam: Where "compressible foam" or "compressible filler" is specified on the Structural Drawings, provide "Ceramar" Flexible Foam Expansion Joint by W.R. Meadows, P.O. Box 338, Hampshire, IL 60140, or approved equal meeting the following properties:
 - 1. Closed cell and water absorption < 0.5% by volume per ASTM D 545.
 - 2. 10% minimum and 25% maximum compressibility at a pressure equal to 3 psi.
 - 3. Resilience: Deformation recovery > 99%.
 - 4. Resistant to fungus and bacterial growth.
- I Rigid Foam: "Insulfoam" Type 1 expanded polystyrene (EPS) foam plastic boards by Premier Industries, Inc./dba Insulfoam, 1019 Pacific Ave., Ste. 1501, Tacoma, WA 98402, or approved equal.

2.10 CONCRETE MIXTURES, GENERAL

- A Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301
 - 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

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2. Provide concrete mixtures that meet the durability requirements of ACI 301, based on exposure categories noted on the drawings.
- B Compressive Strength: as indicated on drawings.
- C Unit weight: As indicated on drawings.
- D Cementitious Materials:
 1. Maximum water-to-cement ratio (W/C): as indicated in drawings.
 2. Minimum Cementitious Materials Content for Slabs:
 - a. 470 lb/cu. yd. for maximum aggregate of 1-1/2 inches
 - b. 520 lb/cu. yd. for maximum aggregate of 1 inch
 - c. 540 lb/cu. yd. for maximum aggregate of 3/4 inch
 - d. 310 lb/cu. yd. for maximum aggregate of 3/8 inch
 3. Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 - a. Fly Ash: 15 percent.
 - b. Combined Fly Ash and Pozzolan: 15 percent.
 - c. Slag Cement: 50 percent.
 - d. Combined Fly Ash or Pozzolan and Slag Cement: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.
- E Slump Limit: 4 inches plus or minus 1 inch.
 1. Water reducing or plasticizing admixtures are permitted to increase the slump to a maximum of 8 inches for concrete with a verified slump of 2 to 4 inches before adding the water reducing or plasticizing admixtures.
- F Air Content: As required to meet durability requirements of ACI 301 for exposure indicated in drawings.
 1. Do not allow air content of trowel-finished floors to exceed 3 percent.
- G Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.
- H Admixtures: Use admixtures according to manufacturer's written instructions.
 1. Use water-reducing admixture in concrete, as required, for placement and workability.
 2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a w/c ratio below 0.50.
 4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

2.11 FABRICATING REINFORCEMENT

- A Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.12 CONCRETE MIXING

- A Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M, and furnish batch ticket information.
 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.01 FORMWORK INSTALLATION

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- A Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits listed below:
 - 1. Deflection: Limit deflection of forming surfaces from concrete pressure to a minimum of $L/240$.
 - 2. Finish Lines: Position formwork to maintain hardened concrete finish lines within following permissible deviations.
 - a. Variation from Plumb:
 - b. In 10' 0" 1/4 inch
 - c. In any story or 20' 0" 3/8 inch
 - d. In 40' 0" or more 3/4 inch
 - e. Variation from Level or Grades Indicated
 - f. In 10' 0" 1/4 inch
 - g. In any bay or 20' 0" maximum 3/8 inch
 - h. In 40' 0" or more 3/4 inch
 - i. Cross-Sectional Dimensions
 - j. Minus 1/4 inch
 - k. Plus 1/2 inch
 - 3. Building Lines: Variation of linear building lines from established position in plan and related position of columns, walls and partitions:
 - a. In any bay or 10' 0" maximum 1/2 inch
 - b. In 40' 0" or more 1 inch
 - 4. Slab Openings: Variations in size and location of sleeves and slab openings shall not exceed 1/4 inch.
- C Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
 - 1. Class A, 1/8 inch for smooth-formed finished surfaces.
 - 2. Class B, 1/4 inch for rough-formed finished surfaces.
- D Construct forms tight enough to prevent loss of concrete mortar.
- E Construct forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 - 1. Install keyways, reglets, recesses, and the like, for easy removal.
 - 2. Do not use rust-stained steel form-facing material.
- F Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H Chamfer exterior corners and edges of permanently exposed concrete.
- I Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

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3.02 EMBEDDED ITEM INSTALLATION

- A Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
 - 2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
 - 3. Install dovetail anchor slots in concrete structures as indicated.

3.03 REMOVING AND REUSING FORMS

- A General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.
 - 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved at least 75 percent of its 28-day design compressive strength, but no sooner than 7 days provided construction is reshored.
 - 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material are not acceptable for exposed surfaces. Apply new form-release agent.
- C When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.04 SHORING AND RESHORING INSTALLATION

- A Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.
 - 1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.
- B In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.
- C Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.05 VAPOR-RETARDER INSTALLATION

- A Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
 - 1. Lap joints 6 inches and seal with manufacturer's recommended tape.
- B Bituminous Vapor Retarders: Place, protect, and repair bituminous vapor retarder according to manufacturer's written instructions.

3.06 STEEL REINFORCEMENT INSTALLATION

- A General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

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1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.
- C Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
 1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.
- D Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E Install welded-wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.07 JOINTS

- A General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
 3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 5. Space vertical joints in walls as indicated on drawings. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
 6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

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- E Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.08 WATERSTOP INSTALLATION

- A Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.

3.09 CONCRETE PLACEMENT

- A Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.
- B Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
 - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- C Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 - 1. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
 - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- D Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 - 1. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Maintain reinforcement in position on chairs during concrete placement.
 - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 - 4. Slope surfaces uniformly to drains where required.
 - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

3.10 FINISHING FORMED SURFACES

- A Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces not exposed to public view.

- B Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces exposed to public view, to receive a rubbed finish, or to be covered with a coating or covering material applied directly to concrete.
- C Rubbed Finish: Apply the following to smooth-formed-finished as-cast concrete where indicated:
 - 1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
 - 2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix 1 part portland cement to 1-1/2 parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
 - 3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix 1 part portland cement and 1 part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.
- D Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.11 FINISHING FLOORS AND SLABS

- A General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in one direction.
 - 1. Apply scratch finish to surfaces indicated on architectural drawings.
- C Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture.
 - 1. Apply float finish to surfaces indicated to receive trowel finish.
- D Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 - 1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
 - 2. Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:
 - a. Specified overall values of flatness, F(F) 25; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 17; and of levelness, F(L) 15.

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- b. Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for slabs-on-grade.
 - c. Specified overall values of flatness, F(F) 30; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 15; for suspended slabs.
 - d. Specified overall values of flatness, F(F) 45; and of levelness, F(L) 35; with minimum local values of flatness, F(F) 30; and of levelness, F(L) 24.
- 3. Finish and measure surface, so gap at any point between concrete surface and an unlevelled, freestanding, 10-ft. long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4 inch.
- E Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated on architectural drawings. While concrete is still plastic, slightly scarify surface with a fine broom.
 - 1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
- F Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.
 - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.
- G Slip-Resistive Finish: Before final floating, apply slip-resistive aggregate or aluminum granule finish where indicated and to concrete stair treads, platforms, and ramps. Apply according to manufacturer's written instructions and as follows:
 - 1. Uniformly spread 25 lb/100 sq. ft. of dampened slip-resistive aggregate or aluminum granules over surface in one or two applications. Tamp aggregate flush with surface, but do not force below surface.
 - 2. After broadcasting and tamping, apply float finish.
 - 3. After curing, lightly work surface with a steel wire brush or an abrasive stone and water to expose slip-resistive aggregate or aluminum granules.
- H Dry-Shake Floor Hardener Finish: After initial floating, apply dry-shake floor hardener to surfaces according to manufacturer's written instructions and as follows:
 - 1. Uniformly apply dry-shake floor hardener at a rate of 100 lb/100 sq. ft unless greater amount is recommended by manufacturer.
 - 2. Uniformly distribute approximately two-thirds of dry-shake floor hardener over surface by hand or with mechanical spreader, and embed by power floating. Follow power floating with a second dry-shake floor hardener application, uniformly distributing remainder of material, and embed by power floating.
 - 3. After final floating, apply a trowel finish. Cure concrete with curing compound recommended by dry-shake floor hardener manufacturer and apply immediately after final finishing.

3.12 MISCELLANEOUS CONCRETE ITEM INSTALLATION

- A Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C Equipment Bases and Foundations:
 - 1. Coordinate sizes and locations of concrete bases with actual equipment provided.
 - 2. Prior to pouring concrete, place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

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3. Cast anchor-bolt insert into bases. Install anchor bolts to elevations required for proper attachment to supported equipment.
- D Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel finish concrete surfaces.

3.13 CONCRETE PROTECTING AND CURING

- A General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.
- D Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E Cure concrete according to ACI 308.1, by one or a combination of the following methods:
 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
 - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
 - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies does not interfere with bonding of floor covering used on Project.
 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.
 4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

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3.14 LIQUID FLOOR TREATMENT APPLICATION

- A Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
 - 1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
 - 2. Do not apply to concrete that is less than 28 days' old.
 - 3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.
- B Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

3.15 JOINT FILLING

- A Prepare, clean, and install joint filler according to manufacturer's written instructions.
 - 1. Defer joint filling until concrete has aged at least one month(s). Do not fill joints until construction traffic has permanently ceased.
- B Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.
- C Install semirigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.16 CONCRETE SURFACE REPAIRS

- A Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar matches surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 - 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 - 2. After concrete has cured at least 14 days, correct high areas by grinding.

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3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F Repair materials and installation not specified above may be used, subject to Architect's approval.

3.17 FIELD QUALITY CONTROL

- A Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- C Inspections: As indicated in the Statement of Special Inspection.
- D Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:
1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.
 - a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
 3. Air Content: ASTM C 231/C 231M, pressure method, for normal-weight concrete; ASTM C 173/C 173M, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
 5. Compression Test Specimens: ASTM C 31/C 31M.

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- a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
- b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
 - a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
 - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi .
9. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
11. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
13. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
- E Additional Tests for Lightweight Structural Concrete: Perform following test for each 50 cubic yards of lightweight structural concrete.
 1. Along with slump test, ASTM C143, and from same sample, determine air content, unit weight and yield per ASTM C138.
 2. Shrinkage Test: Cast 4" by 11" long bars with 10" effective gauge length, cured for 7 days in moist room and as specified in ASTM C157. Make measurements at 7-day intervals to 35 day age. Allowable shrinkage shall not exceed 0.05 percent after period of 35 days.
 3. Previous Shrinkage Tests: Ready-mix concrete manufacturer may furnish certified test reports from an approved Testing Laboratory, of testing conducted within the 6 month period prior to the first scheduled concrete placement for the project, as proof of meeting shrinkage requirements provided a) aggregates used and concrete covered by such test reports conform to the mix design approved for use on the Work, b) ready-mix concrete manufacturer furnishes letter certifying that the cement provided for use on the Work is obtained from same batch as used in Testing Laboratory specimens as identified in test reports, and c) ready-mix concrete manufacturer furnishes letter certifying that the aggregates provided for use on the Work are obtained from the same quarry, and within

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the last 6 months, as the aggregates used in Testing Laboratory specimens as identified in test reports.

4. Equilibrium Density: Cast one set of two or more cylinders from each day's placing and each 50 cubic yards, or fraction thereof, or not less than once for each 5,000 square feet of surface area for slabs. Date cylinders, assign record number, and tag showing the location from which sample was taken. Samples will be made in accordance with ASTM C172. Cast cylinders according to ASTM C31. For each cylinder, determine the equilibrium and dry-density according to ASTM C567.
- F Measure floor and slab flatness and levelness according to ASTM E 1155 within 24 hours of finishing.

3.18 PROTECTION OF LIQUID FLOOR TREATMENTS

- A Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

END OF SECTION

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SECTION 033511 - CONCRETE FLOOR FINISHES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Liquid densifiers and hardeners.
- B Surface treatment with concrete hardener and sealer.

1.02 RELATED REQUIREMENTS

- A Section 033000 - Cast-in-Place Concrete: Finishing of concrete surface to tolerance; floating, troweling, and similar operations; curing.
- B Section 033000 - Cast-in-Place Concrete: Curing compounds that also function as sealers.
- C Section 090561 - Common Work Results for Flooring Preparation.

1.03 REFERENCE STANDARDS

- A ACI 117 - Specification for Tolerances for Concrete Construction and Materials; 2010 (Reapproved 2015).
- B ACI 301 - Specifications for Concrete Construction; 2020.
- C ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2019.
- D ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete; 2019.
- E National Floor Safety Institute:
 - 1. NFSI B101.1-2022 - Test Method for Measuring the Wet SCOF of Hard-Surface Walkways.
 - 2. NFSI B101.3-2022 - Test Method for Measuring the Wet DCOF of Hard Surface Walkways.

1.04 ADMINISTRATIVE REQUIREMENTS

- A Coordinate the work with concrete floor placement and concrete floor curing.

1.05 SUBMITTALS

- A See Section 013300 - Submittal Requirements, for submittal procedures.
- B Product Data: Manufacturer's published data on each finishing product, including information on compatibility of different products and limitations.
- C Product Data: Manufacturer's published data and installation instructions for concrete polishing system and finishing products, including manufacturer's installation instructions, information on compatibility of different products, and limitations.
- D Maintenance Data: Provide data on maintenance and renewal of applied finishes.
- E Warranty Documentation: Manufacturer warranty; ensure that forms have been completed in Owner's name and registered with manufacturer.
- F Specimen Warranty: Manufacturer warranty.
- G Manufacturers Certification: Submit manufacturers ISO 9001/9002 certification.

1.06 QUALITY ASSURANCE

- A For slabs indicated to receive concrete polishing system, do not proceed with concrete polishing unless manufacturer's representative and specialized equipment is present for every day of placement.
- B Applicator Qualifications: Applicator must have prior experience applying specified product or similar products, or have manufacturer's representative on site ensuring that preparation and

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application are performed correctly.

1.07 MOCK-UP

- A Refer to 014000 - Quality Requirements for additional mockup procedures and Pre-Installation Meetings for review of mockups.
- B For coatings, construct mock-up area under conditions similar to those that will exist during application, with coatings applied.
- C Mock-Up Size: 10 feet square.
- D Locate where directed.
- E Mock-up may not remain as part of the work.

1.08 DELIVERY, STORAGE, AND HANDLING

- A Deliver materials in manufacturer's sealed packaging, including application instructions.
- B Store in cool dry area. Protect from freezing.

1.09 FIELD CONDITIONS

- A Maintain light level equivalent to a minimum 200 W light source at 8 feet above the floor surface over each 20 foot square area of floor being finished.
- B Do not finish floors until interior heating system is operational.
- C Maintain ambient temperature of 50 degrees F minimum.

1.10 WARRANTY

- A See Section 017836 for additional warranty requirements.
- B Correct defective work within a two-year period commencing on the Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A Basis of Design: Contract Documents are based on products specified below to establish a standard of quality. Other acceptable manufacturers with products having equivalent characteristics may be considered, provided deviations are minor and design concept expressed in Contract Documents is not changed, as determined by the Architect.
 - 1. As indicated below.
- B Acceptable Manufacturers: Subject to compliance with requirements of Contract Documents, provide product by one of manufacturers listed alphabetically below. If not listed, submit as substitution according to Conditions of the Contract and Division 1 Sections.
 - 1. Or Equal.
- C Substitutions: Refer to Section 012500 - Substitution Procedures.

2.02 MATERIALS

- A Performance Based Specification: Water-based acrylic curing and sealing compound shall be a non-yellowing, clear, acrylic curing and sealing compound meeting the following requirements:
 - 1. ASTM C309, Type 1, Class B
 - 2. ASTM C1315, Type I Class A, Section 6.4.1 - non-yellowing.
 - 3. ASTM C1315, Section 6.6 - exceed 50 MPa (70 psi) adhesion requirements
 - 4. ASTM D2047 slip-resistance requirements.

2.03 CONCRETE FLOOR FINISH APPLICATIONS

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A Type F-5: Liquid Densifier and Hardener:

1. Use at following locations: All exposed concrete floors. Refer to Drawings, Room Finish and Material Schedules.

2.04 DENSIFIERS AND HARDENERS

A Liquid Densifier/Hardener: Type F-5: Penetrating chemical compound that reacts with concrete, filling the pores and dustproofing; for application to concrete after set.

1. Composition: Lithium silicate.
2. Gloss: Matte.
3. Products:
 - a. Basis of Design: PROSOCO, Inc; Consolideck LS/CS: www.prosoco.com/consolideck/#sle.
 - b. Sinak Corporation; LithoHard: www.sinak.com/#sle.
 - c. SpecChem, LLC; LithSeal SC: www.specchemllc.com/#sle.
 - d. W. R. Meadows, Inc; Liqui-Hard Ultra: www.wrmeadows.com/#sle.
 - e. Or Equal.

B Substitutions: Refer to Section 012500 - Substitution Procedures.

PART 3 EXECUTION

3.01 EXAMINATION

- A Verify that floor surfaces are acceptable to receive the work of this section.
- B Verify that flaws in concrete have been patched and joints filled with methods and materials suitable for further finishes.

3.02 GENERAL

- A Apply materials in accordance with manufacturer's instructions.

3.03 SURFACE PREPARATION

- A Protect adjacent surfaces not designated to receive curing and sealing compound.
- B Clean and prepare surfaces to receive curing and sealing compound in accordance with manufacturer's instructions.
- C Ensure concrete surface is clean and dry, with all stains, oil, grease, dust, and dirt removed.
- D Concrete surface water should be dissipated when used on new concrete.
- E Concrete surfaces should not be marred by walking workers.

3.04 APPLICATION

- A Apply curing and sealing compound in accordance with manufacturer's instructions.
- B Ensure product is mixed for optimum performance. Avoid aggressive mixing as foaming may occur.
- C Use an industrial sprayer with a 5916 tip that produces a flow rate of 1/10 of one gallon per minute.
- D Alternatively apply using a lint-free roller or lamb's wool roller.
- E Avoid puddling in low areas.

3.05 FLOOR SEALER

- A At areas indicated on Drawings, provide 2 coats of sealer.
- B Surface must be clean, dry and free of loose dirt, oil, wax, curing and parting compounds and other foreign matter.
- C Apply each coat in accordance with Manufacturer's printed instructions.

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3.06 COATING APPLICATION

- A Verify that surface is free of previous coatings, sealers, curing compounds, water repellents, laitance, efflorescence, fats, oils, grease, wax, soluble salts, residues from cleaning agents, and other impediments to adhesion.
- B Verify that water vapor emission from concrete and relative humidity in concrete are within limits established by coating manufacturer.
- C Protect adjacent non-coated areas from drips, overflow, and overspray; immediately remove excess material.
- D Apply coatings in accordance with manufacturer's instructions, matching approved mock-ups for color, special effects, sealing and workmanship.

PROTECTION

- E Restrict foot traffic for at least four hours; 12 hours is preferable.
- F Protect finished surface as required and as recommended by manufacturer of polishing system.

END OF SECTION 033511

SECTION 042100 - CLAY MASONRY UNITS

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A This specification pertains to Clay Masonry Units that can be installed on new or existing commercial, industrial, or residential structures as an exterior or interior façade over wood or steel framing, CMU, Brick, Scratch Coat or Brown Coat, cement board, tilt-up or poured in place walls.
- B Glazed Thin Brick
- C Mortar
- D Grout
- E Fasteners
- F Expansion Joints

1.02 RELATED DOCUMENTS

- A Drawings and General Provisions of the Contract including General and Supplementary Conditions and Division 1 General Requirements.
- B Related Documents pertinent to Clay Brick Units produced by Pacific Clay and the installation of Clay Brick Units.
- C Section 042200 - Concrete Unit Masonry

1.03 REFERENCES:

- A ASTM C67: Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile
- B ASTM C216: Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale).
- C ASTM C150: Standard Specification for Portland Cements
- D ASTM C207: Standard Specification for Hydrated Lime for Masonry Purposes
 - 1. ASTM C270: Standard Specification for Mortar for Unit Masonry
- E ASTM C1329: Standard Specification for Portland Cement
- F ASTM C1330: Standard Specification for Preblended Dry Mortar Mix for Unit Masonry
- G ASTM C1714: Standard Specification for Preblended Dry Mortar Mix for Unit Masonry
- H Brick Industry Association (BIA) Technical Note #1: "Cold and Hot Weather Construction Brick Industry Association (BIA) Technical Note #20, "Cleaning Brickwork".
- I TMS 602/ACI 530/ASCE 6: Specifications for Masonry Structures.

1.04 SUBMITTALS

- A See Section 013300 - Submittal Requirements for submittal procedures.
- B Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
- C Shop Drawings: Indicate pertinent dimensions, materials, anchorage, size and type of fasteners, and accessories for brickwork support system.
 - 1. Include calculations or selections from the manufacturer's prescriptive design tables that indicate compliance with the applicable building code and project conditions.
- D Samples: Submit four samples of facing brick units to illustrate color, texture, and extremes of color range.
- E Manufacturer's Qualification Statement.
- F Installer's Qualification Statement.
- G Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements, for additional provisions.

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1.05 QUALITY ASSURANCE:

- A Mock-Up:
 - 1. Prior to initiation of installation or preparation of work area, prepare a mock-up wall panel measuring approximately 4'- 0" x 4'- 0". Mock wall substrate to replicate project; all waterproof details to be identical to architectural and specification requirements related to project. Include same brick units and mortar and grout are required on project. The Mock panel to include wall ties, control joints and other accessories as required for project. Locate the Mock-Up on the job site at a location approved by Architect and General Contractor.
 - 2. The Mock Panel should represent the same Brick product (color, type, grade), grout joint, bond, mortar, and general workmanship as required by the Project. Do not proceed with installation prior to approval of Mock-Up by Owner/Architect/General Contractor as required by contract.
 - a. The mock-up installation is to be cleaned in the same manner as the project installation.
 - 3. Locate as indicated on drawings.
 - 4. Mock-up may remain as part of work.
- B Do not commence project installation until/unless the Mock-Up is approved by Architect.
- C Examine all substrates and foundations to insure they have been properly constructed and prepared to receive Face Brick. If deficiencies are noted, do not proceed; report such issues to the General Contractor and Architect.
- D Verify reinforcing dowels are properly installed and located.
- E Clean surfaces which will receive Brick. Remove mud, dirt, loose rust and other contaminates that will interfere with Brick placement of bond.

PART 2 - PRODUCTS:

2.01 BASIS OF DESIGN MANUFACTURERS:

- A Pacific Clay Products Inc.: www.pacificclay.com.

2.02 PRODUCTS:

- A The following brick products have been specified for this project.
 - 1. Model: Modular-Flat by Pacific Clay Products,
- B No substitutions allowed.
 - 1. Type: Match Existing
 - 2. Grade: MW
 - 3. Face Brick - Common - Exterior Grade
 - 4. Texture: Match Existing,
 - 5. Color: Match Existing,
 - 6. Size: 3-3/4" x 2-1/4" x 8" (95mm x 57mm x 203mm).

2.03 RELATED PRODUCTS:

- A Bonding Mortar must comply with ASTM C270. For added shear bond strength, use a polymer modified mortar compliant with ANSI A118.4 or ANSI A118.15. ; Use a conventional mortar conforming to ASTM C270 or ASTM C1330 (Type N or S) to insure ease of removal of excess mortar on face of brick. Polymer modified mortars are difficult to clean from brick face.
- B Environmental Conditions:
 - 1. Store all materials at a minimum of 40F for a period of 48 hours (about 2 days) prior to installation.

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2. Perform installation in an environment at or above 40F. Follow the requirements outlined in the Brick Institute of America's Technical Document #1: Hot and Cold Weather Construction (www.gobrick.com).

PART 3 - EXECUTION:

3.01 PREPARATION:

- A Examine all substrates and foundations to insure they have been properly constructed and prepared to receive Face Brick. If deficiencies are noted, do not proceed; report such issues to the General Contractor and Architect.
- B Verify reinforcing dowels are properly installed and located.
- C Clean surfaces which will receive Brick. Remove mud, dirt, loose rust and other contaminants that will interfere with Brick placement of bond.

3.02 INSTALLATION

- A Installs brick units in accordance with the instructions published by the BRICK INDUSTRY ASSOCIATION (BIA) Technical Document 28C. (www.gobrick.com) or manufacturer's instructions. Comply with tolerances of TMS602/ACI 503.1/ASCE 6.
- B Be sure to pre-wet each brick unit if rate of absorption or brick exceeds 30 grams per 30 sq inches per minute (See ASTM C67) or if the ambient temperature is 90F or above.
- C Follow directions on drawings, general notes or prints regarding bond pattern and wall areas to be covered.

3.03 MORTAR SELECTION:

- A Type Type S)
- B Mortar to conform to ASTM C1330 Standard Specification for Preblended Dry Mix Mortar for Unit Masonry Type S

3.04 MORTAR TO CONFORM TO ANSI A118.4

- A Clean brick units during installation (before pointing) by dry brushing to remove excess mortar or mortar smears as well as mortar fins and smears.
- B Lay out walls in advance of installation to insure accurate spacing, bond pattern alignment and uniform joint thickness. Note locations of openings, returns, offsets and joints to insure no cut Brick units are less than 1/2 unit.
- C If any unit needs to be moved after placement, remove unit including all mortar and reset with fresh mortar.
 1. Note: if using ANSI A118.4 polymer modified mortar, this step is not required if unit is moved within 5 minutes of placement.
- D Keep all drainage ports, weep holes and air spaces free of debris and mortar.
- E Tool all joints when mortar in thumb print hard. All joints to be concave.
- F Once mortar is thoroughly cured, clean in accordance with instructions/recommendations of Brick Institute Association Technical Note 20 (www.gobrick.com).
- G Mix units from different boxes/packages to insure optimum color dispersion.
- H Position cut pieces such that the cut edges are not visible when unit is installed.
- I Install embedded flashing and weeps in masonry at shelf angles, ledges, sills, windows, doors, or other obstacles that interfere with downward flow of rainwater. Install flashing and weeps where indicated on drawings.
- J Lap flashing 6". Seal laps with appropriate cement.
- K All flashing to include a drip edge which extends at least 1/4" beyond face of brick.

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- L Weep holes or drainage ports to be installed at the head joint of the first horizontal row of brick above the through wall flashing at a spacing of 24", maximum.
- M All brick units to be installed plumb and level. Faces of all adjacent brick units to be in same plane.

3.05 COURSING

- A Brick Units:
 - 1. Bond: Stacked.
 - 2. Coursing: Three units and three mortar joints to equal 8 inches.
 - 3. Mortar Joints:
 - a. Vertical Joints: Continuous Concave
 - b. Horizontal Joints: Flush.

3.06 PROTECTION

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

3.07 CLEANING:

- A Clean masonry units as work progresses by dry brushing to remove excess mortar and well as mortar fins and smears. Upon completed installation, an acidic mortar cleaner specifically formulated for clay brick may be used. Follow manufacturer's instructions. Pre-Wet masonry surface prior to applying acidic brick cleaners. Always promptly and thoroughly water-rinse acidic cleaners from masonry surfaces. See Brick Industry Association, Tech Note #20.
- B Metal or wire brushes or scrapers is not allowed to remove excess mortar.
- C Do not use a pressure washer.
- D Protect adjacent wall areas and floor/ground from direct contact with acid cleaners. Insure rinse water run-off is directed away from areas which are sensitive to acidic medium.

END OF SECTION 042100

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SECTION 042200 – CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Provisions of Division 01 apply to this section
- B. Section Includes:
 - 1. Concrete masonry units.
 - 2. Reinforcing steel.
 - 3. Mortar, grout, and grouting.
 - 4. Bolts, anchors, hardware, metal frames, and other insert items.
 - 5. Miscellaneous masonry accessories.
- C. Related Sections:
 - 1. Section 03 30 00 "Cast-In-Place Concrete"
 - 2. Section 03 20 00 "Concrete Reinforcing"

1.2 SUBMITTALS

- A. Mix Design: Submit grouting mix design.
- B. Product Data: Submit manufacturer's Product Data for assembly components, materials, and accessories.
- C. Samples: Submit Samples for each type of required masonry unit, including reinforcement and accessories.
 - 1. Exposed CMUs.
 - 2. Pre-faced CMUs.
 - 3. Pigmented and colored-aggregate mortar. Make Samples using same sand and mortar ingredients to be used on Project.
 - 4. Accessories embedded in masonry.
- D. Shop Drawings: Submit shop drawings indicating wall configuration, thickness, design compressive strength, reinforcement, and conduit/pipe embedded in masonry (see Section 042200.1.3.M).

1.3 QUALITY ASSURANCE

- A. Perform the Work in accordance with CBC, Chapter 21.
- B. Comply with requirements of TMS 402 and TMS 602.
- C. Concrete Masonry Units: Sample and test in accordance with ASTM C 140.
 - 1. Notify the material testing laboratory a minimum of 45 days in advance of installing concrete unit masonry, to allow for testing of the units for compression, shrinkage, and absorption. Absorption test requires 40 days. It is acceptable to provide results from previous material testing to demonstrate material properties satisfy the specifications. Test shall be from masonry made from the same materials, concrete mix design and curing method.
 - 2. The material testing laboratory shall receive five concrete masonry units per test from masonry unit manufacturer, as designed or specified by the Architect, and shall perform and send required test results to the Architect.
- D. Portland Cement: Obtain sample and test in accordance with ASTM C 150.
- E. Mortar: Obtain sample and test in accordance with CBC 2022 Section 2105.5 and ASTM C 1586.
- F. Grout: Obtain sample and test in accordance with CBC 2022 Section 2105.5 and ASTM C 1019.
- G. Inspection During Installation: A special inspector will continuously observe the installation of reinforced masonry.
- H. The Owner will be responsible for the costs of original tests and inspection.

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- I. Core Testing: Comply with CBC 2022 Section 2105.4. Masonry removed by coring operations shall be replaced to match adjoining work.
- J. Compressive Strength:
 - 1. Unit Strength Method: To be used for $f'm = 2,000\text{psi}$ masonry only. Test as per CBC 2022 Section 2105.5 or 2105.6.
 - 2. Prism Tests: Provide as per CBC 2105.5 where selected. Prior to the start of construction, a prism test shall consist of five prisms constructed and tested in accordance with ASTM C 1314. A set of three masonry prisms shall be built during construction in accordance with ASTM C 1314 for each 5,000 square feet (465 m²) of wall area, for each $f'm$ specified in the project.
 - a. Submit masonry prism records, based on the observation of a special masonry inspector, with prisms for/of the corresponding construction of this project, by the sub-contractor erecting the masonry.
- K. Tolerances: Comply with the requirements of TMS 602 and ACI 117.
- L. Conduit/Pipe Embedded in Masonry: Comply with the general guidelines indicated on the General Notes. Coordinate with sub-contractors to ensure these requirements are met prior to submission of the shop drawings.
- M. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- N. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.
- O. Sample Panels: Build sample panels to verify selections made under sample submittals and to demonstrate aesthetic effects. Comply with requirements in Division 01 Section "Quality Requirements" for mockups.
 - 1. Build sample panels for veneer and two types of glazed block, as indicated, in sizes approximately 48 inches long by 36 inches high by full thickness.
 - 2. Where masonry is to match existing, erect panels adjacent and parallel to existing surface.
 - 3. Protect approved sample panels from the elements with weather-resistant membrane.
 - 4. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by the State Representative in writing.
 - a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless such deviations are specifically approved by the State Representative in writing.
- P. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mockups for veneer row, and veneer corner conditions, types in sizes approximately 48 inches long by 36 inches high by full thickness, including face and backup wythes and accessories.
 - a. Include a sealant-filled joint at least 16 inches long in each mockup.
 - b. Include lower corner of window opening at upper corner of exterior wall mockup. Make opening approximately 12 inches wide by 16 inches high.
 - c. Include through-wall flashing installed for a 24-inch length in corner of exterior wall mockup approximately 16 inches down from top of mockup, with a 12-inch length of flashing left exposed to view (omit masonry above half of flashing).
 - 2. Protect accepted mockups from the elements with weather-resistant membrane.
 - 3. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.

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- a. Approval of mockups is also for other material and construction qualities specifically approved by the State Representative in writing.
 - b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by the State Representative in writing.
- Q. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.4 DELIVERY, STORAGE AND HANDLING

- A. Store units above grade on level platforms to allow air circulation under stacked units.
- B. Cover and protect against wetting before installation.
- C. Handle units on pallets or flatbed barrows. Free discharge from conveyor units or transportation in mortar trays is not permitted.

1.5 PROJECT CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches down both sides of walls and hold cover securely in place.
- B. Do not apply soil, floor or roof loads on structure until reinforced concrete masonry has reached design strength after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Concrete Unit Masonry: Modular medium weight conforming to ASTM C 90, Type 1 Moisture Controlled, hollow load-bearing concrete unit masonry.
 - 1. Provide open-end units at walls to be grouted and at walls utilizing stack bond pattern.
 - 2. Provide closed-end units at walls and at openings where ends will be exposed in finish Work; provide horizontal reinforcement in bond beam blocks with 1" minimum grout cover for each grout pour.
 - 3. Provide special shapes and accessory units at locations indicated on Drawings.

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4. Provide units of color and texture as indicated on Drawings.
 5. Masonry unit shall have been cured for a minimum of 28 days.
 6. Masonry unit shall have a maximum liner shrinkage or 0.065 percent from saturated to oven dry.
 7. Comply with the Quality Control Standards of the Concrete Masonry Association.
 8. Exposed Faces: Provide color and texture matching the range represented by the County Representative's sample; Astra-Glaze-SW+ units by Trenwyth manufacturing facilities.
 - a. Manufacturers
 - 1) Angelus Block Co., Inc. Sun Valley, CA (818) 767-8576
 - 2) Desert Block Co. Inc. Bakersfield, CA (661) 858-2848
 - 3) Or equal
 9. Below grade blocks: Non-glazed grey or manufacturer standard precision block.
- B. Portland Cement: ASTM C 150, Type II, from one source. Neither masonry cement nor plastic cement is permitted.
- C. Mortar: Orco blended products or EZ-Mix preblended masonry mortar, type S, conforming to ASTM C 270. Provide mortar in the following color(s): Brown.
- D. Grout: ASTM C 476.
- E. Hydrated Lime: ASTM C 207, Type S.
- F. Admixture for Grout: Grout Aid Type 2, complying with building code requirements; as manufactured by Sika Chemical Corp. or Premix GroutAid.
- G. Water: Potable and fresh.
- H. Cleaning Materials: Shure Klean No. 600 detergent by ProSoCo.
- I. Miscellaneous Materials: As required to complete the Work.
- J. Grout Aggregates: ASTM C404. Size No. 1 or No. 2 for fine aggregate, Size No. 8 for coarse aggregate.
- K. Sampling and Testing of Mortar: Refer to Section 01405: Testing and Inspection.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Discard units with cracked faces, chipped surfaces, or other defects not complying with requirements of ASTM C 216.

3.2 MORTAR AND GROUT MIXING

- A. Mortar: Type S conforming to ASTM C 270. Dry, loose volumes. Mix proportions shall be verified by material testing laboratory.
- B. Grout: Provide grout conforming to ASTM C476, as required for the respective f'm values noted on the Drawings. Slump shall be between 8" - 11".
- C. Measurements: Proportion by accurate volume measurements. Measure in calibrated devices that can be verified at any time.
 1. Add water for workable consistency.
 2. Shovel measurements are not permitted.
- D. Mixing: Place sand, cement, and water in mixer in that order, while mixer is running; mix mortar for 3 minutes, add lime, and admixture (for grout), and continue mixing until a uniform mass is provided, but in no case less than 5 minutes per ASTM C270 and C476, respectively.
 1. Equipment for mixing and handling mortar and grout shall be acceptable to The City.
 2. Batches of less than one sack of cement, and fractional sack batches are not permitted.
- E. Re-tempering Time Limit: Re-temper on mortar boards, for at least 3 minutes, but not more than 5 minutes when required, by adding water into a basin formed by mortar, and installing mortar into it. Dashing, or pouring of water over mortar is not permitted.
 1. Do not re-temper mortar which has become hard or non-plastic.

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2. Discard mortar, which has not been installed within 2 ½ hours after original mixing.
- F. Ready-Mix Grout: Grout batched off the Project site and delivered by mixer truck shall be subject to same procedures and controls as prescribed by building code requirements. Refer to Section 01405: Testing and Inspection.

3.3 INSTALLATION OF MASONRY UNITS

- A. Workmanship: Install masonry plumb and true to line with straight level joints of uniform thickness. Masonry shall be clean during and after installation.
 1. Lay-out and incorporate embedded hardware items.
 2. Assist other trades with built-in items, which require cutting and fitting of masonry.
 3. Cut block units with a diamond saw or carborundum wheel. Trowel or chisel cutting is not permitted.
 4. Keep cavities clear of droppings and debris greater than ¼". Remove promptly.
 5. Install only clean, uncracked units.
 6. Conform to CBC 2019, Section 2104A
- B. Reinforcing Steel: Install as indicated on Drawings. Except as otherwise indicated, install reinforcement in accordance with standards of Concrete Reinforcing Steel Institute and to requirements specified in Section 032000: Concrete Reinforcement. Do not splice vertical reinforcement except where indicated on the Drawings.
- C. Shoring: Provide temporary shoring for lintels with sufficient strength to carry load without deflecting. Remove temporary shoring 28 days after masonry has been installed.
- D. Block Installation: Clean dirt and dust from surfaces before installation. Do not wet masonry units except in very dry weather.
 1. Foundation preparation: Ensure tops of concrete starting surfaces are clean and prepared to receive CMU block. Provide roughened surface and wash-off by high pressure water jet.
 2. Install masonry with mortar to required joint thickness. Install blocks with 3/8 inch mortar bed on entire horizontal surface. Fill head joints solid, install tightly to adjoining units. Provide 3/8 inch joint thickness.
 - a. Hold racking to a minimum.
 - b. No toothing is permitted.
 - c. If it becomes necessary to move a unit after it has been installed, remove the unit, discard the mortar, and install the unit in fresh mortar.
 3. Anchor Bolts: Provide one inch minimum grout space around protruding bolts.
 4. Bond: Unless otherwise indicated, install units in common running bond.
 5. Finish Joint Treatment: Unless otherwise indicated, cut both interior and exterior joints flush, and tool slightly concave to a dense, uniform surface.
 6. Grouting: Unless noted otherwise on Drawings, completely fill cells with grout.
- E. Steel Door Frames:
 1. Locate doorframes accurately, install plumb, fasten to floor surface and brace in position before start of masonry installation.
 - a. Frames are specified to be furnished with adjustable anchors.
 - b. Fill interior of frames solid with mortar or grout as walls are constructed.
 2. Provide temporary wood spreaders from jamb to jamb and from head to floor to ensure that jambs do not bow-in, distort from a straight line, or deflect from superimposed loads during construction.
- F. Weather conditions:
 1. If ambient temperatures exceed 90o F during the course of construction, implement and comply with the requirements of 2104A.4.2 and 2104.4.3 as it applies. Plans shall be in place and coordinated with the Inspector of Record, to implement the procedures outlined if/when such weather conditions are anticipated to occur.
- G. Cleanouts:

1. Provide bond beam units, inverted for start course, and omit alternate blocks or cut openings in alternate face shell on bottom course for cleanouts. Use of open-end concrete masonry units is preferred wherever possible and is required at stacked bond conditions.

3.4 LOW-LIFT GROUTING FOR HOLLOW MASONRY UNITS

- A. After mortar joints have set, cores are cleaned of mortar and debris, and reinforcement is installed and inspected, grout cells in 4 feet maximum lifts, providing specified grout mix. Refer to Section 014000
- B. Grouted walls shall be solid and without voids.
- C. Grout may be installed by pump, tremie or bucket, using hoppers to avoid spilling on exposed surfaces.
- D. Place an initial 2 feet high lift around, thoroughly compact, then place balance of each lift, compacting again through total lift, with hardwood spading sticks or pencil vibrators.
- E. Stop grout pours 1-1/2 inches below the mortar joints, except at the top of wall where the grout shall be stopped a minimum of 3/4" below the top.
- F. Remove and discard spilled grout from upper units before grout can harden.
- G. Bracing: Adequately brace walls against wind and other forces during and after construction.
- H. Re-puddle top of grout after initial set.
- I. Grouting shall be in accordance with CBC 2019 Section 2104A
- J. Grouting of any section of wall shall be completed in the same day with no interruptions greater than 1 hour.

3.5 HIGH-LIFT GROUTING OPTION FOR HOLLOW MASONRY UNITS

- A. High-lift grouting method is not permitted.

3.6 CURING

- A. Remove efflorescence, stains, debris, excess grout, and foreign matter.
- B. During curing, or for any other purpose, do not saturate masonry with water.
- C. For low-humidity conditions, dampen the wall surface with a very light fog spray continuously for 3 days to cure mortar in joints.

3.7 CLEANING

- A. At completion of masonry Work, remove misplaced mortar, grout or other foreign substances, and clean surfaces which will be exposed in finish Work with specified cleaner, or with clean water and stiff fiber brushes.
- B. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

3.8 PROTECTION

- A. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A Section Includes:
 - 1. Structural steel.
 - 2. Prefabricated building columns.
 - 3. Field-installed shear connectors.
 - 4. Grout.
- B Related Requirements:
 - 1. Section 05 31 00 "Steel Decking" for field installation of shear connectors through deck.
 - 2. Section 05 50 00 "Metal Fabrications" for miscellaneous steel fabrications and other steel items not defined as structural steel.
 - 3. Section 09 96 00 "High-Performance Coatings" for surface-preparation and priming requirements.

1.03 DEFINITIONS

- A Structural Steel: Elements of the structural frame indicated on Drawings and as described in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."
- B Seismic-Load-Resisting System: Elements of structural-steel frame designated as "SLRS" or along grid lines designated as "SLRS" on Drawings, including columns, beams, and braces and their connections.
- C Heavy Sections: Rolled and built-up sections as follows:
 - 1. Shapes included in ASTM A 6/A 6M with flanges thicker than 1-1/2 inches (38 mm).
 - 2. Welded built-up members with plates thicker than 2 inches (50 mm).
 - 3. Column base plates thicker than 2 inches (50 mm).
- D Protected Zone: Structural members or portions of structural members indicated as "Protected Zone" on Drawings. Connections of structural and nonstructural elements to protected zones are limited.
- E Demand Critical Welds: Those welds, the failure of which would result in significant degradation of the strength and stiffness of the Seismic-Load-Resisting System and which are indicated as "Demand Critical" or "Seismic Critical" on Drawings.

1.04 COORDINATION

- A Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.05 PREINSTALLATION MEETINGS

- A Preinstallation Conference: Conduct conference at Project site.

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1.06 ACTION SUBMITTALS

- A Product Data: For each type of product.
- B Shop Drawings: Show fabrication of structural-steel components.
 - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 - 2. Include embedment Drawings.
 - 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
 - 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.
 - 5. Identify members and connections of the Seismic-Load-Resisting System.
 - 6. Indicate locations and dimensions of protected zones.
 - 7. Identify demand critical welds.
- C Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for each welded joint whether prequalified or qualified by testing, including the following:
 - 1. Power source (constant current or constant voltage).
 - 2. Electrode manufacturer and trade name, for demand critical welds.

1.07 INFORMATIONAL SUBMITTALS

- A Qualification Data: For qualified installer, fabricator, welding engineer and testing agency for weld and welder qualification.
- B Welding certificates for shop and field welders.
- C Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- D Mill test reports for structural steel, including chemical and physical properties.
- E Product Test Reports: For the following:
 - 1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
 - 2. Direct-tension indicators.
 - 3. Tension-control, high-strength, bolt-nut-washer assemblies.
 - 4. Shear stud connectors.
 - 5. Shop primers.
 - 6. Nonshrink grout.
- F Survey of existing conditions.
- G Source quality-control reports.
- H Field quality-control and special inspection reports.
- I Sustainable Design Submittals: Refer to section 01 81 13 "Sustainable Design Requirements."

1.08 QUALITY ASSURANCE

- A Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD, or is accredited by the IAS Fabricator Inspection Program for Structural Steel (AC 172) or have a minimum 5 year history of successful completion of projects of similar scope and complexity.
- B Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category ACSE or have a minimum 5 year history of successful completion of projects of similar scope and complexity.
- C Shop-Painting Applicators: Qualified according to AISC's Sophisticated Paint to SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."
- D Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

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1. Welders and welding operators performing work on bottom-flange, demand-critical welds shall pass the supplemental welder qualification testing, as required by AWS D1.8/D1.8M. FCAW-S and FCAW-G shall be considered separate processes for welding personnel qualification.
- E Comply with applicable provisions of the following specifications and documents:
 1. AISC 303.
 2. AISC 341 and AISC 341s1.
 3. AISC 360.
 4. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1.09 DELIVERY, STORAGE, AND HANDLING

- A Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- B Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
 1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
 2. Clean and relubricate bolts and nuts that become dry or rusty before use.
 3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

PART 2 PRODUCTS

2.01 STRUCTURAL-STEEL MATERIALS

- A Sustainable Design Submittals: Refer to section 01 81 13 "Sustainable Design Requirements."
- B W-Shapes: ASTM A 992/A 992M, 90% recycled content.
- C Channels, Angles Shapes: ASTM A 36/A 36M or ASTM A 572/A 572M, Grade 50, as indicated.
- D Plate and Bar: ASTM A 36/A 36M or ASTM A 572/A 572M, Grade 50, as indicated.
- E Corrosion-Resisting Structural-Steel Shapes, Plates, and Bars: ASTM A 588/A 588M, Grade 50.
- F Cold-Formed Hollow Structural Sections: ASTM A 500/A 500M, Grade B, structural tubing.
- G Corrosion-Resisting, Cold-Formed Hollow Structural Sections: ASTM A 847/A 847M, structural tubing.
- H Steel Pipe: ASTM A 53/A 53M, Type E or Type S, Grade B.
 1. Weight Class: as noted on structural drawings
 2. Finish: Black except where indicated to be galvanized.
- I Steel Castings: ASTM A 216/A 216M, Grade WCB with supplementary requirement S11.
- J Steel Forgings: ASTM A 668/A 668M.
- K Welding Electrodes: Conform to requirements of AWS D1.1 and D1.8. Filler metals shall be low hydrogen types and shall be as recommended by the manufacturer for the position, thickness and other conditions of use.
 1. Filler Metal Toughness:
 - a. Filler metals for shop and field welded joints designated as SLRS on the Drawings shall have a minimum Charpy V-Notch (CVN) toughness of 20 ft-lb at 0 degrees Fahrenheit as determined by AWS A5 classification test method or manufacturer certification.
 - b. Filler metals for shop and field welded joints designated as demand critical welds on the Drawings shall have a minimum Charpy V-Notch (CVN) toughness of 20 ft-lb at -

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20 degrees Fahrenheit as determined by the appropriate AWS classification test method or manufacturer certification and 40 ft-lb at 70 degrees Fahrenheit as determined by ANSI/AISC 341, Appendix X or other approved method.

2. Arc-welding equipment: Welding equipment shall have calibrated meters for voltage and amperage that accurately indicate these values at the point of welding for the length of cable to be used. Contractor shall demonstrate to the satisfaction of the Design-Builder's Testing Agency the accuracy of the meters, using external meters attached to extension cables of a length that reflects actual project conditions. If equipment meters do not accurately reflect the electrical properties at the point of welding, the Contractor shall provide external meters.

2.02 BOLTS, CONNECTORS, AND ANCHORS

- A High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers; all with plain finish.
 1. Direct-Tension Indicators: ASTM F 959, Type 325, compressible-washer type with plain finish.
- B High-Strength Bolts, Nuts, and Washers: ASTM A 490, Type 1, heavy-hex steel structural bolts or tension-control, bolt-nut-washer assemblies with splined ends; ASTM A 563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers with plain finish.
 1. Direct-Tension Indicators: ASTM F 959, Type 490, compressible-washer type with plain finish.
- C Zinc-Coated High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade DH heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers.
 1. Finish: Hot-dip or mechanically deposited zinc coating.
 2. Direct-Tension Indicators: ASTM F 959, Type 325, compressible-washer type with mechanically deposited zinc coating finish.
- D Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, round head assemblies consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers.
 1. Finish: Plain.
- E Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.
- F Unheaded Anchor Rods: ASTM F 1554, Grade 55, weldable.
 1. Configuration: Straight.
 2. Nuts: ASTM A 563 heavy-hex carbon steel.
 3. Plate Washers: ASTM A 36/A 36M carbon steel.
 4. Washers: ASTM F 436, Type 1, hardened carbon steel.
 5. Finish: Plain.
- G Headed Anchor Rods: ASTM F 1554, Grade 55, weldable.
 1. Nuts: ASTM A 563 heavy-hex carbon steel.
 2. Plate Washers: ASTM A 36/A 36M carbon steel.
 3. Washers: ASTM F 436, Type 1, hardened carbon steel.
 4. Finish: Plain.
- H Threaded Rods: ASTM A 36 or ASTM A 572, Grade 50, as indicated in drawings.
 1. Nuts: ASTM A 563 heavy-hex carbon steel.
 2. Washers: ASTM A 36 carbon steel.
 3. Finish: Plain.

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- I Clevises and Turnbuckles: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1035.
- J Eye Bolts and Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1030.
- K Sleeve Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1018.
- L Structural Slide Bearings: Low-friction assemblies, of configuration indicated, that provide vertical transfer of loads and allow horizontal movement perpendicular to plane of expansion joint while resisting movement within plane of expansion joint.
 - 1. Manufacturer: Seismic Energy Products, Fluorogold Slide Bearings.
 - 2. Mating Surfaces: PTFE and PTFE or PTFE and mirror-finished stainless steel, as indicated in drawings.
 - 3. Coefficient of Friction: Not more than 0.10.
 - 4. Design Load: Not less than 5,000 psi.
 - 5. Total movement capability includes movement in both directions and is generally twice the dimension of the expansion joint.
 - 6. Total Movement Capability: as indicated in drawings.

2.03 PRIMER

- A Primer: Alkyd based primers shall be Tnemec, Series V10, red metal primer as manufactured by Tnemec Inc., Maclac, 42 Series, red oxide primer as manufactured by R.J. McGlennon Co. Inc., or equal. Volatile Organic Compounds (V.O.C.) shall not exceed 340 grams per liter as applied.
 - 1. See Division 09 painting Sections and Division 09 Section "High-Performance Coatings" for surface-preparation and priming requirements for architectural finishes on structural steel.
- B Galvanizing Repair Paint: ASTM A 780.

2.04 GROUT

- A Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.
 - 1. Grout 28-day compressive strength, f'_c =5,000 psi, minimum.

2.05 FABRICATION

- A Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," and to AISC 360.
 - 1. Camber structural-steel members where indicated.
 - 2. Fabricate beams with rolling camber up.
 - 3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
 - 4. Mark and match-mark materials for field assembly.
 - 5. Retain subparagraph below if shop priming is required.
 - 6. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
 - 1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.
- C Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- D Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E Retain "Cleaning" Paragraph below for unpainted structural steel. Delete if shop coating is required and retain applicable requirements in "Shop Priming" Article. Default cleaning in AISC

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303, "Code of Standard Practice for Steel Buildings and Bridges," describes SSPC-SP 1 solvent cleaning and approximates SSPC-SP 2 hand-tool cleaning.

- F Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 1, "Solvent Cleaning."
- G Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.
- H Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.
 - 1. Cut, drill, or punch holes perpendicular to steel surfaces.
 - 2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
 - 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.06 SHOP CONNECTIONS

- A High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Pretensioned.
- B Weld Connections: Comply with AWS D1.1 and AWS D1.8 for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

2.07 PREFABRICATED BUILDING COLUMNS

- A Prefabricated building columns consisting of load-bearing structural-steel members protected by concrete fireproofing encased in an outer non-load-bearing steel shell.
- B Fire-Resistance Ratings: Provide prefabricated building column listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for ratings indicated, based on testing according to ASTM E 119.
 - 1. Fire-Resistance Rating: As indicated.

2.08 SHOP PRIMING

- A Shop prime steel surfaces except the following:
 - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 3 inches.
 - 2. Surfaces to be field welded.
 - 3. Surfaces of high-strength bolted, slip-critical connections.
 - 4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
 - 5. Galvanized surfaces.
- B Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
 - 1. SSPC-SP 3, "Power Tool Cleaning."
- C Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
 - 2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

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2.09 GALVANIZING

- A Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.
 - 1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.
 - 2. Galvanize all elements permanently exposed to weather.
 - 3. Use Type 3 Steel at all elements permanently exposed to weather where galvanization is not permitted by the relevant ASTM material specification.

2.10 SOURCE QUALITY CONTROL

- A Testing Agency: Owner will engage a qualified testing agency to perform shop tests and inspections.
 - 1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
- B Bolted Connections: Inspect and test shop-bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- C Welded Connections: Visually inspect shop-welded connections according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
 - 1. Liquid Penetrant Inspection: ASTM E 165.
 - 2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
 - 3. Ultrasonic Inspection: ASTM E 164.
 - 4. Radiographic Inspection: ASTM E 94.
- D In addition to visual inspection, test and inspect shop-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
 - 1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
 - 2. tests according to requirements in AWS D1.1/D1.1M on additional shear connectors if weld fracture occurs on shear connectors already tested.
- E Prepare test and inspection reports.

PART 3 EXECUTION

3.01 EXAMINATION

- A Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
 - 1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

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1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.03 ERECTION

- A Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
- B Baseplates, Bearing Plates, and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 2. Weld plate washers to top of baseplate.
 3. Pretension anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- C Maintain erection tolerances of structural steel within AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."
- D Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 1. Level and plumb individual members of structure.
 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E Splice members only where indicated.
- F Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1.
- G Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.
- H Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

3.04 FIELD CONNECTIONS

- A High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 1. Joint Type: Pretensioned.
- B Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
 2. Remove backing bars or runoff tabs where indicated, back gouge, and grind steel smooth.
 3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," for mill material.

3.05 PREFABRICATED BUILDING COLUMNS

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- A Install prefabricated building columns to comply with AISC 360, manufacturer's written recommendations, and requirements of testing and inspecting agency that apply to the fire-resistance rating indicated.

3.06 FIELD QUALITY CONTROL

- A Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
 - 1. Verify structural-steel materials and inspect steel frame joint details.
 - 2. Verify weld materials and inspect welds.
 - 3. Verify connection materials and inspect high-strength bolted connections.
- B Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- C Bolted Connections: Inspect and test bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- D Welded Connections: Visually inspect field welds according to AWS D1.1/D1.1M.
 - 1. In addition to visual inspection, test and inspect field welds according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
 - a. Liquid Penetrant Inspection: ASTM E 165.
 - b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
 - c. Ultrasonic Inspection: ASTM E 164.
 - d. Radiographic Inspection: ASTM E 94.
- E In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
 - 1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
 - 2. Conduct tests according to requirements in AWS D1.1/D1.1M on additional shear connectors if weld fracture occurs on shear connectors already tested.

3.07 REPAIRS AND PROTECTION

- A Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780/A 780M.
- B Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
- C Touchup Painting: Cleaning and touchup painting are specified in Section 09 91 13 "Exterior Painting" and Section 09 91 23 "Interior Painting."
- D Touchup Priming: Cleaning and touchup priming are specified in Section 09 96 00 "High-Performance Coatings."

END OF SECTION

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SECTION 051210 – WELDING

PART 1 GENERAL

1.01 SUMMARY

- A Work included in This Section:
 - 1. Provisions for the welding of all structural steel members. This includes both field and shop welding.
 - 2. All Welding shall be performed in full accordance with the latest edition of the AWS D1.1-2015 Structural Welding Code-Steel, except as supplemented or modified by this specification. Reiteration or amplification of code provisions as contained in the specification shall not reduce the necessity of compliance with all other code requirements.
 - 3. Shop welding may be by any of the AWS D1.1-2015 approved welding processes except electroslog (ESW) and electrogas (EGW) without specific approval by the engineer.
- B Related Sections:
 - 1. All pertinent provisions of Division 01, “General Requirements.”
 - 2. Section 03 20 00: Concrete Reinforcement
 - 3. Section 05 06 50: Welded Stud Connectors
 - 4. Section 05 12 00: Structural Steel Framing
 - 5. Section 05 31 00: Metal Floor and Roof Decking

1.02 REFERENCES

- A References as specified in Section 05 12 00, “Structural Steel Framing.”
- B Applicable portions of specification section 05 12 00 apply to the work of this section. Contractor shall be responsible to incorporate all applicable portions of specification section 05 12 00 into this section.

1.03 SUBMITTALS

- A Comply with pertinent provisions of Division 01, Section 01 33 00, “Submittal Procedures.”
- B Welding Procedure specification (WPS):
 - 1. All WPS's shall be submitted to the Structural Engineer of Record (SEOR) and OSHPD for review and approval prior to use.
 - 2. For WPS's that have been qualified by test, the supporting Procedure Qualification Record (PQR) shall be submitted to the Engineer and OSHPD for review and approval. All WPS's and PQR's shall be in accordance with the forms shown in this section.
 - 3. Manufacturer's product data sheets or catalog data for SMAW, FCAW and GMAW composite (cored) filler metals to be used. The data sheets shall describe the product, limitations of use, recommended or typical welding parameters, and storage and exposure requirements, including baking, if applicable.
 - 4. Copies of the manufacturer's typical certificate of conformance for all electrodes, fluxes and shielding gases to be used. Certificates of conformance shall satisfy the applicable AWS A5 requirements. For demand critical welds, submit applicable manufacturer's certifications that the filler metal meets the supplemental notch toughness requirements.
 - 5. Included shall be WPS for repair welds.
- C Submit current valid certificate issued by an independent testing agency for all welders, welding operators, and tack welders.
- D Submit qualification credentials of all inspectors.
- E Submit to the Engineer for approval, a step-by-step welding sequence for the field welding of beam-to-column CP-welded and beam-to-beam CP-welded splice connections.

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- F Submit a quality control plan that addresses all inspection issues, including in-process and final inspection that are addressed in AWS D1.1.

1.04 QUALITY ASSURANCE

- A Comply with all pertinent provisions of Division 01, Section 01 40 00, "Quality Requirements."
- B Standards:
 - 1. American Welding Society
 - a. Structural Welding Code (AWS D1.1-2015)
 - b. Structural Welding Code – Seismic Supplement (AWS D1.8-2016)
 - 2. American Institute of Steel Construction
 - a. Specification for Structural Steel Buildings (AISC 360-16)
 - b. Code of Standard Practice for Steel Buildings and Bridges (AISC 303-10).
 - c. Seismic Provisions For Structural Steel Buildings (AISC 341-16).
- C Welder Qualification:
 - 1. All welders, welding operators, and tack welders shall be qualified by test with the largest diameter electrodes to be used on the work and hold a current valid certificate issued by an independent testing agency, to perform the type of welds required by the work; including the process, position, and thickness of materials used per AWS D1.1 section 4.
 - 2. In addition to meeting the requirements above (section 1.4.B.1), welders that will make welds with restricted access such as, but not limited to, the flange to column welds through a cope hole or access hole in the beam web, or where access to the bottom of a groove is restricted by the presence of a column flange, shall be qualified by the contractor using the same welding procedure as will be used for production and a mock-up assembly that simulates the construction configuration. Qualification test per Annex D of AWS D1.8 is acceptable. Qualifications for welders that have been qualified on previous projects who meet the activity requirements of specification section 05 12 00, section 3.3.B, will be accepted.
 - 3. All Welders on the project shall be capable of understanding and following the requirements of the written WPS.
 - 4. Each welder employed on the project shall understand all the requirements of this welding specification before welding on the project.
 - 5. Copies of the Welder Performance Qualification Records (WPQR), including supplemental testing requirements shall be made available for the SEOR and IOR.

PART 2 PRODUCTS

2.01 WELDING PROCESSES

- A Weld Procedure Specifications, including Procedure Qualification Records shall be submitted and approved by the SEOR and OSHPD prior to welding. PQRs shall include test results that demonstrate all-weld metal CVN values meet the requirements of Paragraph 2.2A.1 and a minimum tensile strength of 70KSI. CVN and minimum tensile strength conformance of the filler metal may be established by submitting with the PQR the results of heat input envelope testing as per AWS D1.8 section 6.3.1.2.

2.02 MATERIALS

- A Electrodes:
 - 1. Filler metals shall conform to the requirements of the latest edition of ANSI/AWS Specifications for Electrodes as listed herein and shall meet Charpy V-Notch Impact Energy of 20 ft-lbs. at 0°F. Filler metals for demand critical welds shall meet Charpy V-Notch Impact Energy of 20 ft-lbs. at -20°F and 40 ft-lbs at 70°F as per Appendix X of AISC 341-05.

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- a. SMAW A5.1 or A5.5 E70XX Low Hydrogen
- b. SAW A5.17 or A5.23 F7XX-EXXX or F7XX-EXXX-XX
- c. GMAW A5.18 or A5.28 ER70S-X
- d. FCAW A5.20 or A5.29 E7XT-X except T8-K6

The Charpy V-Notch requirement above does not apply to welds used in the construction of stairs, elevator guiderail supports, steel supports for partitions or exterior walls, steel supports for exterior architectural appendages, steel supports for MEP equipment, rooftop screen walls, and light gage metal stud framing.

2. The use of E70-T4 Electrode is not allowed for any welding application.
3. The manufacturer shall certify that consumables used in the Work conform with AWS D1.1 and AWS D1.8.

PART 3 EXECUTION

3.01 WELDING PROCEDURE SPECIFICATION (WPS)

- A All welding shall be performed in strict adherence to a written WPS, whether the WPS be pre-qualified or qualified by test. Electrodes shall be limited to the diameters listed herein and welding shall preferably use a stringer bead technique. If weave beads are used, they shall be limited to the following diameter widths:
 1. SMAW – Maximum diameter (d) 3/16 inch and maximum widths shall be:
 - a. 4d for 3/32 inch electrodes
 - b. 3d for 1/8 inch electrodes
 - c. 2 ½ d for 5/32 inch electrodes
 - d. 2 d for 3/16 inch electrodes limited to flat and horizontal positions
 - e. These weave widths shall be strictly adhered to except final (cover) pass(s) may be a maximum of 5/8 inches.
- B All WPS's shall be prepared by qualified individuals and the same individual responsible for the suitability of the WPS.
- C The written WPS shall be available to the welder, welding supervisor, and inspector.
- D All welding equipment shall be properly maintained. Current/amperage and voltage shall be tested for compliance to WPS required ranges by calibrated instruments and also such gauges on the equipment shall be checked for manufacturers stated accuracy.
- E WPS's for SMAW, SAW and FCAW-G may be pre-qualified providing they meet all the requirements of AWS D1.1-2015, paragraph 3.2.1. Any deviation from the pre-qualified WPS requirements shall necessitate qualifications by test.
- F WPS's that are not pre-qualified shall be subject to the qualification testing specified in AWS D1.1-2015, section 4. For WPS's that have not been qualified by test, the supporting procedure qualification record (PQR) shall be submitted with the WPS for approval by the Engineer.
- G The written WPS shall contain all the necessary information required by the code, this specification, and any other information necessary to produce the welds that are in compliance with these requirements.
- H The WPS shall list the applicable base metal types and thicknesses.
- I The WPS shall contain a sketch of the joint and shall list the welding joint details, including type, weld type, joint geometry, and applicable dimensions. Individual weld passes shall be identified in the sketch and numbered to identify the maximum layer thickness and bead widths. Layer thickness shall conform to AWS D1.1 table 3.6 or as qualified by the PQR.
- J The WPS shall list the applicable welding processes.
- K The WPS shall indicate the minimum preheat requirements. The preheat and inter-pass temperatures shall be determined in accordance with AWS D1.1 Table 3.3. Maximum inter-pass temperature shall be 550°F.
- L The WPS shall list all applicable electrical characteristics for the process employed and shall include, as a reference, the electrode manufacturer's cutsheet. The product data sheets or

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catalog data for SMAW FCAW and The WPS shall clearly indicate the acceptable values required for each welding pass. These electrical characteristics shall include at a minimum the following:

1. Type of current, and acceptable ranges of current measures in amperage. For wire feed process both wire feed and amperage should be listed.
 2. Voltage
 3. Travel speed (range)
 4. Electrode extension for wire feed processes
 5. Amperage, voltage and electrode extension (as applicable) shall be within the filler metal manufacturer's recommendation
- M The diameter of the electrodes specified on the WPS shall not exceed the limits listed in section 3.1.A. of this specification section.

3.02 FABRICATION AND ERECTION

- A Assembly:
1. Assembly shall not exceed those for pre-qualified joint detail employed, or the limits of AWS D1.1-2015, Figures 5.3 and 5.4, as applicable. The minimum root opening dimension shall be maintained for the length of the joint. For joints where the minimum root opening dimension is less than the minimum requirement, compensation may be made by increasing the root opening by gouging, chipping or grinding. At the contractor's option, or alternate approved written WPS suitable for the smaller root opening may be employed. Root openings that exceed the maximum allowable may be corrected by welding to acceptable dimensions prior to joining the parts by welding. The Engineer shall be notified when the root opening exceeds the allowable tolerance range.
- B Tack Welds: All tack welds shall be of the same quality as the final welds. This includes the requirements for preheat except as noted in AWS D1.1 section 5.17.5.
- C Weld Access Holes: Weld Access holes shall be sized to ensure adequate access for the welding process being used. Minimum sizes shall be in accordance with AWS D1.1-2015, 5.16 and Figure 5.2
- D Weld Termination:
1. Weld tabs shall be employed as shown in the Structural Drawing. Minimum length shall be the thickness of groove joint or 1 inch, whichever is greater, but not exceed 2 inches as per AWS D1.8 section 6.16.1.
 2. End dams shall not be allowed.
 3. Weld tabs shall be removed in accordance with AWS D1.8 section 6.16.3.
- E Steel Backing: Remove steel backing where so indicated on drawings. If backing bars are removed, the removal area shall be tested for defects or a reinforcing fillet weld, at least $\frac{1}{4}$ of the flange thickness, but not greater than $\frac{3}{8}$ inch, shall be applied.
- F Preheating: To ensure the work place is properly heated, the temperature of the part shall be measured at a distance from the axis of the weld equal to twice the thickness of the thickest part being welded, but in no case less than 3 inches in all directions, including the through thickness dimension of the part being welded, for the full length of the weld joint. Preheat shall be verified by the inspector before welding commences.
- G Peening: Peening shall not be allowed except if approved by the SEOR.
- H Technique for making Welds involving Weld Access Holes:
1. After the joint is assembled (bolts not fully torqued), the weld shall be completed as follows:
 - a. The root pass shall initiate near the center of the joint, in the area of the weld access hole. The welder shall extend the electrode through the weld access hole approximately 1" beyond the opposite side of the web. After the arc is initiated, travel shall progress toward the end of the joint, and the weld shall be terminated on the weld tab.
 - b. The half-length of root pass shall be thoroughly cleaned.

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- c. The start of the weld in the weld access hole area shall be visually inspected to ensure fusion, soundness, freedom from slag inclusions, and excessive porosity, the resulting lead profile shall be suitable for obtaining good fusion by the subsequent pass to be initiated on the opposite side of the beam web. If the profile is not conducive to good fusion, the start of the first root pass shall be ground, gouged, chipped or otherwise prepared to ensure adequate fusion.
- d. The second half of the weld joint shall have the root pass applied before any other weld passes are performed. The arc shall be initiated in the area of the start of the first root pass, and travel shall progress to the end of the joint, terminating on the weld tab.
- e. Each new layer shall be completed on both sides of the joint before a new layer is deposited.
- f. Deviation from the preceding procedure may be made, providing the contractor submits in writing an alternate sequence that is approved by the Engineer and OSHPD prior to fabrication.

3.03 QUALITY CONTROL AND QUALITY ASSURANCE

- A Where there is a conflict with the above specifications and the drawings, the more stringent of the two shall prevail.
- B Comply with pertinent provisions of Division 01 Section 01 40 00 "Quality Requirements."
- C Inspection provided by the Owner:
 - 1. Qualifications: All inspectors shall meet the requirements of AWS D1.1, section 6.1.4 and hold current Certified Welding Inspector (CWI) certification.
 - 2. Inspection Agency Responsibility: The inspection agency shall perform all required inspection including the requirements herein. The inspector(s) shall be present before during and after welding on all Complete Joint Penetration (CJP) weld and as necessary during all other welding operations. The inspector(s) shall also be present during removal of steel backing and run off tabs.
 - 3. All full penetration groove welds shall be ultrasonic testing, as per AWS D1.1, Section 6 "Inspection, Part "F", Ultrasonic Testing of Groove Welds". All defective welds shall be repaired and retested with ultrasonic equipment at the Contractor's expense.
 - 4. Flanges: An area extending 6" above and below point of attachment for CJP welds and flange edge shall be inspected visually, and the entire area ultrasonically for lamination, plate discontinuities and non-metallic inclusions.
 - 5. Ultrasonic inspections of all CJP welds shall be conducted from both the top and bottom sides of the flange, and from the back side of the column flange as necessary to determine potential rejectable welding defects.
 - 6. All weld tabs shall be removed. The affected area shall be ground smooth and magnetic particle tested for defects. Dye penetrant may be used where required.
 - 7. Where backup bars are required to be removed, the weld root area shall be magnetic particle tested for defects.
 - 8. Base metal thicker than 1½ inches, when subjected to through thickness weld shrinkage strains, shall be ultrasonically inspected for discontinuities directly behind such weld before and after joint completion. Repairs if needed, to parent material shall comply with ASTM A6 Sec.9.
 - 9. All Non-Destructive Testing (NDT) shall be performed after all welds are complete including, but not limited to, removal of steel backing and grinding of same, removal of reinforcement as per AWS D1.1 section 5.23.4 any postweld heat treatment. This is not intended to exclude in-house intermittent NDT programs.
 - 10. All NDT except UT shall not be started before a minimum of 24 hours after subject weldments have cooled to ambient temperature.
 - 11. NDT personnel, other than UT, shall also submit their experience and qualification on like type weldments when required by the Engineer.

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Yes ☐

Identification # _____
 Revision _____ Date _____ By _____
 Authorized by _____ Date _____
 Type: Manual ☐ Semi-Automatic ☐
 Machine ☐ Automatic ☐

POSITION _____
 Position of Groove _____
 Vertical Progression: _____
 Fillet: _____
 Up ☐ Down ☐

ELECTRICAL CHARACTERISTICS

Transfer Mode (GMAW) ☐ Short Circuiting ☐ Spray ☐

Globular ☐

Current: AC ☐ DCEP ☐ DCEN ☐ Pulsed ☐

Tungsten Electrode (GTAW): Size _____
Type _____

TECHNIQUE
Stringer or Weave Bead _____
Multi-pass or Single Pass (per side) _____

Number of Electrodes: _____
Electrode Spacing: Longitudinal _____
Lateral _____
Angles _____

Contact Tube to Work Distance _____
Peening _____
Interpass Cleaning _____

POSTWELD HEAT TREATMENT
Temp. _____
Time _____

FILLER METALS
 AWR Specification _____
 AWS Classification _____
 MNFR ID _____
 SHIELDING
 Flux _____ Gas _____
 Composition _____
 Electrode-Flux (Class) _____ Flow Rate _____
 Gas Cup Size _____

PREHEAT
Preheat Temp. Min. _____ Max _____
Interpass Temp. Min. _____ Max _____

WELDING PROCEDURE

[illegible]

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PROCEDURE QUALIFICATION RECORD

Fabricator	Test Date
Process	Filler Metal
Position	
Electrode(s) Mfg. Designation	
Flux Mfg. Designation	
Electrode Extension	

	Diam.	Current	WFS	Voltage	Current & Polarity
Electrode (1)					
(2)					
(3)					

Calculated Heat Input (see 5.2.4)	
Shielding Gas	Flow Rate
Dew Point	Travel Speed
Base Metal Specification & Thickness	
(attach certified copy of mill test report)	

Preheat Temp.	Interpass Temp. Minimum	Maximum
---------------	-------------------------	---------

SPECIMEN	TEST RESULTS
A Weld Metal Tension (AWMT)	Tensile Strength (psi)
	Yield Strength (psi)
	Elongation in 2 in. (%)
	Reduction in area (%)

Side Bends	1)	2)	3)	4)
------------	----	----	----	----

Reduced Section Tension	Tensile Strength 1)	Location of Break 1)
	2)	2)

Charpy V-Notch Impact			
Toughness of Weld Metal	Avg. Ft. lb.	@	Degrees F.

SMAW, SAW, FCAW, GMAW – 5 Reg.			
Toughness of Weld Metal	Avg. Ft. lb.	@	Degrees F.

Chemistry of Deposited Weld Metal	C	Mn	Si	P	S
When Required by Contract Documents	Ni	Cr	Mo	V	Cu

REMARKS	Visual
	Radiographic Test

Wire feed may be used in lieu of current when a correlation curve for the same electrode diameter and same electrode extension.

Test Witness:	Agency:	
Results Reviewed:	State Acceptance:	Date:

END OF SECTION**Welding - 051210**

SECTION 053100 - STEEL DECKING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A Section Includes:
 - 1. Roof deck.
 - 2. Composite floor deck.
- B Related Requirements:
 - 1. Section 03 30 00 "Cast-in-Place Concrete" for normal-weight and lightweight structural concrete fill over steel deck.
 - 2. Section 03 52 16 "Lightweight Insulating Concrete" for lightweight insulating concrete fill over steel deck.
 - 3. Section 05 12 00 "Structural Steel Framing" for shop- and field-welded shear connectors.

1.03 ACTION SUBMITTALS

- A Product Data: For each type of deck, accessory, and product indicated.
- B Shop Drawings:
 - 1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

1.04 INFORMATIONAL SUBMITTALS

- A Welding certificates.
- B Product Certificates: For each type of steel deck.
- C Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that each of the following complies with requirements:
 - 1. Power-actuated mechanical fasteners.
 - 2. Acoustical roof deck.
- D Evaluation Reports: For steel deck.
- E Field quality-control reports.

1.05 QUALITY ASSURANCE

- A Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- B Welding Qualifications: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code - Sheet Steel."
- C FM Global Listing: Provide steel roof deck evaluated by FM Global and listed in its "Approval Guide, Building Materials" for Class 1 fire rating and Class 1-90 windstorm ratings.

1.06 DELIVERY, STORAGE, AND HANDLING

- A Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

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- B Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.
 - 1. Protect and ventilate acoustical cellular roof deck with factory-installed insulation to maintain insulation free of moisture.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."
- B Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.02 MANUFACTURERS

- A Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Steel Deck:
 - a. Verco Manufacturing Co.
 - b. ASC Profiles, Inc.
 - c. Nucor Corp.; Vulcraft Division.
 - d. United Steel Deck, Inc.
 - e. Or equal.

2.03 ROOF DECK

- A Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:
 - 1. Galvanized-Steel Sheet: ASTM A 653, Structural Steel (SS), Grade 33, G60 zinc coating.
 - 2. Galvanized and Shop-Primed Steel Sheet: ASTM A 653, Structural Steel (SS), Grade 33, G60 zinc coating; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer.
 - 3. Aluminum-Zinc-Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Structural Steel (SS), Grade 33 (230) minimum, AZ50 (AZ150) aluminum-zinc-alloy coating.
 - 4. Deck Profile: As indicated on drawings.
 - 5. Profile Depth: As indicated on drawings.
 - 6. Design Uncoated-Steel Thickness: as indicated on the drawings
 - 7. Span Condition: Double span or more. Provide thicker steel material had required when project conditions to not permit minimum number of unit spans.
 - 8. Side Laps: Overlapped or interlocking seam at Contractor's option.

2.04 COMPOSITE FLOOR DECK

- A Composite Floor Deck: Fabricate panels, with integrally embossed or raised pattern ribs and interlocking side laps, to comply with "SDI Specifications and Commentary for Composite Steel

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Floor Deck," in SDI Publication No. 31, with the minimum section properties indicated, and with the following:

1. Prime-Painted Steel Sheet: not used
2. Galvanized-Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33, G60 zinc coating.
3. Profile Depth: as indicated on drawings.
4. Design Uncoated-Steel Thickness: as indicated on drawings.
5. Span Condition: Double span or more. Provide thicker steel material as required when project conditions do not permit minimum number of unit spaces.

2.05 ACCESSORIES

- A General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- C Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.
- D Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.
- E Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- F Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi, of same material and finish as deck, and of thickness and profile recommended by SDI Publication No. 31 for overhang and slab depth.
- G Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck unless otherwise indicated.
- H Piercing Hanger Tabs: Piercing steel sheet hanger attachment devices for use with floor deck.
- I Weld Washers: Uncoated steel sheet, shaped to fit deck rib, 0.0747 inch thick, with factory-punched hole of 3/8-inch minimum diameter.
- J Flat Sump Plates: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck. For drains, cut holes in the field.
- K Recessed Sump Pans: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck, with 3-inch wide flanges and level recessed pans of 1-1/2-inch minimum depth. For drains, cut holes in the field.
- L Galvanizing Repair Paint: SSPC-Paint 20 or DOD P 21035 with dry film containing a minimum of 94 percent zinc dust by weight.
- M Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.
- B Proceed with installation only after unsatisfactory conditions have been corrected.

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3.02 INSTALLATION, GENERAL

- A Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.
- B Install temporary shoring before placing deck panels if required to meet deflection limitations.
- C Locate deck bundles to prevent overloading of supporting members.
- D Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
- E Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- F Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- G Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
- H Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- I Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

3.03 ROOF-DECK INSTALLATION

- A Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches long, and as follows:
 - 1. Weld Diameter: as indicated on structural drawings.
 - 2. Weld Spacing: Weld edge and interior ribs of deck units with a minimum of two welds per deck unit at each support. Space welds as indicated on structural drawings.
 - 3. Weld Washers: Install weld washers at each weld location.
- B Side-Lap and Perimeter Edge Fastening: as indicated on structural drawings.
- C End Bearing: Install deck ends over supporting frame with a minimum end bearing of 2 inches, with end joints as follows:
 - 1. End Joints: Lapped 2 inches minimum or butted at Contractor's option.
- D Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and weld flanges to top of deck. Space welds not more than 12 inches apart with at least one weld at each corner.
 - 1. Install reinforcing channels or zeos in ribs to span between supports and weld.
- E Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld to substrate to provide a complete deck installation.
 - 1. Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.
- F Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive according to manufacturer's written instructions to ensure complete closure.
- G Sound-Absorbing Insulation: Installation into topside ribs of deck as specified in architectural drawings."

3.04 FLOOR-DECK INSTALLATION

- A Fasten floor-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated and as follows:
 - 1. Weld Diameter: as indicated on structural drawings.
 - 2. Weld Spacing: Weld edge ribs of panels at each support. Space and locate welds as indicated.
 - 3. Weld Washers: Install weld washers at each weld location.
- B Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of half of the span or 36 inches, and as indicated on structural drawings.
- C End Bearing: Install deck ends over supporting frame with a minimum end bearing of 2 inches
 - 1. End Joints: Lapped or butted at Contractor's option.
- D Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations unless otherwise indicated.
- E Floor-Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, according to SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck.
- F Electrified Cellular Floor Deck: not used.
- G Install piercing hanger tabs at 14 inches apart in both directions, within 9 inches of walls at ends, and not more than 12 inches from walls at sides unless otherwise indicated.

3.05 FIELD QUALITY CONTROL

- A Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B Field welds will be subject to inspection.
- C Testing agency will report inspection results promptly and in writing to Contractor and Architect.
- D Remove and replace work that does not comply with specified requirements.
- E Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.06 PROTECTION

- A Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation, and apply repair paint.
 - 1. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.
 - 2. Wire brushing, cleaning, and repair painting of bottom deck surfaces are included in Section 09 91 13 "Exterior Painting" and Section 09 91 23 "Interior Painting."
- C Repair Painting: Wire brushing, cleaning, and repair painting of rust spots, welds, and abraded areas of both deck surfaces are included in Section 09 91 13 "Exterior Painting" and Section 09 91 23 "Interior Painting."
- D Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION

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SECTION 054000 - STRUCTURAL COLD-FORMED METAL FRAMING

PART 1 – GENERAL

1.01 SUMMARY

- A Section Includes:
 - 1. Exterior and interior load-bearing cold-formed steel framing systems.
 - 2. Exterior non-load-bearing cold-formed steel framing systems.
- B Related Sections:
 - 1. Division 01 – General Requirements
 - 2. Section 01 4000 – Quality Requirements for referenced testing and inspection requirements.
 - 3. Section 03 3000 – Cast-In-Place Concrete
 - 4. Section 05 1200 – Structural Steel Framing
 - 5. Section 05 3000 – Metal Decking
 - 6. Section 07 2100 – Thermal Insulation
 - 7. Section 09 2216 – Non-Structural Metal Framing
 - 8. Section 13 3400 – Pre-Engineered Building System

1.02 SUBMITTALS

- A Product Data: Submit manufacturer's data for each item proposed for installation. Include evaluation reports when applicable (ICC, IAPMO, Intertek).
- B Shop Drawings for Prefabricated Assemblies.
 - 1. Provide plans showing wall, floor, and roof panel locations, unique panel identification numbers, panel breaks, and dimensions.
 - 2. For exterior framing provide elevations showing panel breaks, rough openings, and panel heights.

1.03 REFERENCES

- A American Iron and Steel Institute (AISI)
 - 1. AISI S100-16 – North American Specification for the Design of Cold-formed Steel Structural Members, 2016
 - 2. AISI S240-15 – North American Standard for Cold-Formed Steel Structural Framing, 2015 Edition, 2015
 - 3. AISI S400-15/S1-16 North American Standard for Seismic Design of Cold-Formed Steel Structural Systems, 2015 Edition With Supplement 1, 2016
- B ASTM International (ASTM)
 - 1. ASTM A653 – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by Hot Dip Process.
 - 2. ASTM A924 – Standard Specification for General Requirements for Steel Sheet Metallic-Coated by Hot-Dip Process.
 - 3. ASTM A1003 – Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members.
 - 4. ASTM A1008 – Standard Specification for Steel Sheet and Strip, Hot-Rolled, Carbon, Structural High-Strength Low-Alloy, and High-Strength Low-Alloy with Improved Formability.

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5. ASTM C954 – Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
 6. ASTM C955 – Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases.
 7. ASTM C1007 – Standard Specification for Installation of Structural (Axial and Transverse) Steel Framing Members and Accessories.
- C American Welding Society (AWS)
1. AWS D1.1 – Structural Welding Code – Steel
 2. AWS D1.3 – Structural Welding Code – Sheet Steel.
- D International Building Code (IBC)
1. 2018 IBC – International Building Code, 2018 IBC

1.04 PERFORMANCE

- A Load Bearing Framing:
1. General Performance: Framing to withstand design loads including but not limited to gravity, wind, and seismic load established by the applicable local building codes. These loads are indicated on the Framing Structural Drawings.
 2. Definition of Design loads for Wind Deflection Calculations: Nominal loads combined using allowable stress load combinations in conjunction with code required wind loads based on the wind load determined per footnote f of Table 1604.3 of the building code (reduction on the wind load determined by a 50 year mean recurrence interval) or based on the wind load determined by a 10 year mean recurrence interval wind speed.
- B Exterior Non-Bearing By-Pass Framing (When Applies):
1. General Performance: Framing is engineered to withstand code specified loading (gravity, wind, and seismic). Non-bearing framing is engineered to accommodate deflections of the base building due to live loading without permanent deformation or failure of materials. Framing is engineered to remain anchored to the structure during base building deflections due to wind and seismic loading. No guarantee can be made against damage to the materials or framing during base building deflections due to design wind/seismic events.
 2. Design Loads: Framing to withstand design loads including but not limited to gravity, wind, and seismic load established by the applicable local building codes. These loads are indicated on the Framing Structural Drawings.
 3. Definition of Design loads for Wind Deflection Calculations: Nominal loads combined using allowable stress load combinations in conjunction with code required wind loads based on the wind load determined per footnote f of Table 1604.3 of the building code (reduction on the wind load determined by a 50 year mean recurrence interval) or based on the wind load determined by a 10 year mean recurrence interval wind speed.
 4. Deflection of Framing Members: Framing systems engineered to withstand design loads without deflections greater than following:
 5. EIFS: 1/240 of the wall span.
 6. Metal Panel: 1/240 of the wall span.
 7. Other Materials: As indicated on the Framing Structural Drawings.
 - a. EIFS: 1/240 of the wall span.
 - b. Metal Panel: 1/240 of the wall span.

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- c. Other Materials: As indicated on the Framing Structural Drawings.

1.05 DELIVERY, STORAGE AND HANDLING

- A Protect materials that will be damaged or negatively affected by exposure to rain, snow, and other harmful weather conditions. Stack material off the ground on a level surface if it is to be stored outside.
- B Deliver and store packaged products in original containers or bundles with seals unbroken and labels intact until time of use.
- C Protect fabricated panels from sustained cascading or ponding water.
- D Allow all material exposed to water to dry prior to applying remaining sheathing and finishes per product manufacturer's recommendations.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A Provide studs, tracks, joists, header, and accessories manufactured by one of following:
 - 1. Digital Building Components
 - 2. Manufacturer with a current ICC, IAPMO, or Intertek evaluation report evidencing compliance with ICC AC 46 and complying with requirements specified in the applicable International Building Code.

2.02 MATERIALS

- A Manufactured from prime mill certified steel; re-rolled steel without a mill certificate is not acceptable.
- B Cold-formed Steel Framing:
 - 1. Metal framing shall be formed from corrosion resistant-steel conforming to requirements of ASTM A653 or ASTM A1003.
 - 2. Metal framing shall be manufactured in conformance to AISI S240-16.
- C Minimum yield strength:
 - 1. 50 ksi for 54-mil and thicker material;
 - 2. 33 ksi for thinner material unless noted otherwise on drawings.
- D Minimum galvanization: G60.

2.03 COMPONENTS

- A Structural Studs: Galvanized steel C-studs complying with AISI S240-16.
 - 1. Gauge and size of studs shall be as indicated on Drawings.
- B Structural Track: Galvanized steel tracks complying with AISI S240-16.
 - 1. Gauge and size of tracks shall be as indicated on Drawings.
- C Structural Joists: Galvanized steel joists complying with AISI S240-16.
 - 1. Gauge and size of joists shall be as indicated on Drawings.
- D Accessories:
 - 1. Minimum thickness: Per Drawings.

2.04 OTHER COMPONENTS

- A Structural Steel: When required in the Drawings.
 - 1. Steel Plates, Bars, and Shapes (including Angles):
 - a. 36 ksi material shall meet ASTM A36
 - b. 50 ksi material shall meet ASTM A572, Grade 50

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2. Steel Tubing: ASTM A 500, Grade B or C (square, rectangular, or round)
 3. Steel Pipe: ASTM A 53/A 53M, Grade B, standard weight (Schedule 40) unless another weight is indicated on the drawings.
 4. Minimum protection:
 - a. Structural Steel occurring behind the water-resistive barrier does not require any protection or coverage.
 - b. Any portion of Structural Steel that extends beyond or occurs outside the water-resistive barrier shall be protected in a manner that is appropriate for the project location.
- B Permanent Shims:
1. Non-Load Bearing Framing: Shims permanently used below or between non-load bearing panels shall be durable and have a minimum compressive strength of 1,000psi. Acceptable materials/products: steel plates conforming to ASTM A36 or stronger, USG Structural Panel Concrete Subfloor, USG Durock Cement Board, Versa Shims, or approved equal by cold-formed metal framing engineer.
 2. Load Bearing Framing: Shims permanently used below or between load-bearing panels shall be durable and have a minimum compressive strength of 5,000psi. Acceptable materials/products: steel plates conforming to ASTM A36 or stronger, USG Structural Panel Concrete Subfloor, Versa Shims, or approved equal by cold-formed metal framing engineer.
- C Grout: Grout used below or between panels shall be factory-packaged, non-shrink, non-metallic grout complying with ASTM C 1107. Grout shall attain a minimum compressive strength of 7000-psi at 28 days.

2.05 SHEAR WALL SHEATHING

- A Sheathing: 5/8 inch thick Type X gypsum board or water resistant gypsum sheathing laminated to 22 gauge galvanized steel sheet complying with ASTM A653/A653M, G40 galvanized coating.
1. Manufacturer: 'Sure-Board' Type 200. IAMPO ES ER-0126.
 - a. Conform to quality assurance requirements of applicable Evaluation Report.

2.06 FLOOR AND ROOF SHEATHING (WHEN APPLIES)

- A Sheathing: 3/4" (+/-1/16") thick cementitious sheathing panel.
1. Manufacturer: USG Structural Panels, ICC ESR-1792.
 - a. Conform to quality assurance requirements of applicable Evaluation Report.

2.07 CONNECTORS AND FASTENERS

- A General: Provide connectors and fasteners as required to complete work.
1. Steel connectors and fasteners permanently exposed to weather shall be hot-dip galvanized in accordance with ASTM A153, unless noted otherwise on the Drawings.
- B Framing Connectors:
1. As specified in the Drawings.
 2. Gauge material shall meet the requirements of Section 2.02.
 3. Structural steel connectors shall meet the following requirements
 - a. 36 ksi material shall meet ASTM A36
 - b. 50 ksi material shall meet ASTM A572, Grade 50

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4. Products shall have current ICC, IAPMO, or Intertek Evaluation Report with approved load values at least equal to those of products designated or specified on the Drawings.
- C Bolts: ASTM A307, Grade A, hex head bolts. Furnish with ASTM F436 or F844 flat washers when specified on the Drawings.
- D Nuts: ASTM A563, Grade A unless noted otherwise on drawings. Rod coupling nuts shall also comply with ASTM A563, Grade A.
- E Anchor Bolts: ASTM F1554, hex head, Grade 36 unless noted otherwise on drawings.
- F Fasteners: Self-drilling, self-tapping screws complying with ASTM C1513 or having a current ICC, IAPMO, or Intertek evaluation report.
- G Plate Washers: Mild steel, ASTM A36, unless noted otherwise in the Drawings.
- H Power Actuated Fasteners: Size, embedment, and manufacturer of power actuated fasteners per drawings. Fastener shall have a current ICC, IAPMO, or Intertek Evaluation Report stating evaluation in accordance with ICC AC-70. Alternates to fastener specified in the drawings must be approved by cold-formed metal framing engineer prior to installation.
- I Expansion Bolts in Concrete: Size, embedment, and manufacturer of wedge-type expansion anchors per Drawings. Fastener shall have a current ICC, IAPMO, or Intertek Evaluation Report stating evaluation in accordance with ICC AC-193 and approved for installation in cracked concrete. Alternates to fastener specified in the drawings must be approved by cold-formed metal framing engineer prior to installation. At conditions exposed to weather use stainless steel version of product.
- J Screw Anchors in Concrete: Size, embedment, and manufacturer of screw-type anchors per Drawings. Fastener shall have a current ICC, IAPMO, or Intertek Evaluation Report stating evaluation in accordance with ICC AC-193 and approved for installation in cracked concrete. Alternates to fastener specified in the drawings must be approved by cold-formed metal framing engineer prior to installation. Screw anchors shall not be used in conditions exposed to weather.

2.08 WELDING CONSUMABLES

- A General: Filler materials and fluxes shall conform to requirements of AWS D1.1 and D1.3; materials to be of suitable type for base metals being welded and the intended application.

PART 3 – EXECUTION

3.01 PREPARATION

- A Examine supporting substrates and structures for proper conditions for installation and performance of cold-formed structural framing and verify the following:
 1. Verify that attachment surfaces are plumb, level, and in proper alignment to accept cold-formed structural framing.
 - a. Slab on grade/curbs/podium slab/elevated slab on metal deck:
 - 1) FF= 25
 - (a) 1/4" over 10 ft, noncumulative at wall locations
 - 2) FL= 20
 - (a) 1/4" over 10 ft, noncumulative at wall locations
 - 3) All high spots to be ground down and not exceed the top of floor elevations per the AOR/SEOR drawings.
 - b. Slab on grade/podium slab deck edges and curbs horizontal locations shall be within - 1/4" or +3/4" of location indicated in Drawings.
 - c. Elevated slab on metal deck edges horizontal locations shall be within +/-1/4" of CFS wall panels above/below.

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- d. Embeds in concrete shall be located as indicated in the Drawings with the following tolerances.
 - 1) Embeds shall be flush with the surface of the concrete. No more than +/- 1/8" from the surface.
 - 2) Embeds shall be within +/- 3/8" in any direction parallel to the surface of the concrete.
- 2. Verify location and elevation of embeds and anchor bolts are correct.
- 3. Verify that other conditions adversely affecting erection are absent.
- B. Do not begin erection before unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install wall panels level, plumb and in alignment, without exceeding the following installation tolerances:
 - 1. Panel plumb: 1/4" over 10ft
 - 2. Panel level: 1/4"
 - 3. Panel to panel alignment: +/-1/4"
 - 4. Joint size:
 - a. Structural exterior panels: 1/4"
 - b. Sheathed by-pass exterior panels: 1/4"
 - c. Finished by-pass exterior panels: +/-3/8"
 - 5. Plan location from building grid datum: +/-1/2"
 - 6. Plan location from centerline of steel: +/-1/2"
 - 7. Joint taper for Finished panels: +/-3/8"
- B. Install accessories per Drawings.
- C. Install studs squarely in top and bottom track, unless noted otherwise on Drawings.
- D. Fasten stud to flanges of both top and bottom tracks unless noted otherwise on Drawings.
- E. Anchor top and bottom track to floor/roof structure above and to floor structure below unless noted otherwise on Drawings.
- F. Wire tying of framing members is not permitted.
- G. Splices in axially loaded studs are not permitted unless noted otherwise on the Drawings.
- H. Weld connections in accordance with AWS recommended procedures and practices.
 - 1. Welds shall be performed by AWS certified welders and/or equipment.
- I. Field abrasions and welds:
 - 1. Framing permanently exposed to the elements shall have field abrasions and welds touched-up with galvanizing touch-up material according to ASTM A780 and manufacturer's written instructions.
 - 2. Framing not permanently exposed to the elements does not require field abrasions and welds to be touched-up with galvanizing touch-up material.

3.03 QUALITY CONTROL

- A. Field Quality Control:
 - 1. Inspection of field welding operations shall be performed by a special inspector.
 - a. Special inspector qualifications shall be in accordance with 2018 IBC Section 1704.2.1.
 - b. The special inspector shall inspect material, equipment, procedures, welds, and welder qualifications for work performed in the field.
 - 2. Perform special inspection of field installed connections of wind force-resisting system in accordance with 2018 IBC Section 1705.10.2.

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3. Perform special inspection of field installed connections of seismic force-resisting system in accordance 2018 IBC Section 1705.11.3.
 4. Field alterations of shop fabricated framing that does not comply with Manufacturer provided field guidelines and details shall be approved by the Manufacturer prior to approval by special inspector.
- B Shop Quality Control:
1. Framing that is fabricated in an approved facility per 2018 IBC Section 1704.2.5.2 does not require special inspection, including the wind and seismic force-resisting systems.
 - a. Approved Fabrication Facilities:
 - 1) Digital Building Components
 2. Framing not fabricated in an approved facility shall be inspected per Section 3.03.A "Field Quality Control".

3.04 CLEAN UP

- A Remove rubbish, debris, and waste materials and legally dispose of off Project site.

END OF SECTION

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SECTION 055000 - METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Shop fabricated steel, aluminum, and miscellaneous metal items.
- B Metal fabrications, including items fabricated from iron and steel shapes, plates, bars, strips, tubes, pipes and castings which are not a part of structural steel or other metal systems in other Sections of these Specifications.
- C Miscellaneous framing and supports including, but not limited to the following:
 - 1. Carpenter's ironwork.
 - 2. Bent bar or angle frame countertop supports and backing plates.
 - 3. Applications where framing and supports are not specified in other sections.
 - 4. Frames for glass and decorative plastic glazing.
 - 5. Hangers & Supports per Divisions 22, 23 & 26 or Mechanical, Plumbing & Electrical Drawings.
- D Supports for suspended ceilings, suspended finishes, chandeliers and fixtures and other items as necessary.
- E Slotted channel framing system used for support of the following:
 - 1. Ceilings and soffits as noted.
 - 2. Structural applications as noted.
 - 3. Hangers & Supports per Divisions 22, 23 & 26 or Mechanical, Plumbing & Electrical Drawings.
- F Other items as indicated in Drawings.

1.02 RELATED REQUIREMENTS

- A Section 033000 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.
- B Section 042000 - Unit Masonry: Placement of metal fabrications in masonry.
- C Section 051200 - Structural Steel Framing: Structural steel column anchor bolts.
- D Section 053100 - Steel Decking: Bearing plates for metal deck bearing, including anchorage.
- E Section 055100 - Metal Stairs.
- F Section 055133 - Metal Ladders.
- G Section 055213 - Pipe and Tube Railings.
- H Section 099000 - Painting and Coating: Paint finish.

1.03 REFERENCE STANDARDS

- A AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
- B AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- C ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- D ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2022.
- E ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- F ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2018.
- G ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.

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- H ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.
- I ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- J ASTM B210/B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes; 2019a.
- K ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2019.
- L ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- M ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- 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 AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014, with Errata (2020).
- R IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172; 2019.
- S SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.
- T SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.
- U SSPC-SP 2 - Hand Tool Cleaning; 2018.

1.04 SYSTEM DESCRIPTION FOR SLOTTED CHANNEL FRAMING SYSTEM

- A Slotted channel framing system is a performance specification and the slotted channel framing supplier shall be responsible for structural design and engineering required to meet specified performance requirements within physical and aesthetic requirements established.
- B Contract Documents are an outline of criteria and performance requirements for the System. Requirements specified or indicated by details are intended to establish aesthetic design requirements and performance of interior finish materials.
- C Drawings do not necessarily indicate or describe total work required for completion of Work. Furnish and install all items required for complete installation.
- D Dimensions and profile adjustments may be made in proposed structural design in interest of fabrication or erection methods and techniques, or ability of design to satisfy design and performance requirements, provided that aesthetic design intent and intent of Contract Documents are maintained. Include modifications or additions required to meet specified requirements and maintain the visual design concept.

1.05 PERFORMANCE REQUIREMENTS FOR SLOTTED CHANNEL FRAMING SYSTEM

- A Design Requirements: Design structural members in accordance with the following:
 - 1. Design system in accordance with the following Standards:
 - a. Federal, State and Local Codes.
 - b. American Iron and Steel Institute (AISI) Specifications for the Design of Cold Formed Steel Structural Members, 2001 Edition.
 - c. American Society for Testing and Materials (ASTM).
 - d. Metal Framing Manufacturer's Association (MFMA).

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2. Design system to provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature changes.
 3. Design system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
 - a. Construction Tolerances: Plus or minus 1/2 inch minimum (all directions).
 - b. Live load deflection of building structural elements: L/360 times the span.
 4. Engineering Responsibility: Slotted channel framing manufacturer shall assume undivided responsibility for engineering slotted channel framing system by employing a qualified professional engineer to prepare and seal design calculations, shop drawings, and other structural data. Engineer to be licensed in the State of California.
- B Structural Performance: Design, engineer, fabricate, and erect structural slotted channel framing system to be capable of withstanding the effects of normal thermal movement, loads resulting from gravity and maintain stresses within the allowable limits and under conditions indicated:
1. Gravity Loads: The slotted channel framing system and its anchorage or related components shall be designed with adequate strength and stiffness to accommodate the loads calculated for the wall framing elements and all cladding systems supported by the framing and/or transferring loads to the framing systems.
- C Design elements of the structural slotted channel framing systems to resist the applicable design loads and maintain the following allowable limits:
1. Maximum allowable deflection:
 - a. Perpendicular to the plane of a soffit, net deflection of framing members shall not exceed L/600 times the span, or 1/4 inch, whichever is less, using the dead load combined with wind load forces. Span is defined as the distance between anchor centerline.
 2. At connection points of framing members to anchors, combined movement of anchor relative to building structure, and framing member relative to anchor, shall not exceed 1/16 inch in any direction.
 3. At 1.5 times the design pressure loads for metal members, the net permanent deflection of framing members shall not exceed 1/1000 times span. There shall be no failure or gross permanent distortion of framing members, anchors or connections. At connection points of framing members to anchors, combined movement of anchor relative to building structure, and framing member relative to anchor, shall not exceed 1/16 inch set after load is removed.
- D Vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening or fracturing of attachments or components of system are not permitted in the installed work.
- E Design and analysis of bolted assemblies or fasteners to connect thin walled members shall use washers to avoid pullover and tearing effects of the steel. Safety Factors shall be as required per Table A5.1 of AISI Commentary on the Cold Formed Specification.
- F Framing elements of the structural slotted channel framing system shall be so designed to accept and support concentrated loads that may be imposed by the adjacent cladding systems or other framing elements without exceeding performance criteria specified herein. To this end, the contractor performing this scope of work shall obtain all necessary engineering analysis including the relevant projected reaction loading data and make such provision in the structural metal stud system work as may be necessary.

1.06 SUBMITTALS

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- A See Section 013300 - Submittal 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.
 - 2. Design data: Submit drawings and supporting calculations, signed and sealed by a qualified professional structural engineer.
 - a. Include the following, as applicable:
 - 1) Design criteria.
 - 2) Engineering analysis depicting stresses and deflections.
 - 3) Member sizes and gauges.
 - 4) Details of connections.
 - 5) Support reactions.
 - 6) Bracing requirements.
 - 3. Structural Calculations by a Registered Professional or Structural Engineer in the State of California for approval by Engineer of Record.
- C Shop Drawings and Product Data for Slotted Channel Framing System: Include the following:
 - 1. Structural Calculations by a Registered Professional or Structural Engineer in the State of California for approval by Engineer of Record. Calculations may include, but are not limited to:
 - a. Description of design criteria.
 - b. Stress of deflection analysis.
 - c. Selection of framing members, fittings and accessories.
 - 2. Assembly drawings necessary to install the slotted channel framing system in compliance with the Contract Drawings.
 - 3. Pertinent manufacturers published data.
- D Designer's Qualification Statement.
- E Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

1.07 QUALITY ASSURANCE

- A Design shall be under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in California.
- B Standards: Comply with the following, except as otherwise shown and specified:
 - 1. AISC "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings."
 - 2. AISI "Specifications for the Design of ColdFormed Steel Structural Members."
 - 3. AWS "Structural Welding CodeSteel."
 - 4. ASTM A6 "General Requirements for Rolled Steel Plates Shapes, Sheet Piping and Bars for Structural Use."
- C Qualifications: Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure."
- D Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

1.08 DELIVERY, STORAGE AND HANDLING

- A Exercise care during unloading, storage and erection to avoid damage. Support material stored at the site completely free of the ground, and cover to avoid damage from the elements.

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1.09 PROJECT/SITE CONDITIONS

- A Field Measurements: Take field measurements prior to preparation of Shop Drawings and fabrication, where possible, to ensure proper fitting of the Work. Allow for trimming and fitting wherever the taking of field measurements before fabrication might delay the Work.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

- A Steel Sections: ASTM A 36/A 36M.
- B Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C Plates: ASTM A283/A283M.
- D Pipe: ASTM A 53/A 53M Grade B Schedule 40, black finish.
- E Slotted Channel Framing: ASTM A653/A653M, Grade 33.
- F Slotted Channel Fittings: ASTM A1011/A1011M.
- G Diamond Pattern Structural Steel Plate: ASTM A611 or ASTM A570, Grade B with diamond checker pattern.
- H Perforated Steel Sheet: Perforated steel sheet as manufactured by ATAS International, Inc., McNichols Co., or McMaster Carr.
- I Cold-Finished Carbon Steel Bars: ASTM A108, Grade as selected by fabricator.
- J Cold-rolled Carbon Steel Sheets: ASTM A611
- K Cold-drawn Steel Tubing: ASTM A512, sunk drawn, butt welded, cold-finished and stress-relieved.
- L Fasteners: Provide zinc-coated fasteners with galvanizing complying with ASTM A153 for exterior use or where built into exterior walls.
 - 1. Bolts and nuts: ASTM A307, Grade A, regular hexagon head.
 - 2. Bolts, hexagon and square: ANSI B-18.2.1.
 - 3. Bolts, round head: ANSI B-18.5.
 - 4. Lag bolts: Square head type.
 - 5. Wood screws: ANSI B-18.6.1, flat head carbon steel.
 - 6. Plain washers: ASTM F844 helical spring type carbon steel.
- M Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.
- N Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.
- O Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- P Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- Q Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 MATERIALS - ALUMINUM

- A Aluminum surfaces in contact with concrete, grout or dissimilar metals will be protected with a coat of bituminous paint, Mylar isolators or other approved material.
- B Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.
- C Sheet Aluminum: ASTM B209/B209M, 5052 alloy, H32 or H22 temper.
- D Aluminum-Alloy Drawn Seamless Tubes: ASTM B210/B210M, 6063 alloy, T6 temper.
- E Aluminum-Alloy Bars: ASTM B211/B211M, 6061 alloy, T6 temper.
- F Bolts, Nuts, and Washers: Stainless steel.
- G Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.03 FABRICATION

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- A Fit and shop assemble items in largest practical sections, for delivery to site.
- B Fabricate items with joints tightly fitted and secured.
- C Continuously seal joined members by intermittent welds and plastic filler.
- D Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F Furnish components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.04 FABRICATED ITEMS

- A Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.
- B Joist Hangers: Strap anchors, fabricated with sheet steel, 18 gauge, 0.0478 inch minimum base metal thickness; galvanized finish.
- C Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; prime paint finish.
- D Lintels: As detailed; prime paint finish.
- E Sill Angles for Tempered Glass Railing Assemblies: ASTM A36/A36M steel angles with anchoring devices and sizes as indicated in shop drawings for railing assembly, drilled and tapped for fastener types, sizes, and spacing indicated, prime paint finish.
- F Door Frames for Wall Openings: Channel sections; prime paint finish.
- G Elevator Hoistway Divider Beams: Beam sections; prime paint finish.
- H Toilet Partition Suspension Members: Steel channel sections; prime paint finish.
- I Miscellaneous Framing and Supports:
 - 1. Provide miscellaneous steel framing and supports which are not a part of the structural steel framework, or other metal systems in other Sections of these Specifications, whether indicated or not as necessary to complete Work.
 - 2. Fabricate miscellaneous units to sizes, shapes and profiles shown, or if not shown, of the dimensions required to receive adjacent grating, plates, doors or other Work to be retained by the framing. Except as otherwise shown, fabricate from structural steel shapes and plates and steel bars of all welded construction using mitered corners, welded brackets and splice plates, and a minimum number of joints for field connection. Cut, drill and tap units to receive hardware and similar items to be anchored to the Work.
 - 3. Equip units with integrally welded anchor straps for casting into concrete or building into masonry wherever possible. Furnish inserts if units must be installed after concrete is poured. Except as otherwise shown, space anchors 24 inches o.c., and provide minimum anchor units of 1 1/4 inch x 1/3 inch x 8 inch steel straps.
- J Countertop Supports: Fabricate countertop supports from steel tube and shapes as detailed on Drawings. Continuously weld all joints and grind smooth where exposed.
- K Prevent galvanic action and other forms of corrosion by insulating contact points between metals and incompatible metals or materials. Provide separation of resilient gasket or other appropriate material to separate aluminum bar gratings and angles where units are attached.

2.05 SLOTTED CHANNEL FRAMING:

- A Fabricate channels and fittings from structural steel complying with the referenced standards; factory-applied, rust-inhibiting thermoset acrylic enamel finish.
 - 1. Basis of Design: Slotted Channel Framing System (Unistrut System): 1-5/8 inch by 1-5/8 inch slotted channel framing system, or as approved. Galvanized G90, coldformed metal

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channels with flange edges returned toward web with 9/16 inch wide slotted holes in webs at 2 inches o.c.

2. Provide Manufacturer's standard connectors, fasteners and other miscellaneous accessories as required for a complete installation and connection to supporting structure.
3. All channel members shall be fabricated from structural grade steel conforming to one of the following ASTM specifications: A 1011 SS GR33 or A 653 GR33.
4. All fittings shall be fabricated from steel conforming to one of the following ASTM specifications: A 757, A 576, A 36 or A635.

B Acceptable Manufacturer:

1. Unistrut Corporation www.unistrut.com.

2.06 FINISHES - STEEL

A Prime paint steel items.

1. Exceptions: Galvanize items to be embedded in concrete or 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 Prepare surfaces to be primed in accordance with SSPC-SP2.

C Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

D Prime Painting: One coat.

E Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements.

F Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

2.07 FINISHES - ALUMINUM

A Exterior Aluminum Surfaces: high performance organic coating.

B Interior Aluminum Surfaces: Class I natural anodized.

C Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

D Class I Color Anodized Finish: AAMA 611 AA-M12C22A42 Integrally colored anodic coating not less than 0.7 mils thick; light bronze.

E High Performance Organic Coating System: AAMA 2604 multiple coat, thermally cured fluoropolymer system; color as selected from manufacturer's standard colors.

F Apply one coat of bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar materials.

2.08 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 and aluminum where site welding is required.

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- B Furnish setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.03 INSTALLATION - GENERAL

- 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, abrasions and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.04 INSTALLATION - SLOTTED CHANNEL FRAMING SYSTEMS

- A For ceiling channel, rails shall be on centers as required by equipment manufacturer and allow continuous attachment along any point on the rail. System shall be true, plumb, and level to the tolerances specified.
- B Framing shall be adjusted as required in the field to avoid interferences.
- C Hammer drilling times shall be coordinated in existing facilities with the Owner.
- D All bolted connections into cold-formed channel members with channel nuts shall be tightened to a minimum:
 - 1. 50 ft-lbs for 1/2" bolts.
 - 2. 100 ft-lbs for 5/8" bolts.
 - 3. 125 ft-lbs for 3/4" bolts.
- E All bolted connections for structural steel joints shall be per ASIC Specifications for Structural Joints Using ASTM A325 or A490 Bolts.

3.05 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.

3.06 CLEAN-UP

- A Immediately following installation, clean field welds, bolted connections, and abraded and rusted areas of shop painted and galvanized finishes and perform required touch-up painting; use appropriate materials to match manufacturer's shop paint and galvanized finishes.
 - 1. For shop primed surfaces, apply paint to comply with requirements of SSPC PA 1.
 - 2. For galvanized surfaces, clean welds, bolted connections, and abraded areas, and apply galvanizing repair paint to comply with ASTM A780.
- B Transport debris and excess materials from site and legally dispose of them.

END OF SECTION 055000

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SECTION 055100 - METAL STAIRS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Stairs with concrete treads.
- B Precast Cement Terrazzo Stairs Treads
 - 1. Setting material, grouts, sealants, and caulks.
- C Structural steel stair framing and supports.
- D Handrails and guards.
- E Prefabricated stair treads and nosings.

1.02 RELATED REQUIREMENTS

- A Section 033000 - Cast-in-Place Concrete: Concrete fill in stair pans; mesh reinforcement for landings.
- B Section 033000 - Cast-in-Place Concrete: Placement of metal anchors in concrete.
- C Section 042000 - Unit Masonry: Placement of metal fabrications in masonry.
- D Section 055213 - Pipe and Tube Railings: Metal handrails and balusters other than specified in this section.

1.03 REFERENCE STANDARDS

- A ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B AISC 201 - AISC Certification Program for Structural Steel Fabricators, Standard for Steel Building Structures; 2006.
- 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 A6/A6M - Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling; 2023.
- E ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- F ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2022.
- G ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- H ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2018.
- I ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.
- J ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.
- K 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.
- L AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.
- M AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2021.
- N AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).
- O CBC - 2022 - 2022 California Code of Regulations - Title 24; 2022.
- P IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172; 2019.
- Q ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

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- R SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.
- S SSPC-SP 2 - Hand Tool Cleaning; 2018.
- T National Terrazzo and Mosaic Association Inc. (NTMA).

1.04 SUBMITTALS

- A See Section 013300 - Submittal Requirements, for submittal procedures.
- B Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
 - 2. Include the design engineer's seal and signature on each sheet of shop drawings.
 - 3. Submit shop drawings of all precast terrazzo items showing detail sections and profile for all precast items. Details shall show all reinforcing and special hardware for fastening.
- C Design Data: As required by authorities having jurisdiction.
- D Design Data, Seismic Performance: Submit documentation that stairs meet performance requirements specified.
- E Samples: Submit maximum of (3) samples, 3" x 6" size .
- F Submit two copies of NTMA maintenance literature.
- G Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.
- H Designer's Qualification Statement.
- I Fabricator's Qualification Statement: Provide documentation showing steel fabricator is certified under AISC 201.

1.05 QUALITY ASSURANCE

- A NTMA Standards: Comply with specified provisions and recommendations of the National Terrazzo & Mosaic Association, Inc. (NTMA).
- B Manufacturer's Instructions: In addition to specified requirements, comply with precast terrazzo manufacturer's instructions and recommendations for substrate preparation, materials storage, mixing and application, finishing and curing.
- C Qualifications: Precast Terrazzo Manufacturer and Trade Contractor must have a minimum of 5 years of successful experience on projects of similar magnitude and complexity to that indicated project. Manufacturer and contractor to be prequalified by Architect prior to bidding. Failure to prequalify will void bid.
- D Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in California, or personnel under direct supervision of such an engineer.
- E Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and dated no more than 12 months before start of scheduled welding work.
- F Fabricator Qualifications:
 - 1. A qualified steel fabricator that is certified by the American Institute for Steel Construction (AISC) under AISC 201.
 - 2. A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel in accordance with IAS AC172.
 - 3. A company specializing in manufacturing products specified in this section, with not less than ten years of documented experience.

1.06 DELIVERY, STORAGE AND HANDLING

- A Packaging and Shipping: Precast terrazzo to be palletized and shrink wrapped, delivered in original unopened packaging with legible manufacturer identification, including size, piece

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number, quantities, manufacturer date and inspector initials.

- B Storage and Protection: Precast terrazzo to be stored indoors, in a climate-controlled environment, sheltered from moisture in original packaging. Protect from damage by other trades.
- C Report all damage due to shipment immediately. Customer is required to sign the Bill of Lading slip noting damaged product. Picture proof is required.

1.07 WARRANTY

- A (Terrazzo): Manufacturer/Installer shall warrant installed system for a period of 1 year from date of substantial completion against failure of workmanship and materials.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A Factory Fabricated Stair Treads and Nosings:
 - 1. Wausau Tile, Inc.
 - 2. Or Approved Equal.

2.02 METAL STAIRS - GENERAL

- A Metal Stairs: Provide stairs of the design specified, complete with landing platforms, vertical and horizontal supports, railings, and guards, fabricated accurately for anchorage to each other and to building structure.
 - 1. Regulatory Requirements: Provide stairs and railings that comply with most stringent requirements of local, state, and federal regulations; where requirements of Contract Documents exceed those of regulations, comply with Contract Documents.
 - 2. Handrails: Comply with applicable accessibility requirements of ADA Standards.
 - 3. Structural Design: Provide complete stair and railing assemblies that comply with the following:
 - a. Stair Capacity: Uniform live load of 100 lb/sq ft and a concentrated load of 300 lb with deflection of stringer or landing framing not to exceed 1/360 of span.
 - b. Railing Assemblies: Comply with applicable local code.
 - c. Seismic Performance: Stairs designed to withstand the effects of earthquake motions determined according to ASCE 7.
 - 1) Component Importance Factor: 1.5.
 - 2) No permanent inelastic deformation occurs under movements equal 2.5 percent interstory drift, minimum.
 - 4. Dimensions: As indicated on drawings.
 - 5. Shop assemble components; disassemble into largest practical sections suitable for transport and access to site.
 - 6. No sharp or rough areas on exposed travel surfaces and surfaces accessible to touch.
 - 7. Separate dissimilar metals using paint or permanent tape.
- B Metal Jointing and Finish Quality Levels:
 - 1. Architectural: All joints as inconspicuous as possible, whether welded or mechanical.
 - a. Welded Joints: Continuously welded and ground smooth and flush.
 - b. Mechanical Joints: Butted tight, flush, and hairline; concealed fastenings only.
 - c. Exposed Edges and Corners: Eased to small uniform radius.
 - d. Metal Surfaces to be Painted: Sanded or ground smooth, suitable for highest quality gloss finish.
- C Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.

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- D Anchors and Related Components: Same material and finish as item to be anchored, except where specifically indicated otherwise; provide all anchors and fasteners required.

2.03 METAL STAIRS WITH CONCRETE TREADS

- A Jointing and Finish Quality Level: Architectural, as defined above.
- B Risers: Closed.
- C Treads: Metal pan with precast concrete tread.
 - 1. Manufacturer of Precast Terrazzo
 - a. Basis of Design: Wausau Tile, Inc.
 - b. Concord Terrazzo Company, Inc.
 - 2. Precast Concrete Treads:
 - a. Concrete Strength: 5,000 psi at 28 days, minimum.
 - b. Air Content: 4 to 6 percent.
 - 3. Tread Pan Material: Steel sheet.
 - 4. Tread Pan Thickness: As required by design; 14 gauge, 0.075 inch minimum.
- D Risers: Same material and thickness as tread pans.
- E Stringers: Rolled steel channels.
 - 1. Stringer Depth: As indicated on drawings.
 - 2. End Closure: Sheet steel of same thickness as risers welded across ends.
- F Precast Terrazzo Stairs:
 - 1. Tread/Riser Model: S-31.
 - 2. Portland Cement: ASTM C150 Specifications for Portland Cement.
 - 3. Aggregates: All aggregates to meet ASTM C33 specifications, cleaned and properly graded to size. Aggregate shall be blended to meet individual project requirements.
 - 4. Marble chips, size to conform with NTMA gradation standards.
 - 5. Coloring; Pigments used shall be inorganic, resistant to alkalinity and used per manufacturer's recommendations.
 - 6. Reinforcement and Hardware:
 - a. To conform with NTMA and Manufacturer's design.
 - b. Reinforce precast with deformed rods or wire mesh or both as recommended by precast terrazzo manufacturer.
 - 7. Abrasive Inserts: Shall consist of silica carbide and black epoxy. Specify one to three lines.
 - 8. Caulks & Sealants:
 - a. Urethane or Polyurethane Sealant
 - b. Color to be selected by Architect from standard color pallet.
 - 9. Cleaner: Liquid neutral chemical cleaner, with pH factor between 7 and 8, of formulation recommended by sealer manufacture for type of precast terrazzo used and complying with NTMA requirements.
 - 10. Sealer: Colorless, slip and stain-resistant penetrating sealer with pH factor between 7 and 8, that does not affect color or physical properties of precast terrazzo surface. Flash point (ASTM D56): 80 degrees F, Minimum.
- G Landings: Same construction as treads, supported and reinforced as required to achieve design load capacity.

2.04 HANDRAILS AND GUARDS

- A Wall-Mounted Rails: Round pipe or tube rails unless otherwise indicated.
 - 1. Outside Diameter: 1-1/4 inch, minimum, to 1-1/2 inches, maximum.
- B Guards: Refer to Section 057300 - Decorative Metal Railings.

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2.05 MATERIALS

- A Steel Sections: ASTM A36/A36M.
- B Steel Tubing: ASTM A500/A500M or ASTM A501/A501M structural tubing, round and shapes as indicated.
- C Steel Plates: ASTM A6/A6M or ASTM A283/A283M.
- D Pipe: ASTM A53/A53M Grade B Schedule 40, black finish.

2.06 ACCESSORIES

- A Steel Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, and galvanized to ASTM A153/A153M where connecting galvanized components.
- B Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- C Shop and Touch-Up Primer: SSPC-Paint 15, and comply with VOC limitations of authorities having jurisdiction.

2.07 SHOP FINISHING

- A Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- B Do not prime surfaces in direct contact with concrete or where field welding is required.
- C Prime Painting: Use specified shop- and touch-up primer.
 - 1. Preparation of Steel: In accordance with SSPC-SP 2 Hand Tool Cleaning.
 - 2. Number of Coats: One.

PART 3 EXECUTION

3.01 EXAMINATION

- A Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

- A When field welding is required, clean and strip primed steel items to bare metal.
- B Supply items required to be cast into concrete and embedded in masonry with setting templates.

3.03 INSTALLATION

- A Install components plumb and level, accurately fitted, free from distortion or defects.
- B Provide anchors, plates, angles, hangers, and struts required for connecting stairs to structure.
- C Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- D Provide welded field joints where specifically indicated on drawings. Perform field welding in accordance with AWS D1.1/D1.1M.
- E Other field joints may be either welded or bolted provided the result complies with the limitations specified for jointing quality levels.
- F Obtain approval prior to site cutting or creating adjustments not scheduled.
- G After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.04 TREAD/RISER INSTALLATION

- A Setting:
 - 1. Setting methods will vary per product. Set accurately as shown on the approved shop drawings. Contact your setting material manufacturer with any questions on proper bonding of all materials.

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2. Setting methods are:
 - a. Cement based setting materials: Contact your selected manufacturer as recommended or specified. Setting materials can change without notice.
 - b. Epoxy based setting materials: Contact your selected manufacturer as recommended or specified. Setting materials can change without notice.
3. All thinset materials, whether cement or epoxy based, will require a full setting bed be applied to all appropriate surfaces of the precast terrazzo, vertical and horizontal, where contact is made with the substrate or structural base.
4. Alignment of precast should be straight and true to all dimensions. It may not vary more than 1/8" in length, height or width.
5. Install anchors as shown on details, if required.
6. Fill joints between with manufacturer – approved caulk or as specified.

3.05 TOLERANCES

- A Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B Maximum Offset From True Alignment: 1/4 inch.

END OF SECTION 055100

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SECTION 055133 - METAL LADDERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Shop-fabricated metal ladders.

1.02 RELATED REQUIREMENTS

- A Section 055100 - Metal Stairs.
- B Section 055213 - Pipe and Tube Railings.
- C Section 051200 - Structural Steel Framing: Roof framing and support.
- D Section 054000 - Cold-Formed Metal Framing
- E Section 055000 - Metal Fabrications: Fasteners and installation requirements used to attach ladders to structure.
- F Section 076200 - Sheet Metal Flashing and Trim
- G Section 099000 - Painting and Coating: Paint finish.

1.03 REFERENCE STANDARDS

- A 29 CFR 1910.23 - Ladders; Current Edition.
- B 29 CFR 1926.1053 - Ladders; Current Edition.
- C AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
- D AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- E ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; 2008 (Reaffirmed 2018).
- F ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- G ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- H ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2022.
- I ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2018.
- J ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.
- K ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.
- L ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings; 2018, with Editorial Revision.
- M ASTM B85/B85M - Standard Specification for Aluminum-Alloy Die Castings; 2018, with Editorial Revision.
- N ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- O ASTM B210/B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes; 2019a.
- P ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2019.
- Q 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

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Strength; 2023.

- R AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.
- S AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2021.
- T AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).
- U AWS D1.2/D1.2M - Structural Welding Code - Aluminum; 2014, with Errata (2020).
- V IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172; 2019.
- W SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.
- X SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.
- Y SSPC-SP 2 - Hand Tool Cleaning; 2018.

1.04 SUBMITTALS

- A See Section 013300 - Submittal Requirements, for submittal procedures.
- B Shop Drawings:
 - 1. Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - 2. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- C Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.
- D Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

1.05 QUALITY ASSURANCE

- A Manufacturer Qualifications: A firm experienced in producing aluminum metal ladders similar to those indicated for this Project.
 - 1. Record of successful in-service performance.
 - 2. Sufficient production capacity to produce required units.
 - 3. Professional engineering competent in design and structural analysis to fabricate ladders in compliance with industry standards and local codes.
- B Design Shall be under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in California.
- C Access ladders shall be designed and installed to comply with ANSI A14.3.
- D Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.2/D1.2M and dated no more than 12 months before start of scheduled welding work.
- E Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

1.06 PROJECT CONDITIONS

- A Field Measurements: Verify dimensions by field measurement before fabrication.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, indicate established dimensions on shop drawing submittal and proceed with fabrication.

1.07 DELIVERY, STORAGE, AND HANDLING

- A Store products in manufacturer's unopened packaging until ready for installation.

1.08 WARRANTY

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- A See Section 017836 - Warranties and Bonds, for additional warranty requirements.
- B Manufacturer has responsibility for an extended Corrective Period for work of this Section for a period of 5 years from date of Substantial Completion against all the conditions indicated below, and when notified in writing from Owner, manufacturer shall promptly and without inconvenience and cost to Owner correct said deficiencies.
 - 1. Defects in materials and workmanship.
 - 2. Deterioration of material and surface performance below minimum OSHA standards as certified by independent third party testing laboratory. Ordinary wear and tear, unusual abuse or neglect excepted.
 - 3. Within the warranty period, the manufacturer shall, at its option, repair, replace, or refund the purchase price of defective ladder.
- C Manufacturer shall be notified immediately of defective products, and be given a reasonable opportunity to inspect the goods prior to return. Manufacturer will not assume responsibility, or compensation, for unauthorized repairs or labor. Manufacturer makes no other warranty, expressed or implied, to the merchantability, fitness for a particular purpose, design, sale, installation, or use, of the ladder; and shall not be liable for incidental or consequential damages, losses of or expenses, resulting from the use of ladder products.

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, hot-dip galvanized finish.
- E Mechanical Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.
- F Bolts, Nuts, and Washers: ASTM A307, plain.
- G Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.
- H Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- I Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- J Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 MATERIALS - ALUMINUM

- A Extruded Aluminum: ASTM B211/B211M, 6063 alloy, T6 temper.
- B Sheet Aluminum: ASTM B209/B209M, 5052 alloy, H32 or H22 temper.
- C Aluminum-Alloy Drawn Seamless Tubes: ASTM B210/B210M, 6063 alloy, T6 temper.
- D Aluminum-Alloy Bars: ASTM B211/B211M, 6061 alloy, T6 temper.
- E Aluminum-Alloy Sand Castings: ASTM B26/B26M.
- F Aluminum-Alloy Die Castings: ASTM B85/B85M .
- G Bolts, Nuts, and Washers: Stainless steel.
- H Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.03 FABRICATION

- A Fit and shop assemble items in largest practical sections, for delivery to site.
- B Fabricate items with joints tightly fitted and secured.
- C Continuously seal joined members by intermittent welds and plastic filler.

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- D Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.04 FABRICATED LADDERS

- A Ladders: Steel; in compliance with ANSI A14.3; with mounting brackets and attachments; prime paint finish.
 - 1. Side Rails: 3/8 by 2 inches members spaced at 20 inches.
 - 2. Rungs: One inch diameter solid round bar spaced 12 inches on center.
 - 3. Space rungs 7 inches from wall surface.

2.05 VERTICAL HEIGHT ACCESS LADDER SYSTEM KITS:

- A Provide complete system with rail, gated top end-stop, gated bottom end-stop, ladder attachment brackets, and hardware.
- B Manufacturer: GlideLoc Fall Arrester by Miller Fall Protection; Product: Universal II GlideLoc Fall Arrester; www.millerfallprotection.com
- C Contact: Miller Engineered Solutions at 800/325-6746
- D Material: Galvanized steel. or Aluminum
- E System Length: Refer to Drawings.

2.06 FINISHES - STEEL

- A Prime paint steel items.
 - 1. Do not prime surfaces in direct contact with concrete.
 - 2. Do not prime surfaces where field welding is required.
- B Prepare surfaces to be primed in accordance with SSPC-SP2.
- C Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D Prime Painting: One coat.
- E Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.
- F Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

2.07 FINISHES - ALUMINUM

- A Exterior Aluminum Surfaces: Class I natural anodized.
- B Interior Aluminum Surfaces: Class I natural anodized.
- C Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

2.08 FABRICATION

- A Rungs: Not less than 1-1/4 inches (32 mm) in section and 18-3/8 inches (467mm) long, formed from tubular aluminum extrusions. Squared and deeply serrated on all sides.
 - 1. Rungs shall withstand a 1,500 pound (454 kg) load without deformation or failure.
- B Channel Side Rails: Not less than 1/8 inch (3 mm) wall thickness by 3 inches (76 mm) wide.
- C Heavy Duty Tubular Side Rails: Assembled from two interlocking aluminum extrusions no less than 1/8 inch (3 mm) wall thickness by 3 inches (76 mm) wide. Construction shall be self-

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locking stainless steel fasteners, full penetration TIG welds and clean, smooth and burr-free surfaces.

- D Walk-Through Rail and Roof Rail Extension: Not less than 3 feet 6 inches (1067 mm) above the landing and shall be fitted with deeply serrated, square, tubular grab rails.
- E Landing Platform: 1-1/2 inches (38 mm) or greater diameter, tubular aluminum guardrails and decks of serrated aluminum treads.
- F Ship Ladder Seismic Bottom Support: Manufacturer's standard; two isolation bearings per stringer.
- G Ladder Safety Post: Retractable hand hold and tie off.
- H Rail and Harness Fall Arrest System: Supplied where specified as alternate to safety cage and landing platforms, in accordance with OSHA regulation 1910.27; permanently mounted to ladder rungs and complete with necessary components.
- I Safety Cages:
 - 1. Fabricate ladder safety cages to comply with authority having jurisdiction. Assemble by welding. Spacing of primary hoops, secondary hoops and vertical bars shall not exceed that required by code.
 - 2. Safety cage hoops and vertical bars: 3/16 inch (5 mm) by 2 inches (51 mm) aluminum bar.

2.09 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.
- B Coordinate anchorages. Furnish setting drawings, templates, and anchorage structural loads for fastener resistance.
- C Do not begin installation until supporting structure is complete and ladder installation will not interfere with supporting structure work.
- D If supporting structure is the responsibility of another installer, notify Architect of unsatisfactory supporting work before proceeding.

3.02 PREPARATION

- A Coordinate ladder installation with construction of metal stud walls specified in Section 05 40 00 - Cold Formed Metal Framing to ensure adequate support and blocking.
- B Clean and strip primed steel items to bare metal where site welding is required.
- C Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.
- D Insulate dissimilar metals to prevent electrolysis with bituminous paint or non-absorptive isolation pad to prevent contact.

3.03 INSTALLATION

- A Install in accordance with manufacturer's instructions and reviewed shop drawings and in proper relationship with adjacent construction.
- B Install items plumb and level, accurately fitted, free from distortion or defects.

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- C Anchor securely using fasteners specified by manufacturer or others of equivalent or greater strength and corrosion resistance.
- D Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- E Field weld components as indicated on drawings.
- F Perform field welding in accordance with AWS D1.1/D1.1M.
- G Obtain approval prior to site cutting or making adjustments not scheduled.
- H After erection, prime welds, abrasions, and surfaces not shop primed , 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.

3.05 CLEANING AND PROTECTION

- A Clean ladder using clean water and mild detergent. Do not use abrasive agent, steel wool, or harsh chemicals. Rinse with clean water.
- B Protect installed products until completion of project.
- C Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 055133

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SECTION 055213 - PIPE AND TUBE RAILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Wall mounted handrails.
- B Free-standing railings at steps or ramps.

1.02 RELATED REQUIREMENTS

- A Section 033000 - Cast-in-Place Concrete: Placement of anchors in concrete.
- B Section 042000 - Unit Masonry: Placement of anchors in masonry.
- C Section 055100 - Metal Stairs: Handrails other than those specified in this section.
- D Section 092116 - Gypsum Board Assemblies: Placement of backing plates in stud wall construction.

1.03 REFERENCE STANDARDS

- A ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B AISC 201 - AISC Certification Program for Structural Steel Fabricators, Standard for Steel Building Structures; 2006.
- C ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2022.
- D ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- E ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.
- F ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.
- G ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings; 2020.
- H ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2021.
- I AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).
- J AWS D1.6/D1.6M - Structural Welding Code - Stainless Steel; 2017, with Amendment (2021).
- K AWS C3.4M/C3.4 - Specification for Torch Brazing; 2016.
- L AWS C3.5M/C3.5 - Specification for Induction Brazing; 2016, with Amendment (2017).
- M AWS C3.9M/C3.9 - Specification for Resistance Brazing; 2020.
- N IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172; 2019.
- O SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.
- P SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

1.04 SUBMITTALS

- A See Section 013300 - Submittal Requirements , for submittal procedures.
- B Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
 - 1. Include the design engineer's stamp or seal on each sheet of shop drawings.
 - 2. Include structural calculations stamped by a Professional Engineer licensed in the State of California.
- C Delegated Design Data: As required by authorities having jurisdiction.
- D Welders' Certificates.

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- E Fabricator's Qualification Statement: Provide documentation showing steel fabricator is certified under AISC 201.

1.05 QUALITY ASSURANCE

- A All components will meet or exceed the requirements of ADA, OSHA, CBC, and/or local code requirements.
- B Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in California, or personnel under direct supervision of such an engineer.
- C Welder Qualifications: Welding processes and welding operators qualified within previous 12 months.
- D Fabricator Qualifications:
 - 1. A qualified steel fabricator that is certified by the American Institute for Steel Construction (AISC) under AISC 201.
 - 2. Embedded weld connections to be welded by certified welders, and inspected by an independent testing laboratory.
 - 3. A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel in accordance with IAS AC172.
 - 4. A company specializing in manufacturing products specified in this section, with not less than ten years of documented experience.

1.06 QUALITY ASSURANCE

- A Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in California, or personnel under direct supervision of such an engineer.
- B Welder Qualifications: Show certification of welders employed on the Work, verifying AWS qualification within the previous 12 months.
- C Fabricator Qualifications:
 - 1. A qualified steel fabricator that is certified by the American Institute for Steel Construction (AISC) under AISC 201.
- D Fabricator Qualifications: A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel (AC172).
- E A company specializing in manufacturing products specified in this section, with not less than ten years of documented experience.

PART 2 PRODUCTS

2.01 RAILINGS - GENERAL REQUIREMENTS

- A Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of applicable local code.
- B Distributed Loads: Design railing assembly, wall rails, and attachments to resist distributed force of 75 pounds per linear foot applied to the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935.
- C Concentrated Loads: Design railing assembly, wall rails, and attachments to resist a concentrated force of 200 pounds applied at any point on the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935.
- D Allow for expansion and contraction of members and building movement without damage to connections or members.
- E Dimensions: See drawings for configurations and heights.
 - 1. Top Rails and Wall Rails: 1-1/2 inches diameter, round.
 - 2. Intermediate Rails: 1-1/2 inches diameter, round.
 - 3. Posts: 1-1/2 inches diameter, round.

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- F Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
 - 1. For anchorage to concrete, provide inserts to be cast into concrete, for bolting anchors.
 - 2. For anchorage to masonry, provide brackets to be embedded in masonry, for bolting anchors.
 - 3. For anchorage to stud walls, provide backing plates, for bolting anchors.
 - 4. Posts: Provide adjustable flanged brackets.
- G Provide welding fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.
- H Welded and Brazed Joints: Make visible joints butt tight, flush, and hairline; use methods that avoid discoloration and damage of finish; grind smooth, polish, and restore to required finish.
 - 1. Ease exposed edges to a small uniform radius.
 - 2. Welded Joints:
 - a. Carbon Steel: Perform welding in accordance with AWS D1.1/D1.1M.
 - b. Stainless Steel: Perform welding in accordance with AWS D1.6/D1.6M.
 - 3. Brass/Bronze Brazed Joints:
 - a. Perform torch brazing in accordance with AWS C3.4M/C3.4.
 - b. Perform induction brazing in accordance with AWS C3.5M/C 3.5.
 - c. Perform resistance brazing in accordance with AWS C3.9M/C3.9.

2.02 STEEL RAILING SYSTEM

- A Steel Tube: ASTM A500/A500M Grade B cold-formed structural tubing.
- B Steel Pipe: ASTM A 53/A 53M Grade B Schedule 40, galvanized finish.
- C Non-Weld Mechanical Fittings: Slip-on, galvanized malleable iron castings, for Schedule 40 pipe, with flush setscrews for tightening by standard hex wrench, no bolts or screw fasteners.
- D Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.
- E Exposed Fasteners: No exposed bolts or screws.
- F Straight Splice Connectors: Steel concealed spigots.
- G Galvanizing: In accordance with requirements of ASTM A123/A123M.
 - 1. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type I - Inorganic.
- H Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.03 FABRICATION

- A Accurately form components to suit specific project conditions and for proper connection to building structure.
- B Fit and shop assemble components in largest practical sizes for delivery to site.
- C Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.
- D Welded Joints:
 - 1. Exterior Components: Continuously seal joined pieces by intermittent welds and plastic filler. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
 - 2. Interior Components: Continuously seal joined pieces by intermittent welds and plastic filler.

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3. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E Weld connections that cannot be shop welded due to size limitations.
 1. Weld in accordance with AWS D1.1/D1.1M.
 2. Match shop welding and bolting.
 3. Clean welds, bolted connections, and abraded areas.
 4. Touch up shop primer and factory-applied finishes.
 5. Repair galvanizing with galvanizing repair paint per ASTM A780/A780M.

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 Supply items required to be cast into concrete or embedded in masonry with setting templates, for installation as work of other sections.
- C Apply one coat of bituminous paint to concealed aluminum surfaces that will be in contact with cementitious or dissimilar materials.

3.03 INSTALLATION

- A Install in accordance with manufacturer's instructions.
- B Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.
- C Install railings in compliance with ADA Standards for accessible design at applicable locations.
- D Anchor railings securely to structure.
- E Field weld anchors as indicated on drawings. Touch-up welds with primer. Grind welds smooth.
- F Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

3.04 TOLERANCES

- A Maximum Variation From Plumb: 1/4 inch per floor level, non-cumulative.
- B Maximum Offset From True Alignment: 1/4 inch.
- C Maximum Out-of-Position: 1/4 inch.

END OF SECTION 055213

Pipe and Tube Railings - 055213

SECTION 057300 - DECORATIVE METAL RAILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Railing systems.

1.02 RELATED REQUIREMENTS

- A Section 092116 - Gypsum Board Assemblies: Placement of backing plates in stud wall construction.

1.03 REFERENCE STANDARDS

- A ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B AISC 201 - AISC Certification Program for Structural Steel Fabricators, Standard for Steel Building Structures; 2006.
- C ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- D ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.
- E ASTM A555/A555M - Standard Specification for General Requirements for Stainless Steel Wire and Wire Rods; 2023.
- F ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
- G ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings; 2020.
- H ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2020.
- I ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2021.
- J 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.
- K AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.
- L AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).
- M IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172; 2019.
- N NAAMM AMP 500-06 - Metal Finishes Manual; 2006.

1.04 ADMINISTRATIVE REQUIREMENTS

- A Preinstallation Meeting: Convene preinstallation meeting one week before starting work of this section. Attendees include:
 - 1. Contractor.
 - 2. Architect.
 - 3. Other subcontractors of adjacent work.

1.05 SUBMITTALS

- A See Section 013000 - Administrative Requirements for submittal procedures.
- B Product Data: Submit manufacturer's product data, including description of materials, components, finishes, fabrication details, glass, anchors, and accessories.

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- C Shop Drawings: Indicate railing system elevations and sections, details of profile, dimensions, sizes, connection attachments, anchorage, size and type of fasteners, and accessories. Indicate anchor and joint locations, brazed connections, transitions, and terminations.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- D Test Reports: Submit test reports from independent testing agency showing compliance with specified design and performance requirements.
- E Manufacturer's Instructions: Indicate installation.
- F Manufacturer's qualification statement.
- G Fabricator's qualification statement.
- H Welders' qualification statement.
- I Installer's qualification statement.
- J Maintenance Data: Manufacturer's instructions for care and cleaning.
- K Executed warranty.

1.06 QUALITY ASSURANCE

- A Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least three years of documented experience.
- B Fabricator Qualifications: Certified in accordance with AISC 201 and IAS AC172.
- C Installer Qualifications:
 - 1. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A Deliver materials in factory-provided protective coverings and packaging.
- B Protect materials against damage during transit, delivery, storage, and installation at site.
- C Inspect materials upon delivery for damage. Replace damaged items.
- D Prior to installation, store materials and components under cover in dry location.

1.08 FIELD CONDITIONS

- A Ambient Conditions:
 - 1. Do not install railings until project is enclosed and ambient temperature of space is minimum 65 degrees F and maximum 95 degrees F.
 - 2. Maintain ambient temperature of space at minimum 65 degrees F and maximum 95 degrees F for 24 hours before, during, and after railing installation.

1.09 WARRANTY

- A Manufacturer's Warranty: Manufacturer's standard 1-year warranty against defects in materials, fabrication, finishes, and installation commencing on mm-dd-yyyy; complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A Decorative Metal Railings:
 - 1. ATR Technologies Inc; Aluminum Cable Railing: www.atr-technologies.com/#sle.
 - 2. HDI Railing Systems; Koto: www.handrail-design.com/#sle.
 - 3. Precision Cable and Swaging, Newport Beach, CA: www.prescable.com/.

2.02 RAILING SYSTEMS

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- A General: Factory- or shop-fabricated to suit project conditions, for proper connection to building structure, and in largest sizes practical for delivery to site.
- B Performance Requirements: Applying loads simultaneously not required; design and fabricate railings and anchorages to resist loads without failure, damage, or permanent set, including:
 - 1. Lateral Force: 75 lb minimum, when tested in accordance with ASTM E935.
 - 2. Distributed Load: 50 lbf/ft minimum, applied vertically and horizontally at top of handrail, when tested in accordance with ASTM E935.
 - 3. Concentrated Loads: 200 lb minimum, applied to handrail horizontally and vertically, in accordance with ASTM E935.
 - 4. Handrails: Comply with ADA Standards.
- C Assembly: Use slip-on, nonweld mechanical fittings, flanges, escutcheons, and wall brackets to join lengths, seal open ends, and conceal exposed mounting bolts and nuts.
- D Joints: Machined smooth with hairline seams; tightly fitted and secured.
- E Field Connections: Provide sleeves to accommodate site assembly and installation.
- F Post and Cable Railing System:
 - 1. Configuration: Guardrail with separate handrail.
 - 2. Stainless Steel Bar and Shape: Type 304 or Type 316 stainless steel.
 - a. Guardrail Post: Refer to Drawings .
 - 3. Stainless Steel Tube: Type 304 or Type 316 stainless steel.
 - a. Guardrail Post: Refer to Drawings.
 - b. Handrail: Refer to Drawings.
 - c. Top Rail: Refer to Drawings.
 - 4. Cable: ASTM A555/A555M.
 - a. Fabricate from ASTM A666 stainless steel, Type 304 or Type 316.
 - b. Size: 3/16-inch diameter.
 - 5. Fittings: Type 304 or Type 316 stainless steel, nonswage.
 - 6. Fasteners: Stainless steel.
 - 7. Finishes:
 - 8. Fabrication:
 - a. Corners: Mitered and welded; grind smooth to match adjacent finish.
 - b. Exposed Joints: Butt tight and flush.
 - c. Splices: Provide interior sleeves; fasteners allowed at splice connections.

2.03 MATERIALS

2.04 FINISHES

- A General: Comply with NAAMM AMP 500-06.
 - 1. Complete mechanical finishes before fabrication. After fabrication, finish joints, bends, abrasions, and surface blemishes to match sheet.
 - 2. Protect mechanical finishes on exposed surfaces from damage.
 - 3. Apply organic and anodic finishes to formed metal after fabrication.
 - 4. Appearance: Limit variations in appearance of adjacent pieces to one-half of range represented in approved samples. Noticeable variations in same piece are not acceptable. Install components within range of approved samples to minimize contrast.
- B Stainless Steel Finishes:
 - 1. Remove tool marks, die marks, and stretch lines before finishing.

2.05 ACCESSORIES

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- A Nonweld Mechanical Fittings for Stainless Steel Railings: Slip-on, galvanized malleable iron castings, for Schedule 40 pipe, with flush setscrews for tightening by standard hex wrench, no bolts or screw fasteners.
- B Anchors and Fasteners: Provide anchors, fasteners, and other attachment devices required to attach to structure. Ensure attachment devices are of same material as components unless indicated otherwise.
 - 1. Steel Fasteners: ASTM F3125/F3125M, Type 1, galvanized in accordance with ASTM A153/A153M.
 - 2. Carbon Steel Fasteners: ASTM A307.
 - 3. Stainless Steel Fasteners: Type 304.
 - 4. Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing; provide only where exposed fasteners are unavoidable.
 - 5. Posts: Provide adjustable flanged brackets.
 - 6. For anchorage to concrete, provide inserts for casting into concrete for bolt anchors.
 - 7. For anchorage to stud walls, provide backing plates for bolt anchors. See Section 092116.
- C Hydraulic Expansion Cement: ASTM C1107/C1107M.
- D Bituminous Coating: Cold-applied asphalt mastic, noncorrosive compound free of asbestos, sulfur, and other deleterious impurities; 0.015-inch dry film thickness per coat.
- E Sealant: Silicone; black.

PART 3 EXECUTION

3.01 EXAMINATION

- A Verify that substrate and site conditions are acceptable and ready to receive work.
- B Verify field dimensions of locations and areas to receive work.
- C Notify Architect immediately of conditions that would prevent satisfactory installation.
- D Do not proceed with work until detrimental conditions are corrected.

3.02 PREPARATION

- A Protection of In-Place Conditions: Protect existing work before proceeding with installation.
- B Review installation drawings before beginning installation. Coordinate diagrams, templates, instructions, and directions for installation of anchorages and fasteners.
- C Clean surfaces to receive railings. Remove materials and substances detrimental to installation.
- D Stainless Steel: After polishing, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

3.03 INSTALLATION

- A Install in accordance with manufacturer's instructions.
- B Install components plumb and level, accurately fitted, free from distortion or defects, and with tight joints, except where necessary for expansion.
- C Anchor securely to structure.
- D Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.
- E Weld connections that cannot be shop welded due to size limitations.
 - 1. Weld in accordance with AWS D1.1/D1.1M.
 - 2. Match shop welding and bolting.
 - 3. Clean welds, bolted connections, and abraded areas.
 - 4. Touch up shop primer and factory-applied finishes.
 - 5. Repair galvanizing with galvanizing repair paint in accordance with ASTM A780/A780M.

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- F Isolate dissimilar materials with bituminous coating, bushings, grommets, or washers to prevent electrolytic corrosion.

3.04 TOLERANCES

- A Maximum Variation From Plumb: 1/4 inch per floor level, noncumulative.
- B Maximum Offset From True Alignment: 1/4 inch.
- C Maximum Out-of-Position: 1/4 inch.

3.05 FIELD QUALITY CONTROL

- A See Section 014000 - Quality Requirements for additional requirements.
- B Manufacturer Services: Provide services of manufacturer's field representative to observe railing installation.

3.06 CLEANING

- A Remove protective film from exposed metal surfaces.
- B Metal: Clean exposed metal finishes with potable water and mild detergent in accordance with manufacturer recommendations; do not use abrasive materials or chemicals, detergents, or other substances that may damage material or finish.

3.07 PROTECTION

- A Protect installed components and finishes from damage after installation.
- B Repair damage to exposed, making finishes indistinguishable from undamaged areas.
- C Replace finishes and components that have irreparable damage. Ensure damaged areas are indistinguishable from undamaged finishes and surfaces.

END OF SECTION 057300

Decorative Metal Railings - 057300

SECTION 062000 - FINISH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Wood door frames, glazed frames.
- B Wood casings and moldings.
- C Hardware and attachment accessories.

1.02 RELATED REQUIREMENTS

- A Section 061000 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- B Section 064100 - Architectural Wood Casework: Shop fabricated custom cabinet work.
- C Section 081416 - Flush Wood Doors.

1.03 REFERENCE STANDARDS

- A ANSI A135.4 - Basic Hardboard; 2012 (Reaffirmed 2020).
- B ANSI A208.1 - American National Standard for Particleboard; 2022.
- C ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015 (Reaffirmed 2020).
- D ASTM C1036 - Standard Specification for Flat Glass; 2021.
- E ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
- F ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- G AWI (QCP) - Quality Certification Program; Current Edition.
- H AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- I AWMAC (GIS) - Guarantee and Inspection Services Program; Current Edition.
- J AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.
- K AWP A U1 - Use Category System: User Specification for Treated Wood; 2023.
- L BHMA A156.9 - Cabinet Hardware; 2020.
- M HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; 2020.
- N NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
- O NHLA G-101 - Rules for the Measurement and Inspection of Hardwood and Cypress; 2023.
- P PS 1 - Structural Plywood; 2023.
- Q PS 20 - American Softwood Lumber Standard; 2021.
- R WDMA I.S. 4 - Industry Specification for Preservative Treatment for Millwork; 2019.
- S WI (CCP) - Certified Compliance Program (CCP); Current Edition.
- T WI (MCP) - Monitored Compliance Program (MCP); Current Edition.

1.04 ADMINISTRATIVE REQUIREMENTS

- A Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.
- B Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

1.05 SUBMITTALS

- A See Section 013300 - Submittal Requirements for submittal procedures.
- B Product Data:
 - 1. Provide data on fire retardant treatment materials and application instructions.

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2. Provide instructions for attachment hardware and finish hardware.
- C Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
 1. Provide engineered shop drawings and calculations for elements hanging from ceilings, structures above or floor elements supporting overhead canopies. A qualified professional engineer shall prepare and seal design calculations, shop drawings, and other structural data. Engineer to be licensed in the State of California.
 2. Scale of Drawings: 1-1/2 inch to 1 foot, minimum.
 3. Provide information as required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
 4. Include certification program label.

1.06 QUALITY ASSURANCE

- A Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
 1. Company with at least one project within the past 5 years with value of woodwork within 20 percent of cost of woodwork for this project.
 2. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
 3. Single Source Responsibility: Provide and install this work from single fabricator.
- B Quality Certification:
 1. Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section: www.awiqcp.org/#sle.

1.07 DELIVERY, STORAGE, AND HANDLING

- A Deliver factory-fabricated units to project site in original packages, containers or bundles bearing brand name and identification.
- B Store finish carpentry items under cover, elevated above grade, and in a dry, well-ventilated area not exposed to heat or sunlight.
- C Store materials at the fabrication site and in the installation location in a temperature and humidity controlled environment. Store materials on site for 14 days, to acclimate prior to installation.

PART 2 PRODUCTS

2.01 FINISH CARPENTRY ITEMS

- A Refer to Interior Drawings and Specifications.
- B Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- C Surface Burning Characteristics: Provide materials having fire and smoke properties as required by applicable code.
- D Interior Woodwork Items:
 1. Moldings, Bases, Casings, and Miscellaneous Trim: Clear white pine; prepare for paint finish.

2.02 LUMBER MATERIALS

- A Softwood Lumber: Species: As indicated on the Drawings, Flat sawn, maximum moisture content of 11 percent; with vertical grain, of quality suitable for transparent finish.

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1. For cleats and the like not subject to view in the completed installations species to be poplar unless noted otherwise.
- B Hardwood Lumber: Species: As indicated on the Drawings, Flat sawn, maximum moisture content of 11 percent; with vertical grain, of quality suitable for transparent finish.

2.03 SHEET MATERIALS

- A Softwood Plywood, Not Exposed to View: Any face species, medium density fiberboard core; PS 1 Grade A-B, glue type as recommended for application.
- B Softwood Plywood, Exposed to View: Face species as indicated, plain sawn, medium density fiberboard core; PS 1 Grade A-B, glue type as recommended for application.
- C Hardwood Plywood: Face species as indicated, plain sawn, book matched, medium density fiberboard core; HPVA HP-1 Front Face Grade AA, Back Face Grade 1, glue type as recommended for application.
- D Particleboard: ANSI A208.1 Composed of wood chips, sawdust, or flakes of medium density, made with waterproof resin binders; of grade to suit application; sanded faces.
- E Hardboard: ANSI A135.4 Pressed wood fiber with resin binder, Class 1 - Tempered, 1/4 inch thick, smooth one side (S1S).

2.04 PLASTIC LAMINATE MATERIALS

- A Plastic Laminate: NEMA LD 3, HGS; color as selected by Architect; textured, low gloss finish.
- B Low Pressure Laminate: Thermally Fused Melamine, Color White, Black or as indicated on the Drawings..
- C Solid Laminate: As indicated on the Drawings.
- D Laminate Backing Sheet: NEMA LD 3, BKL;.
- E Laminate Adhesive: Type recommended by laminate manufacturer to suit application; not containing formaldehyde or other volatile organic compounds.
 1. Formaldehyde free / low VOC adhesives shall be used.

2.05 FASTENINGS

- A Adhesive for Purposes Other Than Laminate Installation: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.
 1. Formaldehyde free / low VOC adhesives shall to be used in the Owner's Suite.
- B Screw Fasteners: Of size and type to suit application; finish in exposed locations to closely match adjacent surface. Submit samples of each finish type..
- C Concealed Joint Fasteners: Threaded steel.

2.06 ACCESSORIES

- A Lumber for Shimming, Blocking,: Softwood lumber of pine species.
- B Plastic Edge Trim: As indicated on the Drawings.
- C Aluminum Edge Trim: As indicated on the Drawings.
- D Glass: Type as specified in Section 08 80 13.
- E Primer: Alkyd primer sealer.
- F Wood Filler: Solvent base, tinted to match surface finish color.

2.07 HARDWARE

- A Hardware: Comply with BHMA A156.9.

2.08 WOOD TREATMENT

- A Factory-Treated Lumber: Comply with requirements of AWP A U1 - Use Category System for pressure impregnated wood treatments determined by use categories, expected service

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conditions, and specific applications.

- B Fire Retardant Treatment (FR-S Type): Chemically treated and pressure impregnated; capable of providing flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.
- C Wood Preservative by Pressure Treatment (PT Type): Provide AWPAC U1 treatment using waterborne preservative with 0.25 percent retainage.
- D Water Repellent Preservative Treatment by Dipping Method: WDMA I.S. 4, with 0.25 percent retainage.
- E Provide identification on fire retardant treated material.
- F Redry wood after pressure treatment to maximum percent moisture content as recommended by manufacturer.

2.09 FABRICATION

- A Shop assemble work for delivery to site, permitting passage through building openings.
- B Fit exposed sheet material edges with 3/8 inch matching hardwood edging. Use one piece for full length only.
- C Cap exposed plastic laminate finish edges with plastic trim.
- D When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.
- E Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.
- F Apply laminate backing sheet to reverse face of plastic laminate finished surfaces.

2.10 SHOP FINISHING

- A Sand work smooth and set exposed nails and screws.
- B Apply wood filler in exposed nail and screw indentations.
- C On items to receive transparent finishes, use wood filler that matches surrounding surfaces and is of type recommended for the applicable finish.
- D 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 - 12 Polyurethane Water-based.
 - b. Stain: Match sample or as noted in the finish specifications.
 - c. Sheen: Match sample or as noted in the finish specifications.
 - 2. Opaque:
 - a. System - 12 Polyurethane Water-based.
 - b. Color: Match sample or as noted in the finish specifications.
 - c. Sheen: Match sample or as noted in the finish specifications.
- E Back prime woodwork items to be field finished, prior to installation.

PART 3 EXECUTION

3.01 EXAMINATION

- A Verify adequacy of backing and support framing.
- B Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

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3.02 INSTALLATION

- A Install work in accordance with AWI/AWMAC/WI (AWS) 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.
- D Install components with nails at 12 inch on center min. Place nail fasteners in blind locations or creases wherever possible. At exposed locations place in a manor that minimizes their appearance.
- E Install prefinished paneling with full bed contact adhesive applied to substrate.
- F Install hardware in accordance with manufacturer's written instructions.

END OF SECTION 062000

Finish Carpentry - 062000

SECTION 064100 - ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Specially fabricated cabinet units.
- B Countertops.
- C Hardware.
- D Factory finishing.
- E Preparation for installing utilities.
- F Plastic Laminate.
- G Other furnishing and decorative items as indicated on Interior Drawings and Specifications.

1.02 RELATED REQUIREMENTS

- A Section 061000 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- B Section 066116 - Solid Surfacing Fabrications: Solid polymer fabrications

1.03 REFERENCE STANDARDS

- A ANSI A135.4 - Basic Hardboard; 2012 (Reaffirmed 2020).
- B ANSI A208.1 - American National Standard for Particleboard; 2022.
- C ANSI A208.2 - Medium Density Fiberboard (MDF) for Interior Applications; 2022.
- D ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- E BHMA A156.9 - Cabinet Hardware; 2020.
- F GSA CID A-A-1936 - Adhesives, Contact, Neoprene Rubber; 1996a (Validated 2013).
- G HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; 2020.
- H NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.04 ADMINISTRATIVE REQUIREMENTS

- A Preinstallation Meeting: Convene a preinstallation meeting not less than one week before starting work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

- A See Section 013300 - Submittal Requirements, for submittal procedures.
- B Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
 - 1. Scale of Drawings: 1-1/2 inch to 1 foot, minimum.
 - 2. Provide the information required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
 - 3. Include certification program label.
- C Product Data: Provide data for hardware accessories.
 - 1. Adhesive manufacturer's product data for each adhesive used indicating that the adhesive contains no urea formaldehyde.
- D Provide UL approved identification on fire retardant treated material.
- E Samples: Submit actual samples of architectural cabinet construction, minimum 12 inches square, illustrating proposed cabinet, countertop, and shelf unit substrate and finish.
- F Samples: Submit actual sample items of proposed pulls, hinges, shelf standards, and locksets, demonstrating hardware design, quality, and finish.

1.06 QUALITY ASSURANCE

Architectural Wood Casework - 064100

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- A Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum 10 years of documented experience.
 - 1. Company with at least one project in the past 5 years with value of woodwork within 20 percent of cost of woodwork for this Project.
- B Single-Source Responsibility for Fabrication and Installation: Engage qualified woodworking firm to assume undivided responsibility for fabricating, finishing, and installing woodwork specified in this Section.
- C Quality Certification:
 - 1. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) requirements for grade or grades specified.
 - 2. Replace, repair, or rework all work for which certification is refused.
- D Regulatory Requirements:
 - 1. Flame Spread Index: Where fire-retardant treated wood is specified or required by IBC Chapter 8 requirements, provide materials that have been tested in accordance with ASTM E84 by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - 2. Fire-retardant treated materials shall be identified with appropriate classification markings indicating rating on surfaces that will be concealed from view in the finished work or by separate removable label applied by the treated wood Manufacturer.

1.07 MOCK-UPS

- A Provide mock-up of typical base cabinet, wall cabinet, and countertop, including hardware, finishes, and plumbing accessories.
- B See Section 014000 - Quality Requirements for additional requirements.
- C Locate where directed.
- D Mock-up may remain as part of the work.

1.08 DELIVERY, STORAGE, AND HANDLING

- A Packing and Shipping: Deliver materials to site in Manufacturer's original unopened packaging with labels intact.
- B Storage: Adequately protect against damage and moisture while stored at the site.
- C Handling: Comply with Manufacturer's instructions.
- D Protect units from moisture damage.

1.09 FIELD CONDITIONS

- A During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.
- B Verify that field measurements are as indicated on Shop Drawings.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A Single Source Responsibility: Provide and install this work from single fabricator.

2.02 CABINETS

- A Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS), unless noted otherwise.
- B Wood Veneer Faced Cabinet:
 - 1. Exposed Surfaces: HPVA HP-1 Grade A, Ash, plain sliced, random-matched.
 - 2. Semi-Exposed Surfaces: HPVA HP-1 Grade B, Ash, plain sliced, random-matched.

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- 3. Concealed Surfaces: Manufacturer's option.
- C Plastic Laminate Faced Cabinets: Custom grade.

2.03 PANEL CORE MATERIALS

- A Particleboard: Composite panel composed of cellulosic particles, additives, and bonding system; comply with ANSI A208.1.
 - 1. Grade: M-2; moisture resistance: MR10.
 - 2. Panel Thickness: 3/4 inch.
- B Medium Density Fiberboard (MDF): Composite panel composed of cellulosic fibers, additives, and bonding system; cured under heat and pressure; comply with ANSI A208.2.
 - 1. Grade: 115; moisture resistance: MR10.
 - 2. Panel Thickness: 3/4 inch.
- C Basic Hardboard: Panel manufactured from inter-felted lignocellulosic fibers consolidated under heat and pressure; comply with ANSI A135.4.
 - 1. Class: Tempered.
 - 2. Surface: Smooth one side (S1S).
 - 3. Nominal Thickness: 1/4 inch.

2.04 LAMINATE MATERIALS

- A Manufacturers:
 - 1. Basis of Design: Wilsonart[<>]: www.wilsonart.com.
 - 2. Formica Corporation: www.formica.com/#sle.
 - 3. Nevamar: www.nevamar.com
 - 4. Panolam Industries International, Inc; Nevamar: www.nevamar.com.
 - 5. Other manufacturers specifically noted in Drawings.
 - 6. Substitutions: Refer to Section 012500 Substitution Procedures.
- B High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.
- C Provide specific types as indicated.
 - 1. Finishes, colors, patterns and textures as indicated on the Drawings and Material Schedule and as indicated on the drawings or selected by the Architect.
 - 2. Horizontal Surfaces: HGL, 0.039 inch nominal thickness, through color, color as selected, finish as indicated.
 - 3. Laminate Backer: BKL, 0.020 inch nominal thickness, undecorated; for application to concealed backside of panels faced with high pressure decorative laminate.

2.05 COUNTERTOPS

- A Refer to Section 066116 - Solid Surfacing Fabrications.
- B Colors, Patterns, and Finishes:
 - 1. As indicated on Drawings and Material Schedules.

2.06 ACCESSORIES

- A Adhesive: Type recommended to meet AWS Adhesive Guidelines.
 - 1. All adhesive to be formaldehyde free/low VOC in fabrication of all casework.
- B Wall Adhesive: Cartridge type compatible with paneling and wall substrate.
- C Fasteners: Size and type to suit application.
- D 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.

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- E Concealed Joint Fasteners: Threaded steel.
- F Grommets: Standard plastic, painted metal, or rubber grommets for cut-outs, in color to match adjacent surface.

2.07 HARDWARE

- A General:
 - 1. Hardware: BHMA A156.9, types as indicated for quality grade specified.
 - 2. Metal Z-Shaped Wall Cabinet Support Clips: Paired, cleated, structural anchorage components applied to back of cabinets and walls for wall cabinet mounting.
 - a. Material: Extruded Aluminum.
 - 3. Finish: As indicated on the Drawings, or if not indicated, as selected by Architect
- B Shelf Supports and Standards:
 - 1. Adjustable Shelf Supports: Standard side-mounted system using multiple holes for pin supports and coordinated self rests, polished chrome finish, for nominal 1 inch spacing adjustments.
- C Vanity Brackets: Cantilevered support leg, face-of-stud mounting.
 - 1. Materials: Steel L-shapes, Refer to Drawings.
 - 2. Finish: Manufacturer's standard, factory-applied, primer.
 - 3. Support Length: 21" inches.
- D Countertop Brackets: Fixed, concealed vertical leg, side-of-stud mounting.
 - 1. Materials: Steel L- and T-shapes.
 - a. Finish: Manufacturer's standard, factory-applied, powder coat.
 - b. Color: Black.
 - c. Vertical Leg: 12 inches.
 - d. Support Member Depth: 1 inch.
 - e. Support Member Width: 1 inch
 - f. Support Member Length: 21 inches.
- E Drawer Hardware:
 - 1. Drawer and Door Pulls: "U" shaped wire pull, steel with satin finish, 4 inch centers.
 - 2. Cabinet Locks: Keyed cylinder, two keys per lock, steel with chrome finish.
 - a. Best Access 3L and 5L Series Cabinet locks.
 - b. or as noted on the Drawings.
 - 3. Cabinet Catches and Latches:
 - a. Type: Magnetic catch.
 - b. Manufacturers:
 - 1) Knappe & Vogt Manufacturing Company: www.knappeandvogt.com/#sle.
 - 2) Sugatsune America, Inc: www.sugatsune.com/#sle.
 - 3) Or Approved Equal.
 - 4. Drawer Slides:
 - a. Type: Full extension with overtravel.
 - b. Conforming to ANSI/BIFMA X5.6, UL 1678 and UL 1286.
 - 1) Light and medium duty drawers 24-inch wide or less: Accuride 7432 ball bearing, rail mount, full extension slides with 100 lb./pr. load rating. Provide Accuride 7434 overtravel slides where drawers require full access.
 - 2) Heavy duty drawers - 42 in wide or less: Accuride 3640A ball bearing, rail mount, full extension slides plus 1 inch (25mm) overtravel with 200 lb./pr. load rating.
 - 3) Finish: Clear zinc.
 - c. Static Load Capacity: Commercial grade.

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- d. Mounting: Side mounted.
- e. Stops: Integral type.
- f. Features: Provide self closing/stay closed type.
- g. Manufacturers:
 - 1) Accuride International, Inc: www accuride.com.
 - 2) Accuride International, Inc; Heavy-Duty Drawer Slides: www accuride.com/#sle.
 - 3) Grass America Inc; ____: www.grassusa.com/#sle.
 - 4) Knappe & Vogt Manufacturing Company: www.knappeandvogt.com.
 - 5) Knappe & Vogt Manufacturing Company; Heavy-Duty Drawer Slides: www.knappeandvogt.com/#sle.
 - 6) Substitutions: Refer to Section 012500 - Substitution Procedures.
- F Hinges:
 - 1. Hinges: European style concealed self-closing type, steel with nickel-plated finish.
 - a. Manufacturers:
 - 1) Blum, Inc; COMPACT BLUMOTION: www.blum.com/#sle.
 - 2) Grass America Inc; ____: www.grassusa.com/#sle.
 - 3) Hettich America, LP: www.hettich.com/sle.

2.08 SHOP TREATMENT OF WOOD MATERIALS

- A Provide UL approved identification on fire retardant treated material at or before time of installation
- B Deliver fire retardant treated materials cut to required sizes. Minimize field cutting.

2.09 FABRICATION

- A Fabricate architectural woodwork and cabinets in conformance with AWI Premium Grade.
- B Exposed fasteners are not allowed in the finish Work on exposed and semi-exposed surfaces of the case goods.
- C Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.
- D Edging: Fit shelves, doors, and exposed edges with specified edging or with material to match face species if not otherwise specified. Edgebanding shall be adhered with PUR or Type 2 Aliphatic Resin. Do not use more than one piece for any single length.
- E Shelves: Fabricate shelves with 3/4 inch thick, formaldehyde free MDF or plywood cores, unless otherwise indicated.
 - 1. Laminate, Shelves within Casework: Melamine, thermally fused, PVC edge banding at all adjustable shelf edges, unless otherwise indicated.
 - 2. Shelf Supports: 5 mm system holes or as indicated on the Drawings.
- F Drawer Boxes: Fabricate drawer boxes from Baltic Birch plywood. Biscuit or blind dowel drawer boxes. Exposed fasteners are unacceptable.
 - 1. Fabricate sides and back from minimum 1/2 inch (9-ply) plywood.
 - 2. Fabricate bottoms from minimum 3/8 inch (7-ply) plywood.
- G Fitting: When necessary to cut and fit on site, provide materials with ample allowance for scribing. Scribe tolerance is 1/32" max. Scribe trim is not acceptable.
- H Door and Drawer Fronts: 3/4 inch, or as shown on Drawings.
- I Semi-exposed Surfaces (Interior surfaces of wood and plastic laminate casework): Melamine, thermally fused.
 - 1. Color: White.
- J Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly

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bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.

1. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
2. Cap exposed plastic laminate finish edges with material of same finish and pattern.
3. Edge Treatment: As detailed.

- K Mechanically fasten back splash to countertops as recommended by laminate manufacturer at 16 inches on center.
- L When necessary to cut and fit on site, provide materials with ample allowance for cutting and scribing to walls.
- M Provide cutouts for plumbing fixtures. Verify locations of cutouts from on-site dimensions. Seal cut edges. Extend J-boxes as required by NEC.

PART 3 EXECUTION

3.01 EXAMINATION

- A Verify adequacy of backing and support framing.
- B Verify location and sizes of utility rough-in associated with work of this section.
- C Coordination: Coordinate with other Work which affects, connects with, or will be concealed by this Work.

3.02 INSTALLATION

- A Install work in accordance with AWI/AWMAC/WI (AWS) requirements for grade indicated.
- B Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level. Shim as required with concealed shims. Install to tolerance of 1/8-inch in 96-inches for plumb and level (including tops).
- C Use fixture attachments in concealed locations for wall mounted components.
- D Use concealed joint fasteners to align and secure adjoining cabinet units.
- E Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose. Refinish cut surfaces or repair damaged finish at cuts.
- F Secure cabinets to floor using appropriate angles and anchorages.
- G Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces. When exposed fastening is required to complete installation, exposed fasteners shall be set in quirks, reveals, and reliefs (to be least visible when installation is complete).
- H Install trim in single lengths without splices where possible.
 1. Splices should be cut at a 22.5 degree angle. Miter external corners and cope internal corners.
 2. Where blind nailing is not possible, drill pilot holes at locations best hidden in finished work.
 3. Use only finish or casing nails. Set nails for putty stopping in surfaced members

3.03 FIELD FINISHING

- A Field finish Architectural Woodwork indicated to have a painted finish.
 1. Sand Work smooth.
 2. Prime, fill, and finish Work of this Section in accordance with Section 099000 - Painting and Coating.

3.04 ADJUSTING

- A Test installed work for rigidity and ability to support loads.
- B Adjust moving or operating parts to function smoothly and correctly.

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- C Repair damaged and defective woodwork where possible to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- D Clean, lubricate, and adjust hardware

3.05 CLEANING

- A Clean casework, counters, shelves, hardware, fittings, and fixtures.
- B During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

3.06 PROTECTION

- A Provide final protection and maintain conditions, in a manner acceptable to Owner that ensures that woodwork is without damage or deterioration at time of Substantial Completion.

END OF SECTION 064100

Architectural Wood Casework - 064100

SECTION 066116 - SOLID SURFACING FABRICATIONS

PART 1 GENERAL

1.01 SUMMARY

- A Section Includes: Solid polymer fabrications, as indicated on Drawings and as specified, including, but not limited to:
 - 1. Solid Surface Countertops, backsplashes, endsplashes.

1.02 RELATED SECTIONS:

- A Section 064100 - Architectural Wood Casework, for sub-tops for solid polymer countertops.

1.03 REFERENCE STANDARDS

- A ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- B ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).
- C ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.
- D NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

1.04 DESIGN REQUIREMENTS

- A Design Load: Deflection limited to 1/360.
- B Design items with sufficient strength for handling stresses.

1.05 SUBMITTALS

- A See Section 013300 - Submittal Requirements, for submittal requirements.
- B Shop Drawings: Indicate dimensions, thicknesses, required clearances, tolerances, materials, colors, finishes, fabrication details, field jointing, adjacent construction, design load parameters, methods of support, integration of plumbing components, and anchorages.
- C Product Data: Indicate product description, fabrication information and compliance with specified performance requirements.
- D Samples: Submit four (4), 6 inch x 6 inch samples of each color/finish of solid surfacing material required.
- E Manufacturer's Installation Instructions: Indicate preparation of opening required, rough-in sizes; provide templates for cast-in or placed frames or anchors; tolerances for item placement, temporary bracing of components.
- F Maintenance Data: Indicate list of approved cleaning materials and procedures required; list of substances that are harmful to the component materials.
 - 1. Include instructions for stain removal, surface and gloss restoration.
- G Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- H Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements, for additional provisions.
 - 2. Extra Polishing Cream: 16 oz.

1.06 QUALITY ASSURANCE

- A Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 10 years of documented experience.
- B Fabricator Qualifications:
 - 1. Certified or approved by the Manufacturer.

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2. Subject to approval by Architect.
3. Have adequate physical facilities and sufficient production capacity to produce, transport, deliver, and install the required units without causing delay in the work.
4. Have a minimum of 10 years of fabrication experience.
- C Installers: Provide work of this Section executed by competent installers with minimum five (5) years experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.
- D Source Limitations: Obtain solid surfacing fabrications through one source.
- E Fire-Test-Response Characteristics: Provide solid surfacing fabrications with the following surface-burning characteristics as determined by testing identical products per ASTM E84 by UL 723 or another testing and inspecting agency acceptable to authorities having jurisdiction:
 1. Flame-Spread Index: 25 or less.
 2. Smoke-Developed Index: 450 or less.

1.07 COORDINATION

- A Submit coordination drawings indicating plumbing and miscellaneous steel work indicating locations of wall rated or non-rated, blocking requirements, locations and recessed wall items and similar items.

1.08 DELIVERY, STORAGE AND HANDLING

- A Deliver no components to project site until areas are ready for installation. Store indoors in a dry area on raised sleepers or pallets, and away from extreme temperatures.
- B Deliver materials and accessory products in manufacturer's unopened containers.
- C Handle materials to prevent damage to finished surfaces. Provide protective coverings to prevent physical damage or staining following installation for duration of project.

1.09 WARRANTY

- A See Section 017836 - Warranties and Bonds, for additional warranty requirements.
- B Provide manufacturer's ten year limited warranty against visible defects and failure due to manufacturing defects. Damage caused by physical or chemical abuse or damage from excessive heat is excluded from warranty. Warranty shall provide material and labor to repair or replace defective materials.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A Solid Surfacing Materials: Provide solid surfacing materials of Manufacturers in this specification or scheduled on Drawings and Material Schedules, unless approved otherwise by Architect.

2.02 MATERIALS - SOLID SURFACE

- A Solid Surfacing Material: Manufacturer's proprietary formulation of fully densified composite of modified polymer resins and mineral fillers.
 1. Basis of Design Product: Corian: www.corian.com.
 - a. Acceptable Manufacturers:
 - 1) Wilsonart.
 - 2) LG Hausys Hi-Mac
 - 3) Or Approved Equal.
 2. UL Class 1 fire resistance rated.

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3. Color and Finish: As indicated on Drawings and Material Schedule by reference to Manufacturer's proprietary color designations.
 4. Sheen on the material is a Semi-Gloss finish typical.
 5. Resin: Polyester type, with integral coloring, stain resistant to domestic chemicals and cleaners.
 6. Thickness: As indicated on Drawings.
 7. Provide edge details as shown on the Drawings.
 8. Provide 4" backsplashes and endsplashes, where shown on the Drawings, to dimensions shown on the Drawings.
- B Accessories
1. Joint Adhesive: Manufacturer's standard twopart adhesive kit to create inconspicuous, nonporous joints. Color to match fabrication material.
 2. Panel Adhesive: Manufacturer's standard neoprene-based panel adhesive meeting ANSI A136.11967 and UL(R) listed.
 3. Sealant:
 - a. For conditions exposed to moisture; Manufacturer's standard mildew-resistant, FDA/UL(R) recognized silicone sealant in colors matching components.
 - b. For conditions not exposed to moisture; Manufacturer's standard silicone sealant in colors matching polymer material.
- C Fabrication:
1. Factory fabricate components to greatest extent practicable to sizes and shapes indicated, in accordance with approved shop drawings.
 2. Form joints between components using manufacturer's standard joint adhesive; without conspicuous joints.
 3. Provide factory cutouts for plumbing fittings and bath accessories as indicated on the drawings. Coordinate with scheduled and specified plumbing fixtures and toilet room accessories.
 4. Cut and finish component edges with clean, sharp returns. Route radii and contours to template. Repair or reject defective and inaccurate work.

PART 3 EXECUTION

3.01 EXAMINATION

- A Verification of Conditions: Examine sub-surfaces to receive Work and report detrimental conditions in writing to Architect. Commencement of Work will be construed as acceptance of sub-surfaces.
- B Coordination: Coordinate with other work which affects, connects with, or will be concealed by this Work.

3.02 INSTALLATION

- A Install components plumb and level, in accordance with approved shop drawings and product installation details.
1. Tops:
 - a. Flat and true to within 1/8" (3 mm) of a flat surface over a 10' length.
 - b. Allow a minimum of 1/16" to a maximum of 1/8" (3 mm) clearance between surface and each wall.
- B Form joint seams with specified seam adhesive. Seams to be inconspicuous in completed work. Seams in locations shown on approved shop drawings and acceptable to manufacturer. Promptly remove excess adhesive.
1. Clamp or brace quartz surfaces in position until adhesive set

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- C Form field joints with joint widths no greater than 1/8" (3 mm) in finished work.
 - 1. Keep components and hands clean when making joints.
- D Fill gaps between countertop and terminating substrates with specified silicone sealant.
- E Sinks:
 - 1. Adhere undermount sinks/bowls to countertops using manufacturer's recommended adhesive and mounting hardware.
 - 2. Adhere drop-in sinks/bowls to countertops using manufacturer-recommended adhesives and color-matched silicone sealant.
- F Provide backsplashes and endsplashes as indicated on the drawings.
 - 1. Adhere to countertops using manufacturer's standard color-matched silicone sealant.
- G Keep components and hands clean during installation.
 - 1. Remove adhesives, sealants and other stains.
 - 2. Components shall be clean on date of substantial completion.
- H Connections:
 - 1. Make plumbing connections in accordance with Division 22.
 - 2. Make electrical connections in accordance with Division 26.
- I Form field joints using manufacturer's recommended adhesive, with joints inconspicuous in finished work. Keep components and hands clean when making joints.

3.03 INSTALLATION TOLERANCES

- A Maximum variation from level and plumb: 1/8 inch in 10 feet, noncumulative.
- B Maximum variation in plane between adjacent pieces at joint: Plus or minus 1/16 inch.

3.04 PROTECTION

- A Keep components and hands clean during installation. Remove adhesives, sealants and other stains. Keep clean until Date of Substantial Completion. Replace stained components.
- B Protect surfaces from damage until Date of Substantial Completion. Repair work or replace damaged work that cannot be repaired to Architect's satisfaction.

3.05 CLEANING

- A During the course of the Work and on completion of the Work, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION 066116

Solid Surfacing Fabrications - 066116

SECTION 070150.19 - PREPARATION FOR RE-ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Replacement of existing roofing system in preparation for entire new roofing system.
- B Removal of existing flashing and counterflashings.
- C Temporary roofing protection.

1.02 RELATED REQUIREMENTS

- A Section 075419 - Polyvinyl-Chloride Roofing: Roof system.
- B Section 076200 - Sheet Metal Flashing and Trim: Replacement of flashing and counterflashings.

1.03 REFERENCE STANDARDS

1.04 ADMINISTRATIVE REQUIREMENTS

- A Coordinate with affected mechanical and electrical work associated with roof penetrations.
- B Preinstallation Meeting: Convene one week before starting work of this section.
 - 1. Attendees:
 - a. Architect.
 - b. Contractor.
 - c. Owner.
 - d. Installer.
 - e. Roofing system manufacturer's field representative.
 - 2. Meeting Agenda: Provide agenda to participants prior to meeting in preparation for discussions on the following:
 - a. Removal and installation schedule.
 - b. Necessary preparatory work.
 - c. Protection before, during, and after roofing system installation.
 - d. Removal of existing roofing system.
 - e. Installation of new roofing system.
 - f. Temporary roofing and daily terminations.
 - g. Transitions and connection to and with other work.
 - h. Inspections and testing of installed systems.
- C Schedule work to coincide with commencement of installation of new roofing system.

1.05 SUBMITTALS

- A See Section 013300 - Submittal Requirements for submittal procedures.
- B Product Data: Submit for each type of material.
- C Shop Drawings: Indicate size, configuration, and installation details.
- D Materials Removal Company Qualification Statement.
- E Installer's Qualification Statement.

1.06 QUALITY ASSURANCE

- A Materials Removal Company Qualifications: Company specializing in performing work of type specified with at least five years of documented experience.
 - 1. Comply with EPA notification regulations prior to start of roofing removal work.
 - 2. Comply with removal and disposal regulations of local authorities having jurisdiction (AHJ).

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- B Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.
 - 1. When same installer as new roofing system, comply with related requirements of section indicated for new roofing system.
- C Preconstruction Testing: Conduct testing by an independent test agency, in accordance with provisions of Section 014000 - Quality Requirements.

1.07 DELIVERY, STORAGE, AND HANDLING

- A Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.

1.08 FIELD CONDITIONS

- A Existing Roofing System: Contractor to verify and report to Architect..
- B Do not remove existing roofing membrane when weather conditions threaten the integrity of building contents or intended continued occupancy.
- C Maintain continuous temporary protection prior to and during installation of new roofing system.
- D Owner will not occupy building areas directly below re-roofing area.

1.09 WARRANTY

- A See Section 017836 - Warranties and Bonds for additional warranty requirements.
- B Existing Warranties: Perform this work using methods and materials that will maintain existing roof system warranties.
 - 1. Upon completion of this work, notify warrantor of reroofing completion and obtain documentation to verify that existing roofing system has been inspected and warranty is still in effect.
 - a. Submit documentation upon project closeout.

PART 2 PRODUCTS

2.01 COMPONENTS

- A See the following sections for additional information on components relating to this work:
 - 1. Replacement and removal of existing roofing system in preparation for entire new roofing system, see Section 075419.
 - 2. Remove existing flashing and counterflashings in preparation for replacement of these materials as part of this work, see Section 076200 for material requirements.

2.02 MATERIALS

- A Patching Materials: Provide necessary materials in accordance with requirements of existing roofing system.
- B Temporary Roofing Protection Materials:
 - 1. Contractor's responsibility to select appropriate materials for temporary protection of roofing areas as determined necessary for this work.
- C Roofing Recover Materials:
 - 1. Contractor's responsibility to select appropriate materials for roofing re-cover as determined necessary for this work.

2.03 ACCESSORIES

- A Fasteners: Type and size as required and compatible with existing and new roofing system to resist local wind uplift.

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- B Roof Vent Pipe Extension: Solid-wall PVC fitting consisting of pipe and splice sleeve inserts, configured for insertion and sealing to existing plumbing vent piping, sized to fit inside diameter of plumbing vent piping, enabling extension of piping to field-determined height to meet local building code requirements for plumbing vent pipe height above existing roof level.

1. Existing Vent Pipe Diameter: 2 inches, nominal.
2. Splice Sleeve Insert Length: 6 inches, nominal.

PART 3 EXECUTION

3.01 EXAMINATION

- A Verify that existing roof surface has been cleared of materials being removed from existing roofing system and ready for next phase of work as required.

3.02 PREPARATION

- A Sweep roof surface clean of loose matter.
- B Remove loose refuse and dispose of properly off-site.

3.03 MATERIAL REMOVAL

- A Remove only existing roofing materials that can be replaced with new materials the same day.
- B Remove metal counter flashings.
- C Remove damaged portions of roofing membrane, perimeter base flashings, flashings around roof protrusions, pitch pans and pockets and insulation vents.
- D Remove damaged insulation and fasteners, cant strips, and blocking.
- E Remove vapor retarder, sheathing paper, and underlay.
- F Repair existing wood deck surface to provide smooth working surface for new roof system.

3.04 INSTALLATION

- A Coordinate scope of this work with requirements for installation of new roofing system, see Section 075419 for additional requirements.

3.05 FIELD QUALITY CONTROL

- A Independent agency inspection and testing will be provided under provisions of Section 014000.
- B Testing will identify the condition of existing materials and their reuse, repair or removal.

3.06 PROTECTION

- A Provide protection of existing roofing system that is not having work performed on it.
- B Provide temporary protective sheeting over uncovered deck surfaces.
- C Turn sheeting up and over parapets and curbing. Retain sheeting in position with weights.
- D Provide for surface drainage from sheeting to existing drainage facilities.
- E Do not permit traffic over unprotected or repaired deck surface.

END OF SECTION 070150.19

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SECTION 071300 - SHEET WATERPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Waterproofing membrane at below grade walls, planters, retaining walls and other areas as indicated. Provide waterproofing system and prefabricated drainage composite system to prevent the passage of liquid water and install without defects, damage or failure. The system shall be approved by the manufacturer for use in an application that recognizes the contents of the Soils Report.
- B If the geotechnical reports notes that there may be water encountered within one foot of the bottom of the elevator pits or if site conditions note this once work as begun, provide for the installation of an underslab waterproofing membrane and one that is manufactured for use by the self-adhering sheet waterproofing manufacturer (basis of design – WR Grace Preprufe).

1.02 RELATED REQUIREMENTS

- A Section 033000 - Cast-in-Place Concrete: Concrete substrate.
- B Section 076200 - Sheet Metal Flashing and Trim: Metal parapet, coping, and counterflashing.

1.03 ABBREVIATIONS

- A EPDM - Ethylene Propylene Diene Monomer.
- B HDPE - High-Density Polyethylene.
- C PVC - Polyvinyl Chloride.
- D SBS - Styrene-Butadiene-Styrene.
- E TPO - Thermoplastic Polyolefin.

1.04 REFERENCE STANDARDS

- A ASTM C836/C836M - Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course; 2018 (Reapproved 2022).
- B ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-- Tension; 2016 (Reapproved 2021).
- C ASTM D570 - Standard Test Method for Water Absorption of Plastics; 2022.
- D ASTM D624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers; 2000 (Reapproved 2020).
- E ASTM D882 - Standard Test Method for Tensile Properties of Thin Plastic Sheet; 2018.
- F ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2021.
- G ASTM D4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers; 2022.
- H ASTM D5295/D5295M - Standard Guide for Preparation of Concrete Surfaces for Adhered (Bonded) Membrane Waterproofing Systems; 2018.
- I ASTM D5385/D5385M - Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes; 2020.
- J ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.

1.05 PERFORMANCE REQUIREMENTS

- A Provide waterproofing that prevents the passage of water.

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- B The system shall be approved by the manufacturer for use in an application that recognizes the contents of the Geotechnical Report and any Environmental Assessment Reports. The bidder shall review in full with the manufacturer, all reports, specifications, drawings and all other aspects of the project before submitting a bid. The bidder shall include all materials and means and methods necessary to provide a system as recommended by the manufacturer in regards to anticipated site conditions and information per the Geotechnical and Environmental assessment reports.

1.06 SUBMITTALS

- A See Section 013300 - Submittal Requirements, for submittal procedures.
- B Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of waterproofing as may be required to show compliance with the Contract Documents.
 - 1. Provide data for membrane, surface conditioner, flexible flashings, joint cover sheet, and joint and crack sealants.
- C Shop Drawings: Show locations and extent of waterproofing.
 - 1. Include details for waterproofing system including all sheet metal flashings, penetrations and terminations.
 - 2. Show installation details for interface with other work.
 - 3. Show locations and extent of waterproofing including details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, and other termination conditions at grade and at other waterproofing systems.
- D Certificate: Certify that products meet or exceed specified requirements.
- E Manufacturer's Installation Instructions: Indicate special procedures.
- F Manufacturer's qualification statement.
- G Installer's qualification statement.
- H Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
- I Specimen Warranty.

1.07 QUALITY ASSURANCE

- A Single Source Responsibility: Obtain primary materials of bituminous sheet waterproofing used for this project through one source from a single Manufacturer.
- B Manufacturer's Representative: Make arrangements necessary to have a trained employee of the Manufacturer on-site periodically to review waterproofing installation procedures.
- C Membrane Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- D Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years experience with Projects of similar scope and complexity.
 - 1. Installer shall be approved by Membrane Manufacturer.
 - 2. Installer shall furnish written evidence that applicator is currently approved by Manufacturer to install the products required or specified for this project.

1.08 FIELD CONDITIONS

- A Maintain ambient temperatures above 40 degrees F for 24 hours before and during application and until liquid or mastic accessories have cured.

1.09 WARRANTY

- A Refer to Section 017836 - Warranties and Bonds, for additional warranty requirements.

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- B Contractor to correct defective Work within period of five years after Date of Substantial Completion; remove and replace materials concealing waterproofing at no extra cost to Owner.
- C Provide five year manufacturer warranty for waterproofing failing to resist penetration of water, except where such failures are the result of structural failures of building. Hairline cracking of concrete due to temperature change or shrinkage is not considered a structural failure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A Basis of Design: Contract Documents are based on products specified below to establish a standard of quality. Other acceptable manufacturers with products having equivalent characteristics may be considered, provided deviations are minor and design concept expressed in Contract Documents is not changed, as determined by the Architect.
 - 1. Furnish products of the following Manufacturer, except as approved otherwise by the Architect, subject to compliance with Specification requirements:
 - a. GCP Applied Technologies: www.gcpat.com/#sle.
- B Acceptable Manufacturers: Subject to compliance with requirements of Contract Documents, provide product by one of manufacturers listed below. If not listed, submit as substitution according to Conditions of the Contract and Division 1 Sections.
 - 1. Henry Company; Blueskin WP 200: www.henry.com/#sle.
 - 2. W. R. Meadows Sealtight Mel-Rol www.wrmeadows.com
 - 3. Carlisle CCW-860 www.carlisle-ccw.com
- C Substitutions: 012500 - Substitution Procedures

2.02 SHEET WATERPROOFING MATERIALS

- A Sheet Membrane Waterproofing: BITUTHENE 3000 Membrane/Low Temperature Membrane as manufactured by GCP Applied Technologies; a self-adhesive, cold-applied composite sheet consisting of a thickness of 1.4 mm (0.056 in.) of rubberized asphalt and 0.1 mm (0.004 in.) of cross-laminated, high density polyethylene film. Provide rubberized asphalt membrane covered with a release sheet, which is removed during installation and no special adhesive or heat shall be required to form laps.
 - 1. Thickness: 60 mil, 0.060 inch, minimum.
 - 2. Sheet Width: 36 inches, minimum.
 - 3. Tensile Strength:
 - a. Film: 5,000 psi, minimum, measured in accordance with ASTM D882 and at grip-separation rate of 2 inches per minute.
 - b. Membrane: 325 psi, minimum, measured in accordance with ASTM D412 Method A, using die C and at spindle-separation rate of 2 inches per minute.
 - 4. Elongation at Break: 300 percent, minimum, measured in accordance with ASTM D412.
 - 5. Water Vapor Permeance: 0.05 perm, maximum, measured in accordance with ASTM E96/E96M.
 - 6. Low Temperature Flexibility: Unaffected when tested in accordance with ASTM D1970/D1970M at minus 20 degrees F, 180 degree bend on 1 inch mandrel.
 - 7. Adhesion: 150 psi, minimum, measured in accordance with ASTM D4541.
 - 8. Water Absorption: 0.1 percent increase in weight, maximum, measured in accordance with ASTM D570, 24 hour immersion.
 - 9. Hydrostatic Pressure Resistance: Membrane resists leakage for at least one hour from pressure equivalent to 200 feet head of water applied in accordance with test method ASTM D5385/D5385M.

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10. Adhesives, Sealants, Tapes, and Accessories: As recommended by membrane manufacturer.
11. Products:
 - a. GCP Applied Technologies: www.gcpat.com/#sle.
- B Self-Adhered HDPE Sheet Membrane: Recommended by manufacturer for placement below concrete slabs and on outside face of below grade walls before placement of concrete.
 1. Low Temperature Flexibility: Unaffected when tested in accordance with ASTM D1970/D1970M at minus 20 degrees F, 180 degree bend on 1 inch mandrel.
 2. Hydrostatic Pressure Resistance: Membrane resists leakage for at least one hour from pressure equivalent to 231 feet head of water applied in accordance with test method ASTM D5385/D5385M.
 3. Elongation at Break: 500 percent, minimum, measured in accordance with ASTM D412.
 4. Tensile Strength, Film: 3,500 psi, minimum, measured in accordance with ASTM D412.
 5. Adhesion: 150 psi, minimum, measured in accordance with ASTM D4541.
 6. Water Vapor Permeance: 0.01 perm, maximum, measured in accordance with ASTM E96/E96M.
 7. Lateral Water Migration Resistance: Resists pressure of 231 ft head of water, when tested in accordance with ASTM D5385/D5385M.
 8. Adhesives, Sealants, Tapes, and Accessories: As recommended by membrane manufacturer.

2.03 ACCESSORIES

- A Seaming Materials: As recommended by membrane manufacturer.
- B Membrane Sealant: As recommended by membrane manufacturer.
- C Sealant for Cracks and Joints In Substrates: Resilient elastomeric joint sealant compatible with substrates and waterproofing materials.
- D Protection Board:
 1. Expanded Polystyrene Protection Board: 25 mm (1 in.) thick for vertical applications with the following characteristics. Adhere to waterproofing membrane with BITUTHENE® Protection Board Adhesive.
 - a. Normal Density: 16 kg/m³ (1.0 lb/ft³)
 - b. Thermal Conductivity, K factor: 0.24 at 5°C (40°F), 0.26 at 24°C (75°F)
 - c. Thermal Resistance, R-Value: 4 per 25 mm (1 in.) of thickness.
 2. Asphalt Hardboard: A premolded semi-rigid protection board consisting of bitumen, mineral core and reinforcement. Provide 3 mm (0.125 in.) thick hardboard on horizontal surfaces not receiving steel reinforced slab. Where steel reinforcing bars are to be used, apply two layers of 3 mm (0.125 in.) thick hardboard or one layer of 6 mm (0.25 in.) thick hardboard.
- E Prefabricated Drainage Composite: Drainage Composite shall be designed to promote positive drainage while serving as a protection course.
 1. Horizontal beneath concrete pavement and traffic areas: W.R. Grace Hydroduct 660.
 2. Vertical and horizontal beneath landscaped areas: W.R. Grace Hydroduct 220.
 3. Perimeter drain: W.R. Grace Hydroduct 600.
 4. Compressive Strength: 15,000 lbf/sq. ft., minimum; ASTM D1621.
- F Cant Strips: Premolded composition material.
- G Flexible Flashings: Type recommended by membrane manufacturer.
- H Waterstop: AdcorTM ES hydrophilic non-bentonite waterstop by Grace Construction Products for non-moving concrete construction joints.

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- I Miscellaneous Materials: Provide other miscellaneous installation materials and accessories, not specifically described but required for a complete and proper installation, including primer, mastic, liquid membrane, tape, and protection board adhesive, in accordance with Manufacturer's specifications or as acceptable to the waterproofing Manufacturer

2.04 AUXILIARY MATERIALS

- A General: Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.
 - 1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.
- B Primer: Liquid waterborne primer recommended for substrate by manufacturer of sheet waterproofing material.
- C Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by manufacturer of sheet waterproofing material.
- D Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, trowel grade or low viscosity.
- E Substrate Patching Membrane: Low-viscosity, two-component, asphalt-modified coating.
- F Sheet Strips: Self-adhering, rubberized-asphalt sheet strips of same material and thickness as sheet waterproofing.
- G Mastic, Adhesives, and Tape: Liquid mastic and adhesives, and adhesive tapes recommended by waterproofing manufacturer.
 - 1. Detail Tape: Two-sided, pressure-sensitive, self-adhering reinforced tape, 4-1/2 inches wide, with a tack-free protective adhesive coating on one side and release film on self-adhering side.
- H Metal Termination Bars: Aluminum bars, approximately 1 by 1/8 inch thick, predrilled at 9-inch centers.
- I Protection Course: ASTM D6506, semi-rigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners and as follows:
 - 1. Thickness: 1/8 inch, nominal, for vertical applications; 1/4 inch, nominal, elsewhere.
 - 2. Adhesive: Rubber-based solvent type recommended by waterproofing manufacturer for type of protection course.
- J Insulation: Extruded Polystyrene, ASTM C578, Type IV. Dow Perimate or equal.
 - 1. Thickness: 6" / R-30
 - 2. Compressive Strength: Min. 30 psi

PART 3 EXECUTION

3.01 EXAMINATION

- A Verify existing conditions are acceptable prior to starting work.
- B Verify substrate surfaces are durable; free of matter detrimental to adhesion or application of waterproofing system.
 - 1. Verify that concrete has cured and aged for minimum time period recommended by waterproofing manufacturer.
 - 2. Self-Adhered Sheet: Verify that concrete is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D4263.
 - 3. Proceed with installation only after unsatisfactory conditions have been corrected.
- C Verify that items penetrating surfaces to receive waterproofing are securely installed.

3.02 PREPARATION

- A Protect adjacent surfaces from damage not designated to receive waterproofing.

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- B Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions; vacuum substrate clean.
- C Do not apply waterproofing to surfaces unacceptable to membrane manufacturer.
- D Fill nonmoving joints and cracks with a filler compatible with waterproofing materials.
- E Seal moving cracks with sealant and nonrigid filler, using procedures recommended by sealant and waterproofing manufacturers.
- F Surfaces for Adhesive Bonding: Apply surface conditioner at a rate recommended by manufacturer, and protect conditioner from rain or frost until dry.
- G Concrete Surfaces for Adhesive Bonding: Prepare concrete substrate in accordance with ASTM D5295/D5295M.
 - 1. Do not proceed with installation until concrete has properly cured and dried, minimum 7 days for normal structural concrete and minimum 14 days for lightweight structural concrete.
 - 2. Remove substances that inhibit adhesion including form release agents, curing compounds admixtures, laitance, moisture, dust, dirt, grease and oil.
 - 3. Repair surface defects including honeycombs, fins, bug holes over 1/2 inch in length and 1/4 inch deep and finish flush with surrounding surface, sharp offsets, rutted cracks, ragged corners, deviations in surface plane, spalling and delaminations, as described in the reference standard. Fill form tie rod holes with concrete and finish flush with surrounding surface.
 - 4. Prepare, fill, prime, and treat joints and cracks in substrates according to manufacturer's written instructions. Remove dust and dirt from joints and cracks according to ASTM D4258 and manufacturer's written instructions.
 - a. Install sheet strips and center over treated construction and contraction joints and cracks exceeding a width of 1/16 inch.
 - 5. Remove scaling to sound, unaffected concrete and repair exposed area.
 - 6. Grind irregular construction joints to suitable flush surface.
 - 7. Remove and replace areas of defective concrete; see Section 033000.
 - 8. Prepare concrete for adhesive bonded waterproofing using mechanical or chemical methods described in referenced standard.
 - 9. Test concrete surfaces as described in referenced standards, and verify surfaces are ready to receive adhesive bonded waterproofing membrane system.
- H Bridge and cover isolation joints with overlapping sheet strips.
 - 1. Invert and loosely lay first sheet strip over center of joint. Firmly adhere second sheet strip to first and overlap to substrate.
- I Corners: Prepare, prime, and treat inside and outside corners according to ASTM D6135 and manufacturer's written instructions.
- J Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions according to ASTM D6135 and manufacturer's written instructions.
- K Masonry Substrates: Apply waterproofing over concrete block and brick with smooth trowel-cut mortar joints or parge coat..
- L Related Materials: Treat joints and install flashing as recommended by waterproofing manufacturer.

3.03 INSTALLATION - MEMBRANE

- A Install membrane waterproofing in accordance with manufacturer's instructions including but not limited to, the following:
- B Roll out membrane, and minimize wrinkles and bubbles.

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- C Overlap edges and ends, minimum 3 inches, seal permanently waterproof by method recommended by manufacturer, and apply uniform bead of sealant to joint edge.
- D Reinforce membrane with multiple thickness of membrane material over joints, whether joints are static or dynamic.
- E Weather lap joints on sloped substrate in direction of drainage, and seal joints and seams.
- F Flexible Flashings: Seal items watertight that penetrate through waterproofing membrane with flexible flashings.
- G Seal membrane and flashings to adjoining surfaces.

3.04 INSTALLATION - DRAINAGE PANEL AND PROTECTION BOARD

- A Apply protection board and related materials in accordance with Manufacturer's recommendations.
- B Place drainage panel directly against membrane, butt joints, place to encourage drainage downward; scribe and cut boards around projections, penetrations, and interruptions.
- C Place protection board directly against drainage panel; butt joints, and scribe and cut boards around projections, penetrations, and interruptions.
- D Adhere protection board to substrate with compatible adhesive.

3.05 FIELD QUALITY CONTROL

- A See Section 014000 - Quality Requirements for additional requirements.
- B Inspection: Arrange for manufacturer's representative to inspect completed installation and provide written report that installation complies with manufacturer's written instructions.

3.06 PROTECTION AND CLEANING

- A Remove any masking materials after installation. Clean any stains on materials which would be exposed in the completed work.
- B Do not permit traffic over unprotected or uncovered membrane.
- C Protect completed membrane waterproofing from subsequent construction activities as recommended by manufacturer.
- D Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 071300

SECTION 072100 - BUILDING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Board insulation as indicated on the drawings.
- B Batt insulation and vapor retarder in wall, ceiling, and roof construction.
- C Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.
- D Acoustic insulation.

1.02 RELATED REQUIREMENTS

- A Section 075419 - PVC Thermoplastic Single-Ply Roofing - Carlisle: Insulation specified as part of roofing system.

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.
- B ASTM C240 - Standard Test Methods for Testing Cellular Glass Insulation Block; 2021.
- C ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.
- D ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2022.
- E ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2023.
- F ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014 (Reapproved 2019).
- G ASTM C726 - Standard Specification for Mineral Wool Roof Insulation Board; 2017.
- H ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2023a.
- I ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics; 2019.
- J ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- K ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.
- L ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750 Degrees C; 2024.
- M ASTM E2357 - Standard Test Method for Determining Air Leakage Rate of Air Barrier Assemblies; 2024.
- N NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials; 2006.
- O NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components; 2023.
- P UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A See Section 013300 - Submittal Requirements for submittal procedures.
- B Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

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- D Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.
- E Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

- A Comply with regulatory agency requirements for fire resistance ratings and surface burning characteristics.
- B Provide certification that product conforms to the required fire resistive requirements.

1.06 DELIVERY AND STORAGE

- A Deliver materials to the project in Manufacturer's original packaging and labels. Protect against damage to the product.

1.07 FIELD CONDITIONS

- A Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.01 APPLICATIONS

- A Insulation Under Concrete Slabs: Extruded polystyrene (XPS) board.
- B Insulation in Metal Framed Walls: Unfaced Batt insulation.
- C Insulation in Wood Framed Walls: Batt insulation with no vapor retarder.
- D Insulation in Wood Framed Walls: Sound Batt insulation with no vapor retarder.
- E Insulation in Wood Framed Ceiling Structure: Batt insulation with no vapor retarder.
- F Insulation Above Lay-In Acoustical Ceilings: Unfaced Batt insulation.
- G Insulation Over Roof Deck: Polyisocyanurate board. Refer to Section 075419 - Polyvinyl-Chloride Roofing
- H Insulation at Structural Connections: Rigid, high-strength polyurethane.

2.02 FOAM BOARD INSULATION MATERIALS

- A Expanded Polystyrene (EPS) Board Insulation: Comply with ASTM C578.
 - 1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
 - 2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
 - 3. Complies with fire resistance requirements indicated on drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
 - 4. Board Size: 48 inch by 96 inch.
 - 5. Board Thickness: 1-1/2 inch.
 - 6. Board Edges: Square.
 - 7. Type and Water Absorption: Type XI, 4.0 percent by volume, maximum, by total immersion.
 - 8. Board Density: 0.7 lb/cu ft.
 - 9. Type and Thermal Resistance, R-value: Type XI, 3.1 (0.55), minimum, per 1 inch thickness at 75 degrees F mean temperature.
 - 10. Thermal Conductivity (k factor) at 25 degrees F: 0.28.
 - 11. Products:
- B 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. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.

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3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
4. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88), minimum, per 1 inch thickness at 75 degrees F mean temperature.
5. Complies with fire resistance requirements indicated on drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
6. Board Edges: Square.
7. Type and Water Absorption: Type XII, 0.3 percent by volume, maximum, by total immersion.
8. Products:
 - a. Dow Chemical Company: www.dow.com/sle.
 - b. Basis of Design: Owens Corning Corporation; FOAMULAR® & FOAMULAR® NGX™ 250: www.ocbuildingspec.com/#sle.
 - c. Or Approved Equal.

2.03 MINERAL FIBER BOARD INSULATION MATERIALS

- A Mineral Wool Roof Insulation Boards: Comply with ASTM C726, with high-density top layer. Mold and microbial growth resistant.
1. Face Coating: None, unfaced.
 2. Flame Spread Index: Zero, when tested with or without facing, in accordance with ASTM E84.
 3. Smoke Developed Index: Zero, when tested with or without facing, in accordance with ASTM E84.
 4. Board Size: 48 by 48 inches.
 5. Board Thickness: 2 inches.
 6. Board Edges: Square.
 7. Thermal Conductivity (k-factor): Btu inch/hr sq ft degrees F of 3.8 per inch, minimum, at 75 degrees F when tested in accordance with ASTM C518.
 8. Top Layer Density: 13.75 pcf, nominal.
 9. Bottom Layer Density: 9.36 pcf for thicknesses greater than 2-1/2 inches.

2.04 MINERAL FIBER BLANKET INSULATION MATERIALS

- A EcoTouch® Unfaced Batt Insulation: ASTM C665, Type I, preformed formaldehyde free glass fiber batt type, unfaced. Includes Unfaced SonoBatts and Sound Attenuation Batts.
1. Noncombustible per ASTM E136.
 2. Flamespread less than 25, smoke developed less than 50 per ASTM E84.
 3. ICC Building Code Construction Classification: All types.
 4. Water vapor sorption, Maximum by weight: not more than 5 percent.
- B EcoTouch® Kraft Faced Batt Insulation: ASTM C665, Type II, Class C preformed formaldehyde free glass fiber batt type, Kraft paper faced one side. Includes Kraft faced SonoBatts and EcoTouch® ProPink FastBatt Insulation
1. ICC Building Code Construction Classification: III, IV, V.
 2. Perm Rating: 1 perm maximum per ASTM E96.
- C EcoTouch® Foil Faced Batt Insulation: ASTM C665, Type III, Class C preformed formaldehyde free glass fiber batt type, foil faced one side.
- D Flamespread less than 75, smoke developed less than 150 per ASTM E84.
1. ICC Building Code Construction Classification: III, IV, V.
 2. Perm Rating: 0.5 perm maximum per ASTM E96.
- E EcoTouch® FS-25 Batt Insulation: ASTM C665, Type II (PSK facing), Class A and Type III (FSK facing), Class A preformed formaldehyde free glass fiber batt, poly/scrim/Kraft (PSK) or

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foil/scrim/Kraft (FSK) faced on one side.

F Performance Criteria:

1. Flame spread less than 25, smoke developed index less than 50 per ASTM E84.
 - a. ICC building construction classification: all types.
 - b. Perm Rating: 0.02 maximum per ASTM E96.
2. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
3. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
4. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
5. Formaldehyde Content: Zero.
6. Thermal Resistance:
 - a. Roofs and Soffits: R-38 min.
 - b. Walls: R-20.
7. Thickness: As required in order to meet the R-Value specified..
8. Facing: Unfaced.
9. Products:
 - a. Basis of Design:
 - 1) Owens Corning Corp: www.owenscorning.com.
 - b. Acceptable Manufacturers:
 - 1) CertainTeed Corporation: www.certainteed.com.
 - 2) Johns Manville: www.jm.com.
 - 3) Or Approved Equal.

G Sound Attenuation Batts:

1. Type SA-1: Kraft faced glass fiber acoustical insulation, complying with ASTM C665, Type II, Class C, Category 2.
 - a. Surface Burning Characteristics: ASTM E84.
 - 1) Maximum flame spread: Not Rated.
 - 2) Maximum smoke developed: Not Rated.
2. Type SA-2: Unfaced glass fiber acoustical insulation complying with ASTM C665, Type I.
 - a. Surface Burning Characteristics:
 - 1) Maximum flame spread: 10
 - 2) Maximum smoke developed: 10
 - 3) When tested in accordance with ASTM E 84.
3. Size:
 - a. Thickness: 3" (76.2 mm), Width: 16" (406mm) or 24" (609mm), Length: 96" (2438mm).
4. Combustion Characteristics:
 - a. Passes ASTM E136.
5. Fire Resistance Ratings:
 - a. Passes ASTM E119 as part of a complete fire tested wall assembly.
6. Sound Transmission Class: STC 45 min.
7. Dimensional Stability:
 - a. Linear Shrinkage less than 0.1%
8. Manufacturers:
 - a. Basis of Design:
 - 1) Owens Corning Corp: www.owenscorning.com.
 - b. Acceptable Manufacturers:
 - 1) Johns Manville Corporation: www.jm.com.
 - 2) CertainTeed Corporation: www.certainteed.com.

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2.05 ACCESSORIES

- A Sheet Vapor Retarder: Specified in Section 072500.
- B Tape: Reinforced polyethylene film with acrylic pressure sensitive adhesive.
 - 1. Application: Sealing of interior circular penetrations, such as pipes or cables.
 - 2. Width: Are required for application.
 - 3. Temperature Resistance: Range of minus 40 to 212 degrees F.
- C Tape: Bright aluminum self-adhering type, mesh reinforced, 2 inch wide.
 - 1. Products:
- D Tape joints of rigid insulation in accordance with roofing and insulation manufacturers' instructions.
- E Insulation Fasteners: Impaling clip of unfinished steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.
- F Insulation Fasteners: Appropriate for purpose intended.
 - 1. Length as required for thickness of insulation material and penetration of deck substrate.
- G Nails or Staples: Steel wire; electroplated or galvanized; type and size to suit application.
- H Wire Mesh: Galvanized steel, hexagonal wire mesh.
- I Protection Board for Below Grade Insulation: Cementitious, 1/4 inch thick.
- J 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.
 - 1. Tape seal joints between sheets.
 - 2. Extend sheet full height of joint.
- B Apply adhesive to back of boards:
 - 1. Three continuous beads per board length.
 - 2. Full bed 1/8 inch thick.
- C Install rigid insulation directly to steel studs or exterior grade sheathing at 16 inches on center with manufacturer recommended mechanical fasteners, and tape joints with manufacturer's minimum 4 inches wide sealant tape; comply with ASTM E2357.
- D Install boards horizontally on walls.
 - 1. Place boards to maximize adhesive contact.
 - 2. Install in running bond pattern.
 - 3. Butt edges and ends tightly to adjacent boards and protrusions.
- E Extend boards over expansion joints, unbonded to wall on one side of joint.
- F Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- G Place 6 inches wide polyethylene sheet at perimeter of wall openings, from adhesive vapor retarder bed to window and door frames, and tape seal in place to ensure continuity of vapor retarder and air seal.
- H Tape insulation board joints.

3.03 BOARD INSTALLATION AT CAVITY WALLS

- A Secure insulation fasteners to substrate at following frequency:
 - 1. Six (6) per insulation board.
- B Adhere a 6 inch wide strip of polyethylene sheet over expansion joints with double beads of adhesive each side of joint.
 - 1. Tape seal joints between sheets.
 - 2. Extend sheet full height of joint.
- C Install boards to fit snugly between wall ties.
 - 1. Place membrane surface against adhesive.
 - 2. Place membrane surface facing out, and tape seal board joints.
- D Install boards horizontally on walls.
 - 1. Place boards to maximize adhesive contact.
 - 2. Install in running bond pattern.
 - 3. Butt edges and ends tightly to adjacent boards and protrusions.
 - 4. Place impale fastener locking discs.
- E Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- F Place 6 inches wide polyethylene sheet at perimeter of wall openings, from adhesive vapor retarder bed to window and door frames, and tape seal in place to ensure continuity of vapor retarder and air seal.

3.04 BOARD INSTALLATION UNDER CONCRETE SLABS

- A Place insulation under slabs on grade after base for slab has been compacted.
- B Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- C Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.

3.05 BOARD INSTALLATION OVER LOW SLOPE ROOF DECK

- A Installation of board insulation over low slope roof deck is specified in Section 075419.
- B Board Installation Over Roof Deck, General:
 - 1. See applicable roofing specification section for specific board installation requirements.
 - 2. Ensure vapor retarder is clean and dry, continuous, and ready for application of roofing system.
 - 3. Fasten insulation to deck in accordance with roofing manufacturer's written instructions and applicable Factory Mutual requirements.
 - 4. Do not apply more insulation than can be covered with roofing on the same day.

3.06 BATT INSTALLATION

- A Install insulation and vapor retarder in accordance with manufacturer's instructions.
- B Install in exterior wall spaces without gaps or voids. Do not compress insulation.
- C Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
- E Install with factory-applied vapor retarder membrane facing warm side of building spaces. Lap ends and side flanges of membrane over framing members.
- F Tape insulation batts in place.
- G Retain insulation batts in place with string wire or other method approved by the Architect.
- H Tape seal butt ends, lapped flanges, and tears or cuts in membrane.

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- I At wood framing, place vapor retarder on warm side of insulation by stapling at 6 inches on center. Lap and seal sheet retarder joints over face of member.
- J At metal framing, place vapor retarder on warm side of insulation; lap and seal sheet retarder joints over face of member
- K Tape seal tears or cuts in vapor retarder.
- L Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane; tape seal in place.

3.07 FIELD QUALITY CONTROL

- A See Section 014000 - Quality Requirements for additional requirements.

3.08 ACOUSTIC INSTALLATION

- A Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- B Comply with manufacturer's instructions for particular conditions of installation in each case.
- C Batts may be friction fit in place until the interior finish is applied. Install batts to fill entire Stud cavity. If stud cavity is less than 96" in height, cut lengths to friction fit against floor and ceiling tracks, walls with penetrations require that insulation be carefully cut to fit around outlets, junction boxes and other irregularities.
- D Where walls are not finished on both sides or insulation does not fill the cavity depth, supplementary support must be provided to hold product in place.
- E Where insulation must extend higher than 8 feet, temporary support can be provided to hold product in place until the finish material is applied.
- F Acoustic Sealant: Refer to Section 079200 - Joint Sealants.

3.09 PROTECTION

- A Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION 072100

Building Insulation - 072100

SECTION 072500 - WEATHER BARRIERS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A Water-Resistive Barrier: Under exterior wall cladding, over sheathing or other substrate; not air tight or vapor retardant.
- B Seam Tape
- C Flashing
- D Fasteners

1.02 RELATED REQUIREMENTS

- A Section 033000 - Cast-In-Place Concrete: Vapor retarder under concrete slabs on grade.
- B Section 072100 - Thermal Insulation: Vapor retarder installed in conjunction with batt insulation.
- C Section 074646 - Fiber-Cement Siding: Water-resistive barrier under siding.
- D Section 076200 - Sheet Metal Flashing and Trim: Metal flashings installed in conjunction with weather barriers.
- E Section 079000 - Joint Sealants: Sealant materials and installation techniques.
- F Section 092116 - Gypsum Board Assemblies: Water-resistive barrier under exterior cladding.

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; 2023d.
- C AATCC Test Method 30 - Antifungal Activity, Assessment on Textile Materials: Mildew and Rot Resistance of Textile Materials; 2013.
- D AATCC Test Method 127 - Water Resistance: Hydrostatic Pressure Test; 2013.
- E ASTM D4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers; 2009.
- F ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2013.
- G ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2011.
- H ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2013.
- I ICC-ES AC308 - Acceptance Criteria for Water-Resistive Barriers; ICC Evaluation Service, Inc.; 2013.
- J ICC-ES AC148 - Acceptance Criteria for Flexible Flashing Materials; ICC Evaluation Service, Inc.; 2011.
- K ICC-ES AC212 - Acceptance Criteria for Water-Resistive Coatings Used as Water-Resistive Barriers over Exterior Sheathing; ICC Evaluation Service, Inc.; 2012.

1.04 DEFINITIONS

- A Weather Barrier: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.
- B Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to adjacent surfaces. Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders.
- C Vapor Retarder: Air tight barrier made of material that is relatively water vapor impermeable, to the degree specified, with sealed seams and with sealed joints to adjacent surfaces.

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1. Water Vapor Permeance: For purposes of conversion, $57.2 \text{ ng}/(\text{Pa s sq m}) = 1 \text{ perm}$.
- D Water-Resistive Barrier: Water-shedding barrier made of material that is moisture-resistant, to the degree specified, intended to be installed to shed water without sealed seams.

1.05 SUBMITTALS

- A See Section 013300 - Submittal Requirements , for submittal procedures.
- B Product Data: Submit manufacturer current technical literature for each component.
 1. Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tests physical and performance properties of products.
 2. For building wrap, include data on air and water-vapor permeance based on testing according to referenced standards.
 3. Submit documentation from primary materials manufacturer indicating approval of products not manufactured by primary materials manufacturer.
 4. Include statement that materials are compatible with adjacent materials proposed for use.
 5. Submit letter from the sealant manufacturer indicating sealant adhesion to the water-resistant material meet the requirements of the project.
- C Shop Drawings: Provide drawings of special joint conditions.
 1. Show locations and extent of air barrier. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
 2. Include details of interfaces with other materials that form part of air barrier.
- D Samples: Weather Barrier Membrane, minimum 8-1/2 inches by 11 inch.
- E Quality Assurance Submittals
 1. Design Data, Test Reports: Provide manufacturer test reports indicating product compliance with indicated requirements.
 2. Manufacturer Instructions: Provide manufacturer's written installation instructions.
 3. Manufacturer's Field Service Reports: Provide site reports from authorized field service representative, indicating observation of weather barrier assembly installation.
- F Closeout Submittals
 1. Refer to Section 017800 - Closeout Procedures and Submittals, for submittal procedures.
 2. Weather Barrier Warranty: Manufacturer's executed warranty form with authorized signatures and endorsements indicating date of Substantial Completion.

1.06 QUALITY ASSURANCE

- A Qualifications
 1. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than 10 years of documented experience.
 2. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years of experience.
 - a. Installers and supervisors shall be trained and approved by manufacturer.
 - b. Installer shall be licensed by ABAA according to ABAA's Quality Assurance Program and shall employ ABAA-certified installers and supervisors on Project.
 3. Installation shall be in accordance with weather barrier manufacturer's installation guidelines and recommendations.
 4. Source Limitations: Provide weather barrier and accessory materials produced by single manufacturer.
- B Pre-installation Meeting
 1. Hold a pre-installation conference, two weeks prior to start of weather barrier installation. Attendees shall include Contractor, Architect, Engineer, Consultant, Installer, Owner's

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Representative, and Weather Barrier Manufacturer's Designated Representative.

2. Review all related project requirements and submittals, status of substrate work and preparation, areas of potential conflict and interface, availability of weather barrier assembly materials and components, installer's training requirements, equipment, facilities and scaffolding, and coordinate methods, procedures and sequencing requirements for full and proper installation, integration and protection.

1.07 DELIVERY, STORAGE AND HANDLING

- A Refer to Section 016000 - Product Requirements.
- B Deliver weather barrier materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C Store weather barrier materials as recommended by weather barrier manufacturer.

1.08 SCHEDULING

- A Review requirements for sequencing of installation of weather barrier assembly with installation of windows, doors, louvers and flashings to provide a weather-tight barrier assembly.
- B Schedule installation of weather barrier materials and exterior cladding within nine months of weather barrier assembly installation.

1.09 FIELD CONDITIONS

- A Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.

1.10 WARRANTY

- A See Section 017836 - Warranties and Bonds, for additional warranty requirements.
- B Special Warranty
 1. Special weather-barrier manufacturer's warranty for weather barrier for a period of ten (10) years from date of final weather barrier installation.
 2. Pre-installation meetings and jobsite observations by weather barrier manufacturer for warranty is required prior to assembly installation.

PART 2 – PRODUCTS

2.01 MANUFACTURER

- A Basis of Design: Contract Documents are based on products specified below to establish a standard of quality. Other acceptable manufacturers with products having equivalent characteristics may be considered, provided deviations are minor and design concept expressed in Contract Documents is not changed, as determined by the Architect.
 1. DuPont; 4417 Lancaster Pike, Chestnut Run Plaza 728, Wilmington, DE 19805; 1-800-44-TYVEK (8-9835); www.construction.tyvek.com.
- B Acceptable Manufacturers: Subject to compliance with requirements of Contract Documents, provide product by one of manufacturers listed alphabetically below. If not listed, submit as substitution according to Conditions of the Contract and Division 1 Sections.
 1. James Hardie Building Products, Inc Engineered for Climate™ HardieWrap™ weather barrier.: www.jameshardie.com.
 2. VaproShield, LLC; WrapShield: www.vaproshield.com.
 3. Pactiv Corporation; GreenGuard; RainDrop Building Wrap: greenguard.pactiv.com.
- C Substitutions: Refer to Section 012500 - Substitution Procedures.

2.02 MATERIALS

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- A Basis of Design: spunbonded polyolefin, non-woven, non-perforated, weather barrier is based upon DuPont™ Tyvek® CommercialWrap® and related assembly components.
- B Performance Characteristics:
 - 1. Air Penetration: 0.001 cfm/ft² at 75 Pa, when tested in accordance with ASTM E2178. Type I per ASTM E1677. =0.04 cfm/ft² at 75 Pa, when tested in accordance with ASTM E2357.
 - 2. Water Vapor Transmission: 28 perms, when tested in accordance with ASTM E96, Method B.
 - 3. Water Penetration Resistance: Minimum 280 cm when tested in accordance with AATCC Test Method 127.
 - 4. Water Resistance: Comply with applicable water-resistive requirements of ICC-ES Acceptance Criteria AC38.
 - 5. Basis Weight: Minimum 2.7 oz/yd², when tested in accordance with TAPPI Test Method T-410.
 - 6. Air Resistance: Air infiltration at >1500 seconds, when tested in accordance with TAPPI Test Method T-460.
 - 7. Tensile Strength: Minimum 38/35 lbs/in., when tested in accordance with ASTM D882, Method A.
 - 8. Tear Resistance: 12/10 lbs., when tested in accordance with ASTM D1117.
 - 9. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E84. Flame Spread: 10, Smoke Developed: 10.

2.03 ACCESSORIES

- A Seam Tape: As recommended by the weather barrier manufacturer.
- B Fasteners:
 - 1. Steel Frame Construction
 - a. 1-5/8 inch rust resistant screw with 2-inch diameter plastic cap or manufacturer approved 1-1/4" or 2" metal gasketed washer.
 - 2. Wood Frame Construction
 - a. Nail Caps: #4 nails with large 1-inch plastic cap fasteners, or 1-inch plastic cap staples with leg length sufficient to achieve a minimum penetration of 5/8-inch into the wood stud.
- C Sealants
 - 1. Refer to Section 079200 - Joint Sealants .
 - 2. Provide sealants that comply with ASTM C920, elastomeric polymer sealant to maintain watertight conditions.
 - 3. Products: Sealants recommended by the weather barrier manufacturer.
- D Adhesives:
 - 1. Provide adhesive recommended by weather barrier manufacturer.
 - 2. Products: Adhesives recommend by the weather barrier manufacturer.
- E Primers:
 - 1. Provide flashing manufacturer recommended primer to assist in adhesion between substrate and flashing.
 - 2. Products: Primers recommended by the flashing manufacturer.
- F Flashing
 - 1. Flexible membrane flashing materials for new and existing window openings and penetrations recommended by manufacturer.
 - 2. Straight flashing membrane materials for flashing new and existing windows and doors and sealing penetrations such as masonry ties, etc. recommended by manufacturer.

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3. Thru-Wall flashing membrane materials for flashing at changes in direction or elevation (shelf angles, foundations, etc.) and at transitions between different assembly materials.
4. Preformed Inside and Outside Corners and End Dams: Preformed three-dimensional shapes to complete the flashing system used in conjunction with Thru-Wall Flashing.

PART 3 – EXECUTION

3.01 EXAMINATION

- A Verify substrate and surface conditions are in accordance with weather barrier manufacturer recommended tolerances prior to installation of weather barrier and accessories.

3.02 INSTALLATION – WEATHER BARRIER

- A Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations.
- B Install weather barrier prior to installation of windows and doors.
- C Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap.
- D Install weather barrier in a horizontal manner starting at the lower portion of the wall surface with subsequent layers installed in a shingling manner to overlap lower layers. Maintain weather barrier plumb and level.
- E Sill Plate Interface: Extend lower edge of weather barrier over sill plate interface 3-6 inches. Secure to foundation with elastomeric sealant as recommended by weather barrier manufacturer.
- F Window and Door Openings: Extend weather barrier completely over openings.
- G Overlap weather barrier
 1. Exterior corners: minimum 12 inches.
 2. Seams: minimum 6 inches.
- H Weather Barrier Attachment:
 1. Steel or Wood Frame Construction: Attach weather barrier to studs through exterior sheathing. Secure using weather barrier manufacturer recommend fasteners, space 12-18 inches vertically on center along stud line, and 24 inch on center, maximum horizontally.
- I Apply flashing to weather barrier membrane prior to installing cladding anchors.

3.03 SEAMING

- A Seal seams of weather barrier with seam tape at all vertical and horizontal overlapping seams.
- B Seal any tears or cuts as recommended by weather barrier manufacturer.

3.04 OPENING PREPARATION (FOR USE WITH NON-FLANGED WINDOWS - ALL CLADDING

TYPES)

- A Flush cut weather barrier at edge of sheathing around full perimeter of opening.
- B Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.

3.05 FLASHING (FOR USE WITH NON-FLANGED WINDOWS - ALL CLADDING TYPES)

- A Cut flexible flashing a minimum of 12 inches longer than width of sill rough opening.
- B Cover horizontal sill by aligning flexible flashing edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.

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- C Fan flexible flashing at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges.
- D Apply 9-inch wide strips of flashing at jambs. Align flashing with interior edge of jamb framing. Start flashing at head of opening and lap sill flashing down to the sill.
- E Spray-apply primer to top 6 inches of jambs and exposed sheathing.
- F Install flexible flashing at opening head using same installation procedures used at sill. Overlap jamb flashing a minimum of 2 inches.
- G Coordinate flashing with window installation.
- H On exterior, install backer-rod in joint between window frame and flashed rough framing. Apply sealant at jambs and head, leaving sill unsealed. Apply sealants in accordance with sealant manufacturer's instructions and ASTM C1193.
- I Position weather barrier head flap across head flashing. Adhere using flashing over the 45-degree seams.
- J Tape top of window in accordance with manufacturer recommendations.
- K On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C1193.

3.06 THRU-WALL FLASHING INSTALLATION

- A Apply primer per manufacturer's written instructions.
- B Install preformed corners and end dams bedded in sealant in appropriate locations along wall.
- C Starting at a corner, remove release sheet and apply membrane to primed surfaces in lengths of 8 to 10 feet.
- D Extend membrane through wall and leave ¼ inch minimum exposed to form drip edge.
- E Roll flashing into place. Ensure continuous and direct contact with substrate.
- F Lap ends and overlap preformed corners 4 inches minimum. Seal all laps with sealant.
- G Trim exterior edge of membrane 1-inch and secure metal drip edge per manufacturer's written instructions.
- H Terminate membrane on vertical wall. Terminate into counterflashing.
- I Apply sealant bead at each termination.

3.07 THRU-WALL FLASHING / WEATHER BARRIER INTERFACE AT BASE OF WALL

- A Overlap thru-wall flashing with weather barrier by 6-inches.
- B Mechanically fasten bottom of weather barrier through top of thru-wall flashing.
- C Seal vertical and horizontal seams with tape or sealing membrane.

3.08 THRU-WALL FLASHING / WEATHER BARRIER INTERFACE AT SHELF ANGLE

- A Seal weather barrier to bottom of shelf angle with sealing membrane.
- B Apply thru-wall flashing to top of shelf angle. Overlap thru-wall flashing with weather barrier by 6-inches.
- C Seal bottom of weather barrier to thru-wall flashing with tape or sealing membrane.

3.09 THRU-WALL FLASHING / WEATHER BARRIER INTERFACE AT WINDOW HEAD

- A Cut flap in weather barrier at window head.
- B Prime exposed sheathing.
- C Install lintel as required. Verify end dams extend 4 inches minimum beyond opening.
- D Install end dams bedded in sealant.
- E Adhere 2 inches minimum thru-wall flashing to wall sheathing. Overlap lintel with thru-wall flashing and extend ¼ inch minimum beyond outside edge of lintel to form drip edge.

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- F Apply sealant along thru-wall flashing edges.
- G Fold weather barrier flap back into place and tape bottom edge to thru-wall flashing.
- H Tape diagonal cuts of weather barrier.
- I Secure weather barrier flap with fasteners.

3.10 FIELD QUALITY CONTROL

- A Notify manufacturer's designated representative to obtain required periodic observations of weather barrier assembly installation.

3.11 PROTECTION

- A Protect installed weather barrier from damage.

END OF SECTION 072500

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SECTION 074646 - FIBER-CEMENT SIDING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A Drawings and general provisions of the Contract, including General Conditions and Division 01 - General Requirements Specification Sections apply to this section.

1.02 SECTION INCLUDES

- A Field-finished Fiber cement lap siding, panels, shingle, trim, fascia, moulding and accessories.

1.03 RELATED REQUIREMENTS

- A Section 054000 - Cold-Formed Metal Framing: Siding substrate.
- B Section 092116 - Gypsum Board Assemblies: Siding substrate.
- C Section 099113 - Exterior Painting: Field painting.

1.04 REFERENCE STANDARDS

- A ASTM C1186 - Standard Specification for Flat Fiber-Cement Sheets; 2022, with Editorial Revision (2023).
- B ASTM D882-12 Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
- C ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023c.

1.05 ADMINISTRATIVE REQUIREMENTS

- A Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

1.06 SUBMITTALS

- A See Section 013000 - Administrative Requirements for submittal procedures.
- B Product Data: Submit manufacturer's data sheets on each product to be used, including:
 - 1. Manufacturer's requirements for related materials to be installed by others.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Installation methods, including nail patterns.
- C Shop Drawings: Provide detailed drawings of atypical non-standard applications of cementitious siding materials which are outside the scope of the standard details and specifications provided by the manufacturer.
- D Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E Test Report: Applicable model code authority evaluation report (e.g. ICC-ES).
- F Installer's qualification statement.
- G Maintenance Instructions: Periodic inspection recommendations and maintenance procedures.
- H Warranty: Submit copy of manufacturer's warranty, made out in Owner's name, showing that it has been registered with manufacturer.

1.07 QUALITY ASSURANCE

- A Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Finish areas designated by Architect.

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2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
3. Refinish mock-up area as required to produce acceptable work.

1.08 DELIVERY, STORAGE, AND HANDLING

- A See Section 017419 - Construction Waste Management and Disposal for packaging waste requirements.
- B Deliver and store materials in manufacturer's unopened packaging, with labels intact, until ready for installation.
- C Store materials under dry and waterproof cover, well ventilated, and elevated above grade on a flat surface.

1.09 WARRANTY

- A See Section 017800 - Closeout Requirements and Submittals, for additional warranty requirements.
- B Product Warranty: Limited, non-pro-rated product warranty.
 1. Lap siding, vertical siding, and panels for 30 years.
 2. Boards for 15 years.
- C Finish Warranty: Limited product warranty against manufacturing finish defects.
 1. When used for its intended purpose, properly installed and maintained according to Manufacturer's published installation instructions, Manufacturer's finish with Technology, for a period of 15 years from the date of purchase: will not peel; will not crack; and will not chip. Finish warranty includes the coverage for labor and material.
- D Correct defective Work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS:

- A Basis of Design: Contract Documents are based on products specified below to establish a standard of quality. Other acceptable manufacturers with products having equivalent characteristics may be considered, provided deviations are minor and design concept expressed in Contract Documents is not changed, as determined by the Architect.
 1. Approved Manufacturer:
 - a. James Hardie Building Products, Inc., which is located at: 26300 La Alameda Suite 400 ; Mission Viejo, CA 92691; Toll Free Tel: 866-274-3464; Tel: 949-367-4980; Fax: 949-367-4981; Email: info@jameshardie.com; Web: www.jameshardiecommercial.com
- B Acceptable Manufacturers: Subject to compliance with requirements of Contract Documents, provide product by one of manufacturers listed alphabetically below. If not listed, submit as substitution according to Conditions of the Contract and Division 1 Sections.
- C Substitutions: 012500 - Substitution Procedures.

2.02 SIDING

- A Lap Siding: Individual horizontal boards made of cement and cellulose fiber formed under high pressure with integral surface texture, complying with ASTM C1186, Type A, Grade II; with machined edges, for nail attachment.
 1. Lap Siding: HardiePlank HZ5 Lap as manufactured by James Hardie Building Products, Inc.
 - a. Select Cedarmill 8-1/4 inches (210 mm) with 7 inches (178 mm) exposure.
 2. Style: Simulated cedar Perfections (straight edge random width in length of board).

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3. Texture: Simulated cedar grain.
4. Length: 12 feet, nominal.
5. Finish: Unfinished.
6. Color: As indicated on drawings.
7. Warranty: 50 year limited; transferable.

B Trim:

1. HardieTrim HZ5 Fascia boards.
2. Texture: Smooth.
3. Color: As indicated on drawings.

2.03 WEATHER BARRIER:

A Basis of Design: Engineered for Climate™ HardieWrap™ weather barrier.

1. The water-resistive barrier must be installed with penetration and junction flashing, in strict accordance with local building code requirements, including those as specified in ESR # 2658.
2. Thickness: 11 mil.
3. Basis Weight: 19.4 lb/1000 sq ft.
4. UV Stability: Up to 180 days.
5. Non-woven, non-perforated polyolefin water-resistive barrier, as per AC38.

B Accessories:

1. HardieWrap® Pro Flashing.
2. HardieWrap® Seam Tape.

2.04 ACCESSORIES

A Fasteners:

1. Metal Framing:
 - a. Metal Framing: 1-1/4 inches (32 mm) No. 8-18 by 0.375 inch (9.5 mm) head self-drilling, corrosion resistant S-12 ribbed buglehead screws.
 - b. Metal Framing: 1-5/8 inches (41 mm) No. 8-18 by 0.323 inch (8.2 mm) head self-drilling, corrosion resistant S-12 ribbed buglehead screws.
 - c. Metal Framing: 1 inch (25 mm) No. 8-18 by 0.323 inch (8.2 mm) head self-drilling, corrosion resistant ribbed buglehead screws.
 - d. Metal Framing: 1 inch (25 mm) No. 8-18 by 0.311 inch (7.9 mm) head self-drilling, corrosion resistant S-12 ribbed buglehead screws.
 - e. Metal Framing: 1.5 inch (38mm) [AGS-100] .100 inches by 25 inches (2540 mm by 635 mm) ET&F Pin or equivalent pneumatic fastener.

2.05 FINISHES

A Factory Primer: Provide factory applied universal primer.

1. Primer: Factory primed by James Hardie.

B Topcoat: Refer to Section 099000 and Exterior Finish Schedule.

PART 3 EXECUTION

3.01 EXAMINATION

- A Examine substrate, clean and repair as required to eliminate conditions that would be detrimental to proper installation.
- B Do not begin until unacceptable conditions have been corrected.
- C If substrate preparation is responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

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- D Minimum 20 gauge 3-5/8 inch (92 mm) C-Stud 16 inches maximum on center or 16 gauge 3-5/8 inches (92 mm) C-Stud 24 inches (610 mm) maximum on center metal framing complying with local building codes, including the use of water-resistive barriers and/or vapor barriers where required. Minimum 1-1/2 inches (38 mm) face and straight, true, of uniform dimensions and properly aligned.
 - 1. Install weather barriers and claddings to dry surfaces.
 - 2. Repair any punctures or tears in the water-resistive barrier prior to the installation of the siding.
 - 3. Protect siding from other trades.

3.02 PREPARATION

- A Protect surrounding areas and adjacent surfaces during execution of this work.
- B Install Sheet Metal Flashing:
 - 1. Above door and window trim and casings.
 - 2. Above horizontal trim in field of siding.
- C Installation of a water-resistive barrier is required in accordance with local building code requirements.
- D The water-resistive barrier must be appropriately installed with penetration and junction flashing in accordance with local building code requirements.
- E Install materials in strict accordance with manufacturer's installation instructions.
- F The water-resistive barrier must be appropriately installed with penetration and junction flashing in accordance with local building code requirements.
- G Install Engineered for Climate™ HardieWrap™ weather barrier in accordance with local building code requirements.
- H Use HardieWrap™ Seam Tape and joint and laps.
- I Install HardieWrap™ flashing, and HardieWrap™ Flex Flashing.

3.03 INSTALLATION - GENERAL

- A Install siding in accordance with manufacturer's instructions and recommendations.
 - 1. Read warranty and comply with terms necessary to maintain warranty coverage.
 - 2. Install in accordance with conditions stated in model code evaluation report applicable to location of project.
 - 3. Use trim details as indicated on drawings.
 - 4. Touch up field cut edges before installing.
 - 5. Pre-drill nail holes if necessary to prevent breakage.
- B Over Steel Studs: Use hot-dipped galvanized self-tapping screws, with the points of at least three screws penetrating each stud the panel crosses and at panel ends.
- C Allow space for thermal movement between both ends of siding panels that butt against trim; seal joint between panel and trim with specified sealant.
- D Joints in Horizontal Siding: Avoid joints in lap siding except at corners; where joints are inevitable stagger joints between successive courses.
- E Joints in Vertical Siding: Install Z-flashing in horizontal joints between successive courses of vertical siding.
- F Do not install siding less than 6 inches from ground surface, or closer than 1 inch to roofs, patios, porches, and other surfaces where water may collect.
- G Exterior Soffit Vents: Install in accordance with manufacturer's written instructions and at locations indicated on drawings; provide vent area as indicated on drawings.
- H After installation, seal joints except lap joints of lap siding; seal around penetrations, and paint exposed cut edges.

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- I Finish Painting: See Section 099113.

3.04 FIELD QUALITY CONTROL

- A See Section 014000 - Quality Requirements, for additional requirements.
- B Provide manufacturer's field representative to inspect final installation.

3.05 PROTECTION

- A Protect installed products until Date of Substantial Completion.
- B Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION 074646

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SECTION 075419 - POLYVINYL-CHLORIDE ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Mechanically attached polyvinyl-chloride (PVC) single-ply membrane roofing, over insulation.
- B Roof boards.
- C Insulation.
- D Flashings.
- E Walkway protection.

1.02 RELATED REQUIREMENTS

- A Section 053100 - Steel Decking: Placement of acoustical insulation for deck flutes.
- B Section 061000 - Rough Carpentry: Wood cant strips.

1.03 REFERENCE STANDARDS

- A ANSI/SPRI/FM 4435/ES-1 - Test Standard for Edge Systems Used with Low Slope Roofing Systems; 2022.
- 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 A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- D ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2017.
- E ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2023a.
- F ASTM C1549 - Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer; 2016 (Reapproved 2022).
- G ASTM D751 - Standard Test Methods for Coated Fabrics; 2019.
- H ASTM D4434/D4434M - Standard Specification for Poly(Vinyl Chloride) Sheet Roofing; 2021.
- I ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- J ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.
- K FM (AG) - FM Approval Guide; Current Edition.
- L FM DS 1-28 - Wind Design; 2015, with Editorial Revision (2024).
- M FM DS 1-29 - Roof Deck Securement and Above-Deck Roof Components; 2016, with Editorial Revision (2022).
- N NRCA (RM) - The NRCA Roofing Manual; 2024.
- O NRCA (WM) - The NRCA Waterproofing Manual; 2021.
- P UL (DIR) - Online Certifications Directory; Current Edition.

1.04 ADMINISTRATIVE REQUIREMENTS

- A Preinstallation Meeting: Convene one week before starting work of this section.
 - 1. Review preparation, installation procedures, coordinating, and scheduling required with related work.

1.05 SUBMITTALS

- A See Section 013300 - Submittal Requirements for submittal procedures.

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- B Product Data: Provide data indicating membrane materials, flashing materials, insulation, fasteners, and coverboard.
- C Shop Drawings: Submit roofing shop drawings for unusual conditions.
- D Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.
- F Manufacturer's Field Reports: Indicate procedures followed, ambient temperatures, humidity, wind velocity during application, and supplementary instructions given.
- G Manufacturer's qualification statement.
- H Installer's qualification statement.
- I Testing firm's qualification statement.
- J Sustainable Design Documentation: Test report showing solar reflectance index of membrane.
- K Executed warranty.

1.06 QUALITY ASSURANCE

- A Manufacturer Qualifications: Company specializing in directly manufacturing products specified in this section with minimum fifteen years of documented experience.
- B Installer Qualifications: Company specializing in performing work of this section with at least five years of documented experience.
- C Testing Firm Qualifications: Company specializing in performing work of the type specified and approved by manufacturer.
- D FM 1-75 requirements using systems which meet FM certifications.

1.07 DELIVERY, STORAGE, AND HANDLING

- A Deliver materials in manufacturer's original containers, dry and undamaged, with seals and labels intact.
- B Store materials in weather protected environment, clear of ground and moisture.
- C Ensure storage and staging of materials do not exceed static and dynamic load-bearing capacities of roof decking.
- D Protect foam insulation and adhesives from direct exposure to sunlight.

1.08 FIELD CONDITIONS

- A Do not apply roofing membrane during unsuitable weather.
- B Do not apply roofing membrane when ambient temperature is below 40 degrees F or above 120 degrees F.
- C Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- D Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.
- E Schedule applications so that no partially completed sections of roof are left exposed at end of the day.

1.09 WARRANTY

- A See Section 017836 - Warranties and Bonds for additional warranty requirements.
- B Manufacturer's Full System Warranty: Provide 20-year manufacturer's system warranty for repair or replacement of roofing that leaks or is damaged due to wind or other natural causes commencing on the Date of Substantial Completion. Complete forms in Owner's name and register with warrantor.

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- C Applicator's Warranty: Signed by installing applicator, covering the work of a System Warranty, including all components of roofing system installation such as membrane roofing, base flashing, roof insulation, fasteners, cover boards, vapor retarders, expansion joints, and walkway products, for the following warranty period:

- 1. Warranty Period: 5 years from date of substantial completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A Basis of Design: Sika Corporation - Roofing.
 - 1. Address: 100 Dan Road, Canton, MA 02021.
 - 2. Telephone: (800) 451-2504 & Sales (562) 397-6593.
 - 3. Website: usa.sika.com/sarnafil/#sle.
- B Acceptable Manufacturers:
 - 1. FiberTite Roofing: www.fibertite.com
 - 2. Duro-Last Roofing: www.duro-last.com
 - 3. Carlisle SynTec Systems: www.carlisle-syntec.com/#sle.
 - 4. Or Approved Equal.
 - 5. Substitutions : 012500 - Substitution Procedures

2.02 APPLICATIONS

- A Polyvinyl-Chloride (PVC) Single-Ply Membrane Roofing:
 - 1. Mechanically attached, over insulation.

2.03 MEMBRANE ROOFING SYSTEMS

- A Type RF-1 - Polyvinyl-Chloride (PVC) Mechanically-Attached Roofing Systems:
 - 1. Sika Sarnafil Inc; Sarnafil S 327 EnergySmart.

2.04 PERFORMANCE REQUIREMENTS

- A Thermoplastic Polyvinyl-Chloride (PVC) Roofing Membrane: Single-ply, mechanically-attached membrane over insulation and cover boards as indicated on drawings.
- B Type MR-1 Roofing Membrane Materials:
 - 1. Polyvinyl Chloride (PVC): Comply with ASTM D4434/D4434M, Type III for Sarnafil S polyester-reinforced mechanically-fastened membranes.
 - a. Thickness: 60 mil, 0.060 inch, minimum, in accordance with ASTM D751 test method.
 - 2. Sheet Width: 10 feet.
 - a. Mechanically Attached Application: Limit width to 120 inches, maximum, when ambient temperatures are less than 40 degrees F for an extended period during installation.
 - 3. Solar Reflectance for EnergySmart Membranes and Color: At least 0.84 - White for initial and 0.76 White for 3 years in accordance with ASTM C1549 test method.
 - 4. Factory Mutual Classification: Class 1, with windstorm resistance of 1-90 in accordance with FM DS 1-28, and secure attachment of roof deck and above-deck components in accordance with FM DS 1-29.
 - 5. Wind Uplift Resistance:
 - a. Designed to withstand wind uplift forces calculated in accordance with ASCE 7.
 - b. Design Wind Speed: In accordance with local building code and authorities having jurisdiction (AHJ).
 - 6. Roof Covering External Fire Resistance Classification: Class A, comply with UL (DIR).

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7. Rated roof insulation: To FM Approval 4450/4470, Class 1-90.
8. Hail damage resistance: To FM 4470, Class 1-SH.
9. Impact resistance: To FM 4473, Class 4 and UL 2218, Class 4.
- C Roofing Assembly: Components, from bottom-up and installed in coordination with roofing system.
 1. Roof deck boards.
 2. Insulation.
 3. Roof cover boards.
 4. Roofing membrane.
- D Insulation Type - Constant and Tapered Thickness Application:
 1. For Mechanically-Attached PVC Membrane:
 - a. Polyisocyanurate (ISO) insulation board.

2.05 INSULATION

- A Polyisocyanurate (ISO) Board Insulation with Facers on Both Sides: Rigid, closed-cell, ISO insulation board complying with ASTM C1289, Type II, Class 1, Grade 2 (20psi).
 1. Facers: Fiber reinforced felt facersGlass Fiber Reinforced (GFR) felt facers.
 2. Classifications:
 - a. Type II:
 - 1) Class 1 - Faced with Glass Fiber Reinforced (GFR) felt facers on both major surfaces of core foam.
 3. Compressive Strength:
 - a. Classes 1-2-3, Grade 2 - 20 psi, minimum.
 4. Thermal Resistance: R-value, at 1-1/2 inch thick and 75 degrees F mean temperature, as follows:
 - a. Class 1, Grades 1-2-3 - 8.0, minimum.

<u>Average LTTR Value*</u>	<u>Thickness</u>	<u>Slope</u>
8.6	0.5 –2.5" (12 –63 mm)	1/2" per ft (4 %)

*LTTR (long term thermal resistance) values are based on ASTM C1289. Test samples were third-party selected and tested by an accredited material testing laboratory. The LTTR results were reviewed by FM Global and certified by the PIMA Quality Mark Program.
 5. Flame Spread Index (FSI): Class A, 25 to 60, when tested in accordance with ASTM E84.
 6. Smoke Developed Index (SDI): Class A, 50 to 170, when tested in accordance with ASTM E84.
 7. Board Size: 48 by 96 inches.
 8. Board Thickness: As indicated on drawings.
 9. Board Edges: Square.
 10. Tapered Board: Slope as indicated; minimum thickness 1 inch; fabricate of fewest layers possible.
 - a. Sarnatherm Tapered ISO is a sloped rigid closed cell polyisocyanurate insulation board with fiber GFR felt facers. Sarnatherm Tapered ISO is designed to achieve positive drainage, prevent ponding water.
 11. Water Vapor Permeance: Less than 1.5 perm at 1 inch thick, and tested in accordance with ASTM E96/E96M.
 12. Basis of Design Products:
 - a. Sika; Roofing Sarnatherm ISO.
 - b. Sarnatherm Tapered ISO.

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2.06 ROOF BOARDS

- A Gypsum Roof Boards: Gypsum roof board with a primed fiberglass mat facer on one side, complying with ASTM C1177/C1177M.
 - 1. Flame Spread Index (FSI): Class A, Zero, when tested in accordance with ASTM E84.
 - 2. Smoke Developed Index (SDI): Class A, Zero, when tested in accordance with ASTM E84.
 - 3. Board Size: 48 by 96 inches.
 - 4. Board Thickness: 1/4 inch, nominal.
 - 5. Compressive Strength: 900 psi, nominal.
 - 6. Products:
 - a. DensDeck Prime: www.gpgypsum.com.
 - b. Or Equal.

2.07 INSULATION/ROOF BOARD ATTACHMENT

- A Manufacturer's Standard plates and fasteners for specified System.

2.08 ATTACHMENT COMPONENTS

- A Attachment Plates for Insulation and Roof Boards:
 - 1. Manufacturer's Standard plates for specified System.
 - 2. Stress Plate: 26 gauge, 0.0179 inch thick, 3- by 3- inch square or 3-inch round steel plate with galvalume coating, used with #12 Sarnafasteners to attach Sarnatherm insulation, gypsum roof board to roof deck before installation of PVC mechanically-attached roof membrane.
 - a. Products:
 - 1) Sika Roofing; Sarnaplate.
- B Attachment Plates for PVC Membrane:
 - 1. Coated Round Steel Disc: 3-inch round polymer-coated steel plate used to attach Sarnatherm insulation and roof boards, gypsum roof boards, or other boards to roof deck or structural purlins before installation of PVC mechanically attached roof membrane. Roofing membrane is field welded to plate using induction welding.
 - a. Products:
 - 1) Sika Roofing; Sarnadisc RhinoBond.
- C Fasteners:
 - 1. #12 Screws: Corrosion-resistant carbon steel fastener used with Sarnaplates within Sarnafil roof systems to attach Sarnatherm insulation and roof boards, gypsum roof boards, or other boards into steel decking, wood plank, or wood sheathing.
 - a. Thread Diameter: 0.220 inch, nominal.
 - b. Length: As indicated on drawings.
 - c. Products:
 - 1) Sika Roofing; Sarnafastener #12.

2.09 FLASHING

- A Wall/Curb Flashing: PVC membrane flashings.
 - 1. Products:
 - a. Sika Roofing; Sarnafil G 410.
 - b. Sika Roofing; Sarnafil G 410 SA Flashing Membrane.
 - c. Sika Roofing; Sarnafil G 459 Flashing Membrane.
 - d. Sika Roofing; Detail Membrane PVC.

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- B Sheet Metal Flashing: PVC-coated, heat-weldable sheet metal for use as perimeter edge, wall, or curb flashing.
 - 1. Metal Sheet: Galvanized steel complying with ASTM A653/A653M, with G90/Z275 zinc coating and at least 24-gauge, 0.0239-inch thick base metal, and 20 mil, 0.020 inch thick PVC coating laminated on one side.
 - 2. Sheet Overall Size: 48 by 96 inches, nominal.
 - 3. Color: White.
 - 4. Products:
 - a. Sika Roofing; Sarnaclad.
- C Miscellaneous Flashing:
 - 1. Circles: Injection-molded, non-reinforced, prefabricated circle, 60 mil, 0.060 inch thick, and 4-1/2 inches in diameter.
 - a. Color: White.
 - b. Products:
 - 1) Sika Roofing; Sarnacircles.
 - 2. Outside Corner: Injection-molded, non-reinforced, prefabricated outside corner, 60 mil, 0.060 inch thick, and used as part of curb and wall flashing details.
 - a. Color: White.
 - b. Products:
 - 1) Sika Roofing; Sarnacorners-Outside.
 - 3. Stack/Pipe Boot: Injection-molded, non-reinforced, prefabricated stack/pipe boot, 60 mil, 0.060 inch thick, and used to flash pipes, vent stacks, and cylindrical penetrations.
 - a. Color: White.
 - b. Penetration Diameter: As indicated on drawings.
 - c. Products:
 - 1) Sika Roofing; Sarnastack Universal.
 - 4. Stack/Pipe Boot: Made from Sarnafil G 410 roofing membrane, prefabricated stack/pipe boot, 60 mil, 0.060 inch thick, and used to flash pipes, vent stacks, and cylindrical penetrations when Sarnastack Universal will not fit.
 - a. Color: White.
 - b. Penetration Diameter: 3/4 to 3 inches.
 - c. Products:
 - 1) Sika Roofing; Sarnastack Split.
- D Counterflashing: Heavy-duty extruded aluminum counterflashing with predrilled holes at 8 inches on center for attachment to walls and curbs.
 - 1. Thickness: 0.10 to 0.12 inch, nominal.
 - 2. Profile Depth: 2-1/4 inches, nominal.
 - 3. Products:
 - a. Sika Roofing; Sarnareglet.

2.10 WALKWAY PROTECTION

- A Chevron Textured Mat: Polyester reinforced, 96 mil, 0.096 inch thick, weldable PVC membrane with chevron textured surface embossment, used as a protection layer from rooftop traffic.
 - 1. Color: Light gray.
 - 2. Width: 39 inches, nominal.
 - 3. Tensile Strength: 275 psi in accordance with ASTM D751 test method.
 - 4. Products:
 - a. Sika Roofing; Sarnatred-V.
- B Perimeter Warning Materials:

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1. Membrane Tape: Highly visible, with yellow top-colored PVC membrane, 4 inches wide and hot-air welded to PVC roofing membrane, used in required areas to draw attention to roof perimeters and potentially hazardous areas.
 - a. Products:
 - 1) Sika Roofing; Perimeter Warning Membrane.

2.11 ACCESSORIES

- A Fasteners and Anchors: Provide fasteners, anchors, nails, straps, and bars that are post-galvanized steel, aluminum, or stainless steel.
 1. Assemble mixed metal type components in an appropriate way that will avoid galvanic corrosion.

PART 3 EXECUTION

3.01 EXAMINATION

- A Verify that surfaces and site conditions are ready to receive this work.
- B Verify that roof deck and existing roof construction are structurally sound and able to provide proper support for new roofing system.
- C Verify roof deck surfaces are clean and smooth, flat, free of flaws, depressions, sharp edges, loose and foreign material, waves, projections, properly sloped, and suitable for installation of roof system.
- D Verify roof deck surfaces are dry and free of snow or ice, oil, grease, and other contaminants.
- E Verify that roof deck openings, curbs, and penetrations through roof decking such as drains and scuppers are solidly set, and cant strips, nailing strips, and reglets are properly placed.

3.02 PREPARATION

- A Owner's representative to verify that roof deck is properly secured to structural framing in accordance with local building code, and capable of resisting anticipated loads to that location.
- B Wood Deck:
 1. Verify flatness and tightness of joints in wood decking; fill knot holes with latex filler.
 2. Confirm dry wood decking moisture content using moisture meter with maximum of 12 percent moisture content level.
 3. Verify that roof decking is at least 1-1/2 inch thick lumber or 15/32 inch thick plywood.
- C Metal Deck:
 1. Install preformed acoustical glass fiber insulation strips in roof deck flutes in accordance with manufacturer's instructions; see Section 053100.
 2. Install Deck Sheathing on Metal Deck:
 - a. Lay with long side at right angle to flutes; stagger end joints; provide support at ends.
 - b. Cut sheathing cleanly and accurately at roof breaks and protrusions to provide smooth surface.
 - c. Mechanically fasten sheathing to roof deck, in accordance with Factory Mutual recommendations and roofing manufacturer's instructions.
 - 1) Over entire roof area, fasten sheathing using six fasteners with washers per sheathing board.
 - 2) At roof perimeter to a distance of 4 feet in from edges, fasten sheathing using six fasteners with washers per board.

3.03 INSTALLATION

- A Perform work in accordance with manufacturer's instructions, NRCA (RM), and NRCA (WM) applicable requirements.

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- B Do not apply roofing membrane during cold or wet weather conditions.
- C Do not apply roofing membrane when ambient temperature is outside the temperature range recommended by manufacturer.
- D Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- E Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.
- F Coordinate this work with installation of associated counterflashings installed by others as this work proceeds.
- G Insulation:
 - 1. Attachment of Insulation: **Type RF-2** - Mechanically fasten insulation and coverboard to deck in accordance with roofing manufacturer's instructions and Factory Mutual FM (AG) requirements.
 - 2. Comply with wind uplift rating requirements and associated fastener patterns.
 - 3. Lay subsequent layers of insulation with joints staggered at least 12 inches from joints of preceding layer.
 - 4. Place tapered insulation to the required slope pattern in accordance with roofing manufacturer's instructions.
 - 5. On metal deck, place boards parallel to flutes with insulation board edges bearing on deck flutes.
 - 6. Lay boards with edges in moderate contact without forcing, and cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
 - 7. At roof drains, use factory-tapered boards to slope down to roof drains over a distance of 18 inches, minimum.
 - 8. Do not install more insulation and coverboard than can be covered with membrane on same day.
- H Roof Deck/Cover Boards:
 - 1. Mechanically fasten roof deck/cover boards in accordance with roofing manufacturer's instructions and Factory Mutual FM (AG) requirements.
- I Membrane:
 - 1. Mechanical Membrane Attachment:
 - a. Install membrane and mechanical attachment devices in accordance with manufacturer's instructions.
 - b. Field-attached system (RhinoBond): Secure PVC roofing membrane using RhinoBond Induction Welder to Sarnadisc-RhinoBond plates fastened with applicable Sarnafasteners and hot-air weld lapping seams with single nozzle welder.
 - c. Mechanically attach membrane using fasteners and discs as required to withstand project design pressures as indicated.
 - 1) Install fasteners and discs along membrane edge on fastening line at manufacturer's established spacing.
 - 2) Ensure fasteners clamp S 327 membrane tightly to substrate.
 - d. Tack welding of S 327 full or half-width rolls for purposes of temporary restraint during installation is not permitted.
 - e. Ensure that sheet layout does not hold water.
 - f. Provide seam test cuts of hot-air weld overlap at least 3 times per day.
 - g. Refer to Sika Sarnafil Roofing Applicator Handbook for detailed installation instructions.
- J Flashing: Install flashings concurrently with roof membrane; temporary flashings are not allowed without the prior written approval of Owner's Representative and manufacturer.

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1. Membrane Flashing: Adhere membrane flashing onto compatible, dry, and smooth surfaces free of dirt, dust, and debris; use caution to ensure adhesive fumes are not drawn into the building.
 - a. Extend flashings at least 8 inches above finished roofing level.
 - b. Mechanically fasten flashing membranes along the counter-flashed top edge with Sarnastop or approved Sarnadisc at 6 to 12 inches on center.
 - c. Provide adhered flashings that exceed 45 inches in height with additional securement, unless applying G 410 SA membrane to plywood, DensDeck Prime, concrete masonry units, or cast-in-place concrete.
 - d. Refer to Typical Flashing Procedures section of Sika Roofing Applicator Handbook for detailed installation instructions.
 2. Liquid Flashing: Due to the strong odor of liquid flashing, take the necessary precautions to prevent odors and/or vapors from entering the building interior including, but not limited to, turning off and sealing air intake vents and other means of ingress for odors and/or vapors during product application and curing.
 - a. Prepare flashing surfaces to be in extremely clean condition.
 - b. Pre-cut liquid flashing fleece to fit around vertical and horizontal penetration with at least 2-inch overlaps.
 - c. Apply catalyzed liquid flashing with at least 55 mil, 0.055 inch thick base layer, and place pre-cut fleece onto wet liquid flashing and ensure fleece is saturated, and apply at least 25 mil, 0.025 inch thick finish layer over fleece.
 - d. Refer to Liquid Flashing Procedures section of Sika Roofing Applicator Handbook for detailed installation instructions.
 3. Metal Base Flashing and Edge Metal: Comply with the following for metal details, fabrication practices, and installation methods:
 - a. ANSI/SPRI/FM 4435/ES-1, and Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA).
 - b. Install preformed metal flashing in accordance with metal manufacturer's guidelines.
 - c. Install and form Sarnaclad and other metal flashings in accordance with detail drawings; refer to Metal Flashings section of Sika Roofing Applicator Handbook for detailed installation instructions.
- K Walkway: Refer to Walkway Installation section of Sika Roofing Applicator Handbook for detailed installation instructions.
1. Chevron Textured Mat: Examine existing deck membrane seams to be covered by Sarnatred-V mat, and install walkway mat in straight line by either adhering and welding or just welding to roof membrane in accordance with manufacturer's installation instructions.
- L Perimeter Warning: Ensure that perimeter warning installation substrates are extremely clean.
1. Membrane: Apply warning membrane using hot-air welding to top of PVC roofing membrane in areas as indicated on drawings.
 - a. Note: Warning membrane is not required for parapet walls 42" or higher.

3.04 FIELD QUALITY CONTROL

- A See Section 014000 - Quality Requirements for additional requirements.
- B Owner will provide testing and inspection services, and Contractor will provide temporary construction and materials for testing.
- C Water Test:
1. A 60-hr. water test of all completed roof systems, including low-slope and metal roofing, as well as adjacent building components, shall be coordinated with the Owner and conducted by the Contractor in the presence of Owner. The water test shall include the

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following procedures:

- a. At the direction of the Owner, apply simulated rain over all roof areas for at least 15 minutes per area, or as otherwise directed.
 - b. In addition to the simulated rain, direct water to all walls, windows, units, penetrations, etc. that occur adjacent to, or within each roof area, using a continuous, unforced hose stream.
 - c. Plug all roof drains in each drainage area and allow each to be filled to a depth of 3 to 4 inches measured at the drain areas. Allow to stand for a minimum of 4 hours.
 - d. Upon completion of water test, unplug primary drains only and insure that water flows freely without restriction. Verify that no water comes through overflow drain outlets (to insure that pipes are not cross-connected). Then unplug overflow drains and run hose stream directly into overflow drains to insure that water flows freely without restriction through overflow lines.
 - e. Perform any necessary corrections to defects noted during or after the water test procedures. Perform additional testing as necessary to further define sources of any noted leakage.
 - f. Contractor shall provide and/or arrange for all necessary equipment, supplies, water, etc. as needed to perform these tests. This may include a water truck with fire hose, if necessary.
 - g. Water test shall be performed after completion of asphalt paving, and must be completed and verified prior to filing for substantial completion.
- D A final audit punch list shall be made by the Architect upon notice by the General Contractor that roofing is complete. The roofing and related work must be 100% complete or additional inspections will be back charged.
- E Manufacturer's technical representative shall make periodic site visits and complete inspection reports that are submitted to the owner. At least one visit per roof area not including final inspections. Final inspections by the roofing membrane manufacturer shall be coordinated at least two weeks in advance with the owner / owner's consultant so that their attendance can be properly coordinated. Final inspection reports and signed / completed punch list reports by the roofing membrane manufacturer shall be submitted to the owner. Submittal of the roofing warranty alone shall not be acceptable.

3.05 CLEANING

- A See Section 017300 - Execution Requirements for additional requirements.
- B Remove bituminous markings from finished surfaces.
- C In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and comply with their documented instructions.
- D Repair or replace defaced or damaged finishes caused by work of this section.
- E Powerwash entire surface of completed roof (all areas).

3.06 PROTECTION

- A Protect installed roofing and flashings from construction operations.
- B Where traffic must continue over the finished roof membrane, protect surfaces using durable materials.

END OF SECTION 075419

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SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Fabricated sheet metal items, including flashings, counterflashings, gutters, downspouts, sheet metal roofing, exterior penetrations, and other items indicated in Schedule.
- B Sealants for joints within sheet metal fabrications.
- C Precast concrete splash pads.

1.02 RELATED REQUIREMENTS

- A Section 075419 - Polyvinyl-Chloride Roofing - Sika

1.03 REFERENCE STANDARDS

- A AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
- B AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- C AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 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 B32 - Standard Specification for Solder Metal; 2020.
- F ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- G ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- H ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2018).
- I CDA A4050 - Copper in Architecture - Handbook; current edition.
- J SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.04 SUBMITTALS

- A See Section 013300 - Submittal Requirements, for submittal procedures.
- B Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

1.05 QUALITY ASSURANCE

- A Standards:
 - 1. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.
 - 2. Comply with The NRCA Roofing and Waterproofing Manual installation details.
- B Performance Requirements: Designed and installed to withstand project specific wind uplift pressures in compliance, at a minimum, with FMG Loss Prevention Data Sheet 149 and per IBC 2022 Chapter 15 and 16.
- C Fabricator and Installer Qualifications: Company specializing in sheet metal work with 5 years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

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- 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 indicated on drawings.
- 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 Fabricate cleats of _____ type sheet metal, minimum _____ inches wide, interlocking with sheet.
- C Form pieces in longest possible lengths.
- D Hem exposed edges on underside 1/2 inch; miter and seam corners.
- E Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- F Fabricate corners from one piece with minimum 18-inch long legs; seam for rigidity, seal with sealant.
- G Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.
- H Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.

2.03 SCUPPERS, GUTTER AND DOWNSPOUT FABRICATION

- A Size for rainfall intensity determined by a storm occurrence of 1 in 5 years in accordance with SMACNA Architectural Sheet Metal Manual.
- B Scuppers: Refer to Figures 1-26a through 1-30C, as applicable to design indicated.
- C Gutters: Profile as indicated. Refer to Figures 1-1 through 1-24D, and Tables 1-5 through 1-8, as applicable to design indicated.
- D Downspouts: Profile as indicated. Refer to Figures 1-31 through 1-36 and Tables 1-9 as applicable to design indicated.
- E Finish: Refer to Drawings and Material Schedule.
- F Accessories: Profiled to suit gutters and downspouts.
 - 1. Anchorage Devices: In accordance with SMACNA (ASMM) requirements.
 - 2. Gutter Supports: Brackets.
 - 3. Downspout Supports: Brackets.
- G Splash Pads: Precast concrete type, of size and profiles indicated; minimum 3,000 psi at 28 days, with minimum 5 percent air entrainment.

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H Seal metal joints.

2.04 ACCESSORIES

- A Fasteners: Galvanized steel, with soft neoprene washers.
- B Waterproofing Underlayment: Self-adhering, butyl rubber and polyethylene membrane or glass fiber reinforced rubberized asphalt and non non-wicking fabric:
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Grace Ultra.
 - b. Carlisle Coatings & Waterproofing, Inc. Dri-Start HR.
 - c. Polystick MU, Polyglass USA, Inc.
 - 2. Underlayment Primer: As recommended by the Manufacturer of the underlayment material.
- C Primer Type: Zinc chromate.
- D Touch-up Paint: Provide high-performance air-dry kynar or compatible touch-up paint as recommended by prepainted coating manufacturer that is compatible with and of same durability as prepainted finish coating.
- E Concealed Sealants: Non-curing butyl sealant.
- F Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.
- G Asphalt Roof Cement: ASTM D4586/D4586M, Type I, asbestos-free.

PART 3 EXECUTION

3.01 EXAMINATION

- A Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

- A Install starter and edge strips, and cleats before starting installation.
- B Install surface mounted reglets true to lines and levels, and seal top of reglets with sealant.
- C Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil, 0.015 inch.
- D Coordination: Coordinate with other Work which affects, connects with, or will be concealed by this Work.

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.
- G Set splash pads under downspouts.

3.04 FIELD QUALITY CONTROL

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- A See Section 014000 - Quality Requirements for field inspection requirements.
- B Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

3.05 TOUCH-UP AND CLEANING

- A Touch up field cuts and abraided areas of prepainted sheet metal work after installation.
- B During the course of the Work and on completion, remove and dispose of excess materials, equipment and debris away from premises. Leave Work in clean condition.

END OF SECTION 076200

Sheet Metal Flashing and Trim - 076200

SECTION 077200 - ROOF ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Roof curbs.
- B Equipment rails.
- C Roof penetrations mounting curbs.
- D Roof hatches -, manual operation.
- E Non-penetrating pedestals.

1.02 REFERENCE STANDARDS

- A ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- B ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- C MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018, with Amendment (2019).
- D UL (DIR) - Online Certifications Directory; Current Edition.

1.03 SUBMITTALS

- A See Section 013300 - Submittal Requirements, for submittal procedures.
- B Product Data: Manufacturer's data sheets on each product to be used.
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. Maintenance requirements.
- C Shop Drawings: Submit detailed layout developed for this project and provide dimensioned location and number for each type of roof accessory.
 - 1. Non-penetrating Rooftop Supports: Submit design calculations for loadings and spacings.
 - 2. Submit shop drawings sealed and signed by a Professional Engineer experienced in design of this type of work and licensed in California.
- D Certificate: For smoke hatches, provide certificate of approval from authority having jurisdiction.
- E Warranty Documentation:
 - 1. Submit manufacturer warranty.
 - 2. Ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 DELIVERY, STORAGE, AND HANDLING

- A Store products in manufacturer's unopened packaging until ready for installation.
- B Store products under cover and elevated above grade.

1.05 WARRANTY

- A See Section 017836 - Warranties and Bonds for additional warranty requirements.
- B Extended Correction Period: Correct defective work within 5-year period commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.01 ROOF CURBS

Roof Accessories - 077200

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- A Roof Curbs Mounting Assemblies: Factory fabricated hollow sheet metal construction, internally reinforced, and capable of supporting superimposed live and dead loads and designated equipment load with fully mitered and sealed corner joints welded or mechanically fastened, and integral counterflashing with top and edges formed to shed water.
 - 1. Applications: Roof curbs used for roof penetrations/openings as indicated on drawings.
 - 2. Roof Curb Mounting Substrate: Curb substrate consists of standing seam metal roof panel system.
 - 3. Sheet Metal Material:
 - a. Aluminum: 0.080 inch minimum thickness, with 3003 alloy, and H14 temper.
 - 4. Roofing Cants: Provide integral sheet metal roofing cants dimensioned to begin slope at top of roofing system at 1:1 slope; minimum cant height 4 inches.
 - 5. Fabricate curb bottom and mounting flanges for installation directly on metal roof panel system to match slope and configuration of system.
 - a. Extend side flange to next adjacent roof panel seam and comply with seam configurations and seal connection, providing at least 6 inch clearance between curb and metal roof panel flange allowing water to properly flow past curb.
 - b. Where side of curb aligns with metal roof panel flange, attach fasteners on upper slope of flange to curb connection allowing water to flow past below fasteners, and seal connection.
 - c. Maintain at least 12 inch clearance from curb, and lap upper curb flange on underside of down sloping metal roof panel, and seal connection.
 - d. Lap lower curb flange overtop of down sloping metal roof panel and seal connection.
 - 6. Provide layouts and configurations indicated on drawings.
- B Curbs Adjacent to Roof Openings: Provide curb on each side of opening, with top of curb horizontal for equipment mounting.
 - 1. Provide preservative treated wood nailers along top of curb.
 - 2. Insulate inside curbs with 1-1/2 inch thick fiberglass insulation.
- C Equipment Rail Curbs: Straight curbs on each side of equipment, with top of curbs horizontal and level with each other for equipment mounting.
- D Pipe, Duct, or Conduit Mounting Curbs: Vertical posts, minimum 8 inches square unless otherwise indicated.

2.02 ROOF HATCHES AND VENTS, MANUAL OPERATION

- A Roof Hatch Manufacturers:
 - 1. Acudor Products Inc; Galvanized Steel Roof Hatch: www.acudor.com/#sle.
 - 2. Babcock-Davis; ThermalMAX: www.babcockdavis.com/#sle.
 - 3. Basis of Design: Bilco Company; Type E (ladder access, 3 ft square, solid cover): www.bilco.com/#sle.
- B Roof Hatches, General: Factory-assembled steel frame and cover, complete with operating and release hardware.
 - 1. Style: Provide flat metal covers unless otherwise indicated.
 - 2. Mounting: Provide frames and curbs suitable for mounting conditions as indicated on drawings.
 - 3. Thermally Broken Hatches: Provide insulation within frame and cover.
 - 4. For Ladder Access: Single leaf; 30 by 36 inches.
- C Metal Covers: Flush, insulated, hollow metal construction.
 - 1. Capable of supporting 40 psf live load.
 - 2. Insulation: Manufacturer's standard 1 inch rigid glass fiber.
 - 3. Gasket: Neoprene, continuous around cover perimeter.

Roof Accessories - 077200

2.03 NON-PENETRATING ROOFTOP SUPPORTS/ASSEMBLIES

- A Non-Penetrating Rooftop Support/Assemblies: Manufacturer-engineered and factory-fabricated, with pedestal bases that rest on top of roofing membrane, and not requiring any attachment to roof structure and not penetrating roofing assembly.
 - 1. Design Loadings and Configurations: As required by applicable codes.
 - 2. Height: Provide minimum clearance of 6 inches under supported items to top of roofing.
 - 3. Support Spacing and Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
 - 4. Steel Components: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.
 - 5. Hardware, Bolts, Nuts, and Washers: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A153/A153M.
- B Pipe Supports: Provide attachment fixtures complying with MSS SP-58 and as indicated.
- C Duct Supports: Provide extruded aluminum supports and sized in accordance with diameter of supported ducts, and with base that is non-penetrating of roofing membrane.
- D Non-Penetrating Pedestals: Steel pedestals with square, round, or rectangular bases.
 - 1. Bases: High density polypropylene.
 - 2. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
 - 3. Steel Components: Stainless steel, or carbon steel hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.

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.

3.02 PREPARATION

- A Clean surfaces thoroughly prior to installation.
- B Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

3.03 INSTALLATION

- A Install in accordance with manufacturer's instructions, in manner that maintains roofing system weather-tight integrity.

3.04 CLEANING

- A Clean installed work to like-new condition.

3.05 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 077200

SECTION 078100 - SPRAY APPLIED FIRE RESISTIVE MATERIALS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Applied fire protection of interior structural steel not exposed to damage or moisture.
- B Applied fire protection of structural steel exposed to damage or moisture.
- C Preparation of applied fire protection for application of exposed overcoat finish specified elsewhere.

1.02 RELATED REQUIREMENTS

- A Section 014533 - Code-Required Special Inspections and Procedures: For Special Inspection requirements for Spray-Applied Fire-Resistive Materials.
- B Section 051200 - Structural Steel Framing.
- C Section 052100 - Steel Joist Framing.
- D Section 053100 - Steel Decking.
- E Section 078123 - Intumescent Fire Protection.
- F Section 078400 - Firestopping.
- G Section 092116 - Gypsum Board Assemblies: Gypsum board fireproofing.

1.03 REFERENCE STANDARDS

- A ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- B ASTM E605/E605M - Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members; 2019 (Reapproved 2023).
- C ASTM E736/E736M - Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members; 2019 (Reapproved 2023).
- D ASTM E759/E759M - Standard Test Method for Effect of Deflection on Sprayed Fire-Resistive Material Applied to Structural Members; 1992 (Reapproved 2023).
- E ASTM E760/E760M - Standard Test Method for Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members; 1992 (Reapproved 2023).
- F ASTM E761/E761M - Standard Test Method for Compressive Strength of Sprayed Fire-Resistive Material Applied to Structural Members; 1992 (Reapproved 2023).
- G ASTM E859/E859M - Standard Test Method for Air Erosion of Sprayed Fire-Resistive Materials (SFRMs) Applied to Structural Members; 2023.
- H ASTM E937/E937M - Standard Test Method for Corrosion of Steel by Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members; 1993 (Reapproved 2023).
- I ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).
- J CBC - 2022 - 2022 California Code of Regulations - Title 24; 2022.
- K UL (FRD) - Fire Resistance Directory; Current Edition.

1.04 ADMINISTRATIVE REQUIREMENTS

- A Coordinate with placement of ceiling hanger tabs, mechanical component hangers, and electrical components.
- B Preinstallation Meeting: Convene one week before starting work of this section.

1.05 SUBMITTALS

- A See Section 013300 - Submittal Requirements , for submittals procedures.

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- B Product Data: Provide data indicating product characteristics, performance criteria, and limitations of use.
 - 1. Assemblies: Provide fireproofing, including auxiliary materials, according to requirements of each fire-resistance design and manufacturer's written instructions.
 - 2. Thickness Schedule: Provide schedule indicating material to be used, structural elements to be protected with spray applied fireproofing, hourly rating and material thickness provided and appropriate references.
- C Manufacturer's Certificate: Certify that applied fireproofing products meet or exceed requirements of Contract Documents.
- D Shop Drawings: Framing plans, schedules, or both, indicating the following:
 - 1. The hourly ratings of each structural member to receive fireproofing.
 - 2. Minimum fireproofing thicknesses needed to achieve required fire-resistance rating of each structural component and assembly.
 - 3. Treatment of fireproofing after application.
- E Test Reports: Reports from reputable independent testing agencies for proposed products, indicating compliance with specified criteria, conducted under conditions similar to those on project, as follows:
 - 1. Bond Strength per ASTM E736 & 2022 (403.2.4).
 - 2. Bond Impact per ASTM E760.
 - 3. Compressive strength per ASTM E761.
 - 4. Deflection per ASTM E759.
 - 5. Air erosion per ASTM E859.
 - 6. High Speed Air Erosion per ASTM E859.
 - 7. Corrosion resistance per ASTM E937.
 - 8. Surface Burning Characteristics per ASTM E84.
 - 9. Combustibility per ASTM E1354 Cone Calorimeter.
 - 10. Density per ASTM E605.
 - 11. Mold Resistance per ASTM G21.
 - 12. Fire tests using substrate materials similar those on project.
 - 13. Evaluation Reports: For fireproofing, from ICC-ES.
- F Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.
- G Field Quality Control Submittals: Submit field test report.
- H Manufacturer Reports: Indicate environmental conditions that applied fireproofing materials were installed.
- I Manufacturer's Qualification Statement.
- J Installer's Qualification Statement.

1.06 QUALITY ASSURANCE

- A Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than 10 years of documented experience.
- B Special Inspector Qualifications: Special inspector performing Field Quality Control Special Inspections shall be a qualified person having a minimum of 5 years documented experience in the successful installation and inspection of sprayapplied fire resistive materials similar to work of this Project, and approved by the Building Official.
- C Installer Qualifications: Company specializing in performing work of the type specified and with at least 5 years of documented experience

1.07 FIELD CONDITIONS

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- A Do not apply fireproofing when temperature of substrate material and surrounding air is below 40 degrees F or when temperature is predicted to be below said temperature for 24 hours after application.
- B Provide ventilation in areas to receive fireproofing during application and 24 hours afterward, to dry applied material.
- C Provide temporary enclosure to prevent spray from contaminating air.
- D Do not allow roof traffic during installation of roof fireproofing and drying period.

1.08 WARRANTY

- A See Section 017836 - Warranties and Bonds, for additional warranty requirements.
- B Correct defective Work within a two year period after Date of Substantial Completion.
 - 1. Include coverage for fireproofing to remain free from cracking, checking, dusting, flaking, spalling, separation, and blistering.
 - 2. Reinstall or repair failures that occur within warranty period.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A Basis of Design: Contract Documents are based on products specified below to establish a standard of quality. Other acceptable manufacturers with products having equivalent characteristics may be considered, provided deviations are minor and design concept expressed in Contract Documents is not changed, as determined by the Architect.
 - 1. Approved Manufacturer:
 - a. GCP Applied Technologies: www.gcpat.com/#sle.
- B Acceptable Manufacturers: Subject to compliance with requirements of Contract Documents, provide product by one of manufacturers listed alphabetically below. If not listed, submit as substitution according to Conditions of the Contract and Division 1 Sections.
 - 1. Isolatek International Inc: www.isolatek.com.
 - 2. Southwest Fireproofing Products Company: www.sfrm.com/#sle.
 - 3. Or Equal.
- C If the Contractor chooses an alternate manufacturer and the AHJ or local agencies require that the Drawings be revised to reflect the change in detailing or manufacturer specific requirements; the Design Team may charge an additional service to the Owner to provide those services to the governing agency.

2.02 APPLIED FIRE PROTECTION ASSEMBLIES

- A Provide assemblies as indicated on drawings.

2.03 MATERIALS, GENERAL

- A Assemblies: Provide fireproofing, including auxiliary materials, according to requirements of each fire-resistance design and manufacturer's written instructions.
- B Fireproofing products shall be 100 percent free of asbestos fibers and shall be formulated with a mold inhibitor as an integral part of the mixture.
- C Sprayed fiber type spray applied fire resistive materials are not allowed.
- D Source Limitations: Submit evidence that the aggregate slurry fireproofing has been tested per ASTM E119 by Underwriters Laboratories Inc or an other accredited testing laboratory. Include evidence that the fire testing was sponsored by the manufacturer and that the material tested was produced at the manufacturer's facility under the supervision of laboratory personnel.
- E Low-Emitting Materials: Fireproofing used within the weatherproofing system shall comply with the testing and product requirements of the California Department of Health Services'

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"Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

- F Fireproofing material shall not be subject to losses from the finished application by sifting, flaking or dusting. Performance shall be measured by the results of a test for erosion resistance when subjected to high velocity air flow across the surface of dried samples. Samples thus tested must be representative of machine applied material similar to that which can be expected on the Project.
- G Dry mix sprayed fire resistive materials containing mineral fibers are not allowed.

2.04 SPRAYED FIRE-RESISTIVE MATERIALS

- A Standard Durability: Sprayed Fire-Resistive Material for Interior Applications: Manufacturer's standard factory mixed material, which when combined with water is capable of providing the indicated fire resistance, and conforming to the following requirements:
 - 1. Composition: Portland-cement-based, not mineral fiber-based.
 - 2. Bond Strength: 200 psf, minimum, when tested in accordance with ASTM E736/E736M when set and dry.
 - 3. Dry Density: Minimum average density of 15 lb/cu ft, with minimum individual density of any test sample of 14 lb/cu ft, when tested in accordance with ASTM E605/E605M.
 - 4. Compressive Strength: 8.33 pounds per square inch, minimum.
 - 5. Thickness: As required for fire-resistance design indicated, measured according to requirements of fire-resistance design or ASTM E605, whichever is thicker, but not less than 0.375 inch (9 mm).
 - 6. Effect of Impact on Bonding: No cracking, spalling or delamination, when tested in accordance with ASTM E760/E760M.
 - 7. Compressive Strength: Minimum 10 lbf/sq. in. (68.9 kPa) according to ASTM E761.
 - 8. Corrosivity: No evidence of corrosion, when tested in accordance with ASTM E937/E937M.
 - 9. Air Erosion Resistance: Weight loss of 0.025 g/sq ft, maximum, when tested in accordance with ASTM E859/E859M after 24 hours.
 - 10. Surface Burning Characteristics: Maximum flame spread index of 0 (zero) and maximum smoke developed index of 0 (zero), when tested in accordance with ASTM E84.
 - 11. Effect of Deflection: No cracking, spalling, or delamination, when tested in accordance with ASTM E759/E759M.
 - 12. Fungal Resistance: No growth after 28 days when tested according to ASTM G21.
 - 13. Finish: Spray-textured finish.
 - 14. Products: Subject to compliance with requirements, provide the following:
 - a. Grace Construction Products; Monokote MK-6 Series.
 - b. Substitutions: Refer to Section 012500 - Substitution Procedures.
- B Intermediate Durability: Sprayed Fire-Resistive Material for Interior Locations and Exposed to View Only: Manufacturer's standard, factory-mixed, lightweight, dry formulation, complying with indicated fire-resistance design, and mixed with water at Project site to form a slurry or mortar before conveyance and application.
 - 1. Bond Strength: Minimum 430-lbf/sq. ft. (20.6-kPa) cohesive and adhesive strength based on field testing according to ASTM E736.
 - 2. Density: Not less than 15 lb/cu. ft. (240 kg/cu. m) and as specified in the approved fire-resistance design, according to ASTM E605.
 - 3. Thickness: As required for fire-resistance design indicated, measured according to requirements of fire-resistance design or ASTM E605, whichever is thicker, but not less than 0.375 inch (9 mm).

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4. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 0.
 - b. Smoke-Developed Index: 0.
 5. Compressive Strength: Minimum 30 lbf/sq. in. (206 kPa) according to ASTM E761.
 6. Corrosion Resistance: No evidence of corrosion according to ASTM E937.
 7. Deflection: No cracking, spalling, or delamination according to ASTM E759.
 8. Effect of Impact on Bonding: No cracking, spalling, or delamination according to ASTM E760.
 9. Air Erosion: Maximum weight loss of 0.0 g/sq. ft. (0. 0 g/sq. m) in 24 hours according to ASTM E859.
 10. Fungal Resistance: Treat products with manufacturer's standard antimicrobial formulation to result in no growth on specimens per ASTM G21.
 11. Finish: Spray-textured finish
 12. Products: Subject to compliance with requirements, provide the following:
 - a. Grace Construction Products; Monokote MK-10HB or Monokote Z-106G
 - b. Substitutions: Refer to Section 012500 - Substitution Procedures.
- C Medium Durability: Sprayed Fire-Resistive Material for Interior Locations or Exposed Conditions to Abrasion: Manufacturer's standard, factory-mixed, Portland cement based dry formulation, complying with indicated fire-resistance design, and mixed with water at Project site to form a slurry or mortar before conveyance and application.
1. Bond Strength: Minimum 2,000-lbf/sq. ft. (94.5-kPa) cohesive and adhesive strength based on field testing according to ASTM E736.
 2. Density: Not less than 22 lb/cu. ft. (350 kg/cu. m) and as specified in the approved fire-resistance design, according to ASTM E605.
 3. Thickness: As required for fire-resistance design indicated, measured according to requirements of fire-resistance design or ASTM E605, whichever is thicker, but not less than 0.375 inch (9 mm).
 4. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 0.
 - b. Smoke-Developed Index: 0.
 5. Compressive Strength: Minimum 100 lbf/sq. in. (680 kPa) according to ASTM E761.
 6. Corrosion Resistance: No evidence of corrosion according to ASTM E937.
 7. Deflection: No cracking, spalling, or delamination according to ASTM E759.
 8. Effect of Impact on Bonding: No cracking, spalling, or delamination according to ASTM E760.
 9. Air Erosion: Maximum weight loss of 0.0 g/sq. ft. (0. 0 g/sq. m) in 24 hours according to ASTM E859.
 10. Fungal Resistance: Treat products with manufacturer's standard antimicrobial formulation to result in no growth on specimens per ASTM G21
 11. Finish: Spray-textured finish
 12. Products: Subject to compliance with requirements, provide the following:
 - a. Grace Construction Products; Monokote Z-106/HY.
 - b. Substitutions: Refer to Section 012500 - Substitution Procedures.
- D High Durability: Sprayed Fire-Resistive Material Interior; Exposed Conditions Subject to Impact: Manufacturer's standard factory mixed material, Portland cement based dry formulation complying with indicated fire-resistance design, and mixed with water at Project site to form a slurry or mortar before conveyance and application and conforming to the following

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requirements:

1. Recommended by manufacturer for permanent exterior exposure.
2. Composition: Portland cement-based; not mineral fiber-based.
3. Bond Strength: Minimum 10,000-lbf/sq. ft. (478-kPa) cohesive and adhesive strength based on field testing according to ASTM E736..
4. Dry Density: Not less than 40 lb/cu. ft. (640 kg/cu. m) and as specified in the approved fire-resistance design, according to ASTM E605.
5. Deflection: No cracking, spalling, or delamination according to ASTM E759.
6. Effect of Impact on Bonding: No cracking, spalling or delamination, when tested in accordance with ASTM E760/E760M.
7. Compressive Strength: Minimum 500 lbf/sq. in. (3450 kPa) according to ASTM E761.
8. Corrosivity: No evidence of corrosion, when tested in accordance with ASTM E937/E937M.
9. Air Erosion Resistance: Weight loss of 0.025 g/sq ft, maximum, when tested in accordance with ASTM E859/E859M after 24 hours.
10. Surface Burning Characteristics: Maximum flame spread index of 0 (zero) and maximum smoke developed index of 0 (zero), when tested in accordance with ASTM E84.
11. Fungal Resistance: No growth after 28 days when tested according to ASTM G21.
12. Finish: Rolled, spray-textured finish.
13. Products: Subject to compliance with requirements, provide the following:
 - a. Grace Construction Products; Monokote Z-146:
 - b. Grace Construction Products; Monokote Z-156:
 - c. Substitutions: Refer to Section 012500 - Substitution Procedures.

2.05 AUXILIARY MATERIALS

- A General: Provide auxiliary materials that are compatible with fireproofing and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.
- B Primer Adhesive: Of type recommended by applied fire protection manufacturer.
- C Overcoat: As recommended by manufacturer of applied fire protection material.
- D Substrate Primers: Primers approved by fireproofing manufacturer and complying with one or both of the following requirements:
 1. Primer and substrate are identical to those tested in required fire-resistance design by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
 2. Primer's bond strength in required fire-resistance design complies with specified bond strength for fireproofing and with requirements in UL's "Fire Resistance Directory" or in the listings of another qualified testing agency acceptable to authorities having jurisdiction, based on a series of bond tests according to ASTM E736.
- E Metal Lath: Expanded metal lath fabricated from material of weight, configuration, and finish required, according to fire-resistance designs indicated and fireproofing manufacturer's written recommendations. Include clips, lathing accessories, corner beads, and other anchorage devices required to attach lath to substrates and to receive fireproofing.; minimum weight of 1.7 psf, galvanized finish.
- F Bonding Agent: Product approved by fireproofing manufacturer and complying with requirements in UL's "Fire Resistance Directory" or in the listings of another qualified testing agency acceptable to authorities having jurisdiction.
- G Reinforcing Fabric: Glass or carbon fiber fabric of type, weight, and form required to comply with fire-resistance designs indicated; approved and provided by fireproofing manufacturer.

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- H Reinforcing Mesh: Metallic mesh reinforcement of type, weight, and form required to comply with fire-resistance design indicated; approved and provided by fireproofing manufacturer. Include pins and attachment.
- I Sealer: If required, a transparent-drying, water-dispersible, tinted protective coating as recommended by fireproofing manufacturer.
- J Mixing water shall be clean, fresh, and suitable for domestic consumption and free from such amounts of mineral or organic substances as would affect the set of the fireproofing material. Provide water with sufficient pressure and volume to meet the fireproofing application schedule.

PART 3 EXECUTION

3.01 EXAMINATION

- A Application of sprayed and cementitious fireproofing shall not begin until the Contractor and the fireproofing applicator have inspected the surfaces to receive fireproofing to determine if surfaces are acceptable to receive the fireproofing material. Submit written, signed certification to Owner prior to commencing with application.
- B Verify that surfaces are ready to receive fireproofing.
- C Substrates are free of dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, incompatible primers, paints, and encapsulants, or other foreign substances capable of impairing bond of fireproofing with substrates under conditions of normal use or fire exposure.
- D Verify that clips, hangers, supports, sleeves, and other items required to penetrate fireproofing are in place.
- E Verify that ducts, piping, equipment, or other items that would interfere with application of fireproofing have not been installed.
- F The application of sprayapplied fire resistive material to the underside of roof deck shall not commence until the roof is completely installed and tight, all penthouses are complete, all mechanical units have been placed, and construction roof traffic has ceased.
- G Verify that roof construction, installation of roof-top HVAC equipment, and other related work is complete before beginning fireproofing work.
- H Conduct tests according to fireproofing manufacturer's written recommendations to verify that substrates are free of substances capable of interfering with bond.
- I Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- J Proceed with installation only after unsatisfactory conditions have been corrected.
- K Verify that voids and cracks in substrate have been filled.
- L Verify that projections have been removed where fireproofing will be exposed to view as a finish material.

3.02 PREPARATION

- A Perform tests as recommended by fireproofing manufacturer in applications where adhesion of fireproofing to substrate is in question.
- B Remove incompatible materials that could effect bond by scraping, brushing, scrubbing, or sandblasting.
- C Prepare substrates to receive fireproofing in strict accordance with instructions of fireproofing manufacturer.
- D Apply fireproofing manufacturer's recommended bonding agent on primed steel.
- E Protect surfaces not scheduled for fireproofing and equipment from damage by overspray, fall-out, and dusting.
- F Painted or primed steel surfaced may require a fireproofing bond test to determine if the paint formulation will impair proper adhesion. Determination of the compatibility of paint or primer

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with the sprayed and cementitious fireproofing shall be the responsibility of the paint or primer manufacturer.

- G For applications visible on completion of Project, repair substrates to remove surface imperfections that could affect uniformity of texture and thickness in finished surface of fireproofing. Remove minor projections and fill voids that would telegraph through fire-resistive products after application.
- H Close off and seal duct work in areas where fireproofing is being applied.

3.03 APPLICATION

- A Install metal lath over structural members as indicated or as required by UL Assembly Design Numbers.
- B Apply primer adhesive in accordance with manufacturer's instructions.
- C Apply fireproofing in uniform thickness and density as necessary to achieve required ratings.
- D Apply sprayapplied fire resistive materials of suitable density for location of installation as follows and as indicated on Drawings:
 - 1. LowDensity Cementitious Fireproofing: Concealed locations within building construction or exposed locations which are not subject to human impact.
 - 2. MediumDensity Cementitious Fireproofing: Concealed and exposed locations which may be subject to occasional human contact/impact (i.e., overhead structure within mechanical spaces, maintenance access areas, etc.).
 - 3. HighDensity Cementitious Fireproofing: Exposed locations which are subject to regular contact/impact. (i.e., columns within mechanical spaces, maintenance areas, back of house, and other equipment sensitive areas, including but not limited to, Dimmer Rooms, Card Access Equipment Rooms, and areas containing electrical equipment).
- E In exposed locations, trowel surface smooth and form square edges, using tools and procedures recommended by fireproofing manufacturer.
- F Retempering or reuse of waste materials shall not be allowed.
- G Bonding materials (adhesives, catch coats, metal lath, mesh, stud pins, etc.) shall be applied as per the appropriate UL fire resistance design and manufacturer's written recommendations.
- H Apply overcoat at the rate recommended by fireproofing manufacturer.
- I Finishes: Where indicated, apply fireproofing to produce the following finishes:
 - 1. Manufacturer's Standard Finishes: Finish according to manufacturer's written instructions for each finish selected.
 - 2. Spray-Textured Finish: Finish left as spray applied with no further treatment.
 - 3. Rolled, Spray-Textured Finish: Even finish produced by rolling spray-applied finish with a damp paint roller to remove drippings and excessive roughness.
 - 4. Skip-Troweled Finish: Even leveled surface produced by troweling spray-applied finish to smooth out the texture and neaten edges.
 - 5. Skip-Troweled Finish with Corner Beads: Even, leveled surface produced by troweling spray-applied finish to smooth out the texture, eliminate surface markings, and square off edges.

3.04 FIELD QUALITY CONTROL

- A Perform field inspection and testing in accordance with Section 014000 - Quality Requirements.
- B Sprayed FireResistive Materials Special Inspections: Installation of Sprayed FireResistive Materials will be inspected during construction as required by Section 1704 of the CBC 2022.
 - 1. For reference, utilize AWCI - Inspection Procedure for Field-Applied Sprayed Fire-Resistive Materials, Technical Manual 12-A; an annotated guide.
 - 2. Provide free access to Work and cooperate with appointed firm.

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3. Owner will engage a qualified independent special inspector meeting qualification requirements specified to perform required special inspections.
 4. Inspector will prepare reports indicating that work inspected was done in conformance to approved fire-resistance designs and the approved manufacturer's written instructions; including structural members surface conditions, application, thickness, density and bond strength.
 5. Reports shall be provided to all parties at the completion of each floor area as delineated on the Drawings.
 6. Discrepancies shall be immediately corrected by the Contractor.
 7. Completed work which does not conform to approved fire-resistance designs and the approved manufacturer's written instructions shall be reported to the Architect.
 8. Work completed that does not comply with approved fire-resistance designs and the approved manufacturer's written instructions shall be corrected and retested to verify compliance with requirements at Contractor's expense.
- C Cohesion/Adhesion Testing: Test using a modified ASTM E736 - Cohesion/Adhesion of Sprayed Fire-Resistive Material Applied to Structural Members test procedure.
1. Inspect the installed fireproofing after application and curing for integrity, prior to its concealment. Ensure that actual thicknesses, densities, and bond strengths meet requirements for specified ratings.
 2. Submit field test reports promptly to Contractor and Architect.
- D Ensure that actual thicknesses, densities, and bond strengths meet requirements for specified ratings and requirements of authorities having jurisdiction (AHJ).
- E Repair or replace applied fireproofing at locations where test results indicate fireproofing does not meet specified requirements.
- F Contractor shall control thickness, utilizing a workable depth gauge to meet minimum thickness as required, and cooperate with the inspecting agency in furnishing samples for tests.
- G Use of the W/D ratio formula to determine fireproofing thickness shall not be allowed, unless approved by the local building authority.
- H Re-inspect installed fireproofing for integrity of fire protection, after installation of subsequent Work.

3.05 CLEANING AND PROTECTION

- A Remove excess material, overspray, droppings, and debris.
- B Remove fireproofing from materials and surfaces not required to be fireproofed.
- C At exposed fireproofing, clean surfaces that have become soiled or stained, using manufacturer's recommended procedures.
- D Protect fireproofing, according to advice of manufacturer and Installer, from damage resulting from construction operations or other causes, so fireproofing will be without damage or deterioration at time of Substantial Completion.
- E As installation of other construction proceeds, inspect fireproofing and repair damaged areas and fireproofing removed due to work of other trades.

3.06 PATCHING

- A All patching and repairing of spray applied fireproofing, due to damage by other trades, shall be performed with same materials under this section, and paid for by the trade(s) responsible for the damage.
- B Repair fireproofing by reapplying it using same method as original installation or using manufacturer's recommended trowel-applied product.

END OF SECTION 078100

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SECTION 078400 - FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.
- B Acoustical Fire Rated Outlet Backer Pads.
- C Firestopping of joints and penetrations in fire-resistance-rated and smoke-resistant assemblies, whether indicated on drawings or not, and other openings indicated.

1.02 RELATED REQUIREMENTS

- A Section 01 73 29 - Cutting and Patching: Cutting and patching.
- B Section 092116 - Gypsum Board Assemblies: Gypsum wallboard fireproofing.

1.03 REFERENCE STANDARDS

- A ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).
- B ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2022.
- C ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2023a.
- D ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems; 2015 (Reapproved 2019).
- E ASTM E2174 - Standard Practice for On-Site Inspection of Installed Firestop Systems; 2020a.
- F ASTM E2393 - Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers; 2020a.
- G ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus; 2023b.
- H ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed between Rated Wall Assemblies and Nonrated Horizontal Assemblies; 2023a.
- I ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).
- J ITS (DIR) - Directory of Listed Products; Current Edition.
- K FM 4991 - Approval Standard of Firestop Contractors; 2013.
- L FM (AG) - FM Approval Guide; Current Edition.
- M NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- N NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- O SCAQMD 1168 - Adhesive and Sealant Applications; 1989, with Amendment (2022).
- P UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; Current Edition, Including All Revisions.
- Q UL (DIR) - Online Certifications Directory; Current Edition.
- R UL (FRD) - Fire Resistance Directory; Current Edition.
- S International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments

1.04 SYSTEM PERFORMANCE REQUIREMENTS

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- A Penetrations: Provide and install firestopping systems that are produced to resist the spread of fire, and the passage of smoke and other gases according to requirements indicated, including but not limited to the following:
 - 1. Firestop all penetrations passing through fire resistance rated wall and floor assemblies and other locations as indicated on the drawings.
 - 2. Provide and install complete penetration firestopping systems that have been tested and approved by third party testing agency.
 - 3. F - Rated Through-Penetration Firestop Systems: Provide through-penetration firestop systems with F ratings indicated, as determined per ASTM E 814, but not less than one hour or the fire-resistance rating of the construction being penetrated.
 - 4. T - Rated Through-Penetration Firestop Systems: Provide firestop systems with T ratings, in addition to F ratings, as determined per ASTM E 814, where indicated..
 - 5. L - Rated Through-Penetration Firestop Systems: Provide firestop systems with L ratings, in addition to F and T ratings, as determined per UL 1479, where indicated.
 - 6. (Optional) W - Rated Through-Penetration Firestop Systems: Provide firestop systems with W Water Resistance ratings, in addition to F, T and L ratings, as determined per UL 1479, where indicated.
- B Where there is no specific third party tested and listed, classified firestop system available for a particular firestop configuration, the firestopping contractor shall obtain from the firestop manufacturer, an Current Engineering Judgment (EJ) or Equivalent Fire Resistance Rated Assembly (EFRRA) for submittal.

1.05 SUBMITTALS

- A See Section 013300 - Submittal Requirements, for submittal procedures.
- B Schedule of Firestopping: Provide a list each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.
 - 1. All approved firestopping assemblies including engineering judgments shall be provided and organized by trade.
- C Product Data: Provide data on product characteristics, performance ratings, and limitations.
- D Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
- E Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F Manufacturer's engineering judgment identification number and document details when no qualified tested system is available for an application. Engineering judgment must include both project name and contractor's name who will install firestop system as described in document.
- G Certificate from authority having jurisdiction indicating approval of materials used, where applicable.
- H Manufacturer's qualification statement.
- I Installer's qualification statement.

1.06 QUALITY ASSURANCE

- A Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with ASTM E814, ASTM E119, ASTM 1479, ASTM E2307, and UL 2079.
 - 1. Listing in UL (FRD), FM (AG), or ITS (DIR) will be considered as constituting an acceptable test report.
 - 2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at www.icc-es.org will be considered as constituting an acceptable test report.
 - 3. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.

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- B For those firestop applications that exist for which no qualified tested system is available through a manufacturer, an engineering judgment derived from similar qualified tested system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineering judgment documents must follow requirements set forth by the International Firestop Council.
- C Single Source Responsibility: Obtain firestop systems for each kind of penetration and construction condition indicated from a single primary firestop systems manufacturer.
 - 1. Materials of different manufacture than allowed by the tested and listed system shall not be intermixed in the same firestop system or opening.
 - 2. Tested and listed, classified firestop systems are to be used. If another manufacturer has a tested and listed system, then that system shall be used prior to an Engineering Judgment (EJ) or Equivalent Fire Resistance Rated Assembly (EFRRRA).
- D Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.
- E Installer Qualifications: Company specializing in performing the work of this section and:
 - 1. Trained by the direct representative of the manufacturer.
 - 2. Approved by Factory Mutual Research under FM Standard 4991, Approval of Firestop Contractors, Underwriters Laboratories (UL) Approved Contractor, or meeting any two of the following requirements:
 - a. Verification of minimum three years documented experience installing work of this type.
 - b. Verification of at least five satisfactorily completed projects of comparable size and type.
 - c. Licensed by local authorities having jurisdiction (AHJ).

1.07 FIELD CONDITIONS

- A Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.
- B Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A Basis of Design: Contract Documents are based on products specified below to establish a standard of quality. Other acceptable manufacturers with products having equivalent characteristics may be considered, provided deviations are minor and design concept expressed in Contract Documents is not changed, as determined by the Architect.
 - 1. Hilti, Inc: www.us.hilti.com, 800-879-8000.
- B Acceptable Manufacturers: Subject to compliance with requirements of Contract Documents, provide product by one of manufacturers listed alphabetically below. If not listed, submit as substitution according to Conditions of the Contract and Division 1 Sections.
 - 1. 3M Fire Protection Products: www.3m.com/firestop.
 - 2. Specified Technologies Inc: www.stifirestop.com/#sle.
- C Substitutions: 012500 - Substitution Procedures

2.02 FIRESTOPPING - GENERAL REQUIREMENTS

- A Firestopping Materials: Any materials meeting requirements.
- B Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under

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conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.

- C Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.
- D Volatile Organic Compound (VOC) Content: Provide products having VOC content lower than that required by SCAQMD 1168.
- E Mold and Mildew Resistance: Provide firestopping materials with mold and mildew resistance rating of zero(0) in accordance with ASTM G21.
- F Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.
- G Fire Ratings: Refer to Drawings for required systems and ratings.

2.03 FIRESTOPPING ASSEMBLY REQUIREMENTS

- A Perimeter Fire Containment Firestopping: Use any system that has been tested according to ASTM E2307 to have fire resistance F Rating equal to required fire rating of the floor assembly.
 - 1. Movement: Provide systems that have been tested to show movement capability as indicated.
 - 2. Temperature Rise: Provide systems that have been tested to show T Rating as indicated.
 - 3. Air Leakage: Provide systems that have been tested to show L Rating as indicated.
 - 4. Where floor assembly is not required to have a fire rating, provide systems that have been tested to show L Rating as indicated.
- B Head-of-Wall Firestopping at Joints Between Non-Rated Floor and Fire-Rated Wall: Use any system that has been tested according to ASTM E 2079 to have fire resistance F Rating equal to required fire rating of floor or wall, whichever is greater.
 - 1. Movement: Provide systems that have been tested to show movement capability as indicated.
- C Floor-to-Floor (FF), Floor-to-Wall (FW), Head-of-Wall (HW), and Wall-to-Wall (WW) Joints, Except Perimeter, Where Both Are Fire-Rated: Use system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.
 - 1. Movement: Provide systems that have been tested to show movement capability as indicated.
 - 2. Air Leakage: Provide systems that have been tested to show L Rating as indicated.
 - 3. Watertightness: Provide systems that have been tested to show W Rating as indicated.
 - 4. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.
- D Through Penetration Firestopping: Use any system that has been tested according to ASTM E 814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.
 - 1. Temperature Rise: Provide systems that have been tested to show T Rating as indicated.
 - 2. Air Leakage: In addition, provide systems that have been tested to show L Rating as indicated on drawings.
 - 3. Watertightness: In addition, provide systems that have been tested to show W Rating as indicated on drawings.
 - 4. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.
- E Acoustically Rated Firestopping: Provide system tested in accordance with ASTM E90 with STC rating of 50, minimum.

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2.04 FIRESTOPPING SYSTEMS

- A Firestopping: Any material meeting requirements.
 - 1. Fire Ratings: Use system that is listed by FM (AG), ITS (DIR), or UL (FRD) and tested in accordance with ASTM E814, ASTM E119, or UL 1479 with F Rating equal to fire rating of penetrated assembly and minimum T Rating Equal to F Rating and in compliance with other specified requirements.

2.05 ACOUSTICAL FIRE-RATED PUTTY PADS:

- A Use only backer pads that have been UL 1479 or ASTM E814 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, and fire-rating involved for each separate instance.
- B Wall opening protective materials for use with U.L. listed metallic and specified nonmetallic outlet boxes, the following products are acceptable:
 - 1. Kinetics Noise Control Model IsoBacker: Acoustical Fire Rated Outlet Backer Pad.
- C Manufacturers:
 - 1. Kinetics Noise Control, Dublin OH; 877-457-2695.
 - 2. 3M Fire Barrier Moldable Putty; 3M Fire Protection Products

PART 3 EXECUTION

3.01 EXAMINATION

- A Verify openings are ready to receive the work of this section.
 - 1. Verify penetrations are properly sized and in suitable condition for application of materials.
 - 2. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
 - 3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
 - 4. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
 - 5. Do not proceed until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.
- B Remove incompatible materials that could adversely affect bond.
- C Install backing materials to prevent liquid material from leakage.

3.03 COORDINATION

- A Coordinate construction of openings, penetrations and construction joints to ensure that the fire stop systems are installed according to specified requirements.
- B Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration fire stop systems. Coordinate construction and sizing of joints to ensure that fire-resistive joint systems are installed according to specified requirements.
- C Coordinate fire stopping with other trades so that obstructions are not placed in the way prior to the installation of the fire stop systems.
- D Do not cover up through-penetration fire stop and joint system installations that will become concealed behind other construction until each installation has been examined by the building inspector.

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3.04 INSTALLATION

- A Regulatory Requirements: Install firestop materials in accordance with UL Fire Resistance Directory or ITS Directory.
- B Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- C Do not cover installed firestopping until inspected by authorities having jurisdiction.
- D Install labeling required by code.

3.05 FIELD QUALITY CONTROL

- A Independent Testing Agency: Inspection agency employed and paid by Owner, will examine penetration firestopping in accordance with ASTM E2174 and ASTM E2393.
- B Repair or replace penetration firestopping and joints at locations where inspection results indicate firestopping or joints do not meet specified requirements.

3.06 ACOUSTIC ACCESSORIES INSTALLATION

- A Apply acoustical putty pads completely around all electrical boxes and other items penetrating into acoustically rated walls, walls with acoustical insulation and all guestroom wall conditions.

3.07 FIELD QUALITY CONTROL

- A Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.
- B Keep areas of work accessible until inspection by applicable code authorities.
- C Inspection of through-penetration firestopping shall be performed in accordance with ASTM E2174, "Standard Practice for On-Site Inspection of Installed Fire Stops" and ASTM E2393 - 10a Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers. Inspection agency to examine firestopping and will determine, in general that firestopping has been installed in compliance with requirements of tested and listed firestop systems, and installation process conforms to FM 4911 - Standard for Approval of Firestop Contractors.
 - 1. The Inspector shall advise the Contractor of any deficiencies noted within one (1) working day.
 - 2. Do not proceed to enclose firestopping with other construction until inspection agency has verified that the firestop installation complies with the requirements.
 - 3. Where deficiencies are found, repair or replace the firestopping so that it complies with requirements of tested and listed systems.
- D Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.
- E Manufacturer's Field Services: During Installation, provide periodic destructive testing inspections to assure proper installation/application. After installation is complete, submit findings in writing indicating whether or not the installation of the tested system identified was installed correctly.

3.08 IDENTIFICATION & DOCUMENTATION

- A The firestop contractor is to supply documentation for each single application addressed. This documentation is to identify each penetration and joint location on the entire project.
- B Penetration Identification: Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to

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anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:

1. The words: "Warning -Through Penetration Firestop System-Do Not Disturb. Notify Building Management of Any Damage."
 - a. Contractor's Name, address, and phone number.
 2. Through-Penetration firestop system designation of applicable testing and inspecting agency.
 3. Date of Installation.
 4. Through-Penetration firestop system manufacturer's name.
 5. Installer's Name.
- C Wall Identification: Where there is an accessible concealed floor, floor-ceiling or attic space, fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions or any other wall required to have protected openings or penetrations shall be effectively and permanently identified with signs or stenciling in the concealed space. Such identification shall:
1. Be in full compliance with Section 703.7 of the CBC 2022.
 2. Be located in accessible concealed floor, floor-ceiling or attic spaces.
 - a. Height above the ceiling - from 6" to 12".
 - b. Both Sides of the wall
 3. Be located within 15 feet (4572 mm) of the end of each wall and at intervals not exceeding 30 feet (9144 mm) measured horizontally along the wall or partition.
 4. Include lettering not less than 3 inch in height, with a minimum 3/8-inch (9.5 mm) stroke, incorporating the suggested wording: "FIRE AND/OR SMOKE BARRIER-PROTECT ALL OPENINGS," or other wording indicating type of wall or partition.
 - a. Color: bright orange or red.

3.09 CLEANING

- A Clean adjacent surfaces of firestopping materials.

3.10 PROTECTION

- A Protect adjacent surfaces from damage by material installation.

END OF SECTION 078400

Firestopping - 078400

SECTION 079200 - JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Sealants, joint backing, and accessories.
- B Acoustical sealants.

1.02 RELATED REQUIREMENTS

- A Section 071300 - Sheet Waterproofing: Sealing cracks and joints in waterproofing substrate surfaces using materials specified in this section.
- B Section 078400 - Firestopping: Firestopping sealants.
- C Section 087100 - Door Hardware: Setting exterior door thresholds in sealant.
- D Section 088000 - Glazing: Glazing sealants and accessories.
- E Section 092116 - Gypsum Board Assemblies: Sealing acoustical and sound-rated walls and ceilings.
- F Section 092216 - Non-Structural Metal Framing: Sealing between framing and adjacent construction in acoustical and sound-rated walls and ceilings.

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 C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2022.
- C ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016 (Reapproved 2023).
- D SCAQMD 1168 - Adhesive and Sealant Applications; 1989, with Amendment (2022).
- E NSF 51 - Food Equipment Materials; 2023.
- F SWRI (VAL) - SWR Institute Validated Products Directory; Current Edition.

1.04 PERFORMANCE REQUIREMENTS

- A Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
- B Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.05 SUBMITTALS

- A See Section 013300 - Submittal Requirements, for submittal procedures.
- B Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes 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 that product is known to satisfactorily adhere to and with which it is compatible.
 - 4. Substrates the product should not be used on.
 - 5. Substrates for which use of primer is required.
 - 6. Substrates for which laboratory adhesion and/or compatibility testing is required.
 - 7. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
 - 8. Sample product warranty.
 - 9. Certification by manufacturer indicating that product complies with specification requirements.

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- 10. SWRI Validation: Provide currently available sealant product validations as listed by SWRI (VAL) for specified sealants.
- C Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.
- D Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
- E Samples for Verification: Where custom sealant color is specified, obtain directions from Architect and submit at least two physical samples for verification of color of each required sealant.

1.06 QUALITY ASSURANCE

- A Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 10 years documented experience.
- B Installer Qualifications: Company specializing in performing the work of this section and with at least 5 years of documented experience.
- C Field Adhesion Tests of Joints: Test for adhesion using most appropriate method in accordance with ASTM C1521, or other applicable method as recommended by manufacturer.
- D Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

1.07 PROJECT CONDITIONS

- A Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 - 4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.08 WARRANTY

- A Correct defective work within a five year period after Date of Substantial Completion.
- B Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal , exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A Basis of Design: Contract Documents are based on products specified below to establish a standard of quality. Other acceptable manufacturers with products having equivalent characteristics may be considered, provided deviations are minor and design concept expressed in Contract Documents is not changed, as determined by the Architect.
 - 1. Manufacturers:
 - a. Dow Corning Corp.
 - b. Momentive Performance Materials, Inc. GE Commercial Sealants.
 - c. Sonneborn
 - d. Tremco
 - e. Sika Corp.
 - f. Pecora

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- B Acceptable Manufacturers: Subject to compliance with requirements of Contract Documents, provide product by one of manufacturers listed alphabetically below. If not listed, submit as substitution according to Conditions of the Contract and Division 1 Sections.
- C Single Source Responsibility
 1. For each different product, provide material from a single Manufacturer.
 2. Where sealants from more than one Manufacturer is used for the project, provide written certification from each Manufacturer involved that the sealants are totally compatible and will have no deleterious effect with each other.
 3. If sealants are to come in contact with existing conditions, provide written certification and, if required, testing which will confirm that the sealants are totally compatible and will have no deleterious effect with each other.
- D Substitutions: Refer to Section 012500 - Substitution Procedures.

2.02 MATERIALS, GENERAL

- A Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 1. Architectural Sealants: 250 g/L.
 2. Non-membrane Roof Sealants: 300 g/L.
 3. Single-Ply Roof Membrane Sealants: 450 g/L.
 4. Sealant Primers for Nonporous Substrates: 250 g/L.
 5. Sealant Primers for Porous Substrates: 775 g/L.
 6. Modified Bituminous Sealant Primers: 500 g/L.
- C Colors of Exposed Joint Sealants: As selected by Architect/Engineer from manufacturer's full range.

2.03 JOINT SEALERS

- A Concrete: Horizontal
 1. Two-part Polyurethane, self-leveling.
 2. ASTM C920, Type M, Grade P, Class 25, Use T and M.
 3. Movement: Plus or minus 25 percent
 4. Shore A Hardness: 25
 5. Color as selected by Architect from manufacturer's full line of standard colors. More than one color may be selected.
 6. Sonneborn "MasterSeal SL-2".
 7. Tremco "THC-900/THC-901".
 8. Sika "Sikaflex - 2C-SL"
 9. Pecora "NR-200 Urexpam"
- B Concrete/CMU: Vertical
 1. Two-part Polyurethane, non-sag
 2. ASTM C920, Type M, Grade NS, Class 50, Use NT, M, A, and O.
 3. Movement: Plus or minus 50 percent.
 4. Color as selected by Architect from manufacturer's full line of standard colors. More than one color may be selected.
 5. Sonneborn "MasterSeal NP-2".
 6. Tremco "Dymeric 240FC"

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7. Sika "Sikaflex - 2C-NS"
8. Pecora "Dynatrol II"
- C Other: Exterior
 1. One-part Silicone.
 2. ASTM C920, Type S, Grade NS, Class 25, Use NT, M, G and A.
 3. Movement: Plus or minus 50 percent
 4. Color as selected by Architect from manufacturer's full line of standard colors. More than one color may be selected.
 5. Tremco "Spectrum 2"
 6. Pecora "864 Silicone"
 7. Dow Corning "Dow 791 Silicone"
 8. G.E. "Silpruf"
- D Interior
 1. Acrylic latex
 2. ASTM C834, Paintable.
 3. Color as selected by Architect from manufacturer's full line of standard colors. More than one color may be selected.
 4. Tremco "Tremflex 834".
 5. Pecora "AC-20 + Silicone".
- E Restrooms/Counters/Fixtures/Other Wet Locations:
 1. Acetoxy Silicone/Silicone.
 2. ASTM C920, Type S, Grade NS, Class 25, Use NT, G and A.
 3. Recommended by manufacturer for use in restrooms and other wet areas, and as not supporting growth of fungus/bacteria.
 4. Movement: Plus or minus 25 percent
 5. Color as selected by Architect from manufacturer's full line of standard colors. More than one color may be selected.
 6. Pecora "898 Silicone Sanitary Sealant"
 7. Dow Corning "Dow 786 Mildew Resistant Silicone Sealant"
 8. G.E. "1700 Sanitary Silicone Sealant"

2.04 ACOUSTICAL SEALANT

- A Acoustical Sealant at Exposed Joints: Nonsag, paintable, nonstaining, latex sealant conforming to ASTM C834. Tested to ASTM E90 for reduction of airborne sound transmission through perimeter joints and openings in building construction at representative assemblies. Specified for type and quality:
- B Permanently resilient sealant for use in conjunction with gypsum board; non-shrinking and non-cracking. USG "Acoustical Sealant", Tremco "Acoustical Sealant" or approved equal.
- C Acoustical Sealant at Concealed Joints:
 1. Synthetic Rubber Joint Sealant: Single component, non-skinning, non-hardening, 90 percent solids, acoustical properties conforming to ASTM C919 and to ASTM E90.
 2. Water Based Siliconized Acrylic Latex:
 3. Install 2 beads under steel stud framing channel and wood plates and into 1/2 inch space.

2.05 ACCESSORIES

- A Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.

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1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type C - Closed Cell Polyethylene.
 2. Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type C - Closed Cell Polyethylene.
 3. Open Cell: 40 to 50 percent larger in diameter than joint width.
- C Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- D Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

- A Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
- B Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.03 INSTALLATION OF JOINT SEALANTS

- A General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
1. Do not leave gaps between ends of sealant backings.
 2. Do not stretch, twist, puncture, or tear sealant backings.
 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E Install sealants using proven techniques that comply with the following and at the same time backings are installed:
1. Place sealants so they directly contact and fully wet joint substrates.
 2. Completely fill recesses in each joint configuration.
 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

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- F Tooling of Nonsag Sealants:
 - 1. Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 2. Remove excess sealant from surfaces adjacent to joints.
 - 3. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
- G Provide concave joint configuration unless otherwise indicated.
 - 1. Provide flush joint configuration where indicated.
- H Installation of Preformed Tapes: Install according to manufacturer's written instructions.

3.04 PLUMBING TRIM

- A The shower and/or tub control escutcheon shall be installed by placing a generous bead of the clear mildew resistant silicone sealant specified in this specification around the inside perimeter of the escutcheon. Immediately the escutcheon shall be placed over the previously prepared opening and securely fastened into place. Do not attempt to remove, smooth or in any way touch the bead formed by the "squeeze".
- B After 24 hours have passed, the bead shall be removed by use of a sharp instrument such as a single edged razor blade.

3.05 TUB AND/OR SHOWER ENCLOSURE INSTALLATION

- A After the perimeter metal frame and trim have been set into place and the screws have been inserted and secured into the proper backing, the entire assembly shall be removed.
- B The screw holes shall be filled with the clear mildew resistant silicone sealant specified in this specification and a generous bead (or beads) of the clear mildew resistant silicone sealant shall be placed on the contact side of all metal components. The metal components shall be snugly reinstalled using the previously placed and removed screws. A "glob" of the same sealant shall be placed on the screw shanks immediately below the head. Do not attempt to remove, smooth or in any way touch the bead formed by the "squeeze".
- C After 24 hours have passed, the bead shall be removed by use of a sharp instrument such as a single edged razor blade.

3.06 GRAB BARS AND ACCESSORIES AT WET AREAS

- A After the grab bars and accessories have been installed and their screws are snug, remove the screws completely and fill the holes with the clear mildew resistant silicone sealant specified in this specification. Re-secure the screws taking care not to disturb the bead of silicone "squeeze".
- B After 24 hours have passed, any of the bead that exists outside of the flange covers shall be removed by use of a sharp instrument such as a single edged razor blade.

3.07 ACOUSTIC SEALANT INSTALLATION

- A Acoustic Sealant: Install as follows:
 - 1. Place one bead continuously on substrate before installation of perimeter framing members.
 - 2. Place continuous bead at perimeter of each layer of gypsum board.
 - 3. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes.

3.08 FIELD QUALITY CONTROL

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- A Field-Adhesion Testing: Perform adhesion tests in accordance with manufacturer's instructions and with ASTM C1193, Method A.
 - 1. Perform (5) tests for the first 100 feet of joint length for each kind of sealant and joint substrate, and one test for each 100 feet of joint length thereafter or (1) test per each floor per building elevation, minimum.
 - 2. For sealant applied between dissimilar materials, test both sides of joint.
- B Non-Destructive Adhesion Testing: If there are any failures in first 100 linear feet, notify Architect immediately.
- C Submit report of field adhesion testing to Architect indicating tests, locations, dates, results, and remedial actions taken.

3.09 CLEANING

- A Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.10 PROTECTION

- A Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion.
- B If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.11 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 the low temperature in the thermal cycle. Report failures immediately and repair.

END OF SECTION 079200

Joint Sealants - 079200

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Non-fire-rated hollow metal doors and frames.
- B Hollow metal frames for wood doors.
- C Fire-rated hollow metal doors and frames.
- D Thermally insulated hollow metal doors with frames.
- E Sound-rated hollow metal doors and frames.
- F Hollow metal borrowed lites glazing frames.
- G Accessories, including glazing and louvers.

1.02 RELATED REQUIREMENTS

- A Section 081416 - Flush Wood Doors.
- B Section 087100 - Door Hardware.
- C Section 088000 - Glass: Glass for doors and borrowed lites.
- D Section 099000 - Painting and Coating: Field painting.

1.03 ABBREVIATIONS AND ACRONYMS

- A ANSI: American National Standards Institute.
- B ASCE: American Society of Civil Engineers.
- C HMMA: Hollow Metal Manufacturers Association.
- D NAAMM: National Association of Architectural Metal Manufacturers.
- E NFPA: National Fire Protection Association.
- F SDI: Steel Door Institute.
- G UL: Underwriters Laboratories.

1.04 REFERENCE STANDARDS

- A ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B ANSI/SDI A250.3 - Test Procedure and Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors and Frames; 2019.
- C ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2022.
- D ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2023.
- E ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2020.
- F ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- G 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.
- H 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.
- I ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2020.
- J ASTM C476 - Standard Specification for Grout for Masonry; 2023.
- K ASTM E1408 - Standard Test Method for Laboratory Measurement of the Sound Transmission Loss of Door Panels and Door Systems; 1991 (Reapproved 2000).

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- L ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.
- M ASTM E413 - Classification for Rating Sound Insulation; 2022.
- N BHMA A156.115 - Hardware Preparation in Steel Doors and Frames; 2016.
- O ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- P ITS (DIR) - Directory of Listed Products; Current Edition.
- Q NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.
- R NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.
- S NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2017.
- T NAAMM HMMA 860 - Guide Specifications for Hollow Metal Doors and Frames; 2018.
- U NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2014.
- V NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.
- W NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.
- X SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2023.
- Y SDI 111 - Recommended Details for Standard Steel Doors, Frames, Accessories and Related Components; 2009.
- Z UL (DIR) - Online Certifications Directory; Current Edition.
- AA SDI 105 - Recommended Erection Instructions for Steel frames.
- BB SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
- CC SDI 124 - Maintenance of Standard Steel Doors and Frames.
- DD UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- EE UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- FF UL 1784 - Standard for Air Leakage Tests of Door Assemblies; Current Edition, Including All Revisions.

1.05 SUBMITTALS

- A Refer to Section 013300 - Submittal 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; and one copy of referenced standards/guidelines.
- C Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.
- D Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.
- E Manufacturer's Certificate: Certification that products meet or exceed specified requirements.
- F Manufacturer's Qualification Statement.
- G Installer's Qualification Statement.
- H Warranty: Executed in Owner's name.

1.06 QUALITY ASSURANCE

- A Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.
- B Quality Standard: In addition to requirements specified, comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".
- C Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 10 years documented experience.

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- D Manufacturer Qualifications: Provide hollow metal doors and frames from SDI Certified manufacturer: <https://steeldoors.org/sdi-certified/#sle>.
- E Installer Qualifications: Company specializing in performing work of the type specified and with at least 5 years of documented experience.
- F Maintain at project site copies of reference standards relating to installation of products specified.
- G Provide a label for each fire rated and sound rated door indicating the testing agencies approval for the required rating. Do not cover or obscure the label in any way.
- H Energy Efficient Exterior Openings: Comply with minimum thermal ratings, based on ASTM C1363. Openings to be fabricated and tested as fully operable, thermal insulating door and frame assemblies.
 - 1. Thermal Performance (Exterior Openings): Independent testing laboratory certification for exterior door assemblies being tested in accordance with ASTM C1363 and meet or exceed the following requirements:
 - a. Door Assembly Operable U-Factor and R-Value Ratings: U-Factor 0.34, R-Value 2.9, including insulated door, thermal-break frame and threshold.
 - 2. Air Infiltration (Exterior Openings): Independent testing laboratory certification for exterior door assemblies being tested in accordance with ASTM E283 to meet or exceed the following requirements:
 - a. Rate of leakage of the door assembly shall not exceed 0.25 cfm per square foot of static differential air pressure of 1.567 psf (equivalent to 25 mph wind velocity).

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.

1.08 WARRANTY

- A Refer to Section 017836 - Warranties and Bonds, for additional warranty requirements.
- B Special Warranty
 - 1. Provide manufacturer's warranty for defects in material and workmanship for the life of the installation.
 - 2. Include removal of the defective door, hanging, hardware installation, finishing and labeling as required

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A Basis of Design: Contract Documents are based on products specified below to establish a standard of quality. Other acceptable manufacturers with products having equivalent characteristics may be considered, provided deviations are minor and design concept expressed in Contract Documents is not changed, as determined by the Architect.
 - 1. Approved Steel Doors and Frames:
 - a. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com.
 - b. Curries, an Assa Abloy Group company: www.assaabloydss.com.
 - c. Republic Doors, an Allegion brand: www.republicdoor.com/#sle.
 - d. Steelcraft, an Allegion brand: www.allegion.com/sle.
- B Acceptable Manufacturers: Subject to compliance with requirements of Contract Documents, provide product by one of manufacturers listed alphabetically below. If not listed, submit as

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substitution according to Conditions of the Contract and Section 012500.

2.02 PERFORMANCE REQUIREMENTS

- A Requirements for Hollow Metal Doors and Frames:
1. Steel Sheet: Comply with one or more of the following requirements; galvanized 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 (galvanized) 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.
 - a. Based on SDI Standards: Provide at least A40/ZF120 (galvanized) when necessary, coating not required for typical interior door applications, and at least A60/ZF180 (galvanized) for corrosive locations.
- 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 DOORS AND FRAMES

- A Requirements for All Doors and Frames:
1. Accessibility: Comply with ICC A117.1 and ADA Standards.
 2. Door Top Closures: Flush with top of faces and edges.
 3. Door Edge Profile: Bevel edge of lock stile.
 4. Door Texture: Smooth faces.
 5. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
 6. Hardware Preparation: In accordance with BHMA A156.115, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
 7. Galvanizing for Units in Wet Areas: Components hot-dipped zinc-iron alloy-coated (galvanized) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness
 8. Finish: Bonderize, apply non lifting, rust inhibitive grey primer compatible with specified finish in Section 09 90 00.
- B Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements

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conflict, comply with the most stringent.

2.04 DESIGN CLEARANCES

- A The clearance between the door and frame head and jambs shall be 1/8" (3.2 mm) in the case of both single swing and pairs of doors.
- B The clearance between the meeting edges of pairs of doors shall be 1/8" (3.2 mm) to 1/4" (6.3 mm), for fire rated doors 1/8" (3.2 mm) \pm 1/16" (1.6 mm).
- C The clearance at the bottom shall be 3/8" (9.25 mm) above finish floor, 1/2" (12.7 mm) at doors with Auto Door Bottom seals.
- D The clearance between the face of the door and door stop shall be 1/16" (1.6 mm) to 1/8" (3.2 mm).
- E All clearances shall be, unless otherwise specified, subject to a tolerance of \pm 1/32" (0.8 mm).

2.05 HOLLOW METAL DOORS

- A Exterior Doors: Thermally insulated.
 - 1. Wind resistant building components tested to the following windstorm or severe weather performance standards:
 - a. ANSI A250.13
 - b. ASTM E330/E1886/E1996
 - 2. Construction: Each wind resistant building component shall be constructed as detailed in the illustrations that follow. Doors over 3'-0" in width that have an exit device must have a horizontal steel stiffener located at centerline of device. When door height is over 7'-0" and design pressure is over 60 PSF and door has mortise lock (single door) or has an ANSI strike with bolts on inactive leaf of pair, vertical lock edge steel stiffeners must be installed.
 - 3. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 2 - Heavy-duty.
 - b. Physical Performance Level B 500 000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 2 - Seamless.
 - d. Door Face Metal Thickness: 18 gage, 0.042 inch, minimum.
 - 4. Core Material: Manufacturers standard core material/construction and in compliance with requirements.
 - 5. Door Thermal Resistance: Min. R-Value of 10.
 - 6. Door Thickness: 1-3/4 inches, nominal.
 - 7. Weatherstripping: Refer to Section 087100.
- B Interior Doors, Non-Fire Rated:
 - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 2 - Heavy-duty.
 - b. Physical Performance Level B 500 000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 2 - Seamless.
 - d. Door Face Metal Thickness: 18 gage, 0.042 inch, minimum.
 - 2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
 - 3. Door Thickness: 1-3/4 inches, nominal.
- C Fire-Rated Doors:
 - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 2 - Heavy-duty.
 - b. Physical Performance Level B 500 000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 2 - Seamless.
 - d. Door Face Metal Thickness: 18 gage, 0.042 inch, minimum.

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2. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
 - a. Temperature-Rise Rating (TRR) Across Door Thickness: In accordance with local building code and authorities having jurisdiction.
 - b. Provide units listed and labeled by UL (DIR) or ITS (DIR).
 - c. Attach fire rating label to each fire rated unit.
3. Core Material: Vertical steel stiffeners.
4. Door Thickness: 1-3/4 inches, nominal.
5. Door Finish: Factory primed and field finished.

2.06 HOLLOW METAL FRAMES

A General:

1. Comply with the requirements of grade specified for corresponding door, except:
 - a. ANSI/SDI A250.8 (SDI-100), Level 1 Door Frames: 16 gage, 0.053 inch, minimum thickness.
 - b. ANSI/SDI A250.8 (SDI-100), Level 2 and 3 Door Frames: 14 gage, 0.067 inch, minimum thickness.
 - c. ANSI/SDI A250.8 (SDI-100), Level 4 Door Frames: 12 gage, 0.093 inch, minimum thickness.
 - d. Frames for Wood Doors: Comply with frame requirements in accordance with ANSI/SDI A250.8 (SDI-100), Level 1, 18 gage, 0.042 inch, minimum thickness.
2. Finish: Factory primed, for field finishing.
3. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
4. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches high to fill opening without cutting masonry units.
5. Frames Wider than 48 Inches: Reinforce with steel channel fitted tightly into frame head, flush with top.
6. Frames Installed Back-to-Back: Reinforce with steel channels anchored to floor and overhead structure.
7. Door frames: unless specified as Knock-down, to be continuously fully welded, fill, grind and dress face; continuously back weld casing, stop, soffit and rabbet.

B Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.

C Exterior Door Frames: Fully welded.

1. Wind resistant building components tested to the following windstorm or severe weather performance standards:
 - a. ANSI A250.13
 - b. ASTM E330/E1886/E1996
2. Frames may also be listed as fire door frames tested in accordance with UL 1 OB or UL 1 OC or ITSIWH. Frames may be fire rated up to and including three hours, except as noted where glass is installed in a frame.
3. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A40/ZF120 coating.
4. Frame Metal Thickness: 14 gage, 0.067 inch, minimum.
5. Weatherstripping: Separate, see Section 087100.

D Interior Door Frames, Non-Fire-Rated: Fully welded type.

1. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
2. Frame Finish: Factory primed and field finished.

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- E Interior Door Frames: Non-Fire Rated: Fully welded type.
 - 1. Frame Profile - Unequal Rabbet profile, standard with manufacturer.
 - a. Series, 0.9 mm (16 gage) thick, closets, bathrooms, interior room areas.
 - b. Series, 1.2 mm (14 gage) thick, with kerf for door seal/gasket for unit entry doors and fire rated frames.
 - 2. Finish: Factory primed, for field finishing.
 - a. Frames for high humidity areas to be electro galvanized prior to pre-finishing.
- F Door Frames, Fire-Rated: Full profile/continuously welded type.
 - 1. Fire Rating: Same as door, labeled.
 - 2. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
 - 3. Frame Finish: Factory primed and field finished.
 - 4. Fire Rated Grade: Comply with frame requirements specified in ANSI A250.8 for Level 1, 16 gage
 - 5. Fire Rating: As indicated on Door and Frame Schedule, tested in accordance with UL 10C ("positive pressure").
 - a. Provide units listed and labeled by UL.
 - b. Attach fire rating label to each fire rated unit.
 - 6. Provide reinforcements shipped loose to project site for hardware application
 - 7. Casing: Provide a frame without casing retainer clips. Provide frames with nail holes and oval slots (NHOS) only.
 - a. Refer to Interior Design Drawings and Specifications for casings.

2.07 SPECIAL FUNCTION HOLLOW METAL FRAMES

- A Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.
- B Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.
- C Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
- D Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches high to fill opening without cutting masonry units.
- E Frames Wider than 48 inches: Reinforce with steel channel fitted tightly into frame head, flush with top.

2.08 FINISHES

- A Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.09 ACCESSORIES

- A Louvers: Roll formed steel with overlapping frame; factory-installed.
 - 1. In Fire-Rated Doors: UL (DIR) or ITS (DIR) listed fusible link louver, same rating as door.
 - 2. Style: Sightproof inverted V blade.
 - 3. Louver Free Area: 40 percent.
 - 4. Fasteners: Concealed fasteners.
- B Door Window Frames: Door window frames with glazing securely fastened within door opening.
 - 1. Size: Refer to Drawings.
 - 2. Frame Material: 18 gauge, 0.0478 inch, galvanized steel.
 - 3. Metal Finish: Beige polyester powder coating.

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- 4. Glazing: 1/4 inch thick, tempered glass, in compliance with requirements of authorities having jurisdiction.
- C Glazing: As specified in Section 088000, factory installed.
- D Removable Stops: Formed sheet steel, shape as indicated on drawings, mitered or butted corners; prepared for countersink style tamper proof screws.
- E Astragals for Double Doors: Specified in Section 087100.
- F Mechanical Fasteners for Concealed Metal-to-Metal Connections: Self-drilling, self-tapping, steel with electroplated zinc finish.
 - 1. Manufacturers:
 - a. ITW Commercial Construction North America; ITW CCNA-Buildex Tek's Select Series: www.ITWBuildex.com/#sle.
- G 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.
- H 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.
- I Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

2.10 FRAME ANCHORS

- A Jamb Anchors:
 - 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
 - 2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.
- B Floor Anchors: Floor anchors to be provided at each jamb. Formed from same material as frames, not less than 0.0625 inches thick.
 - 1. Angle clip type, a minimum of 16 gauge, two fasteners per jamb and weld to bottom of each jamb.
- C Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.11 FABRICATION

- A Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.
- B Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.
- C Hollow Metal Doors:
 - 1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape.
 - 2. Glazed Lites: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicated.
 - 3. Louvers: Factory cut openings in door and install louvers into prepared openings where indicated.
 - 4. Astragals: Provide overlapping astragals as noted in door hardware sets in Division 08 Section "Door Hardware" on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.

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5. Continuous Hinge Reinforcement: Provide welded continuous 12 gage strap for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
- D Electrical Raceways: Provide hollow metal doors to receive electrified hardware with concealed wiring harness and standardized Molex™ plug connectors on both ends to accommodate up to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into the electrified hardware and the through-wire transfer hardware or wiring harness specified in hardware sets in Division 08 Sections "Door Hardware". Wire nut connections are not acceptable.
- E Hollow Metal Frames:
 1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
 2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
 - a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.
 3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
 4. Equal Rabbet Frames: Provide frames with equal rabbet dimensions unless glazing and removable stops require wider dimensions on glass side of frame.
 5. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
 6. Continuous Hinge Reinforcement: Provide welded continuous 12 gage straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
 7. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
 8. Mortar Guards: Weld guard boxes to frame at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
 9. Electrical Thru-Wiring: Provide hollow metal frames receiving electrified hardware with concealed wiring harness and standardized Molex™ plug connectors on one end to accommodate up to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into the electric through-wire transfer hardware or wiring harness specified in hardware sets in Division 08 Sections "Door Hardware".
 10. Electrical Knock Out Boxes: Factory weld 18 gage electrical knock out boxes to frame for electrical hardware preps; including but not limited to, electric through wire transfer hardware, electrical raceways and wiring harnesses, door position switches, electric strikes, magnetic locks, and jamb mounted card readers as specified in hardware sets in Division 08 Sections "Door Hardware".
 - a. Provide electrical knock out boxes with a dual 1/2-inch and 3/4-inch knockouts.
 - b. Conduit to be coordinated and installed in the field (Division 26) from middle hinge box and strike box to door position box.
 - c. Electrical knock out boxes to comply with NFPA requirements and fit electrical door hardware as specified in hardware sets in Division 08 Section "Door Hardware".
 - d. Electrical knock out boxes for continuous hinges should be located in the center of the vertical dimension on the hinge jamb.

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11. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
 12. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - 1) Provide one anchor for every 30 inches of jamb or fraction thereof.
 - 2) Two anchors per jamb up to 60 inches high.
 - 3) Three anchors per jamb from 60 to 90 inches high.
 - 4) Four anchors per jamb from 90 to 120 inches high.
 - 5) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
 - b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - 1) Three anchors per jamb up to 60 inches high.
 - 2) Four anchors per jamb from 60 to 90 inches high.
 - 3) Five anchors per jamb from 90 to 96 inches high.
 - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
 - 5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
 - c. FEMA 361 Storm Shelters: Provide five wall anchors per jamb, at 4" maximum from each end of door opening height, equally spaced, four wall anchors per head at pairs, 6" maximum from each end of door opening and two wall anchors per head at singles, 6" maximum from each end of opening width.
 13. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Section 087100 - Door Hardware.
- F Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section 087100.
1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
 2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
 3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
 4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

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 Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

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- B Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness.
- C Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."
- D Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.
- E Coat inside of frames to be installed in masonry, to be grouted or where sound deadening is specified, with bituminous coating, prior to installation.

3.03 INSTALLATION GENERAL

- 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 087100.
- F Comply with glazing installation requirements of Section 088000.
- G Coordinate installation of electrical connections to electrical hardware items.
- H Touch up damaged factory finishes.
- I Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.
 - 1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
 - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
 - 3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
 - 4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.
- J Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
 - 1. Non-Fire-Rated Standard Steel Doors:
 - a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
 - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
 - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
 - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
 - 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
- K Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

3.04 TOLERANCES

- A Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
- B Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.05 ADJUSTING

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- A Adjust for smooth and balanced door movement.
- B Adjust sound control doors so that seals are fully engaged when door is closed.
- C Test sound control doors for force to close, latch, and unlatch; adjust as necessary in compliance with requirements.

3.06 SCHEDULE

- A Refer to Door and Frame Schedule on the drawings.

END OF SECTION 081113

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SECTION 081416 - FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Flush wood doors; fire rated, non-rated, and acoustical.
- B Transom panels.

1.02 RELATED REQUIREMENTS

- A Section 081113 - Hollow Metal Doors and Frames.
- B Section 087100 - Door Hardware.
- C Section 088000 - Glazing
- D Section 099000 - Painting and Coating: Field finishing of doors.

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 C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
- D ASTM E413 - Classification for Rating Sound Insulation; 2022.
- E ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights; 2023.
- F AWI (QCP) - Quality Certification Program; Current Edition.
- G AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- H AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.
- I FM (AG) - FM Approval Guide; Current Edition.
- J ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- K ITS (DIR) - Directory of Listed Products; Current Edition.
- L ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.
- M NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
- N NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.
- O NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.
- P UL (BMD) - Building Materials Directory; current edition.
- Q UL (DIR) - Online Certifications Directory; Current Edition.
- R UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- S UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- T UL 752 - Standard for Bullet-Resisting Equipment; Current Edition, Including All Revisions.
- U WDMA I.S. 1A - Interior Architectural Wood Flush Doors; 2021, with Errata (2022).

1.04 SUBMITTALS

- A See Section 013300 - Submittal Requirements, for submittal procedures.
- B Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
 - 1. Provide information as required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).

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- D Certificate: Submit labels and certificates required by quality assurance and quality control programs.
- E Test Reports: Show compliance with specified requirements for the following:
 - 1. Sound-retardant doors and frames; sealed panel tests are not acceptable.
 - 2. Certification that the fire door assembly complies with NFPA 252 and UL 10A, UL 10B and UL 10C as applicable.
- F Manufacturer's Installation Instructions: Indicate special installation instructions.
- G Warranty, executed in Owner's name.

1.05 QUALITY ASSURANCE

- A Maintain one copy of the specified door quality standard on site for review during installation and finishing.
- B Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than 10 years of documented experience.
 - 1. Company with at least one project within past five years with value of woodwork within at least 20 percent of cost of woodwork for this project.
 - 2. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
- C Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than 5 years of documented experience.
- D Woodwork Quality Assurance Program:
 - 1. Provide labels indicating that the installed 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 quality assurance program.
 - 3. Provide designated labels on installed products as required by quality assurance program.
 - 4. Submit documentation upon completion of installation that verifies this work is in compliance with specified requirements.
- E Provide a label for each fire rated and sound rated door indicating the testing agencies approval for the required rating. Do not cover or obscure the label in any way.

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 017836 - Warranties and Bonds, for additional warranty requirements.
- B Special Warranty
 - 1. Include removal of the defective door, hanging, hardware installation, finishing and labeling as required.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A Wood Veneer Faced Doors:
 - 1. Algona: www.algomahardwoods.com
 - 2. Graham Wood Doors: www.grahamdoors.com.
 - 3. Marshfield Door Systems, Inc: www.marshfielddoors.com.

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B Sound-Rated Wood Doors:

1. Masonite Architectural; Acoustically-Rated Door Solutions:
www.architectural.masonite.com/#sle.

2.02 DOORS AND PANELS

A Doors: See drawings for locations and additional requirements.

1. Quality Standard: Premium Grade, Heavy Duty performance, in accordance with WDMA I.S. 1A.
2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
 - a. Use minimum 1/50-inch thick for wood door face.
3. High Pressure Decorative Laminate (HPDL) Faced Doors: 5-ply unless otherwise indicated.

B Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.

1. Provide solid core doors at each location.
2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.
3. Sound Retardant Doors: Specified STC ratings as indicated on drawings and calculated in accordance with ASTM E 413, tested in accordance with ASTM E 1408. Provide acoustical core for doors to mechanical and electrical rooms and other scheduled locations.
4. Wood veneer facing for field transparent finish as indicated on drawings.
5. Hardboard facing with factory opaque finish as indicated on drawings.

C Transom Panels: Same construction and finish as door; same performance rating as door.

2.03 DOOR AND PANEL CORES

A Provide particleboard core complying to ANSI/A208.1 Grade 1-LD-2 bonded to outer stiles and rails, adding to Door Performance, for non-rated and 20 minute rated door core.

B Vertical stiles for non-rated and 20 minute rated doors to be an overall 1 3/8 wide after factory trim, bonded to core.

C For rail edges, non-rated and 20 minute rated, provide mill option, softwood, hardwood or engineered lumber meeting NWWDA IS1-A standards, bonded to core

D Use six-inch top rail required for listed door closers for non-rated and 20 minute rated doors.

E Non-Rated Solid Core and 20 Minute Rated Doors: Type staved lumber core (SLC), plies and faces as indicated.

F 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.

G Sound-Rated Doors: Equivalent to type, with particleboard core (PC) construction as required to achieve STC rating specified; plies and faces as indicated above.

2.04 DOOR FACINGS

A Veneer Facing for Transparent Finish: Natural birch, 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.

1. Vertical Edges: Same species as face veneer.
2. "Pair Match" each pair of doors; "Set Match" pairs of doors within 10 feet of each other when doors are closed.
3. Transoms: End match to doors.

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- B Facing Adhesive: Type I - waterproof.

2.05 DOOR CONSTRUCTION

- A Fabricate doors in accordance with door quality standard specified.
- B Cores Constructed with stiles and rails:
 - 1. Provide solid blocks at lock edge for hardware reinforcement.
 - 2. Provide solid blocking for other throughbolted hardware.
- C Where supplementary protective edge trim is required, install trim after veneer facing has been applied full-width.
- D Glazed Openings: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
- E Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- F Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
 - 1. Exception: Doors to be field finished.
- G Provide edge clearances in accordance with the quality standard specified.

2.06 FINISHES - WOOD VENEER DOORS

- A Finish work in accordance with AWI/AWMAC/WI (AWS), Section 5 - Finishing for grade specified and as follows:
 - 1. Transparent:
 - a. System - 12 Polyurethane Water-based.
 - b. Stain: As specified in Drawings and Specifications.
 - c. Sheen: per approved sample.
- B Finish work in accordance with WDMA I.S. 1A for grade specified and as follows:
- C Factory finish doors in accordance with approved sample.
- D Seal door top edge with transparent wood sealer to match door facing.

2.07 ACCESSORIES

- A Hollow Metal Door Frames: See Section 081113.
- B Glazing: See Section 088000.
- C Glazing Stops: Wood, of same species as door facing, butted corners; prepared for countersink style tamper proof screws.
- D Astragals for Non-Rated Double Doors: Steel, T shaped, overlapping and recessed at face edge.

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 Field-Finished Doors: Trimming to fit is acceptable.

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1. Adjust width of non-rated doors by cutting equally on both jamb edges.
 2. Trim maximum of 1/2 inch off bottom edges unless otherwise required.
 3. Trim fire-rated doors in strict compliance with fire rating limitations.
- D To the greatest extent possible, factory (shop) prepare doors for hardware.
- E Use machine tools to cut or drill for hardware.
- F Coordinate installation of doors with installation of frames and hardware.
- G Coordinate installation of glazing.
- H Install door louvers plumb and level.

3.03 TOLERANCES

- A Comply with specified quality standard for fit and clearance tolerances.
- B Comply with specified quality standard for telegraphing, warp, and squareness.

3.04 ADJUSTING

- A Adjust doors for smooth and balanced door movement.
- B Adjust closers for full closure.

3.05 SCHEDULE

- A See Door and Frame Schedule appended to this section.

END OF SECTION 081416

Flush Wood Doors - 081416

SECTION 084313 - ALUMINUM ENTRANCES AND STOREFRONT SYSTEMS
PART 1 GENERAL

1.01 SECTION INCLUDES

- A Delegated engineering, glazed aluminum storefront window system, and accessories indicated, specified, or required to complete installation.
- B Aluminum-framed storefront, with vision glass.
- C Aluminum doors and frames.
- D Weatherstripping.

1.02 RELATED REQUIREMENTS

- A Section 055000 - Metal Fabrications: Steel attachment devices.
- B Section 079200 - Joint Sealants: Sealing joints between frames and adjacent construction.
- C Section 087100 - Door Hardware: Hardware items other than specified in this section.
- D Section 088000 - Glazing: Glass and glazing accessories.

1.03 REFERENCE STANDARDS

- A AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2015.
- B AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2015.
- C AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.
- D AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
- E AAMA 612 - Voluntary Specification, Performance Requirements, and Test Procedures for Combined Coatings of Anodic Oxide and Transparent Organic Coatings on Architectural Aluminum; 2020, with Errata (2022).
- F AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
- G ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- H ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- I ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- J ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- K ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
- L ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights; 2023.
- M ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference; 2015 (Reapproved 2023).
- N SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

1.04 DELEGATED ENGINEERING REQUIREMENTS

- A Contract Documents: Concept of work specified by this Section is expressed on Drawings and in Specifications. However, they may not indicate or specify full extent of work that may be required.

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- B Delegated Engineering Responsibility: Require manufacturer to employ a delegated engineering professional to provide engineering for work of this Section to comply with concept expressed in Contract Documents.
 - 1. Engineer system to withstand structural design loads within limits and under conditions indicated, specified, or required, without material failure or permanent deformation of building structural frame or work specified according to following:
 - a. Applicable local building codes.
 - b. ASCE 7 or the more stringent Building Code requirements.
 - c. Authorities having jurisdiction.
 - d. Wind tunnel testing.
 - e. Criteria indicated in Contract Documents.
- C Prepare engineering calculations, shop drawings, and other submittals and affix professional seal by a Registered Engineer in the State of California, according to respective jurisdictional licensing regulations.
- D Coordination of Contract Documents and Work:
 - 1. Notify Owner and Architect of potential constructability issues between Contract Documents and execution of work. Absence of notice constitutes acceptance of conditions indicated, specified, or required, and changes caused by minor differences between delegated engineering and Contract Documents will be at no additional cost to Owner.
 - 2. Minor adjustments may be made in interest of fabrication or installation methods, techniques, or ability to satisfy concept expressed in Contract Documents, provided concept is maintained as determined by Owner and Architect. Proposed deviations shall include a detailed analysis of impact to adjacent substrates or other building systems, including additional design and construction costs.
- E Delegated Engineering Assumptions:
 - 1. Allowable working stress no more than yield stress of material.
 - 2. Corners and Wind Pressures:
 - a. Corners in Typical Windload Zones: Both surfaces shall be assumed to experience inward and outward design pressures simultaneously.
 - b. Corners in Corner Windload Zones: Simultaneous occurrence of inward design pressure on one surface, and outward design pressure on adjoining surface is not required.
 - 3. A 1/3 increase in allowable working stress for wind is not acceptable.
 - 4. Glass, sealants and interior finishes shall not contribute to framing member strength, stiffness or lateral stability.
 - 5. Compression flanges of flexural members may be assumed to receive effective lateral bracing only from anchors to building structure and horizontal glazing rails or interior trim, which are in contact with compression flange. Points of contraflexure shall not be regarded as lateral braces or as end points of an unbraced length; unbraced length shall be actual distance between effective lateral braces.
 - 6. Where a framing member reaction is resisted by a continuous element, maximum assumed effective length of resisting element shall be 4 times bearing length, but not more than 12 in
 - 7. Properly brace assembly anchors in 3 orthogonal directions (vertical, transverse, and longitudinal) to resist loads from any direction, including, but not limited to, inward positive and outward negative wind pressures.
 - 8. Following transfers of loads onto building structure is not acceptable:
 - a. Application of moments to floor slab edge.
 - b. Application of lateral or torsional loads to steel beams and columns.

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9. All loading into the mullions must have a load path that transfer loading directly into the structure. Mullions can not be fully supported by adjacent or interlocking members.
- F Safety Factors: Engineer to withstand following load effects without exceeding allowable working stress by following safety factors:
 1. Concrete Inserts: 3.
 2. Structural Steel: As determined by delegated engineering professional consistent with engineering quality standards.
 3. Welded Headed Studs: 2.
 4. Cold-Formed Steel: As determined by delegated engineering professional consistent with engineering quality standards.
 5. Cold-Formed Stainless Steel: As determined by delegated engineering professional consistent with engineering quality standards.
 6. Aluminum: As determined by delegated engineering professional consistent with engineering quality standards.
 7. Post-Installed Anchors in Concrete: 5 according to ASTM E 488.
 8. Cast-in-Place Concrete Inserts: 4 according to ASTM E 488.
 9. Drilled expansion or wedge type anchors: 4
- G Engineering Quality Standards: Determine allowable working stresses of products according to the following unless other standards are required by authorities having jurisdiction or applicable local building codes:
 1. ASCE – American Society of Civil Engineers
 - a. SEI/ASCE 7, Minimum Design Loads for Buildings and Other Structures.
 2. Concrete: ACI 318 – Building Code Requirements for Structural Concrete.
 3. Structural Steel:
 - a. AISC – Manual of Steel Construction.
 - b. AISC 303 – Code of Standard Practice for Steel Buildings and Bridges.
 - c. AISC 360 – Specification for Structural Steel Buildings.
 - d. AISC 341 – Seismic Provision for Structural Steel Buildings, including Supplement No.1.
 - e. AISC – Manual of Steel Construction, Load Resistance Factor Design Specification for Structural Steel Buildings.
 4. Aluminum:
 - a. AA – Aluminum Structures: A Guide to their Specifications and Design.
 - b. AA – Aluminum Design Manual.
 5. Glass: AAMA-CW-12 – Structural Properties of Glass.
 6. Welding:
 - a. ANSI/AWS – D1.1 – Structural Welding Code – Steel.
 - b. ANSI/AWS – D1.3 – Structural Welding Code – Sheet Steel.
 - c. ANSI/AWS – D1.2 – Structural Welding Code – Aluminum.
 7. Slotted Channel Framing: MFMA-4.

1.05 ADMINISTRATIVE REQUIREMENTS

- A Coordinate with installation of other components that comprise the exterior enclosure.
- B Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.06 SUBMITTALS

- A See Section 013300 - Submittal Requirements, for submittal procedures.

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- B Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, internal drainage details.
- C Shop Drawings: Prepared by Storefront Contractor, with detailed plans, elevations, sections, and large-scale details of products; include the following:
 - 1. Descriptions, indicate system dimensions, types, sizes, and profiles of products; including those concealed.
 - 2. Framed opening requirements and tolerances.
 - 3. Manufacturers, products, types, sizes, lengths, spacings, embedment, and edge distances of anchors, fasteners, and attachment devices.
 - 4. Insert/embed drawings and erection diagrams.
 - 5. Types of welded connections using AWS welding symbols.
 - 6. Loose, cast-in, and field-set hardware, inserts, and connections.
 - 7. Manufacturers, products, types, thicknesses, and layers of finishes.
 - 8. Material, thicknesses, profiles, and other details for flashings, gutters, and drainage troughs.
 - 9. Route for infiltrated water and condensation drainage to exterior.
 - 10. Provisions for expansion and contraction, including dimension limits of movement for moving joints.
 - 11. Fabrication, assembly and installation tolerances.
 - 12. Maximum and minimum joint sizes, including sealants and backer rods.
 - 13. Material descriptions, types, sizes, and profiles for isolation between dissimilar surfaces.
- D Delegated Engineering Calculations: Engineering calculations, sealed by delegated engineering professional in the State of California, for portion of work designated as delegated engineering.
 - 1. Test reports not acceptable substitute for calculations.
 - 2. Certification of conformance with structural test pressures and design pressures indicated; submit product test reports with notations as required by professional engineer.
- E Samples: Submit two samples 12 by 12 inches in size illustrating finished aluminum surface, glass, infill panels, glazing materials.
- F Fabrication Sample: Of each vertical-to-horizontal intersection of aluminum-framed systems, made from 12" (300 mm) lengths of full-size components and showing details of the following:
 - 1. Joinery, including concealed welds.
 - 2. Anchorage.
 - 3. Expansion provisions.
 - 4. Glazing.
 - 5. Flashing and drainage.
- G Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- H Design Data: Provide framing member structural and physical characteristics, engineering calculations, and dimensional limitations.
- I Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.
- J Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- K Field Quality Control Submittals: Report of field testing for water penetration and air leakage.
- L Designer's qualification statement.
- M Manufacturer's qualification statement.
- N Installer's qualification statement.

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1.07 QUALITY ASSURANCE

- A Perform Work in accordance with AAMA SFM-1 and AAMA - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual and AAMA - Aluminum Curtain Wall Design Guide Manual.
- B Source Limitations: Obtain aluminum framed storefront system through one source from a single manufacturer.
- C Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed at California.
- D Manufacturer Qualifications: Company specializing in performing work of type specified and with at least 10 years of documented experience.
 - 1. Provide certified glass products through ANSI accredited certifications that include plant audits and independent laboratory performance testing.
 - a. Insulating Glass Certification Council (IGCC).
 - b. Safety Glazing Certification Council (SGCC).
- E Installer Qualifications: Company specializing in performing work of type specified and with at least 5 years of documented experience.
 - 1. Provide company, field supervisors, and installers that hold active ANSI accredited certifications in appropriate categories for work specified.
- F Installer Qualifications: An installer which has had successful experience with installation of the same or similar units required for the project systems with minimum [5] years of documented experience.
- G Pre-Installation Conference: Before beginning work of this Section, conduct conference at Project to comply with requirements of appropriate Division 01 Sections.
 - 1. Required Attendees:
 - a. Owner.
 - b. Architect.
 - c. Contractor, including supervisor.
 - d. Glazed aluminum curtain wall installer, including supervisor.
 - e. EIFS installer, including supervisor.
 - f. Installers of adjacent work, including supervisors.
 - g. Manufacturer's technical representative.
 - 2. Minimum Agenda:
 - a. Review Contract Document requirements.
 - b. Review approved submittals.
 - c. Review installation procedures, including, but not limited to, following:
 - d. Review specified inspection and testing.
 - e. Review forecasted weather conditions and procedures for coping with unfavorable conditions.
 - f. Tour representative areas of required work, discuss and evaluate for compliance with Contract Documents and approved submittals, including substrate conditions, surface preparations, sequence of installation and other preparatory work performed by other installers.
 - 3. Reports: Record discussions, including decisions and agreements reached, and prepare report.

1.08 DELIVERY, STORAGE, AND HANDLING

- A Handle products of this section in accordance with AAMA CW-10.

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- B Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.09 FIELD CONDITIONS

- A Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.10 WARRANTY

- A See Section 017836 - Warranties and Bonds, for additional warranty requirements.
- B Correct defective Work within a five year period after Date of Substantial Completion.
- C Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
- D Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.
- E This warranty and its enforcement shall not deprive the Owner of other action right or remedy available to him.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A Basis of Design: Contract Documents are based on products specified below to establish a standard of quality. Other acceptable manufacturers with products having equivalent characteristics may be considered, provided deviations are minor and design concept expressed in Contract Documents is not changed, as determined by the Architect.
 - 1. Approved Manufacturer:
 - a. Arcadia, Inc., 2301 E Vernon, Vernon, CA.
 - b. Telephone 323/269-7300, Fax 323/269-7390.
 - 2. Approved Products: Storefront:
 - a. Arcadia, Inc., AF450 Series, 2" x 4-1/2" Non-Thermal; offset captured/Silicone vertical glazed, compensating stick or punched opening fabrication for 3/8" glass.
 - b. Arcadia, Inc., WS512 Series.
- B Aluminum-Framed Storefronts:
 - 1. Boyd Aluminum: www.boydaluminum.com/#sle.
 - 2. Kawneer North America: www.kawneer.com/#sle.
 - 3. _____.

2.02 PRODUCTS, GENERAL

- A Single Source Responsibility: Furnish each type of product through one source from single manufacturer.
- B Manufacturer Names or Labels: Not acceptable on exposed faces of products; printed label or stamped metal nameplate indicating manufacturer's name and product model number is acceptable on an easily noticeable interior surface or on back surface.

2.03 ALUMINUM-FRAMED STOREFRONT

- A Interior Storefront Entrance Framing
 - 1. Storefront System – Arcadia, Inc., AF450+ Series, 2" x 4-1/2" Non-Thermal; Offset captured/Silicone vertical glazed, compensating stick or punched opening fabrication for 3/8 glass.
- B Finishes: Class I color anodized.
 - 1. Factory finish all surfaces that will be exposed in completed assemblies.

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2. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
3. Finish Color: As indicated on the drawings.
- C Maintain continuous air barrier and/or vapor retarder seal throughout assembly, primarily in line with inside pane of glazing and inner sheet of infill panel, and heel bead of glazing compound.
 1. Preparation for Window Treatments: Provide reinforced interior horizontal head rail.

2.04 COMPONENTS

- A Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
 1. Framing members for interior applications need not be thermally broken.
 2. Glazing Stops: Flush.
 3. Cross-Section: As indicated on drawings.
 4. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.
- B Glazing: As specified in Section 088000 - Glazing.
- C Interior Swing Doors: Glazed aluminum.
 1. Basis of Design: Wide stile.
 2. Thickness: 1-3/4 inches.
 3. Top Rail: 5 1/8 inches wide.
 4. Vertical Stiles: 5 inches wide.
 5. Bottom Rail: 10 inches wide.
 6. Major portions of the door stiles a nominal .125 inches and glass stops .050 inches thick.
 7. Glazing Stops: Square snap-in type for 1/4" or 3/8" infill.
 8. Finish: Refer to Drawings and Material Schedule.

2.05 MATERIALS

- A Aluminum Extrusions: Alloy and temper recommended by sliding aluminum-framed glass door manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.090" wall thickness at any location for the main frame and sash members.
- B Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with sliding aluminum-framed glass door members, trim hardware, anchors, and other components.
- C Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
- D Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
 1. Weather Seals: Provide weather stripping with integral barrier fin or fins of semi-rigid, polypropylene sheet or polypropylene-coated material. Comply with AAMA 701/702.
- E Extruded Aluminum: ASTM B221 (ASTM B221M).
- F Sheet Aluminum: ASTM B209/B209M.
- G Structural Steel Sections: ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.
- H Exposed Flashings: Aluminum sheet, 20 gauge, 0.032 inch minimum thickness; finish to match framing members.
- I Concealed Flashings: Galvanized steel, 26 gauge, 0.0179 inch minimum base metal thickness.

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- J Glass: As specified in Section 08 80 00.
 - 1. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
 - 2. Glazing Accessories: As specified in Section 08 80 00.
- K Shop and Touch-Up Primer for Steel Components: Zinc oxide, alkyd, linseed oil primer appropriate for use over hand cleaned steel.
- L Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

2.06 FINISHES

- A Surface to be finished shall be free from mechanical imperfections such as scratches, scrapes, dents and die marks.
- B Concealed members may be mill finish, providing that they cannot be seen through the glass, do not contact any structural silicone or are not continually exposed to water immersion.
- C Appearance of Finished Work:
 - 1. Variations in appearance of abutting or adjacent pieces are acceptable if they are within one half of range of approved submittal samples.
 - 2. Noticeable variations in same piece are not acceptable.
 - 3. Variations in appearance of other components are acceptable if they are within range of approved submittal samples and they are assembled or installed to minimize contrast as determined by Architect.
 - 4. Architect has the final authority to accept or reject any or all material not meeting specified standards or requirements of the Contract Documents.
- D Class I Color Anodized Finish: AAMA 611 AA-M12C22A44 Electrolytically deposited colored anodic coating not less than 0.7 mils thick.
- E Protection of Finish: Protect exposed surfaces from damage by applying a strippable, temporary protective covering prior to shipment.
- F Touch-Up Materials: As recommended by coating manufacturer for field application.

2.07 HARDWARE

- A For each door, include weatherstripping, sill sweep strip, and threshold.
- B Other Door Hardware: See Section 087100.
- C Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.
- D Sill Sweep Strips: EPDM blade gasket sweep in aluminum extrusion.
- E Threshold: Extruded aluminum, one piece per door opening, non-slip surface; provide on all doors.

2.08 FABRICATION

- A Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C Prepare components to receive anchor devices. Fabricate anchors.
- D Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
- E Arrange fasteners and attachments to conceal from view.
- F Reinforce interior horizontal head rail to receive drapery track brackets and attachments.
- G Reinforce components internally for door hardware and door operators.
- H Reinforce framing members for imposed loads.
- I Finishing: Apply factory finish to all surfaces that will be exposed in completed assemblies.

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1. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.

PART 3 EXECUTION

3.01 EXAMINATION

- A Verify dimensions, tolerances, and method of attachment with other work.
- B Verify that storefront wall openings and adjoining water-resistive and/or air barrier seal materials are ready to receive work of this section.

3.02 INSTALLATION

- A Installation Quality Standards: In addition to standards specified elsewhere, perform work according to following, unless otherwise specified:
 1. Delegated engineering.
 2. Respective manufacturer's written instructions, specifications, and recommendations.
 3. Approved submittals.
 4. Contract Documents.
 5. ASTM E 2112 Standard Practice for Installation of Exterior Windows, Doors and Skylights
- B Install wall system in accordance with manufacturer's instructions.
- C Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- D Provide alignment attachments and shims to permanently fasten system to building structure.
- E Prevent galvanic action and other forms of corrosion by isolating metals from direct contact with incompatible surfaces.
- F Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- G Provide thermal isolation where components penetrate or disrupt building insulation.
- H Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- I Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
- J Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- K Set thresholds in bed of sealant and secure.
- L Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES: CONFORM TO FOLLOWING NON-CUMULATIVE TOLERANCES:

- A Maximum Variation from Plumb: 0.06 inch per 3 feet non-cumulative or 0.06 inch per 10 feet, whichever is less.
 1. Variation for Vertical Members:
 - a. Not more than 1/8 inch in 26 ft.
 - b. Not more than 1/4 inch in 52 ft.
 2. Variation for Horizontal Members: Not more than 1/8 inch in 25 ft in any direction.
- B Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.
- C Offset from Alignment of Members End to End: Not more than 1/32 inch
- D Gap Between Removable Members: Not more than 1/16 inch, or not more than 1/32 inch at each end of single member.
- E Variation in Plane: One of following:
 1. Not more than 1/16 inch in 10 ft at any location.
 2. Not more than 1/8 inch over entire face or area.

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- F Sealant joint width between Mullions and adjacent construction: minimum of 1/4 inch.

3.04 FIELD QUALITY CONTROL

- A Water-Spray Test: Provide water spray quality test of installed storefront components in accordance with AAMA 501.2 during construction process and before installation of interior finishes.
 - 1. Perform a minimum of two tests in each designated area as indicated on drawings.
 - 2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
- B Re-testing and Re-inspections Due to Failures: Contractor is responsible for expenses incurred, without additional cost to Owner, due to failure of work to pass testing and inspections.
- C Weepage System: Mask weeps and introduce water to interior areas to demonstrate weepage performance.
 - 1. Fill gutters to average 3/4 inch height and hold for 30 minutes.
 - 2. No leakage to interior spaces is allowed.

3.05 ADJUSTING

- A Adjust operating hardware and sash for smooth operation.

3.06 CLEANING

- A Remove protective material from pre-finished aluminum surfaces.
- B Remove all mastic smears or other unsightly marks from the installed work. Perform final cleaning and washing of glass and aluminum.
- C Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.
- D Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

3.07 PROTECTION

- A Protect installed products from damage until Date of Substantial Completion.

END OF SECTION 084313

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SECTION 087100 - DOOR HARDWARE

PART 1 GENERAL

1.01 SUMMARY

- A Sections includes:
 - 1. Mechanical and electrified door hardware for:
 - a. Swinging doors.
 - 2. Electronic access control system components, including:
 - a. Biometric access control reader.
 - b. Electronic access control devices.
 - 3. Field verification, preparation and modification of existing doors and frames to receive new door hardware.
 - 4. Lead-lining door hardware items required for radiation protection at door openings.
- B Exclusions: Unless specifically listed in hardware sets, hardware is not specified in this section for:
 - 1. Windows
 - 2. Cabinets (casework), including locks in cabinets
 - 3. Signage
 - 4. Toilet accessories
 - 5. Overhead doors

1.02 RELATED SECTIONS:

- A Division 01 Section "Alternates" for alternates affecting this section.
- B Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
- C Division 09 sections for touchup finishing or refinishing of existing openings modified by this section.
- D Division 26 sections for connections to electrical power system and for low-voltage wiring.
- E Division 28 sections for coordination with other components of electronic access control system.

1.03 REFERENCES

- A UL - Underwriters Laboratories
 - 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 ANSI - American National Standards Institute
 - 1. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
- C California Code of Regulations
 - 1. Title 24: California Building Standards Code

1.04 SUBMITTALS

- A General:
 - 1. Submit in accordance with Conditions of Contract and Division 01 requirements.
 - 2. Highlight, encircle, or otherwise specifically identify on submittals deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.

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3. Prior to forwarding submittal, comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, "EXAMINATION" article, herein.

B Action Submittals:

1. Product Data: Product data including manufacturers' 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 or sample installations of each type of exposed hardware unit in finish indicated, and tagged with full description for coordination with schedule.
 - a. Samples will be returned to supplier in like-new condition. 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: Submit schedule with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, include:
 - a. Door Index; include door number, heading number, and Architects hardware set number.
 - b. Opening Lock Function Spreadsheet: List locking device and function for each opening.
 - c. Type, style, function, size, and finish of each hardware item.
 - d. Name and manufacturer of each item.
 - e. Fastenings and other pertinent information.
 - f. Location of each hardware set cross-referenced to indications on Drawings.
 - g. Explanation of all abbreviations, symbols, and codes contained in schedule.
 - h. Mounting locations for hardware.
 - i. Door and frame sizes and materials.
 - j. Name and phone number for local manufacturer's representative for each product.
 - k. Operational Description of openings with any electrified hardware (locks, exits, electromagnetic locks, electric strikes, automatic operators, door position switches, magnetic holders or closer/holder units, and access control components). Operational description should include how door will operate on egress, ingress, and fire and smoke alarm connection.
 - 1) Submittal Sequence: Submit door hardware schedule 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 that is critical in Project construction schedule.
5. Key Schedule:
 - a. After Keying Conference, provide keying schedule listing levels of keying as well as explanation of key system's function, key symbols used and door numbers controlled.

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- 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.
 - 1) 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.
 - 6. Templates: After final approval of hardware schedule, provide templates for doors, frames and other work specified to be factory prepared for door hardware installation.
- C Informational Submittals:
- 1. Qualification Data: For Supplier and Installer.
 - 2. Product Certificates for electrified door hardware, signed by manufacturer:
 - a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
 - 3. Certificates of Compliance:
 - a. Certificates of compliance for fire-rated hardware and installation instructions if requested by Architect or Authority Having Jurisdiction.
 - b. Installer Training Meeting Certification: Letter of compliance, signed by Contractor, attesting to completion of installer training meeting specified in "QUALITY ASSURANCE" article, herein.
 - c. Electrified Hardware Coordination Conference Certification: Letter of compliance, signed by Contractor, attesting to completion of electrified hardware coordination conference, specified in "QUALITY ASSURANCE" article, herein.
 - 4. Product Test Reports: For compliance with accessibility requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by qualified testing agency, for door hardware on doors located in accessible routes.
 - 5. Warranty: Special warranty specified in this Section.
- 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. Name, address, and phone number of local representative for each manufacturer.
 - d. Parts list for each product.
 - e. Final approved hardware schedule, edited to reflect conditions as-installed.
 - f. Final keying schedule
 - g. Copies of floor plans with keying nomenclature
 - h. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.
 - i. Copy of warranties including appropriate reference numbers for manufacturers to identify project.

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1.05 QUALITY ASSURANCE

- A Product Substitutions: Comply with product requirements stated in Division 01 and as specified herein.
 - 1. Where specific manufacturer's product is named and accompanied by "No Substitute," including make or model number or other designation, provide product specified. (Note: Certain products have been selected for their unique characteristics and particular project suitability.)
 - a. Where no additional products or manufacturers are listed in product category, requirements for "No Substitute" govern product selection.
 - 2. Where products indicate "acceptable manufacturers" or "acceptable manufacturers and products", provide product from specified manufacturers, subject to compliance with specified requirements and "Single Source Responsibility" requirements stated herein.
- B Supplier Qualifications and Responsibilities: Recognized architectural hardware supplier with record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project.
 - 1. Warehousing Facilities: In Project's vicinity.
 - 2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
 - 3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
 - 4. Coordination Responsibility: Coordinate installation of electronic security hardware with Architect and electrical engineers and provide installation and technical data to Architect and other related subcontractors.
 - a. Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.
- C Installer Qualifications: Qualified tradesmen, skilled in application of commercial grade hardware with record of successful in-service performance for installing door hardware similar in quantity, type, and quality to that indicated for this Project.
- D Single Source Responsibility: Obtain each type of door hardware from single manufacturer.
 - 1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated.
 - 2. Manufacturers that perform electrical modifications and that are listed by testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.
- E Fire-Rated Door Openings: Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and are identical to products tested by Underwriters Laboratories, 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.
- F 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.
 - 1. Air Leakage Rate: 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.
- G Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.

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- H Means of Egress Doors: Latches do not require more than 5 lbf (67 N) to release latch. Locks do not require use of key, tool, or special knowledge for operation.
- I Accessibility Requirements: For door hardware on doors in an accessible route, comply with governing accessibility regulations cited in "REFERENCES" article, herein.
 - 1. Provide operating devices that do not require tight grasping, pinching, or twisting of wrist and that operate with force of not more than 5 lbf (22.2 N).
 - 2. Maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
 - b. Sliding or Folding Doors: 5 lbf (22.2 N) applied parallel to door at latch.
 - c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
 - 3. Bevel raised thresholds with slope of not more than 1:2. Provide thresholds not more than 1/2 inch (13 mm) high.
 - 4. Adjust door closer sweep periods so that, from open position of 70 degrees, door will take at least 3 seconds to move to 3 inches (75 mm) from latch, measured to leading edge of door.
- J Keying Conference: Conduct conference at Project site to comply with requirements in Division 01.
 - 1. Attendees: Owner, Contractor, Architect, Installer, Owner's Security Consultant, and Supplier.
 - 2. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
 - a. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 - b. Preliminary key system schematic diagram.
 - c. Requirements for key control system.
 - d. Requirements for access control.
 - e. Address for delivery of keys.
- K Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01.
 - 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Inspect and discuss preparatory work performed by other trades.
 - 3. Inspect and discuss electrical roughing-in for electrified door hardware.
 - 4. Review sequence of operation for each type of electrified door hardware.
 - 5. Review required testing, inspecting, and certifying procedures.
- L Coordination Conferences:
 - 1. Installation Coordination Conference: Prior to hardware installation, schedule and hold meeting to review questions or concerns related to proper installation and adjustment of door hardware.
 - a. Attendees: Door hardware supplier, door hardware installer, Contractor.
 - b. After meeting, provide letter of compliance to Architect, indicating when meeting was held and who was in attendance.
 - 2. Electrified Hardware Coordination Conference: Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.
 - a. Attendees: electrified door hardware supplier, doors and frames supplier, electrified door hardware installer, electrical subcontractor, Owner, Owner's security consultant, Architect and Contractor.

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- b. After meeting, provide letter of compliance to Architect, indicating when coordination conference was held and who was in attendance.

1.06 DELIVERY, STORAGE, AND HANDLING

- A Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site.
- 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.
 1. Deliver each article of hardware in manufacturer's original packaging.
- C Project Conditions:
 1. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
 2. Provide secure lock-up for door hardware delivered to Project, but not yet installed. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
- D Protection and Damage:
 1. Promptly replace products damaged during shipping.
 2. Handle hardware in a manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work.
 3. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.
- E Deliver keys to manufacturer of key control system for subsequent delivery to Owner.
- F Deliver keys and permanent cores to Owner by registered mail or overnight package service.

1.07 COORDINATION

- A Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- B Installation Templates: Distribute for doors, frames, and other work specified to be factory 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.
- E Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.
- F Direct shipments not permitted, unless approved by Contractor.

1.08 WARRANTY

- A Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 1. Warranty Period: Years from date of Substantial Completion, for durations indicated.
 - a. Closers:
 - 1) Mechanical: 10 years. 30 years for LCN 4000

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- 2) Electrified: 2 years.
 - b. Exit Devices:
 - 1) Mechanical: 3 years.
 - 2) Electrified: 1 year.
 - c. Locksets:
 - 1) Mechanical: 3 years
 - 2) Electrified: 1 year.
 - d. Continuous Hinges: Lifetime warranty [10 years].
 - e. Key Blanks: Lifetime
2. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A Where "No Substitute" is noted, submittals and substitution requests for other products will not be considered.
- B Approval of manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturer" in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.
- 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 Hand of Door: Drawings show direction of slide, swing, or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.
- E 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 Fasteners
 - 1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
 - 2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) 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 for hardware units exposed when door is closed except when no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless thru-bolts are required to fasten hardware securely. Review door specification and advise Architect if thru-bolts are required.
 - 4. Install hardware with fasteners provided by hardware manufacturer.
- 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.

2.03 HINGES

- A Manufacturers and Products:
 - 1. Scheduled Manufacturer and Product: Ives 5BB series

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2. Acceptable Manufacturers and Products: Hager BB series, Stanley FBB Series

B Requirements:

1. Provide five-knuckle ball bearing hinges conforming to ANSI/BHMA A156.1.
2. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
 - a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
 - b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
3. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
 - a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
4. 2 inches or thicker doors:
 - a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
5. 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.
6. Where new hinges are specified for existing doors or existing frames, provide new hinges of identical size to hinge preparation present in existing door or existing frame.
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: Non-removable pins
 - d. Out-Swinging Interior Lockable Doors: Non-removable pins
 - e. Interior Non-lockable Doors: Non-rising pins
8. Width of hinges: 4-1/2 inches (114 mm) at 1-3/4 inch (44 mm) thick doors, and 5 inches (127 mm) at 2 inches (51 mm) or thicker doors. Adjust hinge width as required for door, frame, and wall conditions to allow proper degree of opening.
9. Doors 36 inches (914 mm) wide or less furnish hinges 4-1/2 inches (114 mm) high; doors greater than 36 inches (914 mm) wide furnish hinges 5 inches (127 mm) high, heavy weight or standard weight as specified.
10. Provide hinges with electrified options as scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component.
11. Provide mortar guard for each electrified hinge specified.
12. Provide spring hinges where specified. Provide two spring hinges and one bearing hinge per door leaf for doors 90 inches (2286 mm) or less in height. Provide one additional bearing hinge for each 30 inches (762 mm) of additional door height.

2.04 PIVOT SETS

A Manufacturers:

1. Scheduled Manufacturer: Ives
2. Acceptable Manufacturers: Dorma, Rixson

B Requirements:

1. Provide pivot sets complete with oil-impregnated top pivot, unless indicated otherwise.
2. Where offset pivots are specified, Provide one intermediate pivot for doors less than 91 inches (2311 mm) high and one additional intermediate pivot per leaf for each additional 30 inches (762 mm) in height or fraction thereof. Intermediate pivots spaced equally not less than 25 inches (635 mm) or not more than 35 inches (889 mm) on center, for doors over 121 inches (3073 mm) high.
3. Provide appropriate model where pivot sets are scheduled at fire rated openings.

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4. Provide lead-lined model where pivot sets are specified at lead-lined doors.
5. Provide pivots with electrified options as scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware. Locate electrified pivot nearest to electrified locking component. If manufacturer of electrified locking component requires another device for power transfer then provide recommended power transfer device and appropriate quantity of pivots.
6. Provide mortar guard for each electric pivot specified, unless specified in hollow metal frame specification.

2.05 FLUSH BOLTS

- A Manufacturers:
1. Scheduled Manufacturer: Ives
 2. Acceptable Manufacturers: Rockwood, Trimco
- B Requirements:
1. Provide automatic, constant latching, and 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.

2.06 SURFACE BOLTS

- A Manufacturers:
1. Scheduled Manufacturer: Ives
 2. Acceptable Manufacturers: Rockwood, Trimco
- B Requirements:
1. Surface bolts to have 1" throw for maximum security with concealed mounting that prevents vandalism. Units to be constructed of heavy duty steel and cUL listed up to three (3) hours when used on the inactive door of a pair up to 8' in height.

2.07 COORDINATORS

- A Manufacturers:
1. Scheduled Manufacturer: Ives
 2. Acceptable Manufacturers: Rockwood, Trimco
- B Requirements:
1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors, provide bar-type coordinating device, surface applied to underside of stop at frame head.
 2. Provide filler bar of correct length for unit to span entire width of opening, and appropriate brackets for parallel arm door closers and surface vertical rod exit device strikes. Factory-prep coordinators for vertical rod devices if required.

2.08 MORTISE LOCKS

- A Manufacturers and Products:
1. Scheduled Manufacturer and Product: Schlage L9000 series
 2. Acceptable Manufacturers and Products: Best 45H series, Sargent 8200 series
- B Requirements:
1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1 Operational, Grade 1 Security, and manufactured from heavy gauge steel, containing

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components of steel with a zinc dichromate plating for corrosion resistance. Provide lock case that is multi-function and field reversible for handing without opening case.

Cylinders: Refer to "KEYING" article, herein.

2. 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.
3. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
4. Provide electrified options as scheduled in the hardware sets. Where scheduled, provide a request to exit (RX) switch that is actuated with rotation of inside lever.
5. Provide motor based electrified locksets with electrified options as scheduled in the hardware sets and comply with the following requirements:
 - a. Universal input voltage – single chassis accepts 12 or 24V DC 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. Request to Exit Switch (RX) –
 - 1) Modular Design – provide electrified locks capable of using, adding, or changing a modular RX switch without opening the lock case.
 - 2) Monitoring – where scheduled, provide a request to exit (RX) switch that detects rotation of the inside lever.
 - f. Connections – provide quick-connect Molex system standard.
 - g. UL Listed – 3 hour fire door
6. 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. Lever Design: Schlage 17
 - b. Tactile Warning (Knurling): Where required by authority having jurisdiction. Provide on levers on exterior (secure side) of doors serving rooms considered to be hazardous.

2.09 ALUMINUM DOOR LOCKS – NARROW STYLE

- A Manufacturer and Product:
 1. Scheduled Manufacturer and Product: Adams Rite 4900 series X 4568/9 Lever or 4590/1 Paddle
 2. Acceptable Manufacturers and Products: No Substitute.
- B Requirements:
 1. Provide narrow style aluminum door locks as specified. Cylinders: Refer to "KEYING" article, herein.
 2. Provide locks with backset as required for door detail with full 5/8 inch (16 mm) throw latchbolt.
 3. Provide manufacturer's standard strikes unless extended lip strikes are necessary to protect trim.

2.10 EXIT DEVICES

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A Manufacturers and Products:

1. Scheduled Manufacturer and Product: Von Duprin 98/35 series
2. Acceptable Manufacturers and Products: Sargent 19-43-GL-80 series, Precision Apex series

B Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1, and UL listed for Panic Exit or Fire Exit Hardware. Cylinders: Refer to "KEYING" article, herein.
2. Provide touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
3. Touchpad: Extend minimum of one half of door width. Match exit device finish, stainless steel for US26, US26D, US28, US32, and US32D finishes; and for all other finishes, provide compatible finish to exit device. No plastic inserts are allowed in touchpads.
4. Provide exit devices with dead-latching feature for security and for future addition of alarm kits and/or other electrified requirements.
5. Provide flush end caps for exit devices.
6. Provide exit devices with manufacturer's approved strikes.
7. 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.
8. 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.
9. Provide cylinder dogging at non-fire-rated exit devices.
10. 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.
11. Where lever handles are specified as outside trim for exit devices, provide heavy-duty lever trims with forged or cast escutcheon plates. Provide vandal-resistant levers that will travel to 90-degree down position when more than 35 pounds of torque are applied, and which can easily be re-set.
 - a. Lever Style: Match lever style of locksets.
 - b. Tactile Warning (Knurling): Where required by authority having jurisdiction. Provide on levers on exterior (secure side) of doors serving rooms considered to be hazardous.
12. Provide UL labeled fire exit hardware for fire rated openings.
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. Accessibility: Require not more than 5lb. To retract the latch bolt per CBC 11B-404..2.7 and 11B-309.4.
 - a. Mechanical method: Von Duprin "AX-" feature, where touchpad directly retracts the latch bolt with 5 lb or less of force. Provide testing lab certification confirming that the mechanical device is independent third-party tested to meet this 5 lb requirement.

2.11 CYLINDERS

A Manufacturers:

1. Scheduled Manufacturer: Schlage
2. Acceptable Manufacturers: Best, Medeco, Sargent

B Requirements:

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1. Provide cylinders/cores, from the same manufacturer of locksets, compliant with ANSI/BHMA A156.5; latest revision, Section 12, Grade 1; permanent cylinders; cylinder face finished to match lockset, manufacturer's series as indicated. Refer to "KEYING" article, herein.
2. Provide cylinders in the below-listed configuration(s), distributed throughout the Project as indicated.
 - a. Conventional Patented Restricted: cylinder with interchangeable core with patented, restricted keyway.
3. Patent Protection: Cylinders/cores requiring use of restricted, patented keys, patent-protected until the year, 2029.
4. Nickel silver bottom pins.
5. Replaceable Construction Cores.
 - a. Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
 - 1) 3 construction control keys
 - 2) 12 construction change (day) keys.
 - b. Owner or Owner's Representative will replace temporary construction cores with permanent cores.

2.12 KEYING

- A Provide a factory registered keying system, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.
- B Requirements:
 1. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
 - a. Master Keying system as directed by the Owner.
 2. Forward biting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements shall be cause for replacement of cylinders/cores involved at no additional cost to Owner.
 3. Provide keys with the following features:
 - a. Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
 - b. Patent Protection: Keys and blanks protected by one or more utility patent(s) until the year, 2029].
 4. Identification:
 - a. Mark permanent cylinders/cores and keys with applicable blind code per DHI publication "Keying Systems and Nomenclature" for identification. Blind code marks shall not include actual key cuts.
 - b. Identification stamping provisions must be approved by the Architect and Owner.
 - c. 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.
 - d. Failure to comply with stamping requirements shall be cause for replacement of keys involved at no additional cost to Owner.
 - e. Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
 5. Quantity: Furnish in the following quantities.
 - a. Change (Day) Keys: 3 per cylinder/core.
 - b. Permanent Control Keys: 3.

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- c. Master Keys: 6.

2.13 KEY CONTROL SYSTEM

- A Manufacturers:
 - 1. Scheduled Manufacturer: Telkee
 - 2. Acceptable Manufacturers: HPC, 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.

2.14 DOOR CLOSERS

- A Manufacturers and Products:
 - 1. Scheduled Manufacturer and Product: LCN 4040XP series
 - 2. Acceptable Manufacturers and Products: No Substitute
 - a. Norton 9500
 - b. Sargent 281 series
- B Requirements:
 - 1. 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.
 - 2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
 - 3. 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.
 - 4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
 - 5. 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.
 - 6. 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.
 - 7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers.
 - 8. Pressure Relief Valve (PRV) Technology: Not permitted.
 - 9. 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).
 - 10. 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.

2.15 DOOR TRIM

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A Manufacturers:

1. Scheduled Manufacturer: Ives
2. Acceptable Manufacturers: Rockwood, Trimco

B Requirements:

1. Provide push plates 4 inches (102 mm) wide by 16 inches (406 mm) high by 0.050 inch (1 mm) thick and beveled 4 edges. Where width of door stile prevents use of 4 inches (102 mm) wide plate, adjust width to fit.
2. Provide push bars of solid bar stock, diameter and length as scheduled. Provide push bars of sufficient length to span from center to center of each stile. Where required, mount back to back with pull.
3. Provide offset pulls of solid bar stock, diameter and length as scheduled. Where required, mount back to back with push bar.
4. Provide flush pulls as scheduled. Where required, provide back-to-back mounted model.
5. Provide pulls of solid bar stock, diameter and length as scheduled. Where required, mount back to back with push bar.
6. Provide pull plates 4 inches (102 mm) wide by 16 inches (406 mm) high by 0.050 inch (1 mm) thick, beveled 4 edges, and prepped for pull. Where width of door stile prevents use of 4 inches (102 mm) wide plate, adjust width to fit.
7. Provide wire pulls of solid bar stock, diameter and length as scheduled.
8. Provide decorative pulls as scheduled. Where required, mount back to back with pull.

2.16 PROTECTION PLATES

A Manufacturers:

1. Scheduled Manufacturer: Ives
2. Acceptable Manufacturers: Rockwood, Trimco

B Requirements:

1. Provide kick plates, mop plates, and armor plates 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 of plates:
 - a. Kick Plates: 10 inches (254 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs
 - b. Mop Plates: 4 inches (102 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs
 - c. Armor Plates: 36 inches (914 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs

2.17 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A Manufacturers:

1. Scheduled Manufacturers: Glynn-Johnson
2. Acceptable Manufacturers: Rixson, Sargent

B Requirements:

1. Provide heavy duty concealed mounted overhead stop or holder as specified for exterior and interior vestibule single acting doors.
2. Provide heavy duty concealed mounted overhead stop or holder as specified for double acting doors.
3. Provide heavy or medium duty and concealed or surface mounted overhead stop or holder for interior doors as specified. Provide medium duty surface mounted overhead stop for interior doors and at any door that swings more than 140 degrees before striking

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wall, open against equipment, casework, sidelights, and where conditions do not allow wall stop or floor stop presents tripping hazard.

4. Where overhead holders are specified provide friction type at doors without closer and positive type at doors with closer.

2.18 DOOR STOPS AND HOLDERS

A Manufacturers:

1. Scheduled Manufacturer: Ives
2. Acceptable Manufacturers: Rockwood, Trimco

B Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide convex type where mortise type locks are used and concave type where cylindrical type locks are used.
2. Where a wall stop cannot be used, provide universal floor stops for low or high rise options.
3. Where wall or floor stop cannot be used, provide medium duty surface mounted overhead stop.

2.19 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A Manufacturers:

1. Scheduled Manufacturer: Zero International
2. Acceptable Manufacturers: National Guard, Pemko

B Requirements:

1. Provide thresholds, weather-stripping (including door sweeps, seals, and astragals) and gasketing systems (including smoke, sound, and light) as specified and per architectural details. Match finish of other items.
2. Size of thresholds:
 - a. Saddle Thresholds: 1/2 inch (13 mm) high by jamb width by door width
 - b. Bumper Seal Thresholds: 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width
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.

2.20 SILENCERS

A Manufacturers:

1. Scheduled Manufacturer: Ives
2. Acceptable Manufacturers: Rockwood, Trimco

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.

2.21 LATCH PROTECTORS

A Manufacturers:

1. Scheduled Manufacturer: Ives
2. Acceptable Manufacturers: Rockwood, Trimco

B Provide stainless steel latch protectors of type required to function with specified lock.

2.22 COAT HOOKS

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- A Manufacturers:
 - 1. Scheduled Manufacturer: Ives.
 - 2. Acceptable Manufacturers: Rockwood, Trimco
- B Provide coat hooks as specified.

2.23 FINISHES

- A Finish: BHMA 643e/716 (US11); except:
 - 1. Door Closers: Powder Coat to Match.
 - 2. Weatherstripping: Dark Bronze Anodized Aluminum.
 - 3. Thresholds: Extruded anodized 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.
- B Existing Door and Frame Compatibility: Field verify existing doors and frames receiving new hardware and existing conditions receiving new openings. Verify that new hardware is compatible with existing door and frame preparation and existing conditions.
- C Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- D Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A Where on-site modification of doors and frames is required:
 - 1. Carefully remove existing door hardware and components being reused. Clean, protect, tag, and store in accordance with storage and handling requirements specified herein.
 - 2. Field modify and prepare existing door and frame for new hardware being installed.
 - 3. When modifications are exposed to view, use concealed fasteners, when possible.
 - 4. Prepare hardware locations and reinstall in accordance with installation requirements for new door hardware and with:
 - a. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
 - b. Wood Doors: DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."
 - c. Doors in rated assemblies: NFPA 80 for restrictions on on-site door hardware preparation.

3.03 INSTALLATION

- A Mounting Heights: 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. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- B Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
- C Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.

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- D Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- E Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- F Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
- G Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- H Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every 30 inches (750 mm) of door height greater than 90 inches (2286 mm).
- I Lock Cylinders: Install construction cores to secure building and areas during construction period.
 - 1. Replace construction cores with permanent cores as indicated in keying section.
- J Lead Protection: Lead wrap hardware penetrating lead-lined doors. Levers and roses to be lead lined. Apply kick and armor plates on lead-lined doors with adhesive as recommended by manufacturer.
- K Wiring: Coordinate with Division 26, ELECTRICAL 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. Testing and labeling wires with Architect's opening number.
- L Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- M Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Closers shall not be visible in corridors, lobbies and other public spaces unless approved by Architect.
- N Closer/Holders: Mount closer/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.
 - 1. Coordination: Coordinate provision with the security systems provider to mitigate excessive or redundant purchase.
 - 2. Configuration: Provide least number of power supplies required to adequately serve doors with electrified door hardware.
- 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: Apply to bottom of door, forming seal with threshold when door is closed.

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3.04 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 is allowed to 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 months after date of Substantial Completion, Installer shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.05 CLEANING AND PROTECTION

- A Clean adjacent surfaces soiled by door hardware installation.
- B Clean operating items as necessary 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.

3.06 DEMONSTRATION

- A Provide training for Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes. Refer to Division 01 Section "Demonstration and Training."

3.07 DOOR HARDWARE SCHEDULE

- A Hardware sets are design intent only and not to be used to detail project. Locksets, exit devices, and other hardware items are referenced in the following hardware sets for series, type and function. Refer to the above-specifications for special features, options, cylinders/keying, and other requirements.
- B Hardware Sets:

HW SET: 01 - EXTERIOR RATED WITH PANIC HARDWARE

107					
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Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	<input type="checkbox"/>	F643E	IVE
1	EA	FIRE EXIT HARDWARE	PA-AX-98-L-NL-F-17	<input type="checkbox"/>	643E	VON
1	EA	SFIC RIM CYLINDER	80-116	<input type="checkbox"/>	643e	SCH
1	EA	SFIC EVEREST CORE	80-037	<input type="checkbox"/>	613	SCH

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1	EA	SURFACE CLOSER	4040XP RW/PA	<input type="checkbox"/>	695	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	<input type="checkbox"/>	695	IVE
1	EA	FLOOR STOP	FS436/FS438 AS REQ'D	<input type="checkbox"/>	643E	IVE
1	SET	GASKETING	50AA-S	<input type="checkbox"/>	AA	ZER
1	EA	DOOR SWEEP	39D	<input type="checkbox"/>	D	ZER
1	EA	THRESHOLD	546D-OR PER SILL DETAIL	<input type="checkbox"/>	D	ZER

HW SET: 02 - EXTERIOR STOREROOM FUNCTION

105	106	113			
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Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	<input type="checkbox"/>	F643E	IVE
1	EA	STOREROOM LOCK	L9080BDC 17A	<input type="checkbox"/>	643e	SCH
1	EA	SFIC EVEREST CORE	80-037	<input type="checkbox"/>	613	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA	<input type="checkbox"/>	695	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	<input type="checkbox"/>	695	IVE
1	EA	FLOOR STOP	FS436/FS438 AS REQ'D	<input type="checkbox"/>	643E	IVE
1	SET	GASKETING	50AA-S	<input type="checkbox"/>	AA	ZER
1	EA	DOOR SWEEP	39D	<input type="checkbox"/>	D	ZER
1	EA	THRESHOLD	546D-OR PER SILL DETAIL	<input type="checkbox"/>	D	ZER

HW SET: 03 - STOREROOM FUNCTION 3/6 DOOR

110	112				
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Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 5 X 4.5	<input type="checkbox"/>	F643E	IVE
1	EA	STOREROOM LOCK	L9080BDC 17A	<input type="checkbox"/>	643e	SCH

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1	EA	SFIC EVEREST CORE	80-037	<input type="checkbox"/>	613	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA	<input type="checkbox"/>	695	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	<input type="checkbox"/>	695	IVE
1	EA	WALL STOP	WS406/407CCV	<input type="checkbox"/>	643E	IVE
1	EA	SILENCER	SR64	<input type="checkbox"/>	GRY	IVE

HW SET: 04 - STOREROOM FUNCTION

209	210	214			
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Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	<input type="checkbox"/>	F643E	IVE
1	EA	STOREROOM LOCK	L9080BDC 17A	<input type="checkbox"/>	643e	SCH
1	EA	SFIC EVEREST CORE	80-037	<input type="checkbox"/>	613	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA	<input type="checkbox"/>	695	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	<input type="checkbox"/>	695	IVE
1	EA	WALL STOP	WS406/407CCV	<input type="checkbox"/>	643E	IVE
1	EA	SILENCER	SR64	<input type="checkbox"/>	GRY	IVE

HW SET: 05 - STOREROOM FUNCTION NO CLOSER OVERHEAD STOP

203-2					
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Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	<input type="checkbox"/>	F643E	IVE
1	EA	STOREROOM LOCK	L9080BDC 17A	<input type="checkbox"/>	643e	SCH
1	EA	SFIC EVEREST CORE	80-037	<input type="checkbox"/>	613	SCH
1	EA	OH STOP	90S	<input type="checkbox"/>	643E	GLY
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	<input type="checkbox"/>	695	IVE
1	EA	WALL STOP	WS406/407CCV	<input type="checkbox"/>	643E	IVE
1	EA	SILENCER	SR64	<input type="checkbox"/>	GRY	IVE

HW SET: 06 - CLASSROOM FUNCTION**Door Hardware - 087100**

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201	202				
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Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	<input type="checkbox"/>	F643E	IVE
1	EA	CLASSROOM LOCK	L9070BDC 17A	<input type="checkbox"/>	643e	SCH
1	EA	SFIC EVEREST CORE	80-037	<input type="checkbox"/>	613	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA	<input type="checkbox"/>	695	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	<input type="checkbox"/>	695	IVE
1	EA	WALL STOP	WS406/407CCV	<input type="checkbox"/>	643E	IVE
1	EA	SILENCER	SR64	<input type="checkbox"/>	GRY	IVE

HW SET: 07 - CLASSROOM FUNCTION NO CLOSER

109	217				
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Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	<input type="checkbox"/>	F643E	IVE
1	EA	CLASSROOM LOCK	L9070BDC 17A	<input type="checkbox"/>	643e	SCH
1	EA	SFIC EVEREST CORE	80-037	<input type="checkbox"/>	613	SCH
1	EA	WALL STOP	WS406/407CCV	<input type="checkbox"/>	643E	IVE
1	EA	SILENCER	SR64	<input type="checkbox"/>	GRY	IVE

HW SET: 08 - OFFICE FUNCTION

204-1					
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Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	<input type="checkbox"/>	F643E	IVE
1	EA	OFFICE/ENTRY LOCK	L9050BDC 17A L583-363 L283-711	<input type="checkbox"/>	643e	SCH
1	EA	SFIC EVEREST CORE	80-037	<input type="checkbox"/>	613	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA	<input type="checkbox"/>	695	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	<input type="checkbox"/>	695	IVE
1	EA	WALL STOP	WS406/407CCV	<input type="checkbox"/>	643E	IVE
3	EA	SILENCER	SR64	<input type="checkbox"/>	GRY	IVE

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HW SET: 09 - OFFICE FUNCTION NO CLOSER

205					
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Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	<input type="checkbox"/>	F643E	IVE
1	EA	OFFICE/ENTRY LOCK	L9050BDC 17A L583-363 L283-711	<input type="checkbox"/>	643e	SCH
1	EA	SFIC EVEREST CORE	80-037	<input type="checkbox"/>	613	SCH
1	EA	WALL STOP	WS406/407CCV	<input type="checkbox"/>	643E	IVE
1	EA	GASKETING	188SBK PSA	<input type="checkbox"/>	BK	ZER

HW SET: 10 - RESTROOM

103	104	206			
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Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5	<input type="checkbox"/>	F643E	IVE
1	EA	PRIVACY LOCK	L9040 17A L583-363 L283-722	<input type="checkbox"/>	643e	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA	<input type="checkbox"/>	695	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	<input type="checkbox"/>	695	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS	<input type="checkbox"/>	695	IVE
1	EA	WALL STOP	WS406/407CCV	<input type="checkbox"/>	643E	IVE
1	EA	GASKETING	188SBK PSA	<input type="checkbox"/>	BK	ZER
1	EA	COAT AND HAT HOOK	582	<input type="checkbox"/>	A643E	IVE

HW SET: 11 - MULTI-STALL RESTROOM

211	212				
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Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5	<input type="checkbox"/>	F643E	IVE
1	EA	PUSH PLATE	8200 4" X 16"	<input type="checkbox"/>	643E	IVE
1	EA	PULL PLATE	8303 10" 4" X 16"	<input type="checkbox"/>	643E	IVE
1	EA	SURFACE CLOSER	4040XP RW/PA	<input type="checkbox"/>	695	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	<input type="checkbox"/>	695	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS	<input type="checkbox"/>	695	IVE
1	EA	WALL STOP	WS406/407CCV	<input type="checkbox"/>	643E	IVE
3	EA	SILENCER	SR64	<input type="checkbox"/>	GRY	IVE

HW SET: 12

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C Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5	<input type="checkbox"/>	F643e	IVE
1	EA	MANUAL FLUSH BOLT	FB358-TOP ONLY	<input type="checkbox"/>	613	IVE
1	EA	STOREROOM LOCK	L9080BDC 17A	<input type="checkbox"/>	643e	SCH
1	EA	SFIC EVEREST CORE	80-037	<input type="checkbox"/>	613	SCH
2	EA	OH STOP	100S ADJ	<input type="checkbox"/>	613	GLY
2	EA	SILENCER	SR64	<input type="checkbox"/>	GRY	IVE

HW SET: AL-01 - EXTERIOR STOREFRONT WITH PANIC HARDWARE

101-1	102				
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Provide each PR door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	PIVOT SET	7215 SET	<input type="checkbox"/>	643E	IVE
1	EA	PANIC HARDWARE	9847-EO	<input type="checkbox"/>	643E	VON
1	EA	PANIC HARDWARE	9847-NL-OP-110MD	<input type="checkbox"/>	643E	VON
1	EA	SFIC RIM CYLINDER	80-116	<input type="checkbox"/>	643e	SCH
1	EA	SFIC EVEREST CORE	80-037	<input type="checkbox"/>	613	SCH
2	EA	90 DEG OFFSET PULL	8190HD 10" O	<input type="checkbox"/>	643E	IVE
2	EA	SURFACE CLOSER	4040XP RW/PA X MGT PLATE AS REQ	<input type="checkbox"/>	695	LCN
2	EA	FLOOR STOP	FS444	<input type="checkbox"/>	643E	IVE
1	EA	PERIMETER SEALS	BY ALUM STOREFRONT MFG		DBZ	B/O
1	EA	MEETING STILE	BY ALUM STOREFRONT MFG			B/O
2	EA	DOOR SWEEP	39D	<input type="checkbox"/>	D	ZER
1	EA	THRESHOLD	546D-OR PER SILL DETAIL	<input type="checkbox"/>	D	ZER

HW SET: AL-02 - EXTERIOR SINGLE STOREFRONT WITH PANIC HARDWARE

203-1					
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Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	PIVOT SET	7215 SET	<input type="checkbox"/>	643E	IVE
1	EA	PANIC HARDWARE	PA-AX-98-NL-OP-110MD	<input type="checkbox"/>	643E	VON
1	EA	SFIC RIM CYLINDER	80-116	<input type="checkbox"/>	643e	SCH
1	EA	SFIC EVEREST CORE	80-037	<input type="checkbox"/>	613	SCH
1	EA	90 DEG OFFSET PULL	8190HD 10" O	<input type="checkbox"/>	643E	IVE
1	EA	SURFACE CLOSER	4040XP RW/PA X MGT PLATE AS REQ	<input type="checkbox"/>	695	LCN
1	EA	FLOOR STOP	FS436/FS438 AS REQ'D	<input type="checkbox"/>	643E	IVE
1	EA	RAIN DRIP	142D-OMIT IF SHELTERED	<input type="checkbox"/>	D	ZER
1	EA	WEATHER STRIPPING	BY ALUM STOREFRONT			B/O
1	EA	DOOR SWEEP	39D	<input type="checkbox"/>	D	ZER
1	EA	THRESHOLD	546D-OR PER SILL DETAIL	<input type="checkbox"/>	D	ZER

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HW SET: AL-03 - EXTERIOR STOREFRONT WITH STOREROOM FUNCTION

108	204-2	218			
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Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	PIVOT SET	7215 SET	<input type="checkbox"/>	643E	IVE
1	EA	STOREROOM LOCK	L9080BDC 17A	<input type="checkbox"/>	643e	SCH
1	EA	SFIC EVEREST CORE	80-037	<input type="checkbox"/>	613	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA X MGT PLATE AS REQ	<input type="checkbox"/>	695	LCN
1	EA	FLOOR STOP	FS436/FS438 AS REQ'D	<input type="checkbox"/>	643E	IVE
1	EA	RAIN DRIP	142D-OMIT IF SHELTERED	<input type="checkbox"/>	D	ZER
1	EA	WEATHER STRIPPING	BY ALUM STOREFRONT			B/O
1	EA	DOOR SWEEP	39D	<input type="checkbox"/>	D	ZER
1	EA	THRESHOLD	546D-OR PER SILL DETAIL	<input type="checkbox"/>	D	ZER

HW SET: AL-04 - INTERIOR STOREFRONT WITH CLASSROOM FUNCTION NO CLOSER

101-2	101-3	213	216-2	216-1	
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Provide each SGL door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	PIVOT SET	7215 SET	<input type="checkbox"/>	643E	IVE
1	EA	CLASSROOM LOCK	L9070BDC 17A	<input type="checkbox"/>	643e	SCH
1	EA	SFIC EVEREST CORE	80-037	<input type="checkbox"/>	613	SCH
1	EA	FLOOR STOP	FS436/FS438 AS REQ'D	<input type="checkbox"/>	643E	IVE

END OF SECTION 087100

Door Hardware - 087100

SECTION 088000 - GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Insulating glass units.
- B Glazing units.
- C Glazing compounds.

1.02 RELATED REQUIREMENTS

- A Section 081113 - Hollow Metal Doors and Frames: Glazed lites in doors and borrowed lites.
- B Section 081416 - Flush Wood Doors: Glazed lites in doors.
- C Section 084313 - Aluminum Entrances and Storefront Systems: Glazing provided as part of storefront assembly.

1.03 REFERENCE STANDARDS

- A 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.
- B AAMA 501.6 - Recommended Dynamic Test Method for Determining the Seismic Drift Causing Glass Fallout from Window Wall, Curtain Wall and Storefront Systems; 2018.
- C ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015 (Reaffirmed 2020).
- D ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- E ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2019).
- F ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- G ASTM C1036 - Standard Specification for Flat Glass; 2021.
- H ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
- I ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2019.
- J ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016 (Reapproved 2023).
- K ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2021a.
- L ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.
- M ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2019.
- N GANA (GM) - GANA Glazing Manual; 2022.
- O GANA (SM) - GANA Sealant Manual; 2008.
- P GANA (LGRM) - Laminated Glazing Reference Manual; 2019.
- Q ICC (IBC) - 2018 - International Building Code; 2018.
- R IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use; 1990 (2016).
- S NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2023.
- T NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2023.
- U NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2023.

1.04 PERFORMANCE REQUIREMENTS

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- A General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to defective manufacture, fabrication or installation
- B Glass Design
 - 1. Vertical glazing shall have a statistical factor of 2.5 (8 lites per 1,000 lites probability of breakage) at design wind pressure. Load duration of 60 seconds or less.
 - 2. Sloped glazing shall have a probability of breakage of 1 lite per 1,000 lites. Load duration of 30 days.
 - 3. Glass thicknesses indicated are minimums and are for detailing only. Confirm actual project glass thicknesses by analyzing specified loads and in service conditions.
 - 4. Provide glass lites for various size openings in normal thicknesses indicated, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the criteria under "Glass Thickness" below.
 - 5. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.
 - 6. Glass Thickness: Select minimum thickness, fabrication and heat treatment to comply with ASTM E1300, according to the following requirements or ¼ inch, whichever is greater:
 - 7. Specified Design Wind Loads: Determine design wind loads applicable to Project from IBC; 2012, Structural Engineer. Provide glass in adjacent windows or glazed panels of the same thickness unless indicated otherwise.
 - 8. Sound Transmission Control: The design of the exterior wall system on this project is subject to specific Sound Transmission Control (STC) requirements. Those conditions are indicated in the Contract Documents and specified herein.
 - 9. Edge Preparation: Conform to manufacturer's printed standards and the latest standards of GANA.
- C Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum range in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and night heat loss:
 - 1. Temperature range: 120 degrees F, ambient, 180 degrees F, material surfaces.
- D Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:
 - 1. For monolithic glass lites, properties are based on units with lites ¼ inch (6mm) thick.
 - 2. For laminated glass lites, properties are based on products of construction indicated.
 - 3. For insulated glass units, properties are based on units with lites ¼ inch (6mm) thick and a nominal ½ inch (~12mm) wide air space.
 - 4. Center of glass U Values: NFRC 100 methodology using LBL-35298 WINDOW 4.1 computer program, expressed in Btu/sq. ft. x h x degree F.
 - 5. Center of glass Solar Heat Gain Coefficient: NFRC 200 methodology using LBL-35298 WINDOW 4.1 computer program.
 - 6. Solar Optical Properties: NFRC 300.

1.05 DEFINITIONS

- A Sealed Insulating Glass Unit Surfaces:
 - 1. Surface No. 1: Exterior surface of outer lite.
 - 2. Surface No. 2: Interior surface of outer lite.
 - 3. Surface No. 3: Exterior surface of inner lite.

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4. Surface No. 4: Interior surface of inner lite.

1.06 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.

1.07 SUBMITTALS

- A See Section 013300 - Submittal Requirements for submittal procedures.
- B Product Data:
1. Submit manufacturer's published data for glazing material specified and recommended installation requirements.
 2. Product Data on Insulating Glass Unit and Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
 3. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- C Shop Drawings
1. Elevations.
 2. Submit shop drawings showing details of each type of glazing system indicating sizes, shapes, material and quantity. Show details indicating sealant thickness and profile, bite on glass, glass edge clearance, depth of rabbet and thickness of glass. Identify gasket materials, side spacer blocks, and setting blocks. Show weepage system in glass pockets. Details shall be full scale and fully drawn, not outlined.
- D Samples:
1. Submit the following samples for review or testing:
 - a. Submit (4) samples of each type of glass specified. Minimum size of glass shall be 12" by 12" inches. All submittals shall identify thickness and type of glass (annealed, heat strengthened, or tempered) and the maximum design wind load it can accommodate based upon the maximum sizes required for that glass type.
 - b. Submit (4) - 12" long glazing gaskets, including molded corners.
 - c. Submit samples of setting blocks, spacers, edge blocks, tapes, rods, etc.
 - d. Before any glass is delivered to the job site, submit mock-up corner joinery sections and samples of glass installation into these framing members.
- E Glass Analysis
1. Submit calculations demonstrating the structural integrity of the glass in meeting the design load pressures which are specified in the respective glass framing systems. Calculations shall be performed by the glass manufacturer.
 2. Submit wind and thermal stress analysis calculations by glass manufacturer including center deflection and probabilities of breakage.
 3. Glass shall be designed using the probability of breakage of 8 lites per 1000 for vertically glazed areas, and one lite per 1000 for sloped glazed areas.
 4. Where glass manufacturer cannot assure adequate structural performance of insulating glass units based upon combination of inner/outer lite, assume outer lite alone must satisfy structural requirements.
 5. Provide certification from glass producer/fabricator that glass producer/fabricator has reviewed all glazing details, project conditions and thicknesses and compositions of all glass and finds same suitable for the purpose intended in accordance with these specifications.

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- 6. Submit certification from manufacturer stating that insulated glass units meet standards specified herein.
- F Certificate: Certify that products of this section meet or exceed specified requirements.
- G Manufacturer's qualification statement.
- H Installer's qualification statement.
- I Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.08 QUALITY ASSURANCE

- A Perform Work in accordance with GANA (GM), GANA (SM), GANA (LGRM), and IGMA TM-3000 for glazing installation methods. Maintain one copy on site.
- B The Contractor shall assume undivided responsibility for the glass and glazing and coordination with the components of related work. This firm must demonstrate not less than five years successful experience at work similar to the work of this project. Provide at least one person who shall be thoroughly trained and experienced in the skills required, who shall be completely familiar with the referenced standards and the requirements of this work, and who shall personally direct all installation performed under this Section of these specifications.
- C Each glass type is to match the approved samples, be uniform in appearance, free from irregularities and differences in appearance when viewed from exterior as judged by the Architect, Owner or their representatives. Glass not complying with this requirement to be replaced with conforming glass at no additional cost to the Owner.
- D Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following testing and inspecting agency:
 - 1. Insulating Glass Certification Council.
 - 2. Associated Laboratories, Inc.
- E Safety Glazing Products: Comply with testing requirements in 16 CFR 1201 and, for wired glass, ANSI Z97.1.
 - 1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.
 - 2. Lites more than 9 square feet (sf) (0.84 sq. m) in area are required to be Category II materials.
 - 3. Where glazing units, including Kind FT glass and laminated glass, are specified in Part 2 articles for glazing lites more than 9 sf in area, provide glazing products that comply with Category II materials, and for lites 9 sf. or less in area, provide glazing products that comply with Category I or II materials.
- F Code and Standard Compliance:
 - 1. Comply with all building, fire, and safety codes relating to the work, and the codes and standards cited herein. Provide certification that the glazing used conforms to the referenced standards.
 - 2. Use tempered glass for safety glazing unless shown otherwise. Safety glazing shall conform to the requirements of CPSC 16 CFR Part 1201 "Safety Standards for Architectural Glazing Materials" and ANSI Z97.1. Provide certification that the glazing used conforms to the referenced standards.
 - 3. Submit manufacturer's certified identification, showing strength, grade, thickness, type and quality for each type of glass used. Mark tempered, heat strengthened and laminated glass with permanent identification labels.

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- G Labels: Each Individual Piece of Glass: Bear label designating type, thickness and quality. Do not remove labels until reviewed by Architect.
- H Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years of documented experience.
 - 1. Provide certified glass products through ANSI accredited certifications that include plant audits and independent laboratory performance testing.
 - a. Insulating Glass Certification Council (IGCC).
 - b. Safety Glazing Certification Council (SGCC).
- I Installer Qualifications: Company specializing in performing work of the type specified and with at least five years documented experience.
 - 1. Provide company, field supervisors, and installers that hold active ANSI accredited certifications in appropriate categories for work specified.
 - a. North American Contractor Certification (NACC) for glazing contractors.
 - b. Equivalent independent third-party ANSI accredited certification.
- J Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

1.09 DRAWINGS AND SPECIFICATIONS

- A The character of these requirements is intended to provide a performance type specification for the design, fabrication and installation of the glass and glazing. The Contractor is responsible for the engineering and design of all components and materials as well as the fabrication, installation and performance of the glass and glazing.
- B Drawings are diagrammatic. The details shown are intended as a guide for the aesthetic and interfacing requirements of the glass and glazing to and with other work. The requirements shown by the details are intended to establish basic dimensions, locations of glass panels and locations of different glass types. The Contractor is responsible for the design and engineering of the glass and glazing within these aesthetic parameters. The drawings are not to be construed as engineering design, or adequate to meet the engineering design requirements.
- C It is recognized that the design details do not cover some conditions or modifications, which may be required. It is, however, intended that conditions not detailed shall be developed through the Contractor's shop drawings to the same level of aesthetics and in compliance with performance criteria as indicated for detailed areas and as stipulated in these specifications.

The Contractor, by accepting a contract for the work, acknowledges this and agrees that the Architect, Owner and their representatives have the final say as to all matters whether detailed or not on the design details.
- D If conflicts exist between this section of the specification and the glass framing specifications, the more stringent specification shall apply.

1.10 PROJECT CONDITIONS

- A Do not install glazing when ambient temperature is less than 40 degrees F.
- B Prior to beginning of installation, meet with the Architect, Owner and their representatives, Contractor and other trades affected by glass installation. Review all material selections, handling, storage, sealant work, glass pocket alignment tolerances, bedding of gaskets, protection, cleaning, and weather conditions under which glazing can be performed.
- C Do not perform work under adverse weather or job conditions, especially when it can cause frost or moisture condensation on framing.
- D Install liquid sealants when temperatures are within lower or middle third of temperature range recommended by manufacturer.

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- E Field measure openings before ordering glass products. Be responsible for proper fit of field measured products.
- F Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.11 DELIVERY, STORAGE AND HANDLING

- A Schedule delivery to coincide with glazing schedules so minimum handling of crates is required. Do not open crates excepts as required for inspection for shipping damage.
- B Deliver glass to site with manufacturer's labels showing thickness, quality and type, floor location, and/or other denotations that identify where glass is to be used.
- C Deliver glazing compound and other glazing items to site in manufacturer's original unopened packages or containers.
- D Remove from the job site and replace with acceptable material all cracked, broken, chipped or otherwise damaged glass, and all glazing and sealing materials unfit for use.
- E Store glass in dry, well-vented location at a temperature maintained above dew point. Minimize the handling of glass and protect from soiling, atmospheric condensation and other moisture.
- F All delivered items, whether F.O.B. job site for unloading and installation by others, or whether fabricated and installed by the Contractor shall be properly crated. Crates shall be marked with installation location and fabrication/piece numbers, shop drawing references, etc. as applicable.

1.12 WARRANTY

- A See Section 017836 - Warranties and Bonds for additional warranty requirements.
- B Special Warranty
 - 1. The manufacturer of the insulated glass shall warrant and guarantee direct to the Owner each insulating glass unit installed to be free from material obstructions of vision as a result of dust or film formation on the internal glass surfaces caused by failure of the hermetic seal other than glass breakage, and that spacer bars shall not "walk up" into the cavity between the glass lites, for a period of ten years.
 - 2. The manufacturer of units with coated glass shall warrant and guarantee direct to the Owner each unit be free from discoloration, mottling or deteriorating of the coating regardless of loss of insulating glass seal, for a period of ten years.
 - 3. The manufacturer of the laminated glass shall warrant and guarantee direct to the Owner each unit installed to be free from delamination or other defects for a period of ten years.
 - 4. The Contractor shall guarantee glazing occurring on the building to be weather and watertight for a period of five years after date of Substantial Completion.
 - 5. All warranties shall agree to replace the glass F.O.B. project site, including labor, at no cost to the Owner, provided the manufacturer's instructions for protection and maintenance have been adhered to during the warranty period and failure is not due to vandalism or glass breakage caused by external projectiles.
- C 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. Cardinal Glass Industries: www.cardinalcorp.com/#sle.
 - 2. Guardian Glass, LLC: www.guardianglass.com/#sle.
 - 3. Pilkington North America Inc: www.pilkington.com/na/#sle.
 - 4. Vitro Architectural Glass (formerly PPG Glass): www.vitroglazings.com/#sle.

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5. Or Equal.

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 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.
- B Low E Coating: Equal to Guardian "SunGuard" Low E Coating System SNR35.
 1. Basis of Design: "SunGuard" SNR 35 with IS 20 Coating on #2 Surface (where indicated in Glass Types).
 2. Visible Light
 - a. Transmittance: 33 %
 - b. Reflectance outside: 35 %
 - c. Reflectance inside: 19 %
 - d. General Color Rendering Index (CRI): 89.8
 3. Ultraviolet
 - a. Transmittance UV: 11 %
 4. Solar Energy
 - a. Solar transmittance: 13 %
 - b. Reflectance outside: 47 %
 - c. Reflectance inside: 44 %
 - d. Solar absorptance: 39 %
 - e. Solar Heat Gain Coefficient (SHGC): 0.17
 - f. Shading Coefficient: 0.20

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5. Thermal Properties
 - a. Winter night U-Value: 0.289 Btu/hr·ft²·F
 - b. Summer day U-value: 0.270 Btu/hr·ft²·F
6. Light to Solar Gain
 - a. Light to Solar Gain (LSG): 1.92
- C Laminated Glass: Float glass laminated in accordance with ASTM C1172.
 1. Laminated Safety Glass: Complies with ANSI Z97.1 - Class A or 16 CFR 1201 - Category I impact test requirements.
 2. Polyvinyl Butyral (PVB) Interlayer: 0.030 inch thick, minimum.

2.04 INSULATING GLASS UNITS

- A Manufacturers:
 1. Cardinal Glass Industries: www.cardinalcorp.com/#sle.
 2. Basis of Design - Guardian Glass, LLC: www.guardianglass.com/#sle.
 3. Vitro Architectural Glass (formerly PPG Glass): www.vitroglazings.com/#sle.
 4. Or Equal.
- B Fabricator: Certified by glass manufacturer for type of glass, coating, and treatment involved and capable of providing specified warranty.
- C 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: Black.
 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.
 - b. Color: Black.
 6. Purge interpane space with dry air, hermetically sealed.
 7. Breather 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.

2.05 GLASS TYPES

- A Glass Type G1: Exterior 1" Low-E Insulated Tempered Safety Glazing (SNR35 + IS20)
 1. 1/4" Fully Tempered clear float glass with Low-E Coating: SunGuard SNR 35 on #2 surface
 2. 1/2" air space
 3. 1/4" Fully Tempered clear glass, SunGuard IS 20 on #4 surface.
- B Glass Type G2: Interior 1/4" Fully Tempered Safety Glazing.

2.06 GLAZING COMPOUNDS

- A Type GC-1 - Glazing Putty: Polymer modified latex recommended by manufacturer for outdoor use, knife grade consistency; gray color.

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- 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 as selected.
- C Manufacturers:
 - 1. Dow Corning Corporation: www.dowcorning.com/construction/#sle. Dow Corning Corporation: www.dowcorning.com/construction/#sle.
 - 2. Momentive Performance Materials, Inc: www.momentive.com/#sle.
 - 3. Pecora Corporation: www.pecora.com/#sle.
 - 4. Or Equal

2.07 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 Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.

2.08 SOURCE QUALITY CONTROL

- A See Section 014000 - Quality Requirements for additional requirements.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

- A Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B Verify that the minimum required face and edge clearances are being provided.
- C Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.
- D Verify that sealing between joints of glass framing members has been completed effectively.
- E Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- B Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION, GENERAL

- A Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
- B Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- C Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- D Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
- E Set glass lites in proper orientation so that coatings face exterior or interior as indicated.

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- F Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, and paint.

3.04 INSTALLATION - 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 FIELD QUALITY CONTROL

- A See Section 014000 - Quality Requirements for additional requirements.
- B Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
- C Monitor and report installation procedures and unacceptable conditions.

3.06 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.

3.07 PROTECTION

- A After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.
- B Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION 088000

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SECTION 090561 - COMMON WORK RESULTS FOR FLOORING PREPARATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A This section applies to floors identified in Contract Documents that are receiving the following types of floor coverings:
 - 1. Carpet tile.
 - 2. Resinous Flooring.
 - 3. Linoleum Sheet Flooring..
- B Removal of existing floor coverings.
- C Preparation of existing concrete floor slabs for installation of floor coverings.
- D Independent Testing of concrete floor slabs for moisture and alkalinity (pH).
- E Independent Testing of existing concrete floor slabs for moisture and alkalinity (pH) has already been conducted; test report is attached.
- F Remediation of concrete floor slabs due to unsatisfactory moisture or alkalinity (pH) conditions.
 - 1. Contractor shall perform all specified remediation of concrete floor slabs. If such remediation is indicated by testing agency's report and is due to a condition not under Contractor's control or could not have been predicted by examination prior to entering into the contract, a contract modification will be issued.
- G Patching compound.
- H Remedial floor coatings.
- I Remedial floor treatment.
- J Preparation of existing wood-based subfloors for installation of new floor coverings.

1.02 RELATED REQUIREMENTS

- A Section 014000 - Quality Requirements: Additional requirements relating to testing agencies and testing.
- B Section 033000 - Cast-in-Place Concrete: Moisture emission reducing curing and sealing compound for slabs to receive adhered flooring, to prevent moisture content-related flooring failures; to remain in place, not to be removed.
- C Section 033000 - Cast-in-Place Concrete: Limitations on curing requirements for new concrete floor slabs.
- D Section 096500 - Resilient Flooring, Wall Base and Accessories: Linoleum Sheet Flooring Requirements
- E Section .096813 - Tile Carpeting

1.03 REFERENCE STANDARDS

- A ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 50 mm [2 in.] Cube Specimens); 2023.
- B ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters, and Gypsum Concrete; 2020.
- C ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2022.
- D ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2023.
- E ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.
- F RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings; 2018.

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1.04 ADMINISTRATIVE REQUIREMENTS

- A Coordinate scheduling of cleaning and testing, so that preliminary cleaning has been completed for at least 24 hours prior to testing.

1.05 SUBMITTALS

- A See Section 013300 - Submittal Requirements for submittal procedures.
- B Visual Observation Report: For existing floor coverings to be removed.
- C Floor Covering and Adhesive Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
 - 1. Moisture and alkalinity (pH) limits and test methods.
 - 2. Manufacturer's required bond/compatibility test procedure.
- D Remedial Materials Product Data: Manufacturer's published data on each product to be used for remediation.
 - 1. Manufacturer's qualification statement.
 - 2. Certificate: Manufacturer's certification of compatibility with types of flooring applied over remedial product.
 - 3. Test reports indicating compliance with specified performance requirements, performed by nationally recognized independent testing agency.
 - 4. Manufacturer's installation instructions.
 - 5. Specimen Warranty: Copy of warranty to be issued by coating manufacturer and certificate of underwriter's coverage of warranty.
- E Independent Testing Agency's Report:
 - 1. Description of areas tested; include floor plans and photographs if helpful.
 - 2. Summary of conditions encountered.
 - 3. Moisture and alkalinity (pH) test reports.
 - 4. Copies of specified test methods.
 - 5. Recommendations for remediation of unsatisfactory surfaces.
 - 6. Product data for recommended remedial coating.
 - 7. Submit report directly to Owner.
 - 8. Submit report not more than two business days after conclusion of testing.
- F Adhesive Bond and Compatibility Test Report.
- G Floor Moisture Testing Technician Certificate: International Concrete Repair Institute (ICRI) Concrete Slab Moisture Testing Technician- Grade I certificate.
- H Copy of RFCI (RWP).

1.06 QUALITY ASSURANCE

- A Moisture and alkalinity (pH) testing will be performed by an independent testing agency employed and paid by Owner.
- B Contractor may perform adhesive and bond test with Contractor's own personnel or hire a testing agency.
- C Testing Agency Qualifications: Independent testing agency experienced in the types of testing specified.
 - 1. Submit evidence of experience consisting of at least 3 test reports of the type required, with project Owner's project contact information.
- D Contractor's Responsibility Relating to Independent Agency Testing:
 - 1. Provide access for and cooperate with testing agency.
 - 2. Confirm date of start of testing at least 10 days prior to actual start.
 - 3. Allow at least 4 business days on site for testing agency activities.

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4. Achieve and maintain specified ambient conditions.
 5. Notify Owner when specified ambient conditions have been achieved and when testing will start.
- E Floor Moisture Testing Technician Qualifications: International Concrete Repair Institute (ICRI) Concrete Slab Moisture Testing Technician Certification- Grade I.
- F Remedial Coating Installer Qualifications: Company specializing in performing work of the type specified in this section, trained by or employed by coating manufacturer, and able to provide at least 3 project references showing at least 3 years' experience installing moisture emission coatings.

1.07 DELIVERY, STORAGE, AND HANDLING

- A Deliver, store, handle, and protect products in accordance with manufacturer's instructions and recommendations.
- B Deliver materials in manufacturer's packaging; include installation instructions.
- C Keep materials from freezing.

1.08 FIELD CONDITIONS

- A Maintain ambient temperature in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 65 degrees F or more than 85 degrees F.
- B Maintain relative humidity in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 40 percent and not more than 60 percent.

PART 2 PRODUCTS

2.01 MATERIALS

- A Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from flooring manufacturer, provide a product with the following characteristics:
1. Cementitious moisture-, mildew-, and alkali-resistant compound, compatible with floor, floor covering, and floor covering adhesive, and capable of being feathered to nothing at edges.
 2. Latex or polyvinyl acetate additions are permitted; gypsum content is prohibited.
 3. Compressive Strength: 3000 psi, minimum, after 28 days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.
 4. Products:
 - a. ARDEX Engineered Cements; ARDEX Feather Finish: www.ardexamericas.com/#sle.
 - b. LATICRETE International, Inc; SKIM LITE: www.laticrete.com/#sle.
 - c. USG Corporation; Durock Brand Advanced Skim Coat Floor Patch: www.usg.com/#sle.
 - d. Or Equal.
- B Alternate Flooring Adhesive: Floor covering manufacturer's recommended product, suitable for the moisture and pH conditions present; low-VOC. In the absence of any recommendation from flooring manufacturer, provide a product recommended by adhesive manufacturer as suitable for substrate and floor covering and for conditions present.
- C Remedial Floor Coating: Single- or multi-layer coating or coating/overlay combination intended by its manufacturer to resist water vapor transmission to degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of alkalinity (pH) found, and suitable for adhesion of flooring without further treatment.

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1. Thickness: As required for application and in accordance with manufacturer's installation instructions.
2. Products:
 - a. Custom Building Products; TechMVC Moisture Vapor and Alkalinity Barrier: www.custombuildingproducts.com/#sle.
 - b. LATICRETE International, Inc; LATICRETE VAPOR BAN E: www.laticrete.com/#sle.
 - c. Sika Corporation; Sikafloor Moisture Tolerance Epoxy Primer: www.sikafloorusa.com/#sle.
 - d. USG Corporation; Durock CoverPrep: www.usg.com/#sle.
 - e. Or Equal.
- D Remedial Floor Treatment: Penetrating, spray-applied, silicate-based product intended by its manufacturer to resist water vapor transmission to degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of alkalinity (pH) found, and suitable for adhesion of flooring without further treatment.

PART 3 EXECUTION

3.01 CONCRETE SLAB PREPARATION

- A Follow recommendations of testing agency.
- B Perform following operations in the order indicated:
 1. Existing concrete slabs (on-grade and elevated) with existing floor coverings:
 - a. Visual observation of existing floor covering, for adhesion, water damage, alkaline deposits, and other defects.
 - b. Removal of existing floor covering.
 2. Preliminary cleaning.
 3. Moisture vapor emission tests; 3 tests in the first 1000 square feet and one test in each additional 1000 square feet, unless otherwise indicated or required by flooring manufacturer.
 4. Internal relative humidity tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
 5. Alkalinity (pH) tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
 6. Specified remediation, if required.
 7. Patching, smoothing, and leveling, as required.
 8. Other preparation specified.
 - a. Methods of Surface Preparation: Depending upon conditions of the concrete one or more methods of surface preparation may be required. It is common for decontamination to precede mechanical preparation, and if necessary, a second decontamination to follow. The preferred methods for creation of a surface profile, including the removal of dirt, dust, laitance and curing compounds, is steel shot blasting, abrasive (sand) blasting or scarifying. The steel shot blasting, or vacuum blasting process is commonly referenced by equipment brand names, such as, Blastrac, Vacu-Blast, Shot-Blast, etc.
 - 1) CAUTION: The use of high-pressure water jetting will introduce large amounts of water, which may contribute to moisture related problems. The following table provides a guide for the degree of surface profile required for the coating or overlay to be applied and the preparation methods used to generate each profile.

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Application	Profile	Surface Preparation Method
Sealers	0-3 mils	Detergent scrub Low-pressure Water Acid Etching (not recommended) Cup Grinding, Steel Shot Blast CSP-3
Thin Film	4-10 mils	Acid Etching (not recommended) Cup Grinding Steel Shot Blast CSP 3-4
High-Build	10-40 mils	Steel Shot Blast CSP 3-4 Scarifying
Self-Leveling	50mils-1/8 inch	Steel Shot Blast CSP 4-5 Scarifying Needle Scaling High/Ultra high Pressure Water Jetting 40,000 psi
Polymer Overlay	1/8-1/4 inch	Steel Shot Blast CSP 5-6 or 7 Scarifying Needle Scaling High/Ultra high Pressure Water Jetting Scabbling Flame Blasting Milling/rotomilling

9. Surfaces to receive the bonded polymer system must be inspected after the surface is prepared to insure that the substrate is sound and structurally durable. Areas found to be unsound or non-durable must be removed and replaced as described in 2., above. Dust or other deleterious substances not removed after the initial surface preparation must be vacuumed, leaving the surface dust free and clean.
10. Warning: Scabbling, Scarifying, Milling/Roto milling all leave micro-fractures in the concrete surface because of the heavy pounding and shock the surface receives. These surfaces should be Shot Blasted to remove all micro fractured concrete for best adhesion of subsequent systems.
11. Adhesive bond and compatibility test.
12. Protection.

C Remediations:

1. Active Water Leaks or Continuing Moisture Migration to Surface of Slab: Correct this condition before doing any other remediation; re-test after correction.
2. Excessive Moisture Emission or Relative Humidity: If an adhesive that is resistant to the level of moisture present is available and acceptable to flooring manufacturer, use that adhesive for installation of the flooring; if not, apply remedial floor coating or remedial sheet membrane over entire suspect floor area.

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3. Excessive Alkalinity (pH): If remedial floor coating is necessary to address excessive moisture, no additional remediation is required; if not, if an adhesive that is resistant to the level present is available and acceptable to the flooring manufacturer, use that adhesive for installation of the flooring; otherwise, apply a skim coat of specified patching compound over entire suspect floor area.

3.02 REMOVAL OF EXISTING FLOOR COVERINGS

- A Comply with local, State, and federal regulations and recommendations of RFCI (RWP), as applicable to floor covering being removed.
- B Dispose of removed materials in accordance with local, State, and federal regulations and as specified.

3.03 PREPARATION OF WOOD SUBFLOORS

- A All wood underlayments must be recommended and guaranteed by either the wood underlayment manufacturer or the flooring manufacturer. Such underlayments include Group 1 exterior-grade plywood, CC-plugged or better, conforming to APA classification and U.S. Product Standard PS 1-95 or a "SELECT" or (SEL-TF) CANPLY classified exterior-grade plywood conforming to CSA-0121 for exterior fir.
- B Plywood surfaces must be installed with the smooth side facing up.
- C The adjacent edges of the plywood sheets should not be more than 1/32" (1 mm) out of plane.
- D Plywood subfloors should be double-layered.
- E The base layer should be plywood at least 5/8" (16 mm) thick over joist and 16" (41 cm) on center. Follow the plywood manufacturer's recommendations regarding proper application. A second layer – a wood underlayment at least 1/4" (6 mm) thick – is required for all resilient sheet vinyl flooring; thicker boards may be required for commercial applications.
- F Follow the flooring manufacturer's recommendations regarding acceptable wood underlayments.
- G Plywood subfloors must have at least 18" (46 cm) of cross-ventilated air space between the underside of the subfloor and the ground. Cover the ground surface of crawl spaces with a suitable vapor barrier.
- H Under no circumstances should any floor material be laid over wood subfloors that have experienced conditions that might cause buckling or rotting of the wood.
- I Always replace wood subfloors or underlayments that have been subjected to water damage.

3.04 PRELIMINARY CLEANING

- A Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.
- B Do not use solvents or other chemicals for cleaning.

3.05 MOISTURE VAPOR EMISSION TESTING

- A Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C Test in accordance with ASTM F1869 and as follows.
- D Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method, as those methods do not quantify the moisture content sufficiently.

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- E In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if test values exceed 3 pounds per 1000 square feet per 24 hours.
- F Report: Report the information required by the test method.

3.06 INTERNAL RELATIVE HUMIDITY TESTING

- A Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C Test in accordance with ASTM F2170 Procedure A and as follows.
- D Testing with electrical impedance or resistance apparatus may not be substituted for the specified ASTM test method, as the values determined are not comparable to the ASTM test values and do not quantify the moisture content sufficiently.
- E In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if any test value exceeds 75 percent relative humidity.
- F Report: Report the information required by the test method.

3.07 ALKALINITY TESTING

- A Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B The following procedure is the equivalent of that described in ASTM F710, repeated here for the Contractor's convenience.
 - 1. Use a wide range alkalinity (pH) test paper, its associated chart, and distilled or deionized water.
 - 2. Place several drops of water on a clean surface of concrete, forming a puddle approximately 1 inch in diameter. Allow the puddle to set for approximately 60 seconds, then dip the alkalinity (pH) test paper into the water, remove it, and compare immediately to chart to determine alkalinity (pH) reading.
 - 3. Use of a digital pH meter with probe is acceptable; follow meter manufacturer's instructions.
- C In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if alkalinity (pH) test value is over 10.

3.08 PREPARATION

- A See individual floor covering section(s) for additional requirements.
- B Comply with requirements and recommendations of floor covering manufacturer.
- C Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.
- D Do not fill expansion joints, isolation joints, or other moving joints.

3.09 ADHESIVE BOND AND COMPATIBILITY TESTING

- A Comply with requirements and recommendations of floor covering manufacturer.

3.10 APPLICATION OF REMEDIAL FLOOR COATING

- A Comply with requirements and recommendations of coating manufacturer.

3.11 APPLICATION OF REMEDIAL FLOOR TREATMENT

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- A Comply with requirements and recommendations of treatment manufacturer.

3.12 PROTECTION

- A Cover prepared floors with building paper or other durable covering.

END OF SECTION 090561

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SECTION 092116 - GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Performance criteria for gypsum board assemblies.
- B Exterior gypsum sheathing.
- C Gypsum wallboard.
- D Shaft Wall Assemblies.
- E Joint treatment and accessories.
- F Textured finish system.
- G Water-resistive barrier over exterior wall sheathing.
- H Acoustic (sound-dampening) wall and ceiling board.
- I Bullet resistant sheathing and wallboard.

1.02 RELATED REQUIREMENTS

- A Section 054000 - Cold-Formed Metal Framing: Exterior wind-load-bearing metal stud framing.
- B Section 072100 - Building Insulation: Acoustic insulation.
- C Section 072500 - Weather Barriers: Water-resistive barrier over sheathing.
- D Section 078400 - Firestopping: Top-of-wall assemblies at fire rated walls.
- E Section 079200 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.
- F Section 092216 - Non-Structural Metal Framing: For non-structural framing and suspension systems that support gypsum board.
- G Section 093000 - Tiling: Tile backing board.

1.03 REFERENCE STANDARDS

- A AISI S220 - North American Standard for Cold-Formed Steel Nonstructural Framing; 2020.
- B ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units; 2018.
- C ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 2019.
- D ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- E ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- F ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017 (Reapproved 2022).
- G ASTM C514 - Standard Specification for Nails for the Application of Gypsum Board; 2004 (Reapproved 2020).
- H ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2020.
- I ASTM C834 - Standard Specification for Latex Sealants; 2017 (Reapproved 2023).
- J ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2023.
- K ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2022.
- L ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2022.

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- M ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2019.
- N ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2017.
- O ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2018.
- P ASTM C1278/C1278M - Standard Specification for Fiber-Reinforced Gypsum Panel; 2017.
- Q ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing; 2018 (Reapproved 2023).
- R ASTM C1288 - Standard Specification for Fiber-Cement Interior Substrate Sheets; 2023.
- S ASTM C1325 - Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units; 2022, with Editorial Revision (2023).
- T ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.
- U ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels; 2023.
- V ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels; 2019, with Editorial Revision (2020).
- W ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.
- X ASTM D6329 - Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers; 1998 (Reapproved 2023).
- Y ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- Z ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.
- AA ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2022.
- BB ASTM E413 - Classification for Rating Sound Insulation; 2022.
- CC GA-214 - Levels of Finish for Gypsum Panel Products; 2021.
- DD GA-216 - Application and Finishing of Gypsum Panel Products; 2021.
- EE GA-226 - Application of Gypsum Board to Form Curved Surfaces; 2019.
- FF GA-600 - Fire Resistance and Sound Control Design Manual; 2021.
- GG ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- HH UL (FRD) - Fire Resistance Directory; Current Edition.

1.04 ADMINISTRATIVE REQUIREMENTS

- A Coordination: Coordinate the installation of gypsum board assemblies with size, location, and installation of service utilities.
- B Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.
- C Sequencing: Install service utilities in an orderly and expeditious manner.

1.05 SUBMITTALS

- A See Section 013300 - Submittal Requirements, for submittal procedures.
- B Product Data:
 - 1. Provide data on gypsum board, glass mat faced gypsum board, accessories, and joint finishing system.

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- C Shop Drawings: Indicate special details associated with fireproofing and acoustic seals.
- D Samples: Submit two samples of predecorated gypsum board, 12 by 12 inches in size, indicating finish color and texture.
- E Test Reports: For stud framing products that do not comply with AISI S220 or ASTM C754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.

1.06 QUALITY ASSURANCE

- A Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than 25 years of documented experience.
- B Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.
- C Regulatory Requirements: Comply with the applicable codes relating to the fire rated assemblies as shown on the drawings.
- D Documents at Project Site: Maintain at the project site a copy of manufacturer's instructions, erection drawings, and shop drawings.

1.07 DELIVERY, STORAGE, AND HANDLING

- A Store gypsum products and accessories indoors and keep above freezing. Elevate boards above floor, on nonwicking supports, in accordance with manufacturer's recommendations.

1.08 DELIVERY, STORAGE AND HANDLING

- A Comply with GA-216 and Manufacturer's instructions.

1.09 SCHEDULING

- A Provide schedule that will allow products to be installed per the manufacturer's requirements. Specifically for Exterior Gypsum Sheathing; sheathing will not be left exposed longer than 180 days prior to the weather barrier or cladding being installed.

1.10 WARRANTY

- A See Section 017836 - Warranties and Bonds for additional warranty requirements.
- B Special Warranty
 - 1. Exterior Gypsum Sheathing: Provide manufacturer's limited warranty for 10 years covering defects in the manufacturing and in the materials.
 - 2. Include warranty coverage for a minimum of 6 months exposure; clearly state that the product will remain free of defects and suitable for its intended use after installation and before the exterior weather barrier or cladding is installed.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

- A Provide completed assemblies complying with ASTM C840 and GA-216.
 - 1. See PART 3 for finishing requirements.
- B Interior Partitions, Indicated as Acoustic: Provide completed assemblies with the following characteristics:
 - 1. Acoustic Attenuation: STC of 45-62 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- C Shaft Walls at HVAC Shafts: Provide completed assemblies with the following characteristics:
 - 1. Air Pressure Within Shaft: Sustained loads of 5 lbf/sq ft with maximum mid-span deflection of L/240.

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2. Acoustic Attenuation: STC of 35-39 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- D Shaft Walls at Elevator Shafts: Provide completed assemblies with the following characteristics:
 1. Air Pressure Within Shaft: Intermittent loads of 5 lbf/sq ft with maximum mid-span deflection of L/240.
 2. Acoustic Attenuation: STC of 35-39 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- E Seismic Performance: Ceiling systems designed to withstand the effects of earthquake motions in accordance with ASCE 7 for Seismic Design Category D, E, or F and complying with the following:
- F Grid Suspension Systems: Provide grid suspension systems in accordance with ASTM C840 and GA-216 complying with the following:
- G Fire-Resistance-Rated Assemblies: Provide completed assemblies with the following characteristics:
 1. ICC IBC Item Numbers: Comply with applicable requirements of ICC IBC for the particular assembly.
 2. Gypsum Association File Numbers: Comply with requirements of GA-600 for the particular assembly.
 3. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).

2.02 METAL FRAMING MATERIALS

- A Nonstructural Steel Framing for Application of Gypsum Board: See Section 092216.
- B Structural Steel Framing for Application of Gypsum Board: See Section 054000.

2.03 MANUFACTURERS

- A Basis of Design: Contract Documents are based on products specified below to establish a standard of quality. Other acceptable manufacturers with products having equivalent characteristics may be considered, provided deviations are minor and design concept expressed in Contract Documents is not changed, as determined by the Architect.
 1. Georgia-Pacific Gypsum: www.gpgypsum.com.
- B Acceptable Manufacturers: Subject to compliance with requirements of Contract Documents, provide product by one of manufacturers listed alphabetically below. If not listed, submit as substitution according to Conditions of the Contract and Division 1 Sections.
 1. Manufacturers - Gypsum-Based Board:
 - a. CertainTeed Corporation: www.certainteed.com/#sle.
 - b. National Gypsum Company: www.nationalgypsum.com/#sle.
 - c. USG Corporation: www.usg.com/#sle.
- C Substitutions: Refer to Section 012500 - Substitution Procedures.

2.04 MATERIALS

- A Gypsum Wallboard:
 1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
 2. Glass mat faced gypsum panels, as defined in ASTM C1658/C1658M, suitable for paint finish, of the same core type and thickness may be substituted for paper-faced board.
 3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - a. Mold-resistant board is required whenever board is being installed before the building is enclosed and conditioned.

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- b. Mold resistant board is required at all locations.
 4. 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.
 5. Thickness:
 - a. Vertical Surfaces: 5/8 inch.
 - b. Ceilings: 1/2 inch.
 - c. Multi-Layer Assemblies: Thicknesses as indicated on drawings.
 6. Mold-Resistant, Paper-Faced Products:
 - a. Georgia-Pacific Gypsum; ToughRock Mold-Guard: www.gpgypsum.com/#sle.
 7. Glass Mat Faced Products:
 - a. Georgia-Pacific Gypsum; DensArmor Plus: www.gpgypsum.com/#sle.
 - b. Georgia-Pacific Gypsum; DensArmor Plus Fireguard C: www.gpgypsum.com/#sle.
 - B Abuse Resistant Wallboard:
 1. Application: High-traffic areas indicated.
 2. Surface Abrasion: Level 2, 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 1, minimum, when tested in accordance with ASTM C1629/C1629M.
 5. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 6. Glass Mat-Faced Type: Gypsum wallboard, as defined in ASTM C1658/C1658M.
 7. Type: Fire-resistance-rated Type X, UL or WH listed.
 8. Thickness: 5/8 inch.
 9. Edges: Tapered.
 - C Impact-Rated Wall Panels: Tested in accordance with ASTM C1629.
 1. Application: High-traffic areas indicated.
 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. Glass Mat-Faced Type: Gypsum wallboard, as defined in ASTM C1658/C1658M.
 8. Type: Fire-resistance-rated Type X, UL or WH listed.
 9. Thickness: 5/8 inch.
 10. Edges: Tapered.
 11. Glass Mat Faced Products:
 - a. Georgia-Pacific Gypsum; DensArmor Plus Impact-Resistant: www.gpgypsum.com/#sle.
 - b. Gold Bond Building Products, LLC provided by National Gypsum Company; Gold Bond eXP Interior Extreme IR Gypsum Panel: www.goldbondbuilding.com/#sle.
 - c. USG Corporation; Sheetrock Brand Glass-Mat Panels Mold Tough VHI Firecode X 5/8 in. (15.9 mm): www.usg.com/#sle.
 - D Backing Board For Wet Areas:
 1. Application: Surfaces behind tile and FRL/FRP in wet areas including drinking fountains.
 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.

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3. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325.
 - a. Thickness: 1/2 inch.
 - b. Products:
 - 1) USG Corporation; Fiberock Brand Aqua-Tough AR Interior Panels Regular 5/8 in. (15.9 mm): www.usg.com/#sle.
 - 2) National Gypsum Company; PermaBase Flex Brand Cement Board.
4. ASTM Cement-Based Board: Non-gypsum-based, cementitious board complying with ASTM C1288.
 - a. Thickness: 1/2 inch.
 - b. Products:
 - 1) James Hardie Building Products, Inc: www.jameshardie.com/#sle.
 - 2) National Gypsum Company, Permabase Cement Board: www.nationalgypsum.com.
 - 3) USG Corporation; DUROCK Cement Board: www.usg.com.
5. Glass Mat Faced Board: Coated glass mat water-resistant gypsum backing panel as defined in ASTM C1178/C1178M.
 - a. Standard Type: Thickness 1/4 or 5/8 inch.
 - b. Fire-Resistance-Rated Type: Type X core, thickness 5/8 inch.
 - c. Products:
 - 1) Georgia-Pacific Gypsum; DensShield Tile Backer: www.gpgypsum.com/#sle.
- E 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: Vertical surfaces behind thinset tile, except in wet areas.
 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: Regular and Type X, in locations indicated.
 5. Type X Thickness: 5/8 inch.
 6. Regular Board Thickness: 5/8 inch.
 7. Edges: Tapered.
 8. Products:
 - a. Georgia-Pacific Gypsum; DensShield Tile Backer.
- F 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, unless otherwise indicated.
 2. Thickness: 5/8 inch.
 3. Edges: Tapered.
 4. Products:
- G Acoustical Sound Dampening Wall and Ceiling Board: Two layers of heavy paper-faced, high-density gypsum board separated by a viscoelastic polymer layer and capable of achieving STC rating of 50 or more in typical stud wall assemblies as calculated in accordance with ASTM E413 and when tested in accordance with ASTM E90.
 1. Thickness: 1/2 inch.
 2. Long Edges: Tapered.
 3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
- H Exterior Sheathing Board: Sizes to minimize joints in place; ends square cut.
 1. Application: Exterior sheathing, unless otherwise indicated.

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2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
3. Glass Mat Faced Sheathing: Glass mat faced gypsum substrate as defined in ASTM C1177/C1177M.
4. 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.
5. Core Type: Regular and Type X, as indicated.
6. Type X Thickness: 5/8 inch.
7. Regular Board Thickness: 5/8 inch.
8. Edges: Square.
9. Glass Mat Faced Products:
 - a. Georgia-Pacific Gypsum; DensGlass Sheathing: www.gpgypsum.com/#sle.
- I 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. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X.
 3. Type X Thickness: 5/8 inch.
 4. Type C Thickness: 5/8 inch.
 5. Edges: Tapered.
 6. Products:
 - a. Georgia-Pacific Gypsum; ToughRock Fireguard C Soffit Board: www.gpgypsum.com/#sle.
- J Shaftwall and Coreboard: Type X; 1 inch thick by 24 inches wide, beveled long edges, ends square cut.
 1. Glass Mat Faced Type: Glass mat shaftliner gypsum panel or glass mat coreboard gypsum panel as defined in ASTM C1658/C1658M.
 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 3. Glass Mat Faced Products:
 - a. Georgia-Pacific Gypsum; DensGlass Shaftliner (mold-resistant): www.gpgypsum.com/#sle.
 - b. USG Corporation; Sheetrock Brand Glass-Mat Liner Panels Mold Tough 1 in. (25.4 mm): www.usg.com/#sle.

2.05 GYPSUM BOARD ACCESSORIES

- A Acoustic Insulation: See Section 072100.
- B Acoustic Sealant: Refer to Section 079200 - Joint Sealants.
- C Water-Resistive Barrier: See Section 072500.
- D Finishing Accessories: ASTM C1047, extruded aluminum alloy (6063 T5) or galvanized steel sheet ASTM A924/A924M G90, unless noted otherwise.
 1. Types: As detailed or required for finished appearance.
 2. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed panel edges.
 3. Products:
 - a. Same manufacturer as framing materials.
 - b. Phillips Manufacturing Co: www.phillipsmfg.com/#sle.
 - c. U.S. Gypsum.
- E Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.

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1. Fiberglass Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
 2. Paper Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
 3. Joint Compound: Drying type, vinyl-based, ready-mixed.
 4. Joint Compound: Setting type, field-mixed.
- F Finishing Compound: Surface coat and primer, takes the place of skim coating.
1. Products:
 - a. CertainTeed Corporation; Quick Prep Plus Interior Prep Coat:
www.certainteed.com/#sle.
- G High Build Drywall Surfer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.
1. Products:
 - a. Product: SHEETROCK® Brand TUFF-HIDE™ Primer-Surfer manufactured by United States Gypsum Company, USG. www.USG.com..
- H Concrete Finishing Compounds: Vinyl-based compound; plain. For fill and finish coats over concrete.
1. Product: Cover Coat® Compound manufactured by United States Gypsum Company, USG. www.USG.com.
- I Corner Beads: GA216; Type CB; electrogalvanized steel.
- J Edge Trim: GA216; Type L bead; electrogalvanized steel and Type LC rolledformed zinc. Milcore No. 66 Jmetal edge, or as approved by Architect, at unfinished gypsum board edges against other finish materials.
- K Control Joint: U.S. Gypsum No. 093, rollformed zinc.
- L Screws: ASTM C1002 for steel drill screws. Type G for fastening to gypsum board and Type S for fastening to light gauge steel framing.
- M Wall Texture: As manufactured by USG, multipurpose, prepackaged, nonasbestos type.
- N Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.
- O Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion-resistant.
- P Drywall Primer:
1. Paint material specifically formulated to fill the pores and equalize the suction difference between gypsum board surface paper and the compound used on finished joints, angles, fastener heads and accessories and over skim coatings.
 2. Drywall primer which is applied to the finished surface of the work specified in this section shall be provided as specified under Sections 09 90 00 as applicable.
 3. A good quality, white latex drywall primer formulated with high binder solids, applied undiluted, and shall be applied to gypsum board surfaces prior to the application of texture materials.
- Q Accessories for Tile Backer Units:
1. Fasteners: Stainless steel drill screws of size and type recommended by tile backer unit manufacturer for fastening tile backer units to metal studs as indicated.
 2. Joint Tape for Cementitious Backer Units: As recommended by cementitious backer unit manufacturer and complying with ANSI A118.9 and ANSI A108.11.
 3. Veneer Plaster: Diamond Brand Veneer Basecoat Plaster and USG Plaster Bonder as manufactured by United States Gypsum Co.
- R Nails for Attachment to Wood Members: ASTM C514.

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- S Staples For Attachment of Base Ply of Two-Ply Assembly to Wood Members: Flattened galvanized wire type as specified in ASTM C840.
- T Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.
- U Exterior Soffit Vents: One piece, perforated, ASTM B221 6063 T5 alloy aluminum, with plaster or EIFS edge and manufactured especially for soffit application. Provide continuous vent.

PART 3 EXECUTION

3.01 EXAMINATION

- A Verify that project conditions are appropriate for work of this section to commence.

3.02 SHAFT WALL INSTALLATION

- A Shaft Wall Framing: Install in accordance with GA-600 requirements.
 - 1. Fasten runners to structure with short leg to finished side, using appropriate power-driven fasteners at not more than 24 inches on center.
 - 2. Install studs at spacing required to meet performance requirements.
- B Shaft Wall Liner: Cut panels to accurate dimensions and install sequentially between special friction studs.
 - 1. On walls over sixteen feet high, screw-attach studs to runners top and bottom.
 - 2. Seal perimeter of shaft wall and penetrations with acoustical sealant.

3.03 ACOUSTIC ACCESSORIES INSTALLATION

- A Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- B Acoustic Sealant: Install in accordance with manufacturer's instructions.
 - 1. Place one bead continuously on substrate before installation of perimeter framing members.
 - 2. Place continuous bead at perimeter of each layer of gypsum board.
 - 3. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes.

3.04 BOARD INSTALLATION

- A Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
 - 1. Exception: Tapered edges to receive joint treatment at right angles to framing.
- C Double-Layer Non-Rated: Use gypsum board for first layer, placed perpendicular to framing or furring members, with ends and edges occurring over firm bearing. Use glass mat faced gypsum board at exterior walls and at other locations as indicated. Place second layer perpendicular to first layer. Offset joints of second layer from joints of first layer. Secure the second layer to the first layer with adhesive and support to hold in place.
- D Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- E Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.
- F Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.
 - 1. Seal joints, cut edges, and holes with water-resistant sealant.

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2. Paper-Faced Sheathing: Immediately after installation, protect from weather by application of water-resistive barrier.
- G Exterior Soffits: Install exterior soffit board perpendicular to framing, with staggered end joints over framing members or other solid backing.
 1. Seal joints, cut edges, and holes with water-resistant sealant.
- H Cementitious Backing Board: Install over steel framing members and plywood substrate where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.
- I Installation on Metal Framing: Use screws for attachment of gypsum board except face layer of nonrated double-layer assemblies, which may be installed by means of adhesive lamination.
- J Installation on Wood Framing: For rated assemblies, comply with requirements of listing authority. For nonrated assemblies, install as follows:
 1. Single-Layer Applications: Screw attachment.
- K Curved Surfaces: Apply gypsum board to curved substrates in accordance with GA-226.
- L Moisture Protection: Treat cut edges and holes in moisture resistant gypsum board and exterior gypsum soffit board with sealant.
- M Bullet Resistant Sheathing and Wallboard:
 1. Install bullet-resistant sheathing according to manufacturer's written recommendations and with manufacturer-approved fasteners.
 2. Cover all joints between boards with a 4-inch strip of the same thickness material as the boards, centered on the joint.
- N Apply acoustical putty pads completely around all electrical boxes and other items penetrating into acoustically rated walls, walls with acoustical insulation and all guestroom wall conditions.
 1. Refer to Section 07 84 00 - Firestopping.

3.05 INSTALLATION OF TRIM AND ACCESSORIES

- A Control Joints: Place control joints consistent with lines of building spaces and as indicated.
 1. Not more than 30 feet 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.
- D Moisture Guard Trim: Install on bottom edge of gypsum board according to manufacturer's instructions and in locations indicated on drawings.
- E Exterior Soffit Vents: Install according to manufacturer's written instructions and in locations indicated on the drawings. Provide vent area indicated on drawings.
- F Resilient Furring Channels: Attachment to substrate through one leg only.

3.06 JOINT TREATMENT

- A Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, embed and finish with setting type joint compound.
- B Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.

3.07 FINISHES

- A Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
 1. Level 5: Walls and ceilings to receive gloss paint finish where indicated and other areas specifically indicated.
 - a. Joints and interior angles shall have tape embedded in joint compound and 2 separate coats of joint compound applied over flat joints and one separate coat applied over interior angles.

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- b. Fastener heads and accessories shall be covered with 3 separate coats of joint compound.
 - c. A thin skim coat of joint compound, or a material manufactured especially for this purpose, shall be applied to the entire surface to fill imperfections in the joint work, smooth the paper texture and provide a uniform surface for decorating. Excess compound shall be immediately sheared off, leaving a film of skim coating compound completely covering the paper.
 - d. The surface shall be smooth and free of tool marks and ridges.
 - e. Surface to be coated with Drywall Primer as specified herein prior to application of texture.
 - f. Untextured surfaces to be coated with Drywall Primer prior to application of final finishes as specified in Sections 09 90 00 as applicable.
2. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated. (Typical finish for all interior locations, unless otherwise indicated) (Appearance areas to receive flat paints, light texture, or where backed wallcoverings are to be applied. This level of finish is not to be used where gloss and enamel paints are to be applied.):
- a. Joints and interior angles shall have tape embedded in joint compound and 2 separate coats of joint compound applied over flat joints and one separate coat of joint compound applied over interior angles.
 - b. Fastener heads and accessories shall be covered with 3 separate coats of joint compound..
 - c. Joint compound shall be smooth and free of tool marks and ridges.
 - d. Surface to be coated with Drywall Primer as specified herein prior to application of texture.
 - e. Untextured surfaces to be coated with Drywall Primer prior to application of final finishes as specified in Sections 09 90 00 as applicable.
3. Level 3: (Utility and Mechanical Spaces) (Appearance areas to receive heavy or medium texture (spray or hand applied) finishes before final painting, or where heavy grade wallcoverings are to be applied as final decoration. This level of finish is not to be used where smooth painted surface or light to medium wallcoverings are to be applied.):
- a. Joints and interior angles shall have tape embedded in joint compound and one additional coat of joint compound applied over joints and interior angles.
 - b. Fastener heads and accessories shall be covered with 2 separate coats of joint compound.
 - c. Joint compound shall be smooth and free of tool marks and ridges.
 - d. Surface to be coated with Drywall Primer as specified herein prior to application of texture.
 - e. Untextured surfaces to be coated with Drywall Primer prior to application of final finishes as specified in Sections 09 90 00 as applicable.
4. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.(Areas to receive applied wall panels, wood paneling, applied products, etc.):
- a. Joints and interior angles shall have tape embedded in joint compound and wiped with a joint knife leaving a thin coating joint compound over joints and interior angles.
 - b. Fastener heads and accessories shall be covered with a coat of joint compound.
 - c. Surface shall be free of excess joint compound.
 - d. Tool marks and ridges are acceptable.
 - e. Joint compound applied over the body of the tape at the time of tape embedment shall be considered a separate coat of joint compound and shall satisfy the conditions of this level.

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5. Level 1: Fire rated wall areas above finished ceilings, in attics, in areas where the assembly will be concealed or in building service corridors and other areas not normally open to public view whether or not accessible in the completed construction.
 - a. Joints and interior angles shall have tape embedded in joint compound.
 - b. Surface shall be free of excess joint compound.
 - c. Tool marks and ridges are acceptable.
 6. Level 0: Temporary partitions and surfaces indicated to be finished in later stage of project. No taping, finishing, or accessories required.
- B Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
1. Feather coats of joint compound so that camber is maximum 1/32 inch.
 2. Taping, filling, and sanding are not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.
 3. Taping, filling, and sanding are not required at base layer of double-layer applications.
- C Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.
- D Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

3.08 TEXTURE FINISH

- A Apply finish texture coating by means of spraying apparatus in accordance with manufacturer's instructions and to match approved sample.

3.09 TOLERANCES

- A Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION 092116

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SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Metal partition, ceiling, and soffit framing.
- B Drywall Suspension Systems
- C Framing accessories.

1.02 RELATED REQUIREMENTS

- A Section 055000 - Metal Fabrications: Metal fabrications attached to stud framing.
- B Section 055000 - Metal Fabrications: Execution requirements for anchors for attaching work of this section.
- C Section 072100 - Building Insulation: Acoustic insulation.
- D Section 078400 - Firestopping: Sealing top-of-wall assemblies at fire-resistance-rated walls.
- E Section 083100 - Access Doors and Panels.
- F Section 092116 - Gypsum Board Assemblies: Execution requirements for anchors for attaching work of this section.

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 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.
- 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 C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories; 2020.
- G ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2020.
- H ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2022.
- I ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.
- J ASTM E413 - Classification for Rating Sound Insulation; 2022.
- K ASTM F1267 - Standard Specification for Metal, Expanded, Steel; 2018 (Reapproved 2023).
- L Steel Stud Manufacturers Association (SSMA).
- M Steel Framing Industry Association (SFIA).

1.04 SUBMITTALS

- A See Section 013300 - Submittal Requirements, for submittal procedures.
- B Shop Drawings:
 - 1. Indicate prefabricated work, component details, stud layout, framed openings, anchorage to structure, acoustic details, type and location of fasteners, accessories, and items of other related work.

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2. Describe method for securing studs to tracks, splicing, and for blocking and reinforcement of framing connections.
3. Provide shop drawings and calculations prepared by an engineer registered in the State of California as required in this Section including:
 - a. Suspension systems.
 - b. Ceiling framing and soffits.
 - c. Engineering analysis depicting stress and deflection requirements for each framing application.
 - d. Selection of framing components, accessories, fasteners, and welded connection requirements.
- C Product Data: Provide data describing framing member materials and finish, product criteria, load charts, and limitations.
 1. Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- D Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.05 QUALITY ASSURANCE

- A Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years experience and approved by manufacturer.
- B Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-structural steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by, and displaying a classification label from, an independent testing agency acceptable to authority having jurisdiction.
 1. Construct fire-resistance-rated partitions in compliance with tested assembly requirements indicated on the Drawings.
 2. Rated assemblies to be substantiated from applicable testing using the proposed products, by Contractor.
 3. Both metal framing and wallboard manufacturers must submit written confirmation that they accept the other manufacturer's product as a suitable component in the assembly. Acceptance is as follows:
 - a. If installation of both products is proper, no adverse effect will result in the performance of one manufacturer's product by the other's products.
 - b. Combining products can be substantiated by required assembly tests.
- C STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.
- D Sound test reports must be from an independent laboratory accredited by the National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP).

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A Furnish products as Manufactured by a Manufacturing member of the Steel Stud Manufacturers Association (SSMA) www.ssma.com, or Steel Framing Industry Association (SFIA) and subject to compliance with Specification requirements.
 1. Metal Framing, Connectors, and Accessories:
 - a. CEMCO: www.cemcosteel.com/#sle.
 - b. ClarkDietrich Building Systems: www.clarkdietrich.com.

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c. SCAFCO Corporation: www.scafco.com/#sle.

B Substitutions: Refer to Section 012500 - Substitution Procedures.

2.02 FRAMING MATERIALS

- A Fire-Resistance-Rated Assemblies: Comply with applicable code and as indicated on drawings.
- B Loadbearing Studs: As specified in Section 054000.
- C Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S220.
 - 1. Structural Grade: As required to meet design criteria.
 - 2. Corrosion Protection Coating Designation: G60, or equivalent in accordance with AISI S220.
- D Non-Loadbearing Framing System Components: AISI S220; sheet steel, of size and properties necessary for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf.
 - 1. Minimum wall standards shall be 20 gauge metal studs with maximum spacing of 16" on center for regular studs.
 - 2. Studs: C-shaped with flat or formed webs, punched, and size as indicated on the drawings with knurled faces.
 - 3. Runners: U-shaped, sized to match studs.
 - 4. Ceiling Channels: C shaped, cold-rolled.
 - 5. Furring: Hat-shaped sections, minimum depth of 7/8 inch.
- E Shaft Wall Studs and Accessories: AISI S220; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 and specified performance requirements.
 - 1. Products:
 - a. Same manufacturer as other framing materials.
- F Proprietary Framing System:
 - 1. Framing system for gypsum board panels consisting of cold-rolled steel members conforming to ASTM C635, with exposed surfaces finished in manufacturer's standard enamel paint finish.
 - 2. Fire rating: _____-hour rating in accordance with UL assembly indicated.
 - 3. Components: Main tees, furring cross channels, furring cross tees, and cross tees.
 - 4. Accessories:
 - a. U-shaped channel molding.
 - b. Galvanized carbon steel (12 ga.) hanger wire.
 - 5. Acceptable product: Equivalent to Drywall Suspension System by USG.
- G Compression Struts: C-shape steel studs. in minimum thickness as required to adequately resist the vertical component induced by the bracing wires in suspended ceiling applications.
- H Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws, and anti-friction bushings, preventing 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.
 - 3. Provide components UL-listed for use in UL-listed fire-resistance-rated head of partition joint systems indicated on drawings.
 - 4. Deflection and Firestop Track:
 - a. Provide mechanical anchorage devices as described above that accommodate deflection while maintaining the fire-rating of the wall assembly.
 - b. Acceptable Products:
 - 1) "Posi Clip" by Fire Trak Corporation.

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- 2) "The System" by Metal-Lite, Inc.
- I Preformed Top Track Firestop Seal:
 1. Provide components UL-listed for use in UL-listed fire-resistance-rated head of partition joint systems indicated on drawings.
 2. Products:
 - a. Hilti, Inc; Top Track Seal CFS TTS: www.us.hilti.com/#sle.
 - b. Specified Technologies Inc; SpeedFlex TTG Track Top Gasket: www.stfirestop.com/#sle.
- J Non-Loadbearing Framing Accessories:
 1. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.
 2. Bracing and Bridging: ASTM A653/A653M G90 galvanized steel; for lateral bracing of wall studs with slots for engaging on-module studs.
 3. Framing Connectors: ASTM A653/A653M steel clips; secures cold rolled channel to wall studs for lateral bracing.
 4. Sheet Metal Backing: 0.0395 inch thick.
 5. Fasteners: ASTM C1002 self-piercing self-tapping screws.
 6. Anchorage Devices: Powder actuated.
 7. Acoustic Insulation: See Section 072100.
- K Grid Suspension Systems: Steel grid system of main tees and support bars connected to structure using hanging wire.
 1. Products:
 - a. CertainTeed Corporation: www.certainteed.com/ceilings-and-walls/#sle.
 - b. Basis of Design: USG Corporation; Drywall Suspension System: www.usg.com/#sle.
 - c. _____.
- L Clips, Brackets: ASTM A653 Galvanized wire or sheet metal designed for attachment of framing, furring and bridging members.
 1. Deflection Clips: If acceptable to Building Official, VertiClip™ as manufactured by Signature Industries, LLC, P.O. Box 68005, Raleigh, NC 27613 (919) 8440789 may be provided for attachment of framing to roof and floor construction at head and slip conditions. Provide sizes as required for stud depth(s). Clips shall be manufactured of steel conforming to ASTM A 653 Prime Certified G60 galvanized material or better, 50 ksi yield strength and 65 ksi ultimate strength. Deflection clips to have positive attachment to structure and stud material while allowing for frictionless movement.
 2. Bridging Clips: If acceptable to Building Official, BridgeClip™ as manufactured by Signature Industries, LLC, P. O. Box 68005, Raleigh, NC 27613 (919) 8440789 may be provided for attachment of bridging to studs.

2.03 FABRICATION

- A Fabricate assemblies of framed sections to sizes and profiles required.
- B Fit, reinforce, and brace framing members to suit design requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A Verify existing conditions before starting work.
- B Verify that rough-in utilities are in proper location.

3.02 INSTALLATION OF STUD FRAMING

- A Comply with requirements of ASTM C1007.

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- B Extend partition framing to structure where indicated and to ceiling in other locations as indicated on the drawings.
- C Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
- D Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.
- E Align and secure top and bottom runners at 24 inches on center and within 6 inches from the end.
- F At partitions indicated with an acoustic rating:
 - 1. Provide components and install as required to produce STC ratings as indicated, based on published tests by manufacturer conducted in accordance with ASTM E90 with STC rating calculated in accordance with ASTM E413.
 - 2. Place two beads of acoustic sealant between runners and substrate, studs and adjacent construction.
 - 3. Place two beads of acoustic sealant between studs and adjacent vertical surfaces. At exterior wall conditions, install felt strips between the stud and wall.
- G At partitions indicated with a fire rating: Install framing and furring indicated for the required rating.
- H Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.
- I Install studs vertically at spacing indicated on drawings.
- J Align stud web openings horizontally.
- K Secure studs to bottom track using fastener method. Do not weld.
- L Stud splicing is permissible; splice studs with 8 inch nested lap, secure each stud flange with flush head screw.
- M Fabricate corners using a minimum of three studs.
- N Install double studs at wall openings, door and window jambs, not more than 2 inches from each side of openings.
- O Brace stud framing system rigid.
- P Coordinate erection of studs with requirements of door frames and window frames; install supports and attachments.
- Q Coordinate installation of bucks, anchors, and blocking with electrical, mechanical, and other work to be placed within or behind stud framing.
- R Blocking: Use steel channels secured to studs. Provide blocking for support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, hardware, and and other wall mounted items.
- S Furring: Coordinate with sound isolation clip spacing and locations. Lap splices a minimum of 6 inches.
- T Use sheet metal backing, 16 gauge minimum for reinforcement of all wall mounted items and items requiring backing per manufacturer's instructions..

3.03 CEILING AND SOFFIT FRAMING

- A Comply with requirements of ASTM C754.
- B Install furring after work above ceiling or soffit is complete. Coordinate the location of hangers with other work.
- C Install furring independent of walls, columns, and above-ceiling work.

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- D Securely anchor hangers to structural members or embed them in structural slab. Space hangers as required to limit deflection to criteria indicated. Use rigid hangers at exterior soffits.
- E Space main carrying channels at maximum 72 inches on center, and not more than 6 inches from wall surfaces. Lap splice securely.
- F Securely fix carrying channels to hangers to prevent turning or twisting and to transmit full load to hangers.
- G Place furring channels perpendicular to carrying channels, not more than 2 inches from perimeter walls, and rigidly secure. Lap splices securely.
- H Reinforce openings in suspension system that interrupt main carrying channels or furring channels with lateral channel bracing. Extend bracing minimum 24 inches past each opening.
- I Laterally brace suspension system.
- J Provide separate support members on each side of control or expansion joints. Do not bridge.

3.04 TOLERANCES

- A Maximum Variation From True Position: 1/8 inch in 10 feet.
- B Maximum Variation From Plumb: 1/8 inch in 10 feet.

END OF SECTION 092216

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SECTION 092236 - LATH

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Metal lath for cement plaster.
- B Furring for metal lath.

1.02 RELATED REQUIREMENTS

- A Section 072500 - Weather Barriers: Water-resistive barrier under exterior plaster and stucco.
- B Section 083100 - Access Doors and Panels: Product requirements for metal access panels integral with metal lath.
- C Section 092116 - Gypsum Board Assemblies: Sheathing on exterior walls.
- D Section 092400 - Cement Plastering.

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.
- B ASTM A924/A924M - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process; 2022a.
- C ASTM C841 - Standard Specification for Installation of Interior Lathing and Furring; 2023.
- D ASTM C847 - Standard Specification for Metal Lath; 2018.
- E ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2022.
- F ASTM C1063 - Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster; 2023.

1.04 SUBMITTALS

- A See Section 013300 - Submittal Requirements, for submittal procedures.
- B Product Data: Provide data on furring and lathing components, structural characteristics, material limitations, and finish.
- C Samples:
 - 1. Submit two samples, 12 by 12 inch in size illustrating lath material and finish.

1.05 QUALITY ASSURANCE

- A Installer Qualifications: Company specializing in performing the work of this section with at least five years of documented experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A Metal Lath and Accessories:
 - 1. Alabama Metal Industries Corporation; Self-Furred Diamond Mesh Lath: www.amico-lath.com/#sle.
 - 2. CEMCO: www.cemcosteel.com/#sle.
 - 3. ClarkDietrich: www.clarkdietrich.com/#sle.

2.02 FRAMING AND LATH ASSEMBLIES

- A Provide completed assemblies with the following characteristics:
 - 1. Maximum Deflection of Vertical Assemblies: 1:360 under lateral point load of 100 lbs.

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2. Maximum Deflection of Horizontal Assemblies: 1:240 deflection under dead loads and wind uplift.

- B Fire Rated Assemblies: Provide components complying with requirements for fire rated assemblies specified in the section where the plaster finish is specified.

2.03 FRAMING MATERIALS

- A Furring Channels: Formed steel, minimum 0.020 inch thick, 3/8 inch deep by 7/8 inch high, splicing permitted; galvanized.

2.04 LATH

- A Diamond Mesh Metal Lath: ASTM C847, galvanized; self-furring.
 1. Weight: To suit application and as specified in ASTM C841 or ASTM C1063 for framing spacing.
 2. Weight: 2.5 lb/sq yd.
 3. Backed with treated paper.
- B Corner Mesh: ASTM C1063; Formed sheet steel, minimum 0.018 inch thick, perforated flanges shaped to permit complete embedding in plaster, minimum 2 inch size; same finish as lath.
- C Strip Mesh: Expanded metal lath, same weight as lath, 2 inch wide by 24 inch long; same finish as lath.
- D Finishing Accessories: ASTM C841 (gypsum plaster) or ASTM C1063 (cement plaster); extruded aluminum alloy (6063 T5), galvanized steel sheet ASTM A924/A924M G90, or galvanized steel wire, unless noted otherwise.
 1. Types: As detailed or required for finished appearance.
 2. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed plaster edges.
- E Beads, Screeds, Joint Accessories, and Other Trim: Depth governed by plaster thickness, and maximum possible lengths.
 1. Material: Formed sheet steel with rust inhibitive primer, expanded metal flanges.
 2. Casing Beads with Weep Holes: Square edges.
 3. Expansion Joints: Accordion profile with factory-installed protective tape, 2 inch wide flanges.
 4. Base Screeds:
 - a. Material: Galvanized steel, ASTM A653/A653M, with G90/Z275 zinc coating; minimum 26-gauge, 0.0179-inch thick base metal.

2.05 ACCESSORIES

- A Access Panels: See Section 083100.

PART 3 EXECUTION

3.01 EXAMINATION

- A Verify existing conditions before starting work.
- B Verify that substrates are ready to receive work and conditions are suitable for application.
- C For exterior plaster and stucco on stud walls, verify that water-resistive barrier has been installed over sheathing substrate completely and correctly; see Section 072500.
- D Do not begin until unacceptable conditions have been corrected.
- E If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 INSTALLATION - GENERAL

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- A Install metal lath and furring for Portland cement plaster in accordance with ASTM C1063.

3.03 WALL FURRING INSTALLATION

- A Install furring channels horizontally; secure with fasteners on alternate channel flanges at maximum 24 inches on center.
- B Space furring channels maximum 16 inches on center, and not more than 4 inches away from floor and ceiling lines.

3.04 CEILING AND SOFFIT FRAMING INSTALLATION

- A Install furring after work above ceiling or soffit is complete. Coordinate the location of hangers with other work.
- B Install furring independent of walls, columns, and above-ceiling work.

3.05 CONTROL AND EXPANSION JOINT INSTALLATION

- A Locate joints as indicated on drawings and comply with ASTM C1063.
 - 1. Area of plaster panel not to exceed 144 sq ft for vertical surfaces.
 - 2. Area of plaster panel not to exceed 100 sq ft for horizontal, curved or angled surfaces.
 - 3. Spacing between control joints not to exceed 18 ft in each direction.
 - 4. Area bounded by control joints not to exceed a length-to-width ratio of 2-1/2 to 1.
- B Install expansion joints where an expansion joint occurs in base exterior wall.
- C Install prefabricated joint accessories in accordance with ASTM C1063.
- D Construct expansion joints of back-to-back casing beads with a backer rod and sealant, set 1/4 inch apart.

3.06 ACCESS PANELS INSTALLATION

- A Install access panels and rigidly secure in place.
- B Install frames plumb and level in opening. Secure rigidly in place.
- C Position to provide convenient access to concealed work requiring access.

3.07 LATH INSTALLATION

- A Apply lath taut, with long dimension perpendicular to supports.
- B Lap or nest ends of metal lath in accordance with ASTM C841.
- C Secure end laps with tie wire where they occur between supports.
- D Attach metal lath to metal supports using tie wire at maximum 6 inches on center.
- E Continuously reinforce internal angles with corner mesh, except where the metal lath returns 3 inches from corner to form the angle reinforcement; fasten at perimeter edges only.
- F Place corner bead at external wall corners; fasten at outer edges of lath only.
- G Place base screeds at termination of plaster areas; secure rigidly in place.
- H Place 4 inch wide strips of lath centered over junctions of dissimilar backing materials, and secure rigidly in place.
- I Place lath vertically above each top corner and each side of door frames to 6 inches above ceiling line.
- J Place casing beads at terminations of plaster finish. Butt and align ends. Secure rigidly in place.
- K Place additional strip mesh diagonally at corners of lathed openings. Secure rigidly in place.

3.08 TOLERANCES

- A Maximum Variation from True Lines and Levels: 1/8 inch in 10 feet.
- B Maximum Variation from True Position: 1/8 inch.

END OF SECTION 092236

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SECTION 092400 - CEMENT PLASTERING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Cement plastering.

1.02 RELATED REQUIREMENTS

- A Section 054000 - Cold-Formed Metal Framing: Structural metal framing for plaster.
- B Section 072500 - Weather Barriers: Water-resistive barrier.
- C Section 092236 - Lath: Lath, furring, beads, screeds, and joint accessories for plaster base.

1.03 REFERENCE STANDARDS

- A ASTM C150/C150M - Standard Specification for Portland Cement; 2022.
- B ASTM C897 - Standard Specification for Aggregate for Job-Mixed Portland Cement-Based Plasters; 2015 (Reapproved 2020).
- C ASTM C926 - Standard Specification for Application of Portland Cement-Based Plaster; 2023a.
- D ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2022.

1.04 SUBMITTALS

- A See Section 013000 - Administrative Requirements for submittals procedures.
- B Product Data: Provide data on plaster materials and trim accessories.
- C Samples:
- D Installer's Qualification Statement.

1.05 QUALITY ASSURANCE

- A Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience.

1.06 FIELD CONDITIONS

- A Exterior Plaster Work: Do not apply plaster when substrate or ambient air temperature is 40 degrees F or lower, or when temperature is expected to drop below 40 degrees F within 48 hours of application.

PART 2 PRODUCTS

2.01 CEMENT PLASTER APPLICATIONS

- A Lath Plaster Base: Metal lath.
 - 1. Plaster Type: Jobsite mixed plaster.
 - 2. Number of Coats: Three.
 - 3. First Coat: Apply to a nominal thickness of 3/8 inch.
 - 4. Second Coat: Apply to a nominal thickness of 3/8 inch.
 - 5. Leveling Coat: Apply to a nominal thickness of 1/32 to 1/16 inch.
 - 6. Finish Coat: Apply to a nominal thickness of 1/8 inch.
 - a. Texture: Match existing.
 - 7. Finish: Cementitious.

2.02 JOBSITE MIXED CEMENT PLASTER

- A Fire Resistance Rating: Determined in accordance with test procedures in ASTM E119 and complying with:

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1. CBC.
- B Materials:
 1. Portland Cement: ASTM C150/C150M, Type I.
 - a. Finish Coat: White color.
 2. Sand: Clean, well graded, and complying with ASTM C897.
 3. Water: Clean, fresh, potable, and free of mineral or organic matter that could adversely affect plaster.
- C Plaster Mixes: Proportioned in accordance with ASTM C926; parts by volume.
 1. First Coat Over Expanded metal lath:
 - a. Minimum 2-1/2 parts and maximum 4 parts sand, per total volume of cementitious materials.
 2. Second Coat: Same mixture as first coat, without fiber reinforcement, except minimum 3 parts and maximum 5 parts sand.
 3. Finish Coat:
 - a. Minimum 1-1/2 parts and maximum 3 parts sand, per total volume of cementitious materials.

2.03 ACCESSORIES

- A Lath: See Section 092236.
- B Finishing Accessories: See Section 092236.
- C Reinforcing Mesh: 4.5 oz/sq yd alkali-resistant mesh.
- D Water-Resistive Barrier: See Section 072500.

PART 3 EXECUTION

3.01 EXAMINATION

- A Verify existing conditions are acceptable prior to starting this work.
- B Verify lath is flat, secured to substrate, and joint and surface perimeter accessories are properly in place.
- C Verify mechanical and electrical equipment and services located within areas to receive this work have been properly tested and approved.

3.02 INSTALLATION - WATER-RESISTIVE BARRIER

- A Where cement plaster is installed as part of a barrier wall system, install two layers of water-resistive barrier in accordance with water-resistive barrier manufacturer's instructions.
- B Integrate water-resistive barrier with flashing accessories, and adjacent doors, windows, penetrations, and cladding transitions.
- C Apply water-resistive barrier horizontally with upper layer lapped over lower layer at least 2 inches.
- D Lap water-resistive barrier at least 6 inches at vertical joints.
- E Lap water-resistive barrier at least 16 inches beyond vertical line of inside and outside corners in both directions.
- F For two layer applications, start with two horizontal layers at bottom of exterior wall or structure.

3.03 MIXING

- A Mix only as much plaster as can be used prior to initial set.
- B Mix materials dry, to uniform color and consistency, before adding water.
- C Protect mixtures from frost or freezing temperatures, contamination, and excessive evaporation.

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3.04 APPLICATION

- A Apply plaster in accordance with manufacturer's written instructions and comply with ASTM C926.
- B Base Coats:
 - 1. Apply base coat(s) to fully embed lath and to specified thickness.
 - 2. Follow guidelines in ASTM C926 and manufacturer's written installation instructions for moist curing base coats and application of subsequent coats.
- C Leveling Coat:
 - 1. Apply leveling coat to specified thickness.
 - 2. Fully embed reinforcing mesh in leveling coat.
- D Finish Coats:
 - 1. Cement Plaster:
 - a. Apply with sufficient material and pressure to ensure complete coverage of base to specified thickness.
 - b. Apply desired surface texture while mix is still workable.
 - c. Float to a consistent finish.
 - 2. Primer and Acrylic Coatings:
 - a. Remove surface contaminants such as dust and dirt without damaging substrate.
 - b. Apply primer in accordance with manufacturer's instructions.
 - c. Apply finish coating in number of coats and to thickness recommended by manufacturer.

3.05 TOLERANCES

- A Maximum Variation from True Flatness: 1/4 inch in 10 feet.

3.06 REPAIR

- A Patching: Remove loose, damaged or defective plaster and replace with plaster of same composition; finish to match surrounding area.

END OF SECTION 092400

Cement Plastering - 092400

SECTION 093000 - TILING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Tile for wall applications.
- B Non-ceramic trim.

1.02 RELATED REQUIREMENTS

- A Section 079200 - Joint Sealants: Sealing joints between tile work and adjacent construction and fixtures.
- B Section 092116 - Gypsum Board Assemblies: Tile backer board.
- C Section 096500 - Resilient Flooring, Wall Base and Accessories: for additional metal and vinyl transitions.

1.03 REFERENCE STANDARDS

- A ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar; 2017 (Reaffirmed 2022).
- B ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar; 2017.
- C ANSI A108.1c - Contractor's Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar; 1999 (Reaffirmed 2021).
- D ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesive or Water Cleanable Tile-Setting Epoxy Adhesive; 2019.
- E ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar; 2021.
- F ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grout Epoxy; 1999 (Reaffirmed 2019).
- G ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout; 1999 (Reaffirmed 2019).
- H ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout; 1999 (Reaffirmed 2019).
- I ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework; 2017 (Reaffirmed 2022).
- J ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units; 2018.
- K ANSI A108.12 - American National Standard for Installation of Ceramic Tile with EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar; 1999 (Reaffirmed 2019).
- L ANSI A108.13 - American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone; 2005 (Reaffirmed 2021).
- M ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar; 2019.
- N ANSI A118.6 - American National Standard Specifications for Standard Cement Grouts for Tile Installation; 2019.
- O ANSI A118.7 - American National Standard Specifications for High Performance Cement Grouts for Tile Installation; 2019.

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- P ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 2019.
- Q ANSI A118.10 - American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone; 2014 (Reaffirmed 2019).
- R ANSI A118.15 - American National Standard Specifications for Improved Modified Dry-Set Cement Mortar; 2019.
- S ANSI A136.1 - American National Standard Specifications for Organic Adhesives for Installation of Ceramic Tile; 2020.
- T ANSI A137.1 - American National Standard Specifications for Ceramic Tile; 2022.
- U ANSI A137.2 - American National Standard Specifications for Glass Tile; 2022.
- V ASTM C150/C150M - Standard Specification for Portland Cement; 2022.
- W 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).
- X ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2018.
- Y TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2024.

1.04 ADMINISTRATIVE REQUIREMENTS

- A Refer to Section 013000 - Administrative Requirements, for preinstallation meeting requirements.
- B Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by affected installers.

1.05 SUBMITTALS

- A See Section 013000 - 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, ceramic accessories, and setting details.
- D Samples: Mount tile and apply grout on two plywood panels, minimum 18 by 18 inches in size illustrating pattern, color variations, and grout joint size variations.
- E Submit manufacturer's certification under provisions of this Section that the materials supplied conform to ANSI A137.1.
- F Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- G Submit proof of warranty.
- H Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.
- I Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Materials: Furnish one (1) square foot of tile for each 100 square feet of each color and size of tile and grouting materials used in the Project. If less than 100 square feet is installed, provide a minimum of one square foot of extra stock. Extra materials shall be furnished in original packaging.

1.06 QUALITY ASSURANCE

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- 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:
 - 1. Company specializing in performing tile installation, with minimum of five years of documented experience.

1.07 MOCK-UPS

- A See Section 014000 - Quality Requirements for general requirements for mock-up.
- B Construct tile mock-up where indicated on drawings, incorporating all components specified for the location.
 - 1. Minimum size of mock-up is 3' x 3' or as indicated on drawings.
 - 2. Approved mock-up may not remain as part of work.

1.08 DELIVERY, STORAGE, AND HANDLING

- A Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.09 FIELD CONDITIONS

- A Do not install solvent-based products in an unventilated environment.
- B Maintain ambient and substrate temperature above 50 degrees F and below 100 degrees F during installation and curing of setting materials.

1.10 WARRANTY

- A See Section 01 78 36 - Warranties Procedures, for additional warranty requirements.
- B Correct defective Work within a five year period after Date of Substantial Completion.
- C The Contractor warrants the work of this Section to be in accordance with the Contract Documents and free from faults and defects in materials and workmanship for a period of 25 years. The manufacturer of adhesives, mortars, grouts and other installation materials shall provide a written twenty five (25) year warranty, which covers materials and labor. .

PART 2 PRODUCTS

2.01 MANUFACTURERS (NON-TILE)

- A Basis of Design: Contract Documents are based on products specified below to establish a standard of quality. Other acceptable manufacturers with products having equivalent characteristics may be considered, provided deviations are minor and design concept expressed in Contract Documents is not changed, as determined by the Architect.
 - 1. Basis of Design Manufacturer: LATICRETE International, Inc.: www.laticrete.com.
- B Acceptable Manufacturers: Subject to compliance with requirements of Contract Documents, provide product by one of manufacturers listed alphabetically below. If not listed, submit as substitution according to Conditions of the Contract and Division 1 Sections.
 - 1. Custom Building Products: www.custombuildingproducts.com.
 - 2. Mapei Corporation: www.mapei.com.
 - 3. Or Equal
- C Single Source Responsibility:
 - 1. Source Limitations for Setting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout from single manufacturer and each aggregate from single source or producer.
 - a. Obtain setting materials, waterproof membrane, and crack isolation membrane, from single manufacturer.

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2. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer:

- a. Metal edge strips.

D Substitutions: 012500 Substitution Procedures.

2.02 TILE

- A General: Provide tile that complies with ANSI A137.1 for types, compositions and other characteristics indicated. Provide tile in the locations and of the types colors and pattern indicated on the Drawings and identified in the Material Schedule.
- B Porcelain: As scheduled on Drawings and Material Schedules.
- C Porcelain Tile, Type ____: ANSI A137.1 standard grade.
 1. Collection: Daltile; Natural Hues. Style: Carnation Gloss QH48
 2. Moisture Absorption: 0 to 0.5 percent as tested in accordance with ASTM C373.
 3. Size:
 - a. Wall: Refer to Drawings and Material Schedule.
 4. Thickness: ____ inch.
 5. Edges: ____.
 6. Grout Joint Width: ____
 7. Floor Surface Finish: Non-slip.
 8. Color(s): As indicated on drawings.
 9. Pattern: As indicated on Drawings.

2.03 TRIM AND ACCESSORIES

- A Metal Trim: Brushed stainless steel, style and dimensions to suit application, for setting using tile mortar or adhesive.
 1. Applications: As indicated on Drawings.
 - a. Open edges of wall and floor tile.
 - b. Floor-to-wall joints.

2.04 SETTING MATERIALS

- A Provide setting and grout materials from same manufacturer.
- B Latex-Portland Cement Mortar Bond Coat: ANSI A118.4.
 1. Products:
 - a. Custom Building Products; ProLite Premium Rapid Setting Large Format Tile Mortar, with Multi-Surface Bonding Primer: www.custombuildingproducts.com/#sle.
 - b. LATICRETE International, Inc; TRI-LITE: www.laticrete.com/#sle.
 - c. Or Equal.
- C Improved Latex-Portland Cement Mortar Bond Coat: ANSI A118.15.
 1. Applications: Use this type of bond coat where indicated, and where no other type of bond coat is indicated.
 2. Products:
 - a. Custom Building Products; Porcelain Tile Fortified Thin-Set Mortar: www.custombuildingproducts.com/#sle.
 - b. LATICRETE International, Inc; LATICRETE 254 Platinum: www.laticrete.com/#sle.
 - c. Or Equal.

2.05 ADHESIVE MATERIALS

- A Manufacturers:
 1. LATICRETE International, Inc; Laticrete 15 Premium Mastic: www.laticrete.com.

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2. Custom Building Products; OmniGrip: www.custombuildingproducts.com.
3. Mapei Corporation: www.mapei.com.
4. Or Equal.

B Epoxy Adhesive: ANSI A118.3, thinset bond type.

2.06 GROUTS

A Approved Manufacturers:

1. Basis of Design: LATICRETE International, Inc; LATICRETE PERMACOLOR Grout: www.laticrete.com/#sle.
2. Custom Building Products; Fusion Pro® Single Component® Grout: www.custombuildingproducts.com.
3. Mapei Corporation: www.mapei.com.
4. Or Equal.
5. Substitutions: 012500 Substitution Procedures.

B High Performance Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.

1. Applications: Use this type of grout where indicated and where no other type of grout is indicated with built-in with Microban antimicrobial protection to fight the growth of mild and mildew on the grout surface.
2. Use sanded grout for joints 1/8 inch wide and larger; use unsanded grout for joints less than 1/8 inch wide.
3. Color(s): As indicated on drawings.
4. Products:
 - a. Custom Building Products; Fusion Pro® Single Component® Grout: www.custombuildingproducts.com/#sle.
 - b. LATICRETE International, Inc; LATICRETE PERMACOLOR Select Grout: www.laticrete.com/#sle.
 - c. Mapei Corporation; Ultracolor Plus: www.mapei.com.
 - d. Or Equal.
 - e. Substitutions: 012500 Substitution Procedures.

2.07 MAINTENANCE MATERIALS

A Tile Sealant: Gunnable, silicone, siliconized acrylic, or urethane sealant; moisture and mildew resistant type.

1. Applications: Between tile and plumbing fixtures.
2. Color(s): As selected by Architect from manufacturer's full line.
3. Products:
 - a. Custom Building Products; Commercial 100% Silicone Caulk: www.custombuildingproducts.com/#sle.
 - b. LATICRETE International, Inc; LATICRETE LATASIL: www.laticrete.com/#sle.
 - c. Or Equal.

B Grout Sealer: Liquid-applied, moisture and stain protection for existing or new Portland cement grout.

1. Composition: Water-based colorless silicone.
2. Products:

C Tile Sealer: Stain protection for porcelain tile tile.

1. Products:
 - a. Custom Building Products; Aqua Mix Enrich 'N' Seal: www.custombuildingproducts.com/#sle.

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- b. STONETECH, a Division of LATICRETE International, Inc; STONETECH BulletProof Stone Sealer: www.laticrete.com/#sle.
- c. Or Equal.

2.08 ACCESSORY MATERIALS

- A Waterproofing Membrane at Showers: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10.
 - 1. Fluid or Trowel Applied Type:
 - a. Material: Synthetic rubber.
 - b. Thickness: 25 mils, minimum, dry film thickness.
 - c. Products:
 - 1) LATICRETE International, Inc; LATICRETE HYDRO BAN: www.laticrete.com/#sle.
 - 2) Or Equal.
- B 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.
- C Backer Board: Coated glass mat type complying with ASTM C1178/C1178M; inorganic fiberglass mat on both surfaces and integral acrylic coating vapor retarder.
- D Mesh Tape: 2 inch wide self-adhesive fiberglass mesh tape.

PART 3 EXECUTION

3.01 EXAMINATION

- A 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 tile.
- B Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A Protect surrounding work from damage.
- B Vacuum clean surfaces and damp clean.
- C Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.
- D Install 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 a feather edge.
- E Install cementitious backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of dry-set mortar to a feather edge.
- F Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

3.03 INSTALLATION - GENERAL

- A Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
- B Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners neatly.
- 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 non-ceramic trim in accordance with manufacturer's instructions.
- 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 Grout tile joints unless otherwise indicated.

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- J 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 - SHOWERS.

- A At tiled shower receptors install in accordance with The Tile Council of North America Handbook Method B415, mortar bed floor, and W244, thin-set over cementitious backer unit walls.
- B At bathtub walls install in accordance with TCNA (HB) Method B412, over cementitious backer units with waterproofing membrane.
- C Grout with latex-Portland cement grout.

3.05 INSTALLATION - WALL TILE

- A Over cementitious backer units on studs, install in accordance with TCNA (HB) Method W244, using membrane at toilet rooms.
- B Over coated glass mat backer board on studs, install in accordance with The Tile Council of North America Handbook Method W245, using membrane at toilet rooms and showers.

3.06 TILE AND GROUT SEALING

- A Grout Sealer: Apply grout sealer (if required) to cementitious grout joints in tile floors according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.
- B Surface should be dry, clean and free of waxes, sealers or finishes. New installations need to be dry 48 hours before application. Protect surrounding surfaces. Test product in an inconspicuous area to ensure desirable results.
- C Pre-Grout Sealer/Grout Release:
 - 1. Porous tile and stone can be stained by grout during installation. Sealing the tile before grouting.
 - 2. Apply sealer according to directions after tile has been bonded for a minimum of 24 hours, or apply to front face of tile before installation.
 - 3. Wait a minimum of 2 hours before grouting.
 - 4. Allow 30 minutes drying time between applications.
- D Tile industry experts recommend periodic testing of sealed surfaces.
 - 1. Refer to Close-out Requirements regarding periodic resealing of porous tile and grout surfaces.

3.07 FIELD QUALITY CONTROL

- A Testing: Engage a qualified testing agency to perform the following field tests and inspections and prepare test reports:
 - 1. Samples of material delivered to Project site shall be taken, identified, sealed, and certified in presence of Contractor.
 - 2. Testing agency shall perform tests for characteristics specified, using applicable referenced testing procedures.
- B Final Waterproofing inspection: Arrange for manufacturer's technical personnel to inspect membrane installation on completion.
 - 1. Notify Architect or Owner 48 hours in advance of date and time of inspection.

3.08 CLEANING

- A Clean tile and grout surfaces.

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- B Remove and replace material that is stained or otherwise damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- C Clean tiles after setting and grouting is complete; use procedures recommended by manufacturer for types of application indicated.
 - 1. Remove latex-Portland cement mortar (thin set) and polymer-modified tile grout residue from stone tile surfaces as soon as possible.
 - 2. Clean grout smears and haze from tile according to grout manufacturer's written instructions for the type of stone tile installed. Use only cleaners recommended by grout manufacturer and determine that cleaners are safe to use on installed tile and other surfaces by testing on samples of stone tile and other surfaces to be cleaned prior to using cleaners on installed materials. Protect metal surfaces, plumbing and electrical fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.09 PRODUCT MAINTENANCE

- A Do not use cleaners containing ammonia, acids or bleach. Use an appropriate neutral cleaner.
- B Prior to using any cleaning material on a tile, test a discrete area or scrap piece of tile to insure desired results.

3.10 PROTECTION

- A Do not permit traffic over finished floor surface for 4 days after installation.
- B Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- C Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.11 CLOSEOUT ACTIVITIES

- A See Section 017800 - Closeout Procedures and Submittals, for closeout submittals.

END OF SECTION 093000

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SECTION 095100 - ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Suspended metal grid ceiling system.
- B Acoustical units.
- C Supplementary insulation above ceiling.

1.02 RELATED REQUIREMENTS

- A Section 072100 - Building Insulation: Acoustical insulation.
- B Section 23 3000 - Air Distribution: Air diffusion devices in ceiling.
- C Section 265000 - Lighting: Light fixtures in ceiling system.

1.03 REFERENCE STANDARDS

- A ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- B ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- C ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2023.
- D ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2022.
- E ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2019.
- F ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2023.
- G ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2022.
- H ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.
- I ASTM E1477 - Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers; 1998a (Reapproved 2022).
- J 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.
- K ASTM E795 - Standard Practices for Mounting Test Specimens during Sound Absorption Tests; 2023.
- L ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2023.
- M CHPS (HPPD) - High Performance Products Database; Current Edition.
- N Cisca (AC) - Acoustical Ceilings: Use and Practice; 1999.
- O ICC (IBC) - 2018 - International Building Code; 2018.
 - 1. with SouthernSout Nevada Amendments.
- P International Code Council-Evaluation Services - Evaluation Report, ESR-1308, Fire and Nonfire-Resistance-Rated Suspended Ceiling Framing Systems.
- Q NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2024.
- R UL (FRD) - Fire Resistance Directory; Current Edition.
- S UL (GGG) - GREENGUARD Gold Certified Products; Current Edition.

1.04 ADMINISTRATIVE REQUIREMENTS

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- 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 013300 - Submittal Requirements, for submittal procedures.
- B Shop Drawings: Indicate grid layout and related dimensioning, junctions with other ceiling finishes, and mechanical and electrical items installed in the ceiling.
- C Product Data: Provide data on suspension system components and acoustical units.
- D Samples: Submit 4 samples 6 x 6 inch in size illustrating material and finish of acoustical units.
- E Samples: Submit two samples each, 12 inches long, of suspension system main runner, cross runner, and perimeter molding.
- F Certifications: Manufacturer's certifications that system complies with specified requirements:
 - 1. For seismic performance: International Code Council Evaluation Report, ESR-1308
 - 2. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.
- G Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- H Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements, for additional provisions.
 - 2. Extra Acoustical Units: Quantity equal to 10 percent of total installed.
- I Warranty: Manufacturer's standard warranty for extent of conditions allowable and duration of warranty

1.06 QUALITY ASSURANCE

- A Designer Qualifications for Seismic Design: Perform under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at California.
- B Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
 - 1. Surface Burning Characteristics: As follows, tested per ASTM E84 and complying with ASTM E1264 for Class A products.
 - a. Flame Spread: 25 or less
 - b. Smoke Developed: 50 or less
- C Single Source Responsibility: To obtain Lifetime ceiling system warranty, 30-year ceiling system warranty, color match or ceiling panel and suspension system compatibility, all acoustical panel and suspension system components shall be produced and supplied by one manufacturer. Materials supplied by more than one manufacturer are not acceptable
- D Source quality control:
 - 1. Test reports: Manufacturer will provide test certification for minimum requirements as tested in accordance with applicable industry standards and/or to meet performance standards specified by various agencies.
 - 2. Changes from system: System performance following any substitution of materials or change in assembly design must be certified by the manufacturer.
 - 3. All ceiling panel cartons must contain UL label for acoustical compliance.
 - 4. All suspension system cartons must contain UL label for load compliance per ASTM C635.
- E Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 10 years documented experience.

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- F Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- G Requirements of regulatory agencies: Codes and regulations of authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

- A Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.
- B Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.
- C Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

1.08 MAINTENANCE

- A Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.
 - 1. Acoustical Ceiling Units: Furnish quality of full-size units equal to 5.0 percent of amount installed.
 - 2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

1.09 WARRANTY

- A See Section 017836 - Warranties and Bonds, for additional warranty requirements.
- B Provide manufacturer's standard warranties agreeing to repair or replace acoustical panels and suspension systems that fail within the warranty period. Failures include manufacturing defect, sagging and warping of acoustical panels, and rusting of grid system.
 - 1. Warranty Period:
 - a. Acoustical Panels: Manufacturer's standard maximum warranty for each type of panel used.
 - b. Grid and Suspension System: Manufacturer's standard maximum warranty, but not less than 10 years.

1.10 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 Basis of Design: Contract Documents are based on products specified below to establish a standard of quality. Other acceptable manufacturers with products having equivalent characteristics may be considered, provided deviations are minor and design concept expressed in Contract Documents is not changed, as determined by the Architect.
 - 1. Acoustic Tiles/Panels:
 - a. Basis-of-Design Product: Armstrong World Industries, Inc: www.armstrong.com.
 - b. CertainTeed Corporation: www.certainteed.com/ceilings-and-walls/#sle.
 - c. Rockfon: www.rockfon.com/#sle.
 - d. USG: www.usg.com.
 - e. Substitutions: See Section 016000 - Product Requirements.
- B Wood Veneer Acoustic Panels:

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1. Acoufelt; www.acoufelt.com
 2. Substitutions: See Section 016000 - Product Requirements.
- C Suspension Systems:
1. Same as for acoustical units.

2.02 PERFORMANCE REQUIREMENTS

- A Seismic Performance: Ceiling systems designed to withstand the effects of earthquake motions determined according to ASCE 7 for Seismic Design Category E.

2.03 ACOUSTICAL UNITS - GENERAL: ASTM E1264, CLASS A.

- A VOC Content: Certified as Low Emission by one of the following:
1. Product listing in UL (GGG).
 2. Product listing in CHPS (HPPD).
- B Provide panel products matching Manufacturer's designations indicated on Drawings and complying with the following:
1. Light reflectance of LR-1 (over 75 percent), per Fed. Spec. SS-S-118B and ASTM E1264 for factory finished panels. Field painted panels are not required to comply.

2.04 ACOUSTICAL PANELS, TYPE ACT-1: MINERAL FIBER WITH MEMBRANE-FACED

OVERLAY, WITH THE FOLLOWING CHARACTERISTICS:

- A Application(s): As indicated on Drawings.
- B Classification: ASTM E1264 Type IV.
- C Size: 2 x 4 feet.
- D Thickness: 3/4 inch.
- E Panel Edge: Square.
- F Color: As indicated on drawings.
- G Suspension System Type GR-1: Exposed grid.
- H Products:
1. Armstrong World Industries, Inc; Ultima: www.armstrongceilings.com/#sle.

2.05 ACOUSTICAL PANELS, TYPE ACT-2: GLASS FIBER WITH MEMBRANE-FACED OVERLAY,

ATTACHED TO SUSPENDED CEILING GRID WITH BAFFLE CLIPS, WITH THE FOLLOWING CHARACTERISTICS:

- A Classification: ASTM E1264 Type XII.
- B Size: 24 by 24 inches.
- C Thickness: 3/4 inch.
- D Panel Edge: Square.
- E Color: As indicated on drawings.
- F Suspension System Type GR-1: Exposed.
- G Products:
1. Armstrong World Industries, Inc; Optima: www.armstrongceilings.com/#sle.

2.06 ACOUSTICAL WOOD CEILINGS

- A Wood Veneer Acoustic Panels Type LWC-1: 100% polyester core with wood veneer face and non-woven acoustical fabric backer.
1. Panel Size: 24 by 24 inches.
 2. Panel Thickness: 0.47 inch.

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3. Slat Size: Refer to Drawings and Material Schedule
4. Noise Reduction Coefficient (NRC): 0.90 when tested in accordance with ASTM C423 for Type E mounting, per ASTM E795.
5. Composition: 100% Polyester
6. Surface Veneer Species: Refer to Drawings and Material Schedule.
7. Installation:
 - a. Suspension System: Exposed grid Type GR-1.
8. Products:
 - a. SoftenUp Plateau Ceiling | 800.966.8557 | acoufelt.com | hello@acoufelt.com .
 - b. Or Approved Equal.

2.07 SUSPENSION SYSTEM(S)

- A Manufacturers:
1. Same as for acoustical units.
 2. Refer to Drawings and Material Schedule.
- B 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.
1. Materials:
 - a. Steel Grid: ASTM A653/A653M, G60 coating, unless otherwise indicated.
 2. Suspension system shall support the ceiling system specified with a maximum deflection of 1/360 of the span.
- C Exposed Suspension System, Type GR-1: Hot-dipped galvanized steel grid with steel cap.
1. Application(s): Seismic.
 2. Structural Classification: Intermediate-duty, when tested in accordance with ASTM C635/C635M.
 3. Profile: Tee; 15/16 inch face width.
 4. Finish: Baked enamel.
 5. Color: Refer to Drawings and Material Schedule..
 6. Products:
- D Components: Main beams and cross tees In accordance with the International Building Code,
1. Structural Classification: ASTM C635, Intermediate Duty.
 2. Exposed Tee System - . Refer to Drawings and Material Schedule.
 3. Main-Runners: Minimum of 1.64 inch in height with an exposed capped face of width of 15/16 inch, unless otherwise indicated on Drawings.
 4. Cross-Tees: Minimum of 1-1/2 inch or 1-1/4 inch in height with an exposed capped face in a width to match main runners.
 5. Finish: Exposed faces of main and cross runners shall be a baked enamel paint finish, Colors as follows:
 - a. Refer to Drawings and Material Schedule.
- E Attachment Devices: Size for five times design load indicated in ASTM C635, Table 1, Direct Hung unless otherwise indicated.
1. In accordance with the International Building Code, Section 1613 for Category D, E, and F.
- F Wire for Hangers and Ties:
1. ASTM A641, Class 1 zinc coating, soft temper, pre-stretched, with a yield stress load of at least time three design load, but not less than 12 gauge.
- G Edge Moldings and Trim: Metal or extruded aluminum of types and profiles indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations, including light fixtures,

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that fit type of edge detail and suspension system indicated. Provide moldings with exposed flange of the same width as exposed runner.

1. In accordance with the International Building Code, Section 1613 for Category D, E, and F or method as described in ESR-1308.
 - a. Nominal 7/8 inch x 7/8 inch hemmed, pre-finished angle molding.
 - b. Nominal 15/16 inch x 15/16 inch hemmed, pre-finished angle molding.
- H Compression Struts: C-shaped steel stud in compliance with Section 092116. Provide in minimum thickness as required to adequately resist the vertical component induced by the bracing wire
- I Hold-Down Clips: Provide access type hold-down clips where required by Acoustical Ceiling Manufacturer for type and condition and where panels weigh less than one pound per square foot.

2.08 ALUMINUM CUSTOM TRIM - EXTRUDED

- A Product/Manufacturer: Axiom Trim Channel: 4in and 16in Axiom Classic Straight Armstrong World Industries, Incorporated.
- B A. Commercial quality extruded aluminum alloy 6063 trim channel, factory finished in baked polyester paint. Commercial quality galvanized steel unfinished T-bar connection clips; galvanized steel splice plates.
 1. Color: As indicated on Drawings and Material Schedule.
 2. Size: As indicated on Drawings.
 3. Recycle Content: Post-Consumer - 10% Pre-Consumer - 35%
 4. Acceptable Product: AXIOM Classic, 16in Axiom Classic Straight as manufactured by Armstrong World Industries
- C Axiom Trim Channel:
 1. 4in Axiom Classic Straight.
 2. 16in Axiom Classic Straight.
- D Axiom Outside Corner Posts (Straight Only):
 1. 4in Axiom Classic Outside Corner Post.
 2. 16in Axiom Classic Quick Ship Outside Corner 360 Painted.

2.09 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 Hold-Down Clips: Manufacturer's standard clips to suit application.
- D Seismic Clips: Manufacturer's standard clips for seismic conditions and to suit application.
- E Wood Veneer Panel Safety Clips: Galvanized 1-9/16 by 5-1/2 inch bent sheet metal clips screw anchored to back of adjacent panels and spanning over top of suspended tee grid.
 1. Wire Ties: No. 12 galvanized wire.
- F Perimeter Moldings: Same metal and finish as grid.
 1. Size: As required for installation conditions and specified Seismic Design Category.
 2. Angle Molding: L-shaped, for mounting at same elevation as face of grid.
 3. Acoustical Sealant For Perimeter Moldings: Non-hardening, non-skinning, for use in conjunction with suspended ceiling system.
- G Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

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- A Verify existing conditions before starting work.
- B Verify that layout of hangers will not interfere with other work.

3.02 PREPARATION

- A Install after major above-ceiling work is complete.
- B Coordinate the location of hangers with other work.
- C Provide hanger clips during steel deck erection. Provide additional hangers and inserts as required.

3.03 INSTALLATION (CATEGORY D,E,F)

- A Install suspension system and panels in accordance with the International Building Code, Section 1613, except as noted in Section 4.4.3.1 of ESR-1308, and with the authorities having jurisdiction.
- B ESR-1308, Section 4.4.3.1, Alternate Seismic Design Category D,E and F Installation:
 - 1. Under this installation, the runners must be rated heavy-duty and have a minimum simple span uniform load of 16.35 pounds per lineal foot (238 N/m); maximum ceiling weight permitted is 1.80 pounds per square foot (8.78 kg/m²).
 - 2. The BERC-2 clip is used to secure the main runners and cross runners on two adjacent walls to the structure and the two opposite walls to the perimeter trim, as detailed below. A nominal 7/8-inch (22 mm) wall molding is used in lieu of the 2-inch (51 mm) perimeter supporting closure angle required by Section 9.6.2.6.2.2 (b) of ASCE-7 for Seismic Design Categories D, E and F. Except for the use of the BERC-2 clip and the 7/8-inch (22 mm) wall molding and elimination of spreader bars, installation of the ceiling system must be as prescribed by the applicable code.
 - 3. The BERC-2 clip is attached to the wall molding by sliding the locking lances over the hem of the vertical leg of the wall molding. Clips installed on the walls where the runners are fixed are attached to the runner by a sheet metal screw through the horizontal slot in the clip into the web of the runner.
 - a. Alternate #2: If acceptable to architect, fixed attachment may be accomplished by pop-riveting the runner to the wall molding.
 - 4. Clips installed on the walls where the runners are not fixed to the runner allow the terminal runner end to move 3/4 inch (19.1 mm) in both directions. BERC-2 clips installed in this manner are an acceptable means of preventing runners from spreading in lieu of spacer bars required in CISCA 3-4, which is referenced in ASCE 7, Section 9.6.2.6.2.2, which is referenced in IBC Section 1621.

3.04 INSTALLATION - SUSPENSION SYSTEM

- A Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, ASTM C636/C636M, ASTM E580/E580M, ASTM C636/C636M, and ASTM E580/E580M and as supplemented in this section.
- B Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.
- D Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Use longest practical lengths.
- E Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of

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face plane of adjacent members.

- F Seismic Suspension System, Seismic Design Category C: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Maintain a 3/8 inch clearance between grid ends and wall.
- G Seismic Suspension System, Seismic Design Categories D, E, F: Hang suspension system with grid ends attached to the perimeter molding on two adjacent walls; on opposite walls, maintain a 3/4 inch clearance between grid ends and wall.
- H 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.
- I Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- J Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- K Do not eccentrically load system or induce rotation of runners.
- L Form expansion joints as detailed. Form to accommodate plus or minus 1 inch movement. Maintain visual closure.
- M Install light fixture boxes constructed of gypsum board above light fixtures in accordance with fire rated assembly requirements and light fixture ventilation requirements.

3.05 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 Lay directional patterned units with pattern parallel to longest room axis.
- D Fit border trim neatly against abutting surfaces.
- E Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- F Cutting Acoustical Units:
 - 1. Cut to fit irregular grid and perimeter edge trim.
 - 2. Make field cut edges of same profile as factory edges.
 - 3. Double cut and field paint exposed reveal edges.
- G Where round obstructions occur, provide preformed closures to match perimeter molding.
- H For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces.
- I Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.
- J Lay acoustical insulation for a distance of 48 inches either side of acoustical partitions as indicated.
- K Install hold-down clips on each panel to retain panels tight to grid system; comply with fire rating requirements.
- L Install hold-down clips on panels within 20 ft of an exterior door.

3.06 LIGHTING FIXTURES:

- A All light fixtures shall be mechanically attached to the suspension system per NEC 410-16 (two per fixture unless the fixture is independently supported).
- B Support of rigid lay-in (Type G) or can light fixtures:
 - 1. Each fixture less than 10 lbs. shall have a single wire (wire may be slack) attached from the fixture to structure.

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2. Each fixture that weighs between 10 and 56 lbs. shall have two wires (wires may be slack) attached at diagonal corners of the fixture to structure.
3. Each fixture greater than 56 lbs. shall be directly supported to structure by approved hangers.
4. Pendant light fixtures shall be directly supported from structure with 9-gauge wire (or approved alternative).

3.07 AIR TERMINALS:

- A Air terminals less than 20 lbs. shall be positively attached to the suspension system.
- B Air terminals that weigh between 20 and 56 lbs. shall be mechanically attached to the suspension system. Two slack wires shall be attached from the housing to structure.
- C Air terminals in excess of 56 lbs. shall be directly supported to structure by approved hangers.

3.08 SPRINKLER HEADS AND OTHER PENETRATIONS

- A Shall have 3/8" clearance on all sides.

3.09 TOLERANCES

- A Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

3.10 ADJUSTING AND CLEANING

- A Replace damaged and broken panels.
- B Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.
- C Removal of debris: Remove all debris resulting from work of this section.

END OF SECTION 095100

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SECTION 096500 - RESILIENT FLOORING, WALL BASE AND ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Resilient sheet flooring.
- B Linoleum Sheet Flooring
- C Resilient base.
- D Installation accessories.

1.02 RELATED REQUIREMENTS

- A Section 033000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied resilient flooring.
- B Section 090561 - Common Work Results for Flooring Preparation: Removal of existing floor coverings, cleaning, and preparation.
- C Section 090561 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.
- D Section 260526 - Grounding and Bonding for Electrical Systems: Grounding and bonding of static control flooring to building grounding system.

1.03 REFERENCE STANDARDS

- A ASTM D6329 - Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers; 1998 (Reapproved 2023).
- B ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2023.
- C ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2022.
- D ASTM F1861 - Standard Specification for Resilient Wall Base; 2021.
- E ASTM F2034 - Standard Specification for Sheet Linoleum Floor Covering; 2018.
- F ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.
- G 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 013300 - Submittal 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.
 - 1. Include information stating Static Coefficient of Friction.
 - 2. MSDS
 - a. Submit Material Safety Data Sheets (MSDS) available for flooring products, adhesives, patching/leveling compounds, floor finishes (polishes) and cleaning agents.
 - 3. For resilient products. Use same designations indicated on Drawings.
- C Shop Drawings: Indicate seaming plans and floor patterns.
- D Verification Samples: Submit 4 samples, 6 by 6 inch in size illustrating color and pattern for each resilient product specified.
- E Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.

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- F Certification: Prior to installation of flooring, submit written certification by flooring manufacturer and adhesive manufacturer that condition of subfloor is acceptable.
- G Manufacturer's Qualification Statement.
- H Installer's Qualification Statement.
- I Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- J Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements, for additional provisions.
 - 2. Extra Flooring Material: 100 square feet of each type and color.
 - 3. Extra Wall Base: 100 linear feet of each type and color.

1.05 QUALITY ASSURANCE

- A Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum 10 years documented experience.
- B Installer Qualifications: Company specializing in installing specified flooring with minimum 5 years documented experience.
- C Testing Agency Qualifications: Independent firm specializing in performing concrete slab moisture testing and inspections of the type specified in this section.

1.06 QUALITY ASSURANCE AND REGULATORY REQUIREMENTS

- A Single-Source Responsibility: provide types of flooring and accessories supplied by one manufacturer, including leveling and patching compounds, and adhesives.
- B Provide flooring material to meet the following fire test performance criteria as tested by a recognized independent testing laboratory:
 - 1. ASTM E648 Critical Radiant Flux of 0.45 watts per sq. cm. or greater, Class I.
 - 2. ASTM E662 (Smoke Generation) Maximum Specific Optical Density of 450 or less.
- C Slip resistance of floor surfaces and changes in level shall be in accordance with applicable law.

1.07 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.

1.08 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.
- B Install flooring and accessories after the other finishing operations, including painting, have been completed. Close spaces to traffic during the installation of the flooring. Do not install flooring over concrete slabs until they are sufficiently dry to achieve a bond with the adhesive, in accordance with the manufacturer's recommended bond and moisture tests.

1.09 WARRANTY

- A See Section 017836 - Warranties and Bonds, for additional warranty requirements.
- B Resilient Products:

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1. Resilient Base: Submit a written warranty executed by the manufacturer, agreeing to repair or replace resilient base that fails within the warranty period.
2. Warranty Period:
 - a. For Materials: 2 years
- C Linoleum Products:
 1. Manufacturer warrants that flooring products are free from manufacturing defects. Refer to product-specific warranty document for additional detail and warranty period.
 - a. Material warranty must be direct from the product manufacturer.
 - b. Material warranties from separate or third-party insurance providers are not valid.
 - c. Material warranties from private label distributors are not valid.
 - d. Failures include the following:
 - 1) Material manufacturing defects.
 - e. Warranty Period:
 - 1) For materials: 10 years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS:

- A Basis of Design: Contract Documents are based on products specified below to establish a standard of quality. Other acceptable manufacturers with products having equivalent characteristics may be considered, provided deviations are minor and design concept expressed in Contract Documents is not changed, as determined by the Architect.
 1. Approved Manufacturer(s): Refer to Drawings and Material Schedules.
 - a. As specified in this section for other products.
- B Substitutions: Refer to Section 012500 - Substitution Procedures.

2.02 SHEET FLOORING

- A Linoleum Sheet Flooring - Type LF-1: A calendared 2.5mm thick, 6'6" (2m) wide homogeneous linoleum sheet flooring featuring a marble design with a jute backing. The colored design is throughout the homogeneous construction and made with natural raw materials including linseed oil, natural tree resins, wood flour, limestone, and colored pigments. The flooring is protected by a factory applied Neocare® polyurethane surface treatment.
 1. Approved Manufacturers:
 - a. Forbo Flooring, Inc: www.forboflooringna.com/#sle.
 - b. Basis of Design: Gerflor USA, Inc; Gerflor DLW Linoleum Collection: www.gerflorusa.com/#sle.
 - c. Johnsonite, a Tarkett Company: www.johnsonite.com/#sle.
 2. Minimum Requirements: Comply with ASTM F2034, Type 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. Backing: Jute fabric.
 5. Applied Finish: Manufacturer's, factory-applied, permanent UV-cured.
 - a. Basis-of-Design Product: Neocare®
 6. Thickness: 0.100 inch, minimum, excluding backing.
 7. Seams: Heat welded.
 - a. Heat Welding Rod: As supplied by indoor flooring manufacturer. Color shall blend with resilient flooring color.
 8. Color and Pattern: As indicated on drawings.
 9. Trowelable Leveling and Patching Compound: Latex-modified, hydraulic-cement-based moisture insensitive formulation approved by the flooring manufacturer.

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10. Adhesive Method: as recommended per Manufacturer installation instructions to ensure proper installation and performance.
 - a. Water-resistant type recommended by flooring manufacturer for substrate and conditions indicated.
 - 1) Basis-of-Design Product: Gerflor Gerfix 313 Linoleum Adhesive and Gerfix 100.
 - 2) Coverage Type: Full-spread or full surface application
 - 3) Adhesive Available for 100% RH Slab Moisture Installations with no vapor retarder needed beneath the concrete.
 - B Welding Rod: Solid bead in material compatible with flooring, produced by flooring manufacturer for heat welding seams, and in color matching field color.

2.03 RESILIENT BASE

- A Resilient Base Type RB1 : ASTM F1861, Type TP, rubber, thermoplastic; Group 1 top set Style A, Straight.
 1. Approved Manufacturers:
 - a. Basis of Design: Johnsonite, a Tarkett Company[<>]: www.johnsonite.com.
 2. Acceptable Manufacturers:
 - a. Armstrong Flooring: www.ArmstrongFlooring.com
 - b. Substitutions: See Section 016000 - Product Requirements.
 3. Style: Refer to Drawings and Material Schedule.
 4. Height: 4 inch.
 5. Finish: Matte.
 6. Length: 4 foot sections.
 7. Color: As indicated on drawings.
 8. Accessories: Premolded external corners and internal corners.

2.04 ACCESSORIES

- A Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.
- C Adhesive for Vinyl Flooring: : Solvent free no VOC as recommended by manufacturer.
- D Filler for Coved Base: Plastic.

PART 3 EXECUTION

3.01 EXAMINATION

- A Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- B Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- C Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
 1. Test in accordance with Section 090561.
 2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
 3. Follow moisture and alkalinity remediation procedures in Section 090561.
- D Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

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- A Prepare floor substrates for installation of flooring in accordance with Section 090561.

3.03 INSTALLATION - GENERAL

- A Starting installation constitutes acceptance of subfloor conditions.
- B Install in accordance with manufacturer's written instructions.
- C Adhesive-Applied Installation:
 - 1. Spread only enough adhesive to permit installation of materials before initial set.
 - 2. Fit joints and butt seams tightly.
 - 3. Set flooring in place, press with heavy roller to attain full adhesion.
- D Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- E Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
 - 1. Metal Strips: Attach to substrate before installation of flooring using stainless steel screws.
 - 2. Resilient Strips: Attach to substrate using adhesive.
- F Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 INSTALLATION - 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.
- C Seal seams by heat welding where indicated.
- D Coved Base: Install as detailed on drawings, using coved base filler as backing at floor to wall junction. Extend sheet flooring vertically to height indicated, and cover top edge with metal cap strip.

3.05 INSTALLATION - RESILIENT BASE

- A Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
- B Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.
- C Install base on solid backing. Bond tightly to wall and floor surfaces.
- D Scribe and fit to door frames and other interruptions.

3.06 CLEANING

- A Remove excess adhesive from floor, base, and wall surfaces without damage.
- B Clean in accordance with manufacturer's written instructions.

3.07 PROTECTION

- A Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION 096500

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SECTION 096720 - RESINOUS FLOORING SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

- A This section includes the following:
 - 1. Resinous flooring system as shown on the drawings and in schedules.

1.02 RELATED REQUIREMENTS

- A Section 079200 - Joint Sealants.
- B Section 090561 - Common Work Results for Flooring Preparation.

1.03 REFERENCE STANDARDS

- A ASTM C579 - Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes; 2023.
- B ASTM C580 - Standard Test Method for Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes; 2018 (Reapproved 2023).
- C ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2022.
- D ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics; 2023.
- E ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials; 2017.
- F ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015 (Reapproved 2021).
- G ASTM D4060 - Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser; 2019.
- H ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- I ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.
- J ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2023.
- K UL 410 Standard for Safety for Slip Resistance of Floor Surface Materials; 2020.

1.04 SYSTEM DESCRIPTION

- A The work shall consist of preparation of the substrate, the furnishing and application of a squeegee-applied resinous flooring system with Micro or Macro colored decorative chips and topcoat. The system shall have the color and texture as specified by the Owner with a nominal thickness of 50 mils. It shall be applied to the prepared area(s) as defined in the plans strictly in accordance with the Manufacturer's recommendations.

1.05 SUBMITTALS

- A See Section 013300 - Submittal Requirements for submittal procedures.
- B Product Data: Submit manufacturer's technical data, installation instructions, and general recommendations for each resinous flooring material required. Include certification indicating compliance of materials with requirements.
- C Surfacing applicator shall submit samples of color and textures for Architect's approval.
- D Samples: Submit, for verification purposes, 6 x 6 inch square samples of each type of resinous decking required, applied to a rigid backing, in color and finish indicated.

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1. For initial selection of colors and finishes, submit manufacturer's color charts showing full range of colors and finishes available.

1.06 MOCK-UP

- A Build mock-ups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
- B Extent of mock-up shall be the same as that which will be provided in the final work.
- C Personnel assembling mock-up shall be the same personnel that will perform the actual work at the project site.
- D Mock-up shall be installed simulating actual construction conditions. Use means, methods and techniques proposed for final installation.
- E Construct mock-up of resinous ceiling, wall, flooring, border and base illustrating appearance of finished work at corners and material transitions. Size mock-up to be not less than 6 x 6 x 6 feet.
- F Locate where directed.
- G Approved mock-up may not remain as part of the Work.
- H Mock-up shall be subjected to testing criteria specified for final installation.

1.07 QUALITY ASSURANCE

- A Single Source Responsibility: Obtain primary resinous flooring materials including primers, resins, hardening agents, finish or sealing coats from a single manufacturer with not less than ten years of successful experience in manufacturing and installing principal materials described in this section. Contractor shall have completed at least five projects of similar size and complexity; Stonhard or approved equal. Provide secondary materials only of type and from source recommended by manufacturer of primary materials.
- B Surfacing shall be applied by a surfacing applicator approved by the Architect, with a minimum of seven (7) years experience installing the brand of surfacing in similar size and function projects. A list of ten (10) completed projects using the specified materials must be submitted proving seven (7) years experience by the lead mechanic.
- C Surfacing applicator shall provide to the architect a completed list of jobs including the names of the Architect, General Contractor, and Owner, telephone numbers of all concerned, materials used, quantity installed and date completed on similar projects.
- D Surfacing applicator must provide a written joint guarantee for materials and workmanship between applicator and surfacing manufacturer for one (1) year.
- E Surfacing applicator or manufacturer seeking approval of products other than what is specified must supply samples, full product information, technical data with specifications, certification from an independent testing laboratory that the product being submitted for approval meets all requirements of the performance properties specified within this specification, installation instructions and comply with the above quality assurances in writing fourteen (14) days before bid letting.
 - 1. Omission of any item will result in an automatic rejection.
 - 2. Bidders will be notified by addendum of substitute surfacing materials, if approved.
- F Static Coefficient of Friction: Provide floor products and finished floor installations with a wet and dry static coefficient of friction of 0.6 minimum for level surfaces and treads of stairs and 0.8 minimum for ramp surfaces as tested.

1.08 DELIVERY, STORAGE AND HANDLING

- A Material shall be delivered to job site and checked by flooring contractor for completeness and shipping damage prior to job start.

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- B All materials used shall be factory pre-weighed and pre-packaged in single, easy to manage batches to eliminate on site mixing errors. No on site weighing or volumetric measurements allowed.
- C Material shall be stored in a dry, enclosed area protected from exposure to moisture. Temperature of storage area shall be maintained between 60 and 85°F/16 and 30°C.
- D Material temperatures shall be a minimum of 55°F before use.
- E Work on seamless flooring shall not commence until the building can be maintained at a minimum temperature of 55 °F for 48 hours before, during and 48 hours after application. Areas shall also be broom clean and reasonably dust free and shall have adequately controlled ventilation with bright, uniform lighting.

1.09 PROJECT CONDITIONS

- A Before commencing work, ensure environmental and site conditions are suitable for application and curing.
- B Site Requirements
 - 1. Application may proceed while air, material and substrate temperatures are between 60 F and 85 F providing the substrate temperature is above the dew point. Outside of this range, the Manufacturer shall be consulted.
 - 2. The relative humidity in the specific location of the application shall be less than 85 % and the surface temperature shall be at least 5 F above the dew point.
 - 3. The application of Accelera where jobsite relative humidity is less than 30% is not recommended.
 - 4. Use Accelera LH resin where jobsite relative humidity is between 10% and 30%.
 - 5. The Applicator shall ensure that adequate ventilation is available for the work area. This shall include the use of manufacturer's approved fans, smooth bore tubing and closure of the work area.
 - 6. The Applicator shall be supplied with adequate lighting equal to the final lighting level during the preparation and installation of the system.
- C Safety Requirements
 - 1. All open flames and spark-producing equipment shall be removed from the work area prior to commencement of application.
 - 2. "No Smoking" signs shall be posted at the entrances to the work area.
 - 3. The Owner shall be responsible for the removal of foodstuffs from the work area.
 - 4. Non-related personnel in the work area shall be kept to a minimum.

1.10 PROTECTION

- A Protect adjacent surfaces from damage resulting from work of this trade. If necessary, mask and/or cover adjacent surfaces, fixtures, cabinet work, equipment, etc. by suitable means.

1.11 WARRANTY

- A Manufacturer warrants that material shipped to buyers at the time of shipment substantially free from material defects and will perform substantially to Dur-A-Flex, Inc. published literature if used in accordance with the latest prescribed procedures and prior to the expiration date.
- B Dur-A-Flex, Inc. liability with respect to this warranty is strictly limited to the value of the material purchase.

PART 2 PRODUCTS

2.01 MANUFACTURER:

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- A Basis of Design: Contract Documents are based on products specified below to establish a standard of quality. Other acceptable manufacturers with products having equivalent characteristics may be considered, provided deviations are minor and design concept expressed in Contract Documents is not changed, as determined by the Architect.
 - 1. Dur-A-Flex, Inc., 95 Goodwin Street, East Hartford, CT 06108, Phone: (860) 528-9838, Fax: (860) 528-2802
- B Acceptable Manufacturers: Subject to compliance with requirements of Contract Documents, provide product by one of manufacturers listed alphabetically below. If not listed, submit as substitution according to Conditions of the Contract and Division 1 Sections.
 - 1. Flowcrete Americas, which is located at: 616 Spring Hill Dr. Suite 100; Spring, TX 77386; Tel: 936 539 6700; Fax: 936 539 6701; Web: www.flowcreteamericas.com.
 - 2. Or Approved Equal.
- C Substitutions: 012500 Substitution Procedures.

2.02 MATERIALS FLOORING:

- A Resinous Flooring - Type RS-1: Dur-A-Flex, Inc, ACCELERERA HC seamless flooring system
 - 1. System Materials:
 - a. Primer: Dur-A-Flex, Inc, ACCELERERA (HC) Pigmented Poly-Crete TF Plus (only required if the substrate is very porous).
 - b. Body Coat: Pigmented Poly-Crete SL.
 - c. Chip Broadcast: Dur-A-Flex, Inc. Macro or Micro Decorative Vinyl chip into the SL.
 - d. Second Chip Broadcast: Clear Accelerera, Accelerera LH, or Accelerera EXT with broadcast of Macro or Micro Vinyl Chip Aggregate.
 - e. Topcoat: Dur-A-Flex, Inc. ACCELERERA (HC) Clear, gloss, or satin Accelerera, Accelerera LH, or Accelerera EXT.
 - 2. Patch Materials
 - a. Shallow Fill and Patching: Use Dur-A-Flex, Inc. Dur-A-Glaze #4 Cove-Rez.
 - b. Deep Fill and Sloping Material (over ¼ inch): Use Dur-A-Flex, Inc. Poly-Crete WR.
 - 3. Color/Pattern: As indicated on Drawings and Material Schedule.
- B Cove Base - Type B-2: Provide seamless high turned up cove base with 1" radius cove as indicated on drawings, for an integral seal at the joint between the floor and the wall.

PART 3 - EXECUTION

3.01 EXAMINATION

- A Examine substrates, areas and conditions, with Applicator present, for compliance with requirements for maximum moisture content, installation tolerances and other conditions affecting flooring performance.
- B Verify that substrates and conditions are satisfactory for flooring installation and comply with requirements specified.

3.02 PREPARATION

- A General
 - 1. Existing concrete surfaces shall be free of oil, grease, curing compounds, loose particles, moss, algae growth, laitance, friable matter, dirt, and bituminous products.
- B Moisture Testing: Perform tests recommended by manufacturer and as follows.
 - 1. Perform anhydrous calcium chloride test ASTM F1869. Application will proceed only when the vapor/moisture emission rates from the slab is less than and not higher than 20 lbs/1,000 sf/24 hrs.

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2. Perform relative humidity test using is situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 99% relative humidity level measurement.
 3. If the vapor drive exceeds 99% relative humidity or 20 lbs/1,000 sf/24 hrs then the Owner and/or Engineer shall be notified and advised of additional cost for the possible installation of a vapor mitigation system that has been approved by the manufacturer or other means to lower the value to the acceptable limit.
- C Mechanical surface preparation:
1. Shot blast all surfaces to receive flooring system with a mobile steel shot, dust recycling machine (Blastrac or equal). All surface and embedded accumulations of paint, toppings hardened concrete layers, laitance, power trowel finishes and other similar surface characteristics shall be completely removed leaving a bare concrete surface having a minimum profile of CSP 4-5 as described by the International Concrete Repair Institute.
 2. Floor areas inaccessible to the mobile blast machines shall be mechanically abraded to the same degree of cleanliness, soundness and profile using diamond grinders, needle guns, bush hammers, or other suitable equipment.
 3. Where the perimeter of the substrate to be coated is not adjacent to a wall or curb, a minimum 1/4 inch key cut shall be made to properly seat the system, providing a smooth transition between areas. The Cracks and joints (non-moving) greater than 1/8 inch wide are to be chiseled or chipped-out and repaired per manufacturer's recommendations.
 4. Cracks and joints (non-moving) greater than 1/8 inch wide are to be chiseled or chipped-out and repaired per manufacturer's recommendations.
 5. At spalled or worn areas, mechanically remove loose or delaminated concrete to a sound concrete and patch per manufactures recommendations.

3.03 FLOORING APPLICATION

- A General:
1. The system shall be applied in five distinct steps as listed below:
 - a. Substrate preparation
 - b. Topping/overlay application with chip broadcast.
 - c. Resin application with chip broadcast.
 - d. Topcoat application
 2. Immediately prior to the application of any component of the system, the surface shall be dry and any remaining dust or loose particles shall be removed using a vacuum or clean, dry, oil-free compressed air.
 3. The handling, mixing and addition of components shall be performed in a safe manner to achieve the desired results in accordance with the Manufacturer's recommendations.
 4. The system shall follow the contour of the substrate unless pitching or other leveling work has been specified by the Architect.
 5. A neat finish with well-defined boundaries and straight edges shall be provided by the Applicator.
- B Primer
1. The primer shall be pigmented ACCELERA mixed per the manufacturer's instructions.
 2. The primer shall be applied by 1/8" V-notched squeegee and cross rolled with a 3/8" nap roller at the rate of 115 SF/kit.
- C Broadcast Coat:
1. The broadcast coat shall be applied as a single broadcast system as specified by the Architect.
 2. The broadcast coat shall be comprised of two components: a resin, and hardener as supplied by the Manufacturer and mixed per manufacturer instructions.

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3. The hardener shall be added to the resin and thoroughly mixed by suitably approved mechanical means.
 4. The broadcast coat shall be applied over horizontal surfaces using a 3/16" V-notched squeegee and cross rolled with a 3/8" nap roller at the rate of 75 SF/kit.
 5. Chips shall be broadcast to excess into the wet material, Macro chips at the rate of 0.1 lbs/sf, and Micro chips at the rate of 0.15 lbs/sf.
 6. Allow material to fully cure. Vacuum, sweep and/or blow to remove all loose aggregate.
 7. Scrape the floor with a trowel or floor scraper. Sweep and vacuum the floor again.
- D Topcoat
1. The grout coat shall be comprised of ACCELEREA resin and hardener mixed per the manufacturer's instructions.
 2. The grout coat shall be flat squeegee applied and cross rolled with a 3/8" nap roller with a coverage rate of 65 SF/kit.
 3. The finished floor will have a nominal thickness of 44 mils.

3.04 FIELD QUALITY CONTROL

- A Tests, Inspection
1. The following tests shall be conducted by the Applicator:
 - a. Temperature
 - 1) Air, substrate temperatures and, if applicable, dew point.
 - b. Coverage Rates
 - 1) Rates for all layers shall be monitored by checking quantity of material used against the area covered.

3.05 CLEANING AND PROTECTION

- A Cure flooring material in compliance with manufacturer's directions, taking care to prevent their contamination during stages of application and prior to completion of the curing process.
- B Remove masking. Perform detail cleaning at floor termination, to leave cleanable surface for subsequent work of other sections.

END OF SECTION 096720

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SECTION 096813 - TILE CARPETING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Carpet tile, fully adhered.
- B Removal of existing carpet tile.

1.02 RELATED REQUIREMENTS

- A Section 090561 - Common Work Results for Flooring Preparation: Removal of existing floor coverings, cleaning, and preparation.
- B Section 090561 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.

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; 2023.
- C ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2022.
- D CRI 104 - Standard for Installation of Commercial Carpet; 2015.
- E CRI (GLP) - Green Label Plus Testing Program - Certified Products; Current Edition.
- F 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 013000 - Administrative Requirements, for submittal procedures.
- B Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- C Shop Drawings: Indicate layout of joints and location of edge moldings.
- D Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.
- E Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- F Operation and Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.
- G Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements, for additional provisions.
 - 2. Extra Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed.

1.05 QUALITY ASSURANCE

- A Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum 10 years documented experience.
- B Installer Qualifications: Company specializing in installing carpet tile with minimum 5 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.

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1.07 WARRANTY

- A See Section 017836 - Warranties and Bonds, for additional warranty requirements.
- B Special Warranty for Entry Mat Carpet Tiles: Manufacturer's standard form in which manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
 - 2. Warranty Period: Start at date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A Basis of Design: Contract Documents are based on products specified below to establish a standard of quality. Other acceptable manufacturers with products having equivalent characteristics may be considered, provided deviations are minor and design concept expressed in Contract Documents is not changed, as determined by the Architect.
 - 1. Carpet Tile:
 - a. Basis-of-Design: Interface, Inc: www.interfaceinc.com/#sle.
- B Acceptable Manufacturers: Subject to compliance with requirements of Contract Documents, provide product by one of manufacturers listed alphabetically below. If not listed, submit as substitution according to Conditions of the Contract and Division 01 Sections.
 - 1. Mannington Commercial: www.manningtoncommercial.com#sle.
 - 2. Shaw: shawcontract.com.
 - 3. Or Equal.
 - 4. Substitutions:012500 - Substitution Procedures.

2.02 MATERIALS

- A Carpet Tile, Type CPT-1: Multi-Level Pattern Loop, manufactured in one color dye lot.
 - 1. Product: Carpet Tile manufactured by Interface; www.shop.interface.com.
 - 2. Collection: Refer to Drawings and Material Schedule. Style: Refer to Drawings and Material Schedule.
 - 3. Tile Size: Refer to Drawings and Material Schedule.
 - 4. Thickness: Refer to Drawings and Material Schedule. .
 - 5. Color: Refer to Drawings and Material Schedule..
 - 6. Pattern: Refer to Drawings.
 - 7. VOC Content: Provide CRI (GLP) certified product; in lieu of labeling, independent test report showing compliance is acceptable.
 - 8. Gage: 1/10 inch.
 - 9. Stitches: 9.5 per inch.
 - 10. Primary Backing Material: Synthetic.
 - 11. Secondary Backing Material: ecoworx® tile.
 - 12. Total Weight: 24.0 oz/sq yd.

2.03 ACCESSORIES

- A Subfloor Filler: White premix latex; type recommended by flooring material manufacturer.
- B Edge Strips: Embossed aluminum, color as selected by Architect.
- C Adhesives:
 - 1. Compatible with materials being adhered; maximum VOC content of 50 g/L; CRI (GLP) certified; in lieu of labeled product, independent test report showing compliance is

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acceptable.

- D Carpet Tile Adhesive: Recommended by carpet tile manufacturer.

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 Cementitious Subfloor Surfaces: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).
 - 1. Test in accordance with Section 090561.
 - 2. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.
- E Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A Remove existing carpet.
- B Prepare floor substrates for installation of flooring in accordance with Section 090561.

3.03 INSTALLATION

- A Starting installation constitutes acceptance of subfloor conditions.
- B Install carpet tile in accordance with manufacturer's instructions.
- 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 Fully adhere carpet tile to substrate.
- G Trim carpet tile neatly at walls and around interruptions.
- H Complete installation of edge strips, concealing exposed edges.

3.04 CLEANING

- A See Section 017300 - Execution Requirements for additional requirements.
- B Remove excess adhesive without damage, from floor, base, and wall surfaces.
- C Clean and vacuum carpet surfaces.

END OF SECTION 096813

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SECTION 099113 - 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, including the following:
 - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
 - 2. Exposed surfaces of steel lintels and ledge angles.
 - 3. Mechanical and Electrical:
 - a. On the roof and outdoors, paint equipment exposed to weather or to view, including factory-finished materials.
- 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. Floors, unless specifically indicated.
 - 6. Glass.
 - 7. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

- A Section 055000 - Metal Fabrications: Shop-primed items.
- B Section 055100 - Metal Stairs: Shop-primed items.
- C Section 099123 - Interior Painting.

1.03 DEFINITIONS

- A Comply with ASTM D16 for interpretation of terms used in this section.
- B Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- C Gloss Level 2: Not more than 10 units at 60 degrees and 35 units at 85 degrees, according to ASTM D 523.
- D Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- E Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- F Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- G Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- H Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.
- I EG: Ethylene Glycol. Ethylene glycol is listed as a hazardous air pollutant (HAP) by the U.S. EPA.
- J Blocking: Two painted surfaces sticking together such as a painted door sticking to a painted jamb.
- K RAVOC: Reactivity adjusted VOC 'Reactivity' means the ability of a VOC to promote ozone formation.

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- L PDCA: Painting & Decorating Contractors of America www.pdca.org
- M SSPC: Scopes of SSPC Surface Preparation Standards and Specifications. www.sspc.org.
- N Green Wise: Green Wise products are tested in an ISO accredited laboratory to meet environmentally determined performance standards established by Coatings Research Group, Inc.

1.04 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 D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2024.
- C ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2020.
- D MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; Current Edition.
- E MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.
- F SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).

1.05 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. 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 three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
 - 1. Where sheen is specified, submit samples in only that sheen.
 - 2. Where sheen is not specified, discuss sheen options with Architect before preparing samples, to eliminate sheens not required.
 - 3. Allow 30 days for approval process, after receipt of complete samples by Architect.
 - 4. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as masonry, have been approved.
- D Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- E Manufacturer's Instructions: Indicate special surface preparation procedures.
- F Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.
- G 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 of each color; from the same product run, store where directed.
 - 3. Label each container with color in addition to the manufacturer's label.

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1.06 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 5 years experience and approved by manufacturer.

1.07 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.

1.08 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 Do not apply exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- D Minimum Application Temperatures for Latex Paints: 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- E Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A Paints:
 - 1. Base Manufacturer: Dunn-Edwards Corporation; www.dunnedwards.com/#sle..

2.02 PAINTS AND FINISHES - GENERAL

- A Paints and Finishes: Ready-mixed, unless required to be a field-catalyzed paint.
 - 1. Where MPI paint numbers are specified, provide products listed in Master Painters Institute Approved Product List, current edition available at www.paintinfo.com, for specified MPI categories, except as otherwise indicated.
 - 2. 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.
 - 3. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
 - 4. Supply each paint material in quantity required to complete entire project's work from a single production run.
 - 5. 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:
 - 1. Provide paints and finishes that comply with the most stringent requirements specified in the following:

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- a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
- b. Architectural coatings VOC limits of California.
- 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- C 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: As indicated in Color Schedule.
 - 1. Extend colors to surface edges; colors may change at any edge as directed by Architect.

2.03 PAINT SYSTEMS - EXTERIOR

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 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:

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 Exterior Gypsum Board: Fill minor defects with exterior filler compound. Spot prime defects after repair.
- G Aluminum: Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.

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.

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- E Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- F Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 FIELD QUALITY CONTROL

- A See Section 014000 - Quality Requirements, for general requirements for field inspection.

3.05 CLEANING

- A Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06 PROTECTION

- A Protect finishes until completion of project.
- B Touch-up damaged finishes after Substantial Completion.

3.07 SCHEDULE - PAINT SYSTEMS

- A Exterior Gypsum Board: Finish surfaces exposed to view, except _____.
- B Aluminum: Finish surfaces exposed to view, except _____.

3.08 EXTERIOR PAINTING SCHEDULE

- A Concrete Substrates, Masonry, Clay, Stucco, Non-Traffic Surfaces:
 - 1. Commercial Latex System:
 - a. Prime Coat: Primer, alkali resistant, waterbased, interior/exterior, Dunn-Edwards, Eff-Stop Select ESSL00.
 - b. Intermediate Coat: Latex, exterior, matching topcoat.
 - c. Topcoat: Latex, exterior, flat, Dunn-Edwards, Acri-Hues ACHS10 100% acrylic, (Gloss Level 1).
 - d. Topcoat: Latex, exterior, eggshell, Dunn-Edwards, Acri-Hues ACHS30 100% acrylic, (Gloss Level 3).
 - e. Topcoat: Latex, exterior, semi-gloss, Dunn-Edwards, Acri-Hues ACHS50 100% acrylic, (Gloss Level 5).
- B Ferrous Metal Substrates:
 - 1. Commercial Latex over a Waterborne Alkyd Primer System:
 - a. Prime Coat: Primer, rust inhibitive, waterborne alkyd, interior/exterior, Dunn-Edwards, Bloc-Rust Premium BRPR00 Series or Enduraprime rust preventative primer ENPR00.
 - b. Intermediate Coat: Latex, exterior, matching topcoat.
 - c. Topcoat: Latex, exterior, flat, Dunn-Edwards, Acri-Hues ACHS10 100% acrylic, (Gloss Level 1).
 - d. Topcoat: Latex, exterior, eggshell, Dunn-Edwards, Acri-Hues ACHS30 100% acrylic, (Gloss Level 3).
 - e. Topcoat: Latex, exterior, semi-gloss, Dunn-Edwards, Acri-Hues ACHS50 100% acrylic, (Gloss Level 5).
- C Non-Ferrous Metal Substrates:
 - 1. Commercial Latex System:
 - a. Pre-Treatment: Waterbased, Krud Kutter, Metal Clean & Etch SCME-01
 - b. Prime Coat: Primer, waterbased, interior/exterior, Dunn-Edwards, Ultrashield Galvanized Metal Primer ULGM00.

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- c. Intermediate Coat: Latex, exterior, matching topcoat.
 - d. Topcoat: Latex, exterior, flat, Dunn-Edwards, Acri-Hues ACHS10 100% acrylic, (Gloss Level 1).
 - e. Topcoat: Latex, exterior eggshell, Dunn-Edwards, Acri-Hues ACHS30 100% acrylic, (Gloss Level 3).
 - f. Topcoat: Latex, exterior, semi-gloss, Dunn-Edwards, Acri-Hues ACHS50 100% acrylic, (Gloss Level 5).
- D Stainless Steel, Anodized Aluminum Substrates:
- 1. Commercial Latex System:
 - a. Prime Coat: Primer, waterborne acrylic bonding primer, Dunn-Edwards, Super-Loc, SLPR00.
 - b. Intermediate Coat: Latex, exterior, matching topcoat.
 - c. Topcoat: Latex, exterior, flat, Dunn-Edwards, Acri-Hues ACHS10 100% acrylic, (Gloss Level 1).
 - d. Topcoat: Latex, exterior, eggshell, Dunn-Edwards, Acri-Hues ACHS30 100% acrylic, (Gloss Level 3).
 - e. Topcoat: Latex, exterior, semi-gloss, Dunn-Edwards, Acri-Hues ACHS50 100% acrylic, (Gloss Level 5).

END OF SECTION 099113

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SECTION 099123 - INTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Surface preparation.
- B Field application of paints.
- C Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
 - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
 - 2. Elevator pit ladders.
 - 3. Mechanical and Electrical:
 - a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
 - b. In finished areas, paint shop-primed items.
 - c. 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. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
- 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 055000 - Metal Fabrications: Shop-primed items.
- B Section 055100 - Metal Stairs: Shop-primed items.
- C Section 099113 - Exterior Painting.

1.03 DEFINITIONS

- A Comply with ASTM D16 for interpretation of terms used in this section.
- B Gloss Level 1: Not more than 5 units at 60 degrees and 1 to 2 units at 85 degrees.
- C Gloss Level 2: 5 to 9 units at 60 degrees and 10 to 15 units at 85 degrees.
- D Gloss Level 3: 10 to 15 units at 60 degrees and 15 to 30 units at 85 degrees.
- E Gloss Level 4: 20 to 35 units at 60 degrees and 35 to 50 units at 85 degrees.
- F Gloss Level 5: 40 to 50 units at 60 degrees.
- G Gloss Level 6: 70 to 80 units at 60 degrees.
- H Gloss Level 7: More than 80 units at 60 degrees.
- I Blocking: Two painted surfaces sticking together such as a painted door sticking to a painted jamb.

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- J Mildew Resistant: Certified products are specially formulated with microbicidal additives that resist mold, mildew, and algae growth on the paint film and inhibit growth of bacterial odors.
- K CHPS: Collaborative for High Performance Schools. A national movement to improve student performance and the entire educational experience by building the best possible schools. www.chps.net.
- L EG: Ethylene Glycol. Ethylene glycol is listed as a hazardous air pollutant (HAP) by the U.S. EPA.
- M PDCA: Painting & Decorating Contractors of America www.pdca.org.
- N RAVOC: Reactivity adjusted VOC. "Reactivity" means the ability of a VOC to promote ozone formation
- O SSPC: The Society for Protective Coatings publishes Scopes of SSPC Surface Preparation Standards and Specifications www.sspc.org.

1.04 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 D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2024.
- C ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2020.
- D MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; Current Edition.
- E MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.

1.05 SUBMITTALS

- A See Section 013300 - Submittal 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 products to be used in project; include description of each system.
 - 4. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.
- C Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
 - 1. Where sheen is specified, submit samples in only that sheen.
 - 2. Where sheen is not specified, discuss sheen options with Architect before preparing samples, to eliminate sheens not required.
 - 3. Allow 30 days for approval process, after receipt of complete samples by Architect.
 - 4. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as masonry, have been approved.
- D Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- E Manufacturer's Instructions: Indicate special surface preparation procedures.
- F Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished

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surfaces, and color samples of each color and finish used.

- G 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 gal of each color; from the same product run, store where directed.
 - 3. Label each container with color in addition to the manufacturer's label.

1.06 QUALITY ASSURANCE

- A Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum 10 years documented experience.
- B Applicator Qualifications: Company specializing in performing the type of work specified with minimum 5 years experience and approved by manufacturer.

1.07 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.

1.08 FIELD CONDITIONS

- A Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C Do not apply materials when relative humidity exceeds 85 percent, at temperatures less than 5 degrees F above the dew point, or to damp or wet surfaces.
- D Minimum Application Temperatures for Paints: 50 degrees F for interiors unless required otherwise by manufacturer's instructions.
- E Provide lighting level of 80 fc measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
- B Paints:
 - 1. Base Manufacturer: Dunn-Edwards Corporation: www.dunnedwards.com/#sle..

2.02 PAINTS AND FINISHES - GENERAL

- A Paints and Finishes: Ready-mixed, unless intended to be a field-catalyzed paint.
 - 1. Where MPI paint numbers are specified, provide products listed in Master Painters Institute Approved Product List, current edition available at www.paintinfo.com, for specified MPI categories, except as otherwise indicated.
 - 2. 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.
 - 3. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing

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- and field experience.
- 4. Supply each paint material in quantity required to complete entire project's work from a single production run.
- 5. 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:
 - 1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - b. Architectural coatings VOC limits of California.
 - 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- C 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: As indicated in Color Schedule.
 - 1. Extend colors to surface edges; colors may change at any edge as directed by Architect.
 - 2. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling under which they are mounted.
 - 3. 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 P-3 Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board.
 - 1. Two top coats and one coat primer.
 - 2. Commercial Low Odor / Zero VOC Latex System:
 - 3. Prime Coat: Primer sealer, latex, interior, Dunn-Edwards, Vinylastic Select VNSL00.
 - 4. Intermediate Coat: Latex, interior, matching topcoatRetain one of six "Topcoat" subparagraphs below.
 - 5. Top Coat(s): Interior Latex; MPI #43, 44, 52, 53, 54, or 114.
 - a. Products:
 - 1) Dunn-Edwards Corporation; Acri-Wall Interior Eggshell Paint. (MPI #44)
- B Medium Duty Door/Trim: For surfaces subject to frequent contact by occupants, including metals:
 - 1. Medium duty applications include doors and door frames.
 - 2. Two top coats and one coat primer.
 - 3. Top Coat(s): High Performance Architectural Interior Latex; MPI #138, 139, 140, or 141.
 - a. Products:
 - 1) Dunn-Edwards Corporation; Suprema Interior Semi-Gloss. (MPI #141)

PART 3 EXECUTION

3.01 EXAMINATION

- A Do not begin application of paints and finishes until substrates have been adequately 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.

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- 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 is below the following maximums:
 - 1. Gypsum Wallboard: 12 percent.
 - 2. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

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 Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
- G Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.
- H Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with clear sealer.

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 Sand wood and metal surfaces lightly between coats to achieve required finish.
- 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 FIELD QUALITY CONTROL

- A See Section 014000 - Quality Requirements, for general requirements for field inspection.

3.05 CLEANING

- A Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06 PROTECTION

- A Protect finishes until completion of project.
- B Touch-up damaged finishes after Substantial Completion.

3.07 SCHEDULE - PAINT SYSTEMS

- A Gypsum Board: Finish surfaces exposed to view, except _____.

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- B Wood: Finish surfaces exposed to view, except _____.
 - 1. Interior Trim and Frames: WI-OP-3A, semi-gloss.

3.08 INTERIOR PAINTING SCHEDULE

- A Gypsum Board Substrates:
 - 1. Commercial Low Odor / Zero VOC Latex System:
 - a. Prime Coat: Primer sealer, latex, interior, Dunn-Edwards, Vinylastic Select VNSL00.
 - b. Intermediate Coat: Latex, interior, matching topcoat. Retain one of six "Topcoat" subparagraphs below.
 - c. Topcoat: Latex, interior, flat, Dunn-Edwards, Acri-Wall ACWL10, (Gloss Level 1).
 - d. Topcoat: Latex, interior, eggshell, Dunn-Edwards, Acri-Wall ACWL30, (Gloss Level 3).
 - e. Topcoat: Latex, interior, semi-gloss, Dunn-Edwards, Acri-Wall ACWL50, (Gloss Level 5).
- B Ferrous Metal Substrates:
 - 1. Commercial Low Odor / Zero VOC Latex over a Waterborne Alkyd Primer System:
 - a. Prime Coat: Primer, alkyd, anti-corrosive, for metal, Dunn-Edwards, Bloc-Rust Premium BRPR00 Series or Enduraprime rust preventative primer ENPR00.
 - b. Intermediate Coat: Latex, interior, matching topcoat.
 - c. Topcoat: Latex, interior, flat, Dunn-Edwards, Acri-Wall ACWL10, (Gloss Level 1).
- C Stainless Steel, Anodized Aluminum Substrates:
 - 1. Premium Low Odor / Zero VOC Latex System:
 - a. Prime Coat: Primer, waterborne acrylic bonding primer, Dunn-Edwards, Super-Loc, SLPR00.
 - b. Intermediate Coat: Latex, interior, matching topcoat.
 - c. Topcoat: Latex, interior, flat, Dunn-Edwards, Acri-Wall ACWL10, (Gloss Level 1).
 - d. Topcoat: Latex, interior, eggshell, Dunn-Edwards, Acri-Wall ACWL30, (Gloss Level 3).
 - e. Topcoat: Latex, interior, semi-gloss, Dunn-Edwards, Acri-Wall ACWL50, (Gloss Level 5).
- D Wood Substrates:
 - 1. Commercial Low Odor / Zero VOC Latex System:
 - a. Prime Coat: Primer, acrylic, for interior wood, Dunn-Edwards, Ultra-Grip Select UGSL00 or Dunn-Edwards, DecoPrime DCPR00.
 - b. Intermediate Coat: Latex, interior, matching topcoat.
 - c. Topcoat: Latex, interior, flat, Dunn-Edwards, Acri-Wall ACWL10, (Gloss Level 1).
 - d. Topcoat: Latex, interior, eggshell, Dunn-Edwards, Acri-Wall ACWL30, (Gloss Level 3).
 - e. Topcoat: Latex, interior, semi-gloss, Dunn-Edwards, Acri-Wall ACWL50, (Gloss Level 5).

END OF SECTION 099123

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SECTION 099600 - ANTI-GRAFFITI COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Anti-graffiti coating to exterior exposed masonry surfaces not scheduled to receive other surface coatings or treatments.

1.02 RELATED SECTIONS

- A Section 042000 - Unit Masonry.

1.03 SUBMITTALS

- A See Section 013300 - Submittal Requirements, for submittal procedures.
- B Product Data: Provide manufacturer's data sheets on all products. Include:
 - 1. Product description,
 - 2. Tests performed,
 - 3. Limitations to coating,
 - 4. Cautionary procedures required during application
 - 5. Chemical properties.
- C Manufacturer's Instructions: Include manufacturer's storage, handling, and application instruction for the type of system and applicable details as well as all special precautions required.
- D Mock-Up: Apply graffiti resistant coating to field mock-up sample representing exterior wall surface to be coated. Apply coating system over a minimum 3 ft x 3 ft test area and test removal of applied spray paint in presence of Owner for approval using removal methods recommended by the manufacturer.

1.04 QUALITY ASSURANCE

- A Manufacturer: Company specializing in manufacturing the Products specified in this section with a minimum of five (5) years experience.
- B Installer Qualifications:
 - 1. Successful experience in application of similar finish systems.
 - 2. Employ persons trained for application of finish systems.
- C Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
 - 1. Area shall be the Unit Masonry mock-up panel specified in Section 042000 - Unit Masonry unless another location is designated by Architect.
 - 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
 - 3. Refinish mock-up area as required to produce acceptable work.
- D Single Source Responsibility: Materials shall be products of a single manufacturer.
- E Pre-installation Meeting:
 - 1. Convene a meeting before the start of the application of. Require attendance of parties directly affecting work of this section, including Contractor, Architect, and applicator.
 - 2. Review surface preparation, application, protection, and coordination with other work.

1.05 DELIVERY, STORAGE, AND HANDLING

- A Store products in manufacturer's unopened packaging until ready for installation.
- B Handling: Protect materials during handling and application to prevent damage or contamination.

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1.06 PROJECT CONDITIONS

- A Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results.
- B Do not install products under environmental conditions outside manufacturer's recommended limits.
- C Exterior Surfaces: Do not apply materials in wet weather.

1.07 WARRANTY

- A See Section 017836 - Warranties and Bonds, for additional warranty requirements.
- B Manufacturer shall provide a 10 year material warranty as long as the substrate, application, and removal methods meet their guidelines. For the duration of the warranty, no additional graffiti coatings will need to be applied, and after each graffiti removal the warranty protects against yellowing, shadowing, ghosting, or chemical staining.

PART 2 PRODUCTS

2.01 ANTI-GRAFFITI COATING

- A Anti-Graffiti coating shall be a clear, non-sacrificial graffiti resistant coating which provides protection for exterior vertical surfaces from permanent graffiti staining and damage caused by spray paint and marking pens. Coating shall be suitable for application to painted and unpainted surfaces including masonry, concrete, metals, and EIFS. Product shall be of type such that recoating with the underlying paint is possible without removal of the graffiti resistant coating. Product shall be a coating that dries clear, non-yellowing, with a low luster.
 - 1. Manufacturers:
 - a. Prosoco: Sure Klean ® Weather Seal Blok-Guard ® & Graffiti Control 15; www.prosoco.com.
 - b. PRO Industrial Anti-Graffiti Coating: www.sherwin-williams.com
- B Graffiti Remover: Manufacturer's standard graffiti remover or other product as recommended by the manufacturer.
- C Substitutions: 012500 - Product Substitutions.

2.02 MATERIAL

- A Solvent based silicone elastomer masonry sealer formulated to weatherproof exterior masonry.
- B Penetrates and fills pores to prevent water penetration through exterior walls exposed to normal weathering.
- C Shall have UV stability and provide long-lasting protection against water penetration and many types of graffiti.
- D Clear, colorless liquid which produces a water repellent effect without altering color or texture of substrate.

PART 3 EXECUTION

3.01 EXAMINATION

- A Verify all surfaces are ready to receive coating in accordance with manufacturer's printed requirements. Beginning of installation indicates acceptance of substrate.

3.02 PREPARATION

- A Surface shall be free of dirt, dust, contaminants such as curing compounds, hardeners, bond breakers, and form release. Allow painted surfaces to cure properly. Do not water blast painted surfaces. Assure surfaces are clean and dry.

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- B Mask or otherwise protect adjacent surfaces not scheduled to receive coating. If applied on unscheduled surfaces such as glass, remove immediately, by approved method.
- C Protect landscaping, property, and vehicles from over spray and drift.

3.03 APPLICATION

- A Apply coating in accordance with manufacturer's published instructions.
- B Application Rate: Apply each coat at the manufacturers published application rate.

3.04 SURFACES TO BE COATED

- A Apply graffiti resistant coating to all exterior exposed building surfaces visible from the ground level, including concrete and masonry. Apply coating to painted and unpainted surfaces. Exclude horizontal surfaces subject to wheel or foot traffic.
- B Apply to exterior non-building vertical surfaces including solid or semi-solid fencing, segmental block or concrete panel retaining walls, and masonry screening as applicable.
- C On building surfaces, apply coating system to first definitive continuous horizontal demarcation including change in paint color or surface material but not less than 12 feet above finish grade. Apply to full height of exterior overhead or coiling door surfaces. Apply to top of building if no definitive continuous horizontal demarcation lines exist.

3.05 MAINTENANCE

- A Deliver cleaning products to the Owner for storage and subsequent use for graffiti removal.
- B Apply cleaning instructions label to interior wall location as directed by the Construction Manager.

3.06 FIELD QUALITY CONTROL

- A Verify application rate by periodic on-site inspection and calculation of area covered compared to consumption of coating material used. Document inspections showing total area covered and number and volume of coating containers used.

END OF SECTION 099600

Anti-Graffiti Coatings - 099600

SECTION 101400 - SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A All graphics and signage for the Project
 - 1. Room and door signs.
 - 2. Interior directional and informational signs.
- B Building identification signs.
- C Plaques.

1.02 RELATED REQUIREMENTS

- A Section 220553 - Identification for Plumbing Piping and Equipment.
- B Section 260553 - Identification for Electrical Systems.

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 MINIMUM SIGN REQUIREMENTS

- A Permanent Rooms and Spaces:
 - 1. Tactile and Braille Characters, raised minimum 0.793 mm (1/32 in). Characters shall be accompanied by Grade 2 Braille.
 - 2. Type Styles: Characters shall be uppercase, Helvetica Medium, Helvetica Medium Condensed and Helvetica Regular.
 - 3. Character Height: Minimum 16 mm (5/8 in) high, Maximum 50 mm (2 in).
 - 4. Symbols (Pictograms): Equivalent written description shall be placed directly below symbol, outside of symbol's background field. Border dimensions of symbol background shall be minimum 150 mm (6 in) high.
 - 5. Finish and Contrast: Characters and background shall be eggshell, matte or other non-glare finish with adequate contrast with background.
 - 6. Mounting Location and Height: As shown in drawings, mounted on wall adjacent to the latch side of the door and to avoid door swing and protruding objects.
- B Overhead Signs:
 - 1. Type Styles: As shown. Characters shall have a width-to-height ratio between 3:5 and 1:1. Characters shall have a stroke width-to-height ratio of between 1:5 and 1:10.
 - 2. Character Height: minimum 75 mm (3 in) high for overhead signs. As shown, for directional signs.
 - 3. Finish and Contrast: Same as for signs of permanent rooms and spaces.
 - 4. Mounting Location and Height: As shown in Drawings.

1.05 SUBMITTALS

- A See Section 013300 - Submittal Requirements , for submittal requirements.
- 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.

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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 Shop Drawings: Show fabrication and installation details for signs.
 1. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
 2. Provide message list, typestyles, graphic elements, including tactile characters and Braille, and layout for each sign.
- E 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.
- F Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips.
- G Verification Samples: Submit samples showing colors specified.
- H Manufacturer's Installation Instructions: Include installation templates and attachment devices.
- I Closeout Submittals:
 1. Submit operation and maintenance data for installed products, including precautions against harmful cleaning materials and methods.
 2. Submit warranty documents specified herein.

1.06 QUALITY ASSURANCE

- A Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 10 years of documented experience.
- B Installer Qualifications: An employer of workers trained and approved by manufacturer.

1.07 COORDINATION

- A Coordinate placement of anchorage devices with templates for installing signs.

1.08 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.

1.09 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.

1.10 WARRANTY

- A See Section 017836 - Warranties and Bonds; for additional warranty requirements.
- B Manufacturer's Warranty: Submit manufacturer's standard warranty document executed by authorized company official.
 1. Warranty Period: One (1) year from Substantial Completion date.

PART 2 PRODUCTS

2.01 GENERAL

- A Signs of type, size and design shown on the drawings and as specified.

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- B Signs complete with lettering, framing and related components for a complete installation.
- C Provide graphics items as completed units produced by a single manufacturer, including necessary mounting accessories, fittings and fastenings.
- D Do not scale drawings for dimensions. Contractor to verify and be responsible for all dimensions and conditions shown by these drawings. Resident Engineer to be notified of any discrepancy in drawing, in field directions or conditions, and/or of any changes required for all such construction details.
- E The Sign Contractor, by commencing work of this section, assumes overall responsibility, as part of his warranty of work, to assure that assemblies, components and parts shown or required within the work of the section, comply with the Contract Documents. The Contractor shall further warrant: That all components, specified or required to satisfactorily complete the installation are compatible with each other and with conditions of installations.

2.02 MATERIALS

- A Aluminum Sheet Plate: ASTM B209 (ASTM B209M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with at least the strength and durability properties of Alloy 5005-H32.
 - 1. Not less than 0.125 inch thick for face and 0.125 inch thick for returns.

2.03 SIGNAGE APPLICATIONS

- A Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1 and applicable building codes, 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. Refer to Drawings.
- 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 on drawings.
 - 4. Where suspended, ceiling mounted, or projecting from wall signs are indicated, provide two-sided signs with same information on both sides.
- D Emergency Evacuation Maps:
 - 1. Map content to be provided by Owner.
- E Building Identification Signs:
 - 1. Use individual metal letters.
 - 2. Mount on outside wall in location indicated on drawings.
- F Fire Extinguisher Cabinets: Cabinets and enclosed compartments used to house portable fire extinguishers shall be clearly marked with the words FIRE EXTINGUISHER in letters at least 2 inches (51 mm) high.
 - 1. Identify extinguishers and cabinets with the words "FIRE EXTINGUISHER" in red letter decals applied to wall surface

2.04 TACTILE SIGNAGE MEDIA

- A Tactile sign is to be made from a material that provides for letters, numbers and Braille to be integral with sign plaque material of etched metal. Do not apply letters, numbers and Braille with adhesive.
 - 1. Material: Zinc.
 - 2. Numbers, letters and Braille to be raised 0.793 mm (.0312 inches) from the background surface. The draft of the letters, numbers and Braille to be tapered, vertical and clean.

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3. Braille dots are to conform with standard dimensions for literary Braille; (a) Dot base diameter: 1.5 mm (.059 inches) (b) Inter-dot spacing: 2.3 mm (.090 inches) (c) Horizontal separation between cells: 6.0 mm (.241 inches) (d) Vertical separation between cells: 10.0 mm (.395 inches)
4. Entire assembly is painted in specified color. Refer to Drawings. After painting, entire sign is to have a protective clear coat sealant applied.

2.05 PLAQUES

- A Size: 24" x 33" (long axis orientation to be determined), beveled edge, cast-bronze plaque.
- B Metal Plaques:
 1. Metal: Bronze casting.
 2. Metal Thickness: 1/8 inch, minimum.
 3. Border Style: Straight, beveled, polished edge
 4. Background: Manufacturer's standard "leatherette" finish
 5. Letter Face: Raised with single line edge and satin polished finish
 6. Letter size: As shown on drawing
 7. Letter Style: "Optima"
 8. Mounting: Concealed
- C The Casting to be free from the pits, scale, sand holes or other defects. Plaques to comply with requirements for metal, border style, background texture, finish, thickness, size, shape, copy and specified mounting. Hand-tool and buff borders and raised copy to produce the manufacturer's standard satin polished finish.

2.06 DIMENSIONAL LETTERS

- A Exterior Signage: As indicated on drawings.
- B Backlighting Characters: Provide concealed LED, number required by size of characters. Include manufacturer's hardware for projection mounting of characters at distance from wall surface indicated.
- C Metal Letters:
 1. Metal: Stainless steel sheet, formed.
 2. Finish: Brushed, satin.
 3. Mounting: Concealed or exposed screws.

2.07 ACCESSORIES

- A Anchors and Inserts: Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.
- B Concealed Screws: Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.
- C Exposed Screws: Stainless steel.
- D Tape Adhesive: Double sided tape, permanent adhesive.

2.08 FABRICATION

- A General Provide manufacturer's standard signs of configurations indicated.
 1. Welded Connections: Comply with AWS standards for recommended practices in shop welding. Provide welds behind finished surfaces without distortion or discoloration of exposed side. Clean exposed welded surfaces of welding flux and dress exposed and contact surfaces.

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2. Mill joints to tight, hairline fit. Form joints exposed to weather to exclude water penetration.
3. Preassemble signs in the shop to greatest extent possible. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in location not exposed to view after final assembly.
4. Conceal fasteners if possible; otherwise, locate fasteners where they will be inconspicuous.

2.09 FINISHES, GENERAL

- A Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.10 ACRYLIC SHEET FINISHES

- A Colored Coatings for Acrylic Sheet: For copy and background and frame colors, provide colored coatings, including inks, dyes, and paints, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and that are UV and water resistant for five years for application intended.

PART 3 EXECUTION

3.01 EXAMINATION

- A Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B Verify that items, including anchor inserts, and electrical power are sized and located to accommodate signs.
- C Proceed with installation only after unsatisfactory conditions have been corrected
- D 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 Wall mount plaques shall be installed straight, level and true to the surface of the mounting area. The plaque shall be mounted in accordance with manufacturer's specification with concealed fasteners for the type of wall surface that the plaque is being mounted. Plaques shall be mounted so that the center of the plaque is located in five (5) feet above the finish grade or floor.

3.03 CLEANING AND PROTECTION

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- A After installation, clean soiled sign surfaces per manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

END OF SECTION 101400

SECTION 102113.17 - PHENOLIC TOILET COMPARTMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Phenolic toilet compartments.
- B Urinal screens.

1.02 RELATED REQUIREMENTS

- A Section 055000 - Metal Fabrications: Concealed steel support members. Sheet metal backing for wall mounted partitions.
- B Section 102800 - Toilet Room Accessories.

1.03 REFERENCE STANDARDS

- A ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- C ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
- D ICC A117.1-2009 - Accessible and Usable Buildings and Facilities; 2009.
 - 1. as applicable to toilet compartments designated as accessible.
- E NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2024.

1.04 ADMINISTRATIVE REQUIREMENTS

- A Coordination: Coordinate the work with placement of support framing and anchors in walls and ceilings.

1.05 SUBMITTALS

- A See Section 013300 - Submittal Requirements, for submittal procedures.
- B Product Data: Provide data on panel construction, hardware, and accessories. Include fabrication details, description of materials and finishes.
- C Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall supports, door swings. Include choice of options with details.
- D Samples: Submit two samples of partition panels, 6 x 6 inch in size illustrating panel finish, color, and sheen.
- E Manufacturer's Installation Instructions: Indicate special procedures.

1.06 QUALITY ASSURANCE

- A Manufacturer Qualifications: Approved manufacturer listed in this section, with minimum 10 years experience in the manufacture of toilet compartments.
- B Installers Qualifications: Experienced Installer regularly engaged in installation of toilet compartments for minimum 5 years.
- C Source Limitations: Obtain toilet compartment components and accessories from single manufacturer.
- D Accessibility Requirements: Comply with requirements of ICC/ANSI 117.1, and with requirements of authorities having jurisdiction.
- E Surface-Burning Characteristics: As determined by testing identical products according to ASTM E84 by qualified testing agency. Identify products with appropriate markings of applicable testing agency.

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1. Flame-Spread Index: 30.
2. Smoke-Developed Index: 110.

1.07 DELIVERY, STORAGE, AND HANDLING

- A Do not deliver toilet compartments to site until building is enclosed and HVAC systems are in operation.
1. Deliver toilet compartments in manufacturer's original packaging.
 2. Store in an upright condition.

1.08 WARRANTY

- A Special Manufacturer's Warranty: Provide manufacturer's standard form in which manufacturer agrees to repair or replace products that fail in materials or workmanship during the following period after substantial completion:
1. Phenolic Core Toilet Partitions: Against delamination: 3 years.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A Basis-of-Design Manufacturer: Subject to compliance with requirements, provide products of Formica, Floor Braced, Formic Compact.
1. Contact Information: Phone:(800)367-6422, Website: www.formica.com.
- B Acceptable Manufacturers:
1. All American Metal Corp - AAMCO: www.allamericanmetal.com/#sle.
 2. Partition Systems International of South Carolina; Phenolic Toilet Partitions: www.psisc.com/#sle.
 3. Or Approved Equal.
- C Substitutions: 012500 Substitution Procedures.

2.02 PHENOLIC TOILET / URINAL SCREENS

- A Toilet Compartments: Factory fabricated doors, pilasters, and divider panels.
1. Phenolic Core: Compressed cellulose impregnated with phenolic resins. Provide smooth material, without creases or ripples.
 2. Door, Panel, and Pilaster Construction, General: Form edges with 15 degree bevel without crown molding. Finish edges smooth.
 3. Mounting: Floor-mounted unbraced.
 4. Color: Refer to Drawings.
- B Doors:
1. Thickness: 3/4 inch.
 2. Width: Toilet Partition: 26 inch.; Shower Partition: 26 inch
 3. Width for Handicapped Use: 36 inch, out-swinging doors with a minimum 32-inch- (813-mm-) wide clear opening for compartments designated as accessible.
 4. Height: 72 inch. ; 69 inch. tall doors at ADA stalls.
- C Panels:
1. Thickness: 1/2 inch.
 2. Height: As indicated on Drawings.
 3. Depth: As indicated on Drawings.
 4. Mounting Height: 6" AFF; panels mounted 9" AFF for ADA stalls.
- D Pilasters:
1. Thickness: 3/4 inch.
 2. Width: As required to fit space; minimum 3 inch.

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3. Provide pilaster with mechanically fastened leveling bar reinforcement with zinc-plated jack bolt for leveling.
- E Urinal Screens: without doors; to match compartments.
 1. Wall hung with panel brackets:
 - a. Basis of Design Product:
 2. Thickness: 1/2 inch.
 3. Height: 48 inch.
 4. Depth: As indicated on Drawings
 5. Mounting:
 - a. Three cast stainless steel stirrup brackets.
 - b. Two-ear stainless steel or Aluminum continuous brackets.
 6. Mounting Height: 18" AFF.

2.03 FABRICATION

- A Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.

2.04 ACCESSORIES

- A Headrail: Extruded anodized aluminum headrail with anti-grip profile. Provide clamps for attachment to pilaster and stainless steel brackets to secure to wall.
- B Wall and Pilaster Brackets: Satin stainless steel; manufacturer's standard type for conditions indicated on drawings.
- C Attachments, Screws, and Bolts: Stainless steel , tamper proof type.
 1. For attaching panels and pilasters to brackets: Through-bolts and nuts ; tamper proof.
- D Hardware - Heavy Duty: Manufacturer's heavy-duty stainless steel castings, including stainless steel tamper-resistant fasteners:
 1. Hinges: Self-closing surface mounted, through bolted, with gravity cams, adjustable to hold doors open at any angle up to 90 degrees, with emergency access by lifting door. Mount with stainless steel through-bolts.
 2. Latch and Keeper: Surface-mounted slide latch with flat rubber-faced combination door strike and keeper, with provision for emergency access, meeting requirements for accessibility at accessible compartments.
 3. Coat Hook: Combination hook and rubber-tipped stop, sized to prevent door from hitting compartment-mounted accessories. Provide wall bumper where door abuts wall. Provide formed L-shaped hook without stop at outswing doors. Mount with stainless steel through-bolts.
 4. Door Pull: Standard unit on outside of inswing doors. Provide pulls on both sides of outswing doors.

PART 3 EXECUTION

3.01 EXAMINATION

- A Verify that field measurements are as indicated on shop drawings.
- B Verify correct spacing of and between plumbing fixtures.
- C Verify correct location of built-in framing, anchorage, and bracing.

3.02 INSTALLATION

- A Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.

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- B Clearances: Install with clearances indicated on Drawings. Where clearances are not indicated, allow maximum 1/2 inch (13 mm) between pilasters and panels, and 1 inch (25 mm) between panels and walls.
- C Attach panel brackets securely to walls using anchor devices.
- D Attach panels and pilasters to brackets.
- E Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.03 TOLERANCES

- A Maximum Variation From True Position: 1/4 inch.
- B Maximum Variation From Plumb: 1/8 inch.

3.04 ADJUSTING

- A Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.
- B Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.
- C Adjust adjacent components for consistency of line or plane.

3.05 FINAL CLEANING

- A Remove packaging and construction debris and legally dispose of off-site.
- B Clean partition and screen surfaces with materials and cleansers in accordance with manufacturer's recommendations.

END OF SECTION 102113.17

Phenolic Toilet Compartments - 102113.17

SECTION 102601 - WALL AND CORNER GUARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Corner Guards

1.02 RELATED REQUIREMENTS

- A Section 055000 - Metal Fabrications: Anchors for attachment of work of this section, concealed in wall.

1.03 REFERENCE STANDARDS

- A ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- C ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- D ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2022.

1.04 SUBMITTALS

- A See Section 013300 - Submittal Requirements, for submittal procedures.
- B Product Data: Indicate physical dimensions, features, wall mounting brackets with mounted measurements, anchorage details, and rough-in measurements.
- C Samples: Submit two sections of corner guard, 12 inch long, illustrating component design, configuration, color and finish.
- D Manufacturer's Instructions: Indicate special procedures, perimeter conditions requiring special attention.

1.05 QUALITY ASSURANCE

- A Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than 10 years of documented experience.
- B Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years of experience.
- C Comply with NFPA 101® for interior finish materials. Smoke developed less than 450 and flame spread of 25 or less in accordance with ASTM E84.

1.06 DELIVERY, STORAGE AND HANDLING

- A Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging with labels clearly indicating manufacturer and material.
- B Storage: Store materials indoors in a clean, dry area protected from damage and in accordance with manufacturer's instructions.
- C Handling: Protect materials during handling and installation to prevent damage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A Basis of Design: Contract Documents are based on products specified below to establish a standard of quality. Other acceptable manufacturers with products having equivalent characteristics may be considered, provided deviations are minor and design concept expressed in Contract Documents is not changed, as determined by the Architect.
 - 1. Construction Specialties, Inc: www.c-sgroup.com.

Wall and Corner Guards - 102601

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- 2.
- B Acceptable Manufacturers: Subject to compliance with requirements of Contract Documents, provide product by one of manufacturers listed alphabetically below. If not listed, submit as substitution according to Conditions of the Contract and Division 1 Sections.
 1. Corner Guards:
 - a. Arden Architectural Specialties, Inc: www.ardenarch.com.
 - b. Inpro: www.inprocorp.com/#sle.
- C Substitutions: Refer to Section 01 2500 - Substitution Requirements.

2.02 STAINLESS STEEL WALL PROTECTION & CORNER GUARDS:

- A Stainless Steel Corner Guards:
 1. Stainless steel corner guards to be CS Acrovyn: Surface mounted guards to be 16 gauge stainless steel.
 - a. Type CG-1: Model CO-8: 90° stainless steel corner guard with 3/16" (4.8mm) radius and 3 1/2" (88.9mm) standard legs.
 2. Materials:
 - a. Stainless steel: To be type 304 alloy with #4 satin finish.
 3. Mounting: Surface Mounted
 - a. Mounted with construction adhesive standard.
 - b. Hardware: Provide attachment hardware for complete and secure assembly. Flush mounted screws.
 - c. All necessary fasteners to be supplied by the manufacturer.
 4. Height: As indicated on Drawings.
 5. Locations: As indicated on Drawings.

2.03 ACCESSORIES

- A Mounting Brackets and Attachment Hardware: Appropriate to component and substrate.
- B Wall backing: Provide horizontal backing . See Section 05 50 00 - Metal Fabrications for supply of anchor devices to be installed as work of this section.

2.04 FABRICATION

- A Fabricate components with tight joints, corners and seams.
- B Pre-drill holes for attachment.
- C Form end trim closure by capping and finishing smooth.

PART 3 EXECUTION

3.01 EXAMINATION

- A Verify that rough openings, concealed blocking, and anchors are correctly sized and located.
- B Verify that field measurements are as indicated on drawings.

3.02 INSTALLATION

- A Install the work of this section in strict accordance with the manufacturer's recommendations, using only approved adhesive or mounting hardware and locating all components firmly into position, level and plumb.
- B Position corner guard 4 inches above finished floor to 48 inches high.

3.03 TOLERANCES

- A Maximum Variation From Required Height: 1/4 inch.
- B Maximum Variation From Level or Plane For Visible Length: 1/4 inch.

Wall and Corner Guards - 102601

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3.04 CLEANING

- A General: Immediately upon completion of installation, clean material in accordance with manufacturer's recommended cleaning method.

END OF SECTION 102601

SECTION 102800 - TOILET ROOM ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Commercial toilet accessories.
- B Under-lavatory pipe supply covers.
- C Diaper changing stations.
- D Utility room accessories.

1.02 RELATED REQUIREMENTS

- A Section 079200 - Joint Sealants: Sealant around grab bars and accessories.
- B Section 088300 - Mirrors: Other mirrors.
- C Section 092216 - Non-Structural Metal Framing Sheet metal backing for accessories.

1.03 REFERENCE STANDARDS

- A ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- B ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 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 A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
- E ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium; 2017 (Reapproved 2022).
- 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 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 013300 - Submittal 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.

1.06 DELIVERY, STORAGE, AND HANDLING

- A Deliver, store and handle materials and products in strict compliance with manufacturer's instructions and recommendations. Protect from damage.

1.07 WARRANTY

- A See Section 017836 - Warranties and Bonds, for additional warranty requirements.

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- B Manufacturer's Warranty for Washroom Accessories: Manufacturer's standard 1 year warranty for materials and workmanship.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A Refer to Drawings - Toilet Accessory Schedule and Interior Elevations.
- B Basis of Design: Contract Documents are based on products specified below to establish a standard of quality. Other acceptable manufacturers with products having equivalent characteristics may be considered, provided deviations are minor and design concept expressed in Contract Documents is not changed, as determined by the Architect.
 - 1. Basis of Design: Bobrick Washroom Equipment, Inc..
- C Acceptable Manufacturers: Subject to compliance with requirements of Contract Documents, provide product by one of manufacturers listed alphabetically below. If not listed, submit as substitution according to Conditions of the Contract and Division 1 Sections.
 - 1. American Specialties, Inc: www.americanspecialties.com.
 - 2. Bradley Corporation: www.bradleycorp.com.
- D Substitutions: 012500 - Substitution Procedures .
- E Provide products of each category type by single manufacturer.

2.02 MATERIALS

- A Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
 - 1. Grind welded joints smooth.
 - 2. Fabricate units made of metal sheet of seamless sheets with flat surfaces.
- B Keys: Provide 6 keys for each accessory to Owner; master key lockable accessories.
- C Stainless Steel Sheet: ASTM A666, 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 Mirror Glass: Tempered safety glass, ASTM C1048; and ASTM C1036 Type I, Class 1, Quality Q2, with silvering as required.
- G Adhesive: Two component epoxy type, waterproof.
- H Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.
- I 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 Galvanizing for Items Other than Sheet: Comply with ASTM A123/A123M; galvanize ferrous metal and fastening devices.
- D Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.
- E Back paint components where contact is made with building finishes to prevent electrolysis.

2.04 COMMERCIAL TOILET ACCESSORIES

- A Refer to Drawings - Toilet Accessory Schedule and Interior Elevations.
- B Mirrors: Stainless steel framed, 1/4 inch thick annealed float glass; ASTM C1036.
 - 1. Refer also to Section 088300 - Mirrors.

Toilet Room Accessories - 102800

2.05 ADA PIPING PROTECTION SYSTEMS

- A Undersink Piping Protective Covers:
1. General: Comply with requirements of (ADAAG), ANSI/ICC A117.1, and as follows:
 - a. Contractor to provide one of the following types.
 - b. Lavatory P-traps and angle valve assemblies shall be covered with undersink protective pipe cover assemblies.
 - 1) Cover assemblies shall include P-trap cover, two angle valve covers, offset grid drain cover, tailpiece cover, and extensions as necessary to cover all undersink piping and valves.
 - c. Covers shall be secured with snap-clip flush reusable fasteners, and angle stop shall have locking access cover. Cable ties or baggie tie fasteners are not acceptable.
 - d. Covers shall be installable and removable without requiring disassembly of P-trap or angle stop.
 - e. Covers shall allow for emergency and maintenance access to the plumbing P-trap clean-out and angle stop valve without removing piping covers.
- B Undersink Piping Protective Covers - Type _____ : Product: Lav Guard 2.
1. Material: Soft, resilient molded vinyl.
 2. Nominal Wall Thickness : 1/8" constant with internal ribs.
 3. UV Protection: Will not fade or discolor.
 4. Durability : Virtually indestructible.
 5. Color: China white.
 6. Compatibility #100 E-Z Series Fits all 1-1/4" or 1-1/2" cast brass or tubular P-trap assemblies and 3/8" or 1/2" angle stop assemblies.
 7. Compatibility #400* Series Fits all 1-1/2" schedule 40 plastic P-traps.
 8. Paintability: Apply latex paint.
 9. Burning Characteristics: Self extinguished 0 sec (ATB) mm (AEB).
(ASTM D-635)
 10. Bacteria/Fungus Resistance ASTM G21 — Result: 0 growth.
- OR**
- C Undersink Piping Protective Covers - Type _____ : Product: Soft Guard Plus.
1. Provide under sink pipe protection to all drainage piping including hot and cold water valves and supplies under lavatories to meet ADA compliance.
 2. Material: 1/8" Pliable PVC Shell Finish.
 3. 1-1/2" Schedule 40 Plastic with Swivel Nuts.
 4. Furnished custom fit snap-to-lock fasteners may be used for improved tamper resistance.
 5. Burning Characteristics: PVC Base Insulation Material complies with 25 Flame Spread/450 Smoke Index.
 6. Bacteria/Fungus Resistance ASTM G21 — Result: 0 growth.
- D Basis of Design Manufacturer: TrueBro, Inc.; 7 Main Street, Ellington, CT 06029; Tel. 860-875-2868 or 800-340-5969; Fax. 860-872-0300; internet:www.truebro.com.
1. TrueBro Lav-Guard Undersink Protective Pipe Covers.
- E Substitutions: See Section 01600 - Product Requirements.

2.06 RESIDENTIAL TOILET, SHOWER, AND BATH ACCESSORIES

PART 3 EXECUTION

3.01 EXAMINATION

- A Verify existing conditions before starting work.

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- 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.
- E See Sections 05 50 00 or 09 22 16 for installation of blocking, reinforcing plates, and concealed anchors in walls and ceilings.

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 in locations and at heights indicated on Drawings.
- C Mounting Heights: As required by accessibility regulations, unless otherwise indicated.
- D Mounting Heights and Locations: As required by accessibility regulations and as indicated on drawings

3.04 ADJUSTING AND CLEANING

- A Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B Remove temporary labels and protective coatings.
- C Clean and polish exposed surfaces according to manufacturer's written recommendations

3.05 PROTECTION

- A Protect installed accessories from damage due to subsequent construction operations.

END OF SECTION 102800

Toilet Room Accessories - 102800

SECTION 104300 - EMERGENCY AID SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Automated external defibrillators (AEDs).
- B Automated external defibrillator (AED) cabinets.
- C Accessories.

1.02 DEFINITIONS

1.03 REFERENCE STANDARDS

- A ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2023a.

1.04 SUBMITTALS

- A See Section 013000 - Administrative Requirements for submittal procedures.
- B Product Data: Provide AED operational features, color and finish, anchorage details, and installation instructions.
- C Shop Drawings: Indicate locations of cabinets and cabinet physical dimensions.
- D Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.
- E Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F Maintenance Data: Include test schedules and recertification requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A Automated External Defibrillators (AEDs):
 - 1. Philips Medical Systems: www.usa.philips.com/#sle.
 - 2. Stryker Corporation; HeartSine samaritan PAD 350P Defibrillator - PAD 350p: www.stryker.com/#sle.
- B Emergency Aid Cabinets and Accessories:
 - 1. Modern Metal Products, a division of Technico, Inc: www.modern-metal.com/#sle.

2.02 AUTOMATED EXTERNAL DEFIBRILLATORS (AEDS)

- A Automated External Defibrillators (AEDs) - General: FDA approval required.
 - 1. Provide automated external defibrillators (AEDs) as indicated.

2.03 EMERGENCY AID CABINETS

- A Type: Automated external defibrillator (AED).
- B Fire Rating: Listed and labeled in accordance with ASTM E814 requirements for fire resistance rating of walls where being installed.
- C Cabinet Construction: Non-fire-rated.
 - 1. Formed primed steel sheet; 0.036 inch thick base metal.
- D Cabinet Configuration: Recessed type.
 - 1. Size to accommodate AED.
 - 2. Trimless type.
 - 3. Provide cabinet enclosure with right angle inside corners and seams, and with formed perimeter trim and door stiles.
- E Door: 0.036 inch metal thickness, reinforced for flatness and rigidity with wire pull handle and nylon catch. Hinge door for 180 degree opening with two butt hinges.

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- F Door Glazing: Tempered glass, clear, 1/8 inch thick, and set in resilient channel glazing gasket.
- G Fabrication: Weld, fill, and grind components smooth.
- H Finish of Cabinet Exterior Trim and Door: No.4 - Brushed stainless steel.
- I Finish of Door Pull or Handle: Stainless steel.
- J Finish of Cabinet Interior: White powder coat.

2.04 ACCESSORIES

- A Theft Alarm: Battery operated audible and strobe light alarm, 10 second delay for disarming, activated by opening cabinet door. Alarm deactivated when door is closed.
- B Alarm Contacts: Contact devices.
 - 1. Magnetic door contact for existing alarm systems.
- C Cabinet Door Signage: 'AED" decal, or vinyl self-adhering, prespaced black lettering and identifying graphic in accordance with authorities having jurisdiction (AHJ).
- D Plastic Wall Signage: Flat style.

PART 3 EXECUTION

3.01 EXAMINATION

- A Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

- A Install in accordance with manufacturer's instructions.
- B Secure rigidly in place.
- C Place AEDs in cabinets.
- D Wall Signs:
 - 1. Location: Where shown.
 - 2. Apply on walls after field painting is completed and has been accepted.
- E Cabinet Lettering:
 - 1. Location: Face of door framing.
 - 2. Apply lettering on field-painted cabinets after painting is complete and has been accepted.
 - 3. Apply lettering on factory-finished cabinets either at the factory or just prior to Substantial Completion.

3.03 ADJUSTING AND CLEANING

- A Remove temporary protective coverings and strippable films, if any, as cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B Adjust cabinet doors to operate smoothly without binding. Verify that alarms and integral locking devices operate properly.
- C On completion of cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D Touch up marred finishes. Replace cabinets that cannot be restored to factory-finished appearance. Use materials and procedures recommended by cabinet manufacturer.

3.04 CLOSEOUT ACTIVITIES

- A Demonstrate proper operation of AED to Owner's designated representative.

END OF SECTION 104300

Emergency Aid Specialties - 104300

SECTION 104400 - FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Fire extinguishers.
- B Fire extinguisher cabinets.
- C Accessories.

1.02 RELATED REQUIREMENTS

- A Section 061000 - Rough Carpentry: Wood blocking product and execution requirements.

1.03 REFERENCE STANDARDS

- A ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2023a.
- B FM (AG) - FM Approval Guide; Current Edition.
- C NFPA 10 - Standard for Portable Fire Extinguishers; 2022.
- D UL (DIR) - Online Certifications Directory; Current Edition.

1.04 SUBMITTALS

- A See Section 013000 - Administrative Requirements, for submittal procedures.
- B Product Data: Provide extinguisher operational features, extinguisher ratings and classifications, color and finish, anchorage details, and installation instructions.
- C Shop Drawings: Indicate locations of cabinets, cabinet physical dimensions, rough-in measurements for recessed cabinets, locations of individual fire extinguishers, mounting measurements for wall bracket, installation procedures, and accessories required for complete installation.
- D Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
 - 1. Size: 6 by 6 inches (150 by 150 mm) square.
- E Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.
- F Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- G Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

1.05 COORDINATION

- A Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B Coordinate sizes and locations of fire protection cabinets with wall depths.

1.06 FIELD CONDITIONS

- A Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A Fire Extinguishers:
 - 1. Activar Construction Products Group, Inc. - JL Industries; Cosmic Extinguisher - Multipurpose Chemical: www.activarcpg.com/#sle.
 - 2. Potter-Roemer: www.potterroemer.com.
 - 3. Or Equal.

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- B Fire Extinguisher Cabinets and Accessories:
 - 1. Basis of Design: Activar Construction Products Group, Inc. - JL Industries; Ambassador Series: www.activarcpg.com/#sle.
 - 2. Larsen's Manufacturing Co: www.larsensmfg.com.
 - 3. Potter-Roemer: www.potterroemer.com.
 - 4. Or Equal.
- C Substitutions: 012500 012500 Substitution Procedures Substitution Procedures.

2.02 FIRE EXTINGUISHERS

- A Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
 - 1. Provide extinguishers labeled by UL (DIR) or FM (AG) for purpose specified and as indicated.
- B Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gauge.
 - 1. Construction: Heavy duty steel cylinder with metal valve and siphon tube, O-ring seal, replaceable valve stem seal, visual pressure gage, pull pin and upright squeeze grip.
 - 2. Class: 5E; 3A-40BC type.
 - 3. Size: 5 pound.
 - 4. Monoammonium phosphate-based dry chemical.
 - 5. Finish: Baked polyester powder coat, red color.
 - 6. Valves: Manufacturer's standard.
 - 7. Handles and Levers: Manufacturer's standard.
 - 8. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.
 - 9. Temperature range: Minus 40 degrees F to 120 degrees F.

2.03 FIRE EXTINGUISHER CABINETS - (JR INDUSTRIES)

- A Type FEC-1: Cabinet Configuration: Recessed, Flat Trim.
 - 1. Basis of Design: Ambassador Series.
 - 2. Model #: 1015.
 - 3. Door Style: Style W: Vertical Duo Panel with SAF-T-LOK™; narrow vertical glazing full height of door; theft-deterrent, pull handle.
 - 4. Trim Style and Depth:
 - a. Recessed Cabinet: 3/8 inch (9.53 mm) flat trim.
 - 5. Form cabinet enclosure with right angle inside corners and seams. Form perimeter trim and door stiles.
 - 6. Door and Trim Construction:
 - a. Cold-rolled steel with white powder-coated finish standard. Flush cabinet doors with a 5/8" door stop are attached by a continuous hinge and equipped with zinc-plated handle and roller catch. All models have 1-3/4" wide trim on frame and 1-1/4 trim on doors with glazing.
 - b. Finish:
 - 1) Standard Color: White.
 - 7. Door Glazing: Type 10: Clear acrylic.
 - 8. Tub: The tub is constructed of CRS with white powder-coat finish standard.
 - 9. Cabinet Mounting Hardware: Appropriate to cabinet. Pre-drill for anchors.
 - 10. Weld, fill, and grind components smooth.
- B Type FEC-2: Cabinet Configuration: Semi-recessed type.

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1. Basis of Design: Ambassador Series.
 2. Model #: 1017.
 3. Door Style: Style W: Vertical Duo Panel with SAF-T-LOK™; narrow vertical glazing full height of door; theft-deterrent, pull handle.
 4. Trim Style and Depth: Semi-recessed Cabinet:
 - a. Rolled Edge: 3 inch (76.20 mm), as required for specified extinguisher.
 5. Door and Trim Construction:
 - a. Cold-rolled steel with white powder-coated finish standard. Flush cabinet doors with a 5/8" door stop are attached by a continuous hinge and equipped with zinc-plated handle and roller catch. All models have 1-3/4" wide trim on frame and 1-1/4 trim on doors with glazing.
 - b. Finish:
 - 1) Standard Color: White.
 - c. Finish of Cabinet Interior: White enamel.
 6. Door Glazing: Type 10: Clear acrylic.
 7. Tub: The tub is constructed of CRS with white powder-coat finish standard.
 8. Cabinet Mounting Hardware: Pre-drill for anchors.
 9. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
 - a. Provide ADA flush door pull and friction latch.
 - b. Provide manufacturer's standard hinge permitting door to open 180 degrees.
 10. Weld, fill, and grind components smooth.
- C Type FEC-3: Cabinet Configuration: Surface type.
1. Basis of Design: Ambassador Series.
 2. Model #: 1013
 3. Door Style: Style W: Vertical Duo Panel with SAF-T-LOK™; narrow vertical glazing full height of door; theft-deterrent, pull handle.
 4. Trim Style and Depth: Surface-Mount Cabinet:
 - a. Standard Profile: Square Edge or Rolled Edge (optional).
 - b. Trim Dimensions: 1-3/4 inch (44.45 mm) face trim on frame and 1-1/4 inch (31.75 mm) face trim on door.
 5. Door and Trim Construction:
 - a. Cold-rolled steel with white powder-coated finish standard. Flush cabinet doors with a 5/8" door stop are attached by a continuous hinge and equipped with zinc-plated handle and roller catch.
 - b. Finish:
 - 1) Standard Color: White.
 - c. Finish of Cabinet Interior: White enamel.
 6. Door Glazing: Type 10: Clear acrylic.
 7. Tub (Surface mount cabinets): The tub is constructed of CRS with white powder-coat finish standard.
 8. Cabinet Mounting Hardware: Appropriate to cabinet. Pre-drill for anchors.
 9. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
 - a. Provide ADA flush door pull and friction latch.
 - b. Provide manufacturer's standard hinge permitting door to open 180 degrees.
 10. Weld, fill, and grind components smooth.
- D Fire-Rated Cabinets: Listed and labeled to meet requirements of ASTM E814 for fire-resistance rating of wall where it is installed. Construct fire-rated cabinets with double walls fabricated from

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0.0478 inch (1.2-mm) thick, cold-rolled steel sheet lined with minimum (16-mm) thick, fire-barrier material. Provide factory drilled mounting holes.

2.04 ACCESSORIES

- A Break-Glass Strike: Manufacturer's standard metal strike, complete with chain and mounting clip, secured to cabinet.
- B Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location.
 - 1. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."
 - a. Location: Applied to cabinet door.
 - b. Application Process: Pressure-sensitive vinyl letters.
 - c. Lettering Color: Red.
 - d. Orientation: Vertical.
- C Extinguisher Brackets: Formed steel, chrome-plated.

PART 3 EXECUTION

3.01 EXAMINATION

- A Verify existing conditions before starting work.
- B Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

- A Install in accordance with manufacturer's instructions.
- B Install cabinets plumb and level, 60 inches from finished floor to the top of the extinguisher, or as indicated on Drawings.
- C Secure rigidly in place.
- D Place extinguishers in cabinets.
- E Wall Signs:
 - 1. Location: Where shown or directed.
 - 2. Apply on walls after field painting is completed and has been accepted.
- F Position cabinet signage as indicated on Drawings.

3.03 MAINTENANCE - SELF-SERVICE FIRE EXTINGUISHERS

- A Annual Inspections: Inspect self-service fire extinguishers on annual basis in accordance with manufacturers instructions, and requirements of the authorities having jurisdiction (AHJ).
- B Inspection Certification Tag: Provide new tag indicating acceptable condition of fire extinguisher, date of inspection, and name of self-service inspector for each inspection.

END OF SECTION 104400

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SECTION 118129 - FACILITY FALL PROTECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Roof anchors.
- B Horizontal lifeline systems.

1.02 RELATED REQUIREMENTS

- A Section 055133 - Metal Ladders.

1.03 DEFINITIONS

- A Anchorage: A secure connecting point or a terminating component of a fall protection system or rescue system capable of safely supporting the impact forces applied by a fall protection system or anchorage subsystem.
- B Anchorage Connector: A component or subsystem that functions as an interface between the anchorage and a fall protection, work positioning, rope access, or rescue system for the purpose of coupling the system to the anchorage.
- C Fall Arrest System: A system designed to stop you in the process of a fall, typically including an anchor point or series of anchor points, a safety lanyard or self-retracting lifeline, and a harness.
- D Fall Restraint System: A system designed to keep you from getting close enough to the fall hazard to fall, typically including an anchor point or series of anchor points, a safety lanyard or self-retracting lifeline, and a harness.
- E Fall Protection System: System can be either a fall arrest or a fall restraint system.
- F Lifeline: A component of a fall protection system consisting of a flexible line designed to hang vertically, a vertical lifeline, or connecting to anchorages or anchorage connectors at both ends to span horizontally, a horizontal lifeline.

1.04 REFERENCE STANDARDS

- A 29 CFR 1910.28 - Duty to have Fall Protection and Falling Object Protection; Current Edition.
- B 29 CFR 1910.29 - Fall Protection Systems and Falling Object Protection - Criteria and Practices; Current Edition.
- C 29 CFR 1910.140 - Personal fall protection systems; Current Edition.
- D 29 CFR 1926 - Safety and Health Regulations for Construction; Current Edition.
- E 29 CFR 1926.502 - Fall protection systems criteria and practices; Current Edition.
- F ANSI/ASSP Z359.1 - The Fall Protection Code; 2020.
- G ANSI/ASSP Z359.15 - Safety Requirements for Single Anchor Lifelines and Fall Arresters for Personal Fall Arrest Systems; 2014.
- H ANSI/ASSP Z359.18 - Safety Requirements for Anchorage Connectors for Active Fall Protection Systems; 2017, with Errata (2021).
- I ASTM A6/A6M - Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling; 2023.
- J ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- K ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2022.
- L ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- M ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

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- N ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2018.
- O ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.
- P ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.
- Q ASTM A1023/A1023M - Standard Specification for Carbon Steel Wire Ropes for General Purposes; 2021.
- R 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.
- S AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2021.
- T AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).
- U CAL (OSHA) TITLE 8 SC 7 - California Code of Regulations, Title 8, Subchapter 7, General Industry Safety Orders; 2021.
- V SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.

1.05 ADMINISTRATIVE REQUIREMENTS

- A Coordination: Coordinate installation of roof anchors with Roofing Manufacturer to verify installation will result in a warrantable building envelope.

1.06 SUBMITTALS

- A See Section 013300 - Submittal Requirements for submittal procedures.
- B Product Data: Provide manufacturer's data sheets on each ladder safety system product to be used, including installation instructions.
- C Product Data: Material, equipment, and fixture lists. Manufacturer's catalog data indicating the sizes, descriptions, capacities, test certifications, and other descriptive data showing in sufficient detail that product complies with contract requirements. Equipment and performance data including but not limited to lifeline anchors, safety tieback anchors, and lifeline cable.
- D Shop Drawings: Installation details: plan showing locations and types of anchorage points for personal fall protection systems and building maintenance equipment.
 - 1. Detail mounting, securing, and flashing of roof-mounted items to roof structure. Indicate coordinating requirements with roof membrane system.
 - 2. Indicate anchorage details and quantity, diameter, and depth of penetration of anchors.
- E Certificate: Certify that products of this section meet or exceed specified requirements.
- F Delegated Design Documents: Drawings and calculations sealed by Designer for fall protection system, indicating compliance with performance requirements and design criteria.
- G Test Report: Indicating completion of proof load testing on installed systems.
- H Manufacturer's Installation Instructions: Instructions indicating recommended method and sequence of installation for lifeline anchors, safety tieback anchors, energy-absorbing devices, and lifeline cable.
- I Manufacturer's qualification statement.
- J Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated within the previous 12 months.
- K Designer's qualification statement.
- L Installer's qualification statement.
- M Testing agency's qualification statement.
- N Operation Data: Provide operating instructions and identify unit limitations.

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- O Maintenance Data: Include parts list and maintenance requirements for equipment.

1.07 QUALITY ASSURANCE

- A Designer Qualifications: Perform design under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in California.
- B Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least ten years of documented experience.
- C Welder Qualifications: Welding processes and welding operators qualified within previous 12 months.
- D Installer Qualifications: Company specializing in performing work of type specified and with at least five years of documented experience.
- E Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of type specified in this section.

1.08 WARRANTY

- A See Section 017836 - Warranties and Bonds for additional warranty requirements.
- B Extended Correction Period: Correct defective work within 2-year period commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.01 ROOF ANCHORS

- A Manufacturers:
 - 1. Guardian Fall Protection: www.guardianfall.com/#sle.
 - 2. Summit Anchor Company: www.summitanchor.com/#sle.
 - 3. Basis of Design: 3M Personal Safety Division: .
- B Application:
 - 1. OSHA and ANSI one person PPE anchor.
 - 2. CAL-OSHA one person PPE anchor.
 - 3. OSHA HLL end anchors.
 - 4. OSHA HLL intermediate anchors.
 - 5. CAL-OSHA window washing tieback anchor.
- C Description:
 - 1. Roof anchorage points for personal fall protection systems; used exclusively for employee fall protection and independent of any anchorage used to suspend employees or platforms on which employees work.
 - a. Anchor Type per ANSI/ASSP Z359.18: Type T.
- D Structural Performance: Provide safety tieback anchors capable of withstanding design loads as required by governing regulations and codes.
- E Design Criteria: Fall protection anchors.
 - 1. Comply with 29 CFR 1910.140 and 29 CFR 1926.502 for personal fall protection systems and anchorage.
 - 2. Comply with 29 CFR 1926, Subpart M-Fall Protection.
 - 3. Comply with ANSI/ASSP Z359.18 test requirements for static strength, dynamic strength, residual strength, serviceability, and corrosion of anchorage.
 - 4. Comply with CAL (OSHA) TITLE 8 SC 7 requirements for anchors used in personal fall protection systems.
- F Design Criteria: Primary suspension lines.
 - 1. Comply with 29 CFR 1910.140 for fall protection.
 - 2. Comply with 29 CFR 1926, Subpart M-Fall Protection.

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- 3. Comply with CAL (OSHA) TITLE 8 SC 7 requirements for anchors used in window washing applications.
- G Provide permanent labels with manufacturer's name, serial number, manufacturing date, and rated load on commercial roof anchors.
- H Anchors:

2.02 HORIZONTAL LIFELINE SYSTEMS

- A Manufacturers:
- B Description: A system comprised of a flexible line such as wire rope or cable, with connectors at both ends to secure it horizontally between two anchorages or anchorage connectors.
- C Structural Performance: Provide fall-arresting lifeline systems capable of withstanding design loads as required by governing regulations and codes.
- D Design Criteria:
- E Wire Rope: ASTM A1023/A1023M, 7x7 galvanized wire , 5/16 inch diameter.

2.03 MATERIALS - STEEL

- A Structural Steel Sections: ASTM A36/A36M.
- B Steel Plates, Shapes, and Bars: ASTM A6/A6M or ASTM A283/A283M.
- C Steel Pipe: ASTM A53/A53M Grade B Schedule 40, black finish.
- D Steel Tubing: ASTM A500/A500M or ASTM A501/A501M structural tubing, round and shapes as indicated.
- E Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- F Steel Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, and galvanized in accordance with ASTM A153/A153M where connecting galvanized hardware components.
- G Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

2.04 FINISHES

- A Galvanizing: Hot-dip galvanize to minimum requirements of ASTM A123/A123M.
 - 1. Touch up abraded areas after fabrication using specified touch-up primer for galvanized surfaces.

PART 3 EXECUTION

3.01 EXAMINATION

- A Examine area for compliance with requirements for installation tolerances and other conditions related to this work.
- B Proceed with installation after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A Coordinate location of fall protection equipment indicated to be attached to structural substrate or surface of roofing system and provide anchoring devices with templates, diagrams, and installation instructions.

3.03 INSTALLATION

- A Install anchorage and fasteners in accordance with shop drawings and manufacturer's recommendations to obtain allowable working loads published in product literature and in accordance with this specification.
- B Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous coating or by other permanent separation as recommended by fall

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protection system manufacturer.

- C Deform threads of tail end of anchor studs after nuts have been tightened to prevent accidental removal or vandalism.
- D Do not load or stress anchors until all materials and fasteners are properly installed and ready for service.
- E Seal roof penetrations at anchors with pre-molded pipe flashing, membrane flashing, or sealant acceptable to roof manufacturer.
- F Install all roof safety anchors a minimum of 6 feet from the roof edge.

3.04 FIELD QUALITY CONTROL

- A See Section 014000 - Quality Requirements for additional requirements.
- B Test anchorage systems using only chemical adhesive fasteners on-site using load cell test apparatus in accordance with manufacturer's recommendations.

3.05 ADJUSTING

- A Adjust fall protection components to function smoothly and safely.

3.06 CLEANING

- A Clean exposed surfaces in accordance with fall protection system manufacturer's written instructions.

3.07 CLOSEOUT ACTIVITIES

END OF SECTION 118129

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SECTION 122400 - WINDOW SHADES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A Manual roller shades and accessories.

1.02 REFERENCE STANDARDS

- A ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).
- B BIFMA HCF 8.1 - Health Care Furniture Design – Guidelines for Cleanability; 2019.
- C NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2023, with Errata.
- D UL (GGG) - GREENGUARD Gold Certified Products; Current Edition.
- E WCMA A100.1 - Standard for Safety of Window Covering Products; 2022.

1.03 ADMINISTRATIVE REQUIREMENTS

- A Preinstallation Meeting: Convene one week prior to commencing work related to products of this section; require attendance of all affected installers.
- B Sequencing:
 - 1. Do not fabricate shades until field dimensions for each opening have been taken with finished conditions in place. "Hold to" dimensions are not acceptable.
 - 2. Do not install shades until final surface finishes and painting are complete.

1.04 SUBMITTALS

- A See Section 013000 - Administrative Requirements, for submittal procedures.
- B Product Data: Provide manufacturer's standard catalog pages and data sheets for each product to be used including materials, finishes, fabrication details, dimensions, profiles, mounting requirements, and accessories.
- C Shop Drawings: Include shade schedule indicating size, location and keys to details, head, jamb and sill details, mounting dimension requirements for each product and condition, and operation direction.
- D Source Quality Control Submittals: Provide test reports indicating compliance with specified fabric properties.
- E Selection Samples: Include fabric samples in full range of available colors and patterns.
- F Verification Samples: Minimum size 6 inches square, representing actual materials, color and pattern.
- G Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- H Operation and Maintenance Data: List of all components with part numbers, and operation and maintenance instructions; include copy of shop drawings.
- I Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

- A Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than ten years of documented experience.
- B Installer Qualifications: Company specializing in performing work of this type with minimum ten years of documented experience with shading systems of similar size, type, and complexity; manufacturer's authorized representative.

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- C Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.
- D Resistance to Degradation When Exposed to Typical Cleaners: Passes BIFMA HCF 8.1 testing.

1.06 DELIVERY, STORAGE, AND HANDLING

- A Deliver shades in manufacturer's unopened packaging, labeled to identify each shade for each opening.
- B Handle and store shades in accordance with manufacturer's recommendations.

1.07 FIELD CONDITIONS

- A Do not install products under environmental conditions outside manufacturer's absolute limits.

1.08 WARRANTY

- A See Section 017800 - Closeout Procedures and Submittals, for additional warranty requirements.
- B Provide manufacturer's standard, non-depreciating warranty, for interior shading only, covering the following:
 - 1. Shade Hardware: 10 years unless otherwise indicated.
 - a. Mecho /5 with ThermoVeil, EuroVeil, EuroTwill, Soho, Equinox, Midnite, Chelsea, or Classic Blackout shade fabric: 25 years.
 - 2. Shade Fabric: 10 years unless otherwise indicated.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A Basis of Design: MechoShade Systems LLC: www.mechoshade.com/#sle.
- B Other Acceptable Manufacturers:
 - 1. Draper, Inc: www.draperinc.com/#sle.
 - 2. Hunter Douglas Architectural: www.hunterdouglasarchitectural.com/#sle.
 - 3. Products by listed manufacturers are subject to compliance with specified requirements.
- C Substitutions: See Section 016000 - Product Requirements.
 - 1. Proposed substitutions must be submitted in writing for approval by Architect a minimum of 10 working days prior to the bid date and must be made available to all bidders. Proposed substitutions must be accompanied by certification of compliance with specifications listing all exceptions.

2.02 ROLLER SHADES

- A General:
 - 1. Provide shade system components that are capable of being removed or adjusted without removing mounted shade brackets.
 - 2. Provide shade system that operates smoothly when shades are raised or lowered.
- B Basis of Design - Roller Shades Type WC-1: MechoShade Systems LLC; Mecho/5 System: www.mechoshade.com/#sle.
 - 1. Description: Single roller, manually operated fabric window shades.
 - a. Provide universal drive capability to offset drive chain for reverse roll or regular roll shades.
 - b. Drop Position: Regular roll.
 - c. Mounting: Ceiling mounted.

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- d. Size: As indicated on drawings.
 - e. Fabric: Refer to Drawings and Material Schedule.
2. Brackets and Mounting Hardware: As recommended by manufacturer for mounting indicated and to accommodate shade fabric roll-up size and weight.
 - a. Material: Steel, 1/8 inch thick.
3. Roller Tubes:
 - a. Material: Extruded aluminum.
 - b. Size: As recommended by manufacturer; selected for suitability for installation conditions, span, and weight of shades.
 - c. Fabric Attachment: Utilize extruded channel in tube to accept vinyl spline welded to fabric edge. Shade band to be removable and replaceable without removing roller tube from brackets or inserting spline from the side of the roller tube.
 - d. Roller tubes to be capable of being removed and reinstalled without affecting roller shade limit adjustments.
4. Hembars: Designed to maintain bottom of shade straight and flat.
 - a. Style: Full wrap fabric covered bottom bar, flat profile with heat sealed closed ends.
5. Clutch Operator: Manufacturer's standard material and design integrated with bracket/brake assembly.
 - a. Provide a permanently lubricated brake assembly mounted on a oil-impregnated hub with wrapped spring clutch.
 - b. Brake must withstand minimum pull force of 50 pounds in the stopped position.
 - c. Mount clutch/brake assembly on the support brackets, fully independent of the roller tube components.
6. Drive Chain: Continuous loop stainless steel beaded ball chain, 95 pound minimum breaking strength. Provide upper and lower limit stops.
 - a. Chain Retainer: Chain tensioning device complying with WCMA A100.1.
7. Managed Lift: Required lifting force of 3 pounds to a maximum of 8.5 pounds for single band or multi-band shades up to 5 bands and a maximum of 30 pounds hanging weight.
8. Accessories:
 - a. Fascia: Removable extruded aluminum fascia, size as required to conceal shade mounting, attachable to brackets without exposed fasteners; clear anodized finish.
 - 1) Fascia to be capable of installation across two or more shade bands in one piece.
 - 2) Provide single fascia to accommodate regular roll shades.
 - b. Room-Darkening Channels, Standard: Extruded aluminum side and center channels with brush pile edge seals, SnapLoc mounting base, and concealed fasteners. Channels to accept one-piece exposed blackout hembar to assure side light control and sill light control.

2.03 SHADE FABRIC

- A Fabric - Type SF-1: Non-flammable, color-fast, impervious to heat and moisture, and able to retain its shape under normal operation.
 1. Material Composition:
 - a. PVC coated polyester yarns.
 2. Material Certificates and Product Disclosures:
 - a. Low-Emitting Material Certification: Greenguard Gold certified and listed in UL (GGG).
 - b. Health Product Declaration (HPD): Complete, published declaration with full disclosure of known hazards.

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- c. Declare label.
- 3. Performance Requirements:
 - a. Flammability: Pass NFPA 701 large or small scale test.
 - b. Fungal Resistance: No growth when tested according to ASTM G21.
- 4. Openness Factor: 3%, nominal.
- 5. Products:
 - a. MechoShade Systems LLC Inc; ThermoVeil Basket Weave - 1500 Series (3% open):
www.mechoshade.com/#sle.

END OF SECTION 122400

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SECTION 129300 – SITE AND STREET FURNISHINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes materials, labor, apparatus, tools, equipment, temporary construction, transportation, and services necessary for and incidental to performing the proper completion of Work for Site and Street Furnishings, as shown on the Contract Drawings, and as specified herein this Section.
- B. Work under this Section consists of, but is not necessarily limited to, furnishing and installing the following:
 - 1. Trash Receptacle (Unit).
 - 2. Bike Rack (Unit).
 - 3. Planter Type 1 (Unit).
 - 4. Bollard – Fixed (Unit).
 - 5. Bench (Unit).
- C. Related Sections: The following Sections contain requirements of Work that relate to this Section:
 - 1. Section 321313 – Concrete Paving.
 - 2. Section 321323 – Site Concrete (for cast-in-place concrete footings or sub-grade foundations).
 - 3. Section 329113 – Soil Preparation.
 - 4. Section 328400 – Irrigation Systems.

1.2 SUBMITTALS

- A. General:
 - 1. Collect information into a single Submittal for each element of construction and type of product or equipment identified under this Section for review.
 - 2. To expedite review, Submittal shall be organized and presented into specific sections or headings. Furnish neat, concise, legible, and clearly identifiable information, and sufficiently explicit detail, to enable proper evaluation for Contract compliance. Highlight catalog, product data, or brochures containing various products, sizes, and materials to show particular item submitted.
 - 3. Submittal Format: As applicable, furnish Submittal as a single electronic digital PDF (Portable Document Format) file.
- B. Digital Submittal Information:
 - 1. Product/Material Data: Submit available product/material literature, test reports, color charts, supplied by manufacturer's, indicating that their products comply with specified requirements. Provide manufacturing source (name, address, and telephone number), and distributor source (name, address, and telephone number) for each product/material type in this Section.
 - 2. Shop Drawings to show component parts, fabrication, installation, and dimensions for items indicated herein this Section.
 - 3. Certification: Provide certification from each manufacturer, as specified herein this Section, that their product(s) meet the specific criteria associated for sustainable products.

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- C. Material Samples:
 - 1. Submit printed manufacturer's product data, including color charts or color chips of actual fabricated products, for material sample review.
 - 2. Samples of complete Units or parts of Units of the items indicated herein this Section shall be furnished, as requested by Landscape Architect, for review and approval.
 - 3. Submit manufacturer's written certification that each product complies with specified requirements noted herein.
- D. Submittals under this Article will be rejected and returned without the benefit of review by the Landscape Architect if they are difficult to read due to insufficient scale, poor image quality, or poor drafting quality; or if all of the required information is missing or not presented in the format as requested. Partial Submittals will not be accepted.
- E. No Work under this Section shall proceed until all information indicated herein this Article have been reviewed, accepted, and approved by the Landscape Architect, in writing.

1.3 QUALITY ASSURANCE AND CONTROL

- A. All materials and Work shall be in accordance with the State Codes and Specifications and other criteria herein specified.
- B. Single-Source Responsibility: Obtain furnishing Units from each respective single source with resources to provide products and materials of consistent quality in appearance and physical properties without delaying the Work.

1.4 COORDINATION, SCHEDULING, AND OBSERVATIONS

- A. Notify the Contractors performing Work related to installation of Work under this Section in ample time to allow sufficient time for them to perform their portion of Work and that progress of Work is not delayed. Verify conditions at the Project Site for Work that affects installation under this Section. Coordinate items of other trades to be furnished and set in place.
- B. Field Measurements: Contractor shall take field measurements as required. Report major discrepancies between the Contract Drawings and field dimensions to the Landscape Architect prior to commencing Work. Check adjoining finished surfaces, finished grades, and other Work by accurate field measurements before erection. Maintain required levels and grade elevations. Review installation procedures and coordinate Work here in this Section with other Work affected.
- C. Perform installation operations only when weather is suitable in accordance with locally accepted practices:
- D. Coordinating furnishing footings with utility locations. Note potential conflicts to the Landscape Architect.
- E. Construction Site Observations: Periodic site observations shall be made by the Landscape Architect during the installation of Work under this Section for compliance with requirements for type, size, and quality. Landscape Architect retains right to observe Work for defects and to reject unsatisfactory or defective material at any time during progress of Work. Contractor shall remove rejected materials immediately from Project site. Contractor shall request, in writing, at least one (1) week in advance of the time when mandatory site observation(s) by the Landscape Architect are required.

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1.5 DELIVERY, STORAGE AND HANDLING

- A. Furnishings shall be stored as necessary to prevent damage and shall be in new condition when ready for installation. It shall be the responsibility of the Contractor to install "factory condition" furnishings.
- B. Store materials off ground and under cover, away from damp surfaces and inclement weather.
- C. Deliver manufactured materials in original, unopened packages or containers with manufacturer's labels intact and legible. Deliver and install materials so as to not delay Work, and install only after preparations for installation have been completed.

1.6 SUBSTITUTIONS

- A. Consideration: Materials to be considered equal to the Materials indicated herein this Section shall be reviewed by the Landscape Architect. Materials with equal performance characteristics produced by other Manufacturer's and/or Distributors may be considered, providing deviations in dimensional size, color, composition, operation, and/or other characteristics do not change the design concept, aesthetic appearance, nor intended performance, as solely judged by the Landscape Architect. The burden of proof on product equality is on the Contractor.
- B. Specific reference to Manufacturer's names and products specified herein are used as standards of quality. This implies no right to the Contractor to substitute other materials without prior written approval by the Landscape Architect for Work under this Section.
- C. Materials substituted and installed by the Contractor, without prior written approval by the Landscape Architect, may be rejected. Contractor shall not be entitled to be compensated by the Owner where the Contractor has installed rejected substitutions without receiving prior written approval.
- D. Contract Price: Substituted Materials under this Section shall not increase the Contract price.

PART 2 - PRODUCTS

2.1 TRASH RECEPTACLE (Unit)

- A. Trash Receptacle Unit shall consist of the complete assembly, consisting of the reinforced pre-cast sealed concrete shell, galvanized steel internal liner, aluminum ash ring, silica sand, and mounting hardware.
 - 1. Manufacturer: Refer to the Contract Drawings.
 - 2. Model Number: Refer to the Contract Drawings.
 - 3. Color/Finish:
 - a. Pre-cast Unit: Refer to the Contract Drawings.
 - b. Lid: Refer to the Contract Drawings.
- B. Install in quantity as indicated on the Contract Drawings.

2.2 BIKE RACK (Unit)

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- A. Bike Rack Unit shall consist of a complete assembly, including Bike Rack and all applicable mounting hardware.
 - 1. Manufacturer: Refer to the Contract Drawings.
 - 2. Model Number: Refer to the Contract Drawings.
 - 3. Color/Finishes: Refer to the Contract Drawings.
 - 4. Mounting and Orientation: Refer to the Contract Drawings.

- B. Install in quantity as indicated on the Contract Drawings.

2.3 PLANTER TYPE I (Unit)

- A. Planter Type I Unit shall consist of the complete assembly, consisting of the reinforced pre-cast concrete shell, Manufacturer-applied sealer on interior and exterior surfaces, and drainage holes in the quantity and locations as indicated on the Contract Drawings.
 - 1. Manufacturer: Refer to the Contract Drawings.
 - 2. Model Number: Refer to the Contract Drawings.
 - 3. Color/Finishes: Refer to the Contract Drawings.

- B. Install in quantity as indicated on the Contract Drawings.

- C. Each Assembly shall include the following:
 - 1. Irrigation System components per the Contract Drawings, in accordance with requirements per Section 328400 – Irrigation System.
 - 2. Drain Rock/Aggregate, per Section 329113 – Soil Preparation.
 - 3. Geotextile Filter Fabric, per Section 329400 – Landscape Planting Accessories.
 - 4. Perforated Drain Pipe & Drain Sock (Tree Chimney), per Section 329400 – Landscape Planting Accessories.
 - 5. Amended Imported Soil Mix for Planting Containers (Pots), per Section 329113 – Soil Preparation.
 - 6. Exterior Plants in the Planting Containers (Pots) in the type, size, and quantity as indicated in the Contract Drawings, in accordance with requirements per Section 329300 – Exterior Plants.
 - 7. Landscape Mulch Material, per Section 329400 – Landscape Planting Accessories.

2.4 BOLLARD – FIXED (Unit)

- A. Bollard - Fixed Unit shall consist of the complete assembly, consisting of the Manufacturer-fabricated Bollard Unit, chain hardware, and applicable Manufacturer-supplied mounting hardware.
 - 1. Manufacturer: Refer to the Contract Drawings.
 - 2. Model: Refer to the Contract Drawings.
 - 3. Color/Finish: Refer to the Contract Drawings.
 - 4. Mounting: Refer to the Contract Drawings.
 - 5. Or equal, as approved by the Landscape Architect.

- B. Install in quantity as indicated on the Contract Drawings.

2.5 BENCH – (Unit)

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- A. Bench Unit shall consist of the complete assembly, with the manufactured unit, concrete support foundation(s), and applicable Manufacturer-supplied vandal-resistant mounting hardware.
 - 1. Manufacturer: Refer to the Contract Drawings.
 - 2. Model: Refer to the Contract Drawings.
 - 3. Color/Finish: Refer to the Contract Drawings.
 - 4. Mounting: Refer to the Contract Drawings.
 - 5. Or equal, as approved by the Landscape Architect.
- B. Install in quantity as indicated on the Contract Drawings.

2.6 MISCELLANEOUS MATERIALS

- A. Anchors, Fasteners, Fittings, and Hardware: Stainless steel, commercial quality, tamper-proof, vandal & theft resistant, concealed, recessed, and capped or plugged. Provide from manufacturer of site furnishing, as applicable.
- B. Non-shrink, Non-metallic Setting Grout: Pre-mixed, factory-packaged, non-staining, non-corrosive, non-gaseous Setting Grout, suitable for exterior applications, complying with ASTM C1107.
 - 1. Products & Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - a. *Euco N-S Grout*, Euclid Chemical Co.
 - b. *Crystex*, L&M Construction Chemicals, Inc.
 - c. *Masterflow 713*, BASF Building Systems, Inc.
 - d. *Conspec Enduro 50*, CONSPEC Marketing and Manufacturing Co.
 - e. *Rapidset Grout*, Rapidset Products.
 - f. *SikaGrout 212*, Sika Corporation.
 - g. *Quikcrete Commercial Grade Fast Set Non-Shrink Grout*, Quikcrete Companies.
 - h. *588 Grout*, W.R. Meadows.
 - i. *Certi-Grout #1000*, Vexcon Chemicals.
 - j. Or equal, as approved by the Landscape Architect.
- C. Erosion-resistant Anchoring Cement: Factory-packaged, non-shrink, non-staining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pour-able anchoring, patching, and grouting compound, resistant to erosion from water exposure without needing protection by a sealer or waterproof coating, recommended in writing by manufacturer of site furnishings, for exterior applications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. General: Examine areas and conditions under which site furnishing units are to be installed with Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance.
 - 1. Remedy any conditions detrimental to the proper and timely completion of the Work.
 - 2. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the Landscape Architect.
- B. Verification:

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1. Verify that substrates are stable and capable of supporting the weight of items covered under this Section.
2. Verify that substrates have been adequately prepared to securely anchor those items that will be surface mounted.

3.2 INSTALLATION

A. Trash Receptacle (Unit):

1. Trash Receptacle Unit shall be furnished and located as shown on the Contract Drawings, and as directed by the Contract Specifications. Verify exact locations (both at ground level and on-structure) with the Landscape Architect prior to installation.
2. Use actual Unit(s) to establish all dimensions for installation.
3. Erect and install Unit(s) in accordance with the Manufacturer's instructions and recommendations. Install unit(s) plumb, accurately, and in the correct orientation and relationship with other site furnishings, elements and/or paving as shown on the Contract Drawings.
4. Install all anchorage and mounting hardware, as applicable, in strict accordance with Manufacturer's instructions, and as directed by the Landscape Architect.

B. Bike Rack (Unit):

1. Bike Rack Unit shall be furnished and located as shown on the Contract Drawings, and as directed by the Contract Specifications. Verify exact locations and orientation with the Owner's Representative prior to installation.
2. Use actual Unit(s) to establish all dimensions for installation.
3. Erect and install Unit in accordance with the Manufacturer's written instructions and recommendations. Install Unit(s) plumb, accurately, and in the correct orientation and relationship with other site furnishings, elements and/or paving as shown on the Contract Drawings.
4. Install footings, anchorages, or mounting hardware, as applicable, in strict accordance with the Manufacturer's instructions.
 - a. Embed Unit into cast-in-place concrete foundation. Foundation for Unit shall be completely set below work of surrounding pavements.

C. Planter Type I (Unit):

1. Planter Type I Unit shall be furnished and located as shown on the Contract Drawings, and as directed by the Contract Specifications. Verify exact locations with the Landscape Architect prior to installation.
2. Use actual Unit(s) to establish all dimensions for installation.
3. Erect and install Unit(s) in accordance with Manufacturer's instructions and recommendations. Install unit(s) plumb, accurately, and in the correct orientation and relationship with other site furnishings, elements and/or paving as shown on the Contract Drawings. Provide drain and irrigation piping connections to bottom of Unit as indicated on the Contract Drawings. Seal all connections at Unit with silicone sealant to prevent leaks.
4. Install all anchorage and mounting hardware, as applicable, in strict accordance with manufacturer's instructions, and as directed by the Landscape Architect.
5. After plumbing and anchorage installation, place Drain Rock/Aggregate (as indicated per Section 329113) in the bottom of Planting Containers (Pots), at the depth indicated in Contract Drawings.
6. Place the Perforated Drain Pipe & Drain Sock (Tree Chimney) so it is anchored within the Drain-Rock/Aggregate. Provide Grate.

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7. Place a layer of Geotextile Filter Fabric over the Drain Rock/Aggregate and partially up the sides of the Planting Container (Pot). Trim Fabric around plumbing connections so that Soil Mix does not erode into the Drain Rock/Aggregate.
 8. Install the Amended Imported Soil Mix for Planting Containers (Pots), as indicated in Section 329113 – Soil Preparation. Place Soil Mix so that it does not contaminate the Drain Rock/Aggregate. Set Mix in 6" compacted lifts, to within 2" of the top elevation of the Planting Container (Pot).
 9. Install Exterior Plants in the Planting Containers (Pots) in the type, size, and quantity as indicated in the Contract Drawings, in accordance with the requirements per Section 329300 – Exterior Plants.
- D. Drinking Water Fountain (Unit):
1. Drinking Water Fountain Unit shall be furnished and located as shown on the Contract Drawings, and as directed by the Contract Specifications. Verify exact locations with the Landscape Architect prior to installation.
 2. Use actual Unit(s) to establish all dimensions for installation.
 3. Erect and install Unit in accordance with the Manufacturer's written instructions and recommendations. Install Unit(s) plumb, accurately, and in the correct orientation and relationship with other site furnishings, elements and/or paving as shown on the Contract Drawings.
 4. Install footings, anchorages, or mounting hardware, and all applicable plumbing connections, in strict accordance with the Manufacturer's instructions and per jurisdictional codes.
 5. Attach to water supply with shut off valve in immediate proximity to Unit, per Contract Drawings.
 6. Attach to drain line connected to gravel-lined subsurface drainage sump or sanitary sewer line with clean out.
- E. Bollard – Fixed (Unit):
1. Bollard - Fixed Unit shall be furnished and located as shown on the Contract Drawings, and as directed by the Contract Specifications. Verify exact locations with the Landscape Architect prior to installation.
 2. Use actual Unit(s) to establish all dimensions for installation.
 3. Erect and install Unit(s) in accordance with Manufacturer's instructions and recommendations. Install unit(s) plumb, accurately, and in the correct orientation and relationship with other site furnishings, elements and/or paving as shown on the Contract Drawings.
 4. Install all anchorage/mounting hardware, as applicable, in strict accordance with manufacturer's instructions, and as directed by the Landscape Architect.
- F. Bench (Unit):
1. Bench Unit shall be furnished and located as shown on the Contract Drawings, and as directed by the Contract Specifications. Verify exact locations with the Landscape Architect prior to installation.
 2. Use actual Unit(s) to establish all dimensions for installation.
 3. Erect and install Unit(s) in accordance with Manufacturer's instructions and recommendations. Install unit(s) plumb, accurately, and in the correct orientation and relationship with other site furnishings, elements and/or paving as shown on the Contract Drawings.
 4. Install all cast-in-place concrete foundations, anchorage/mounting hardware, as applicable, in strict accordance with manufacturer's instructions, and as directed by the Landscape Architect.

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3.3 PROTECTION

- A. Protect installed furnishings against damage throughout the duration of the construction period, complying with Manufacturer's directions.
 - 1. Remove and replace damaged furnishings as required to deliver factory-condition units at Final Acceptance of Work.

3.4 CLEANING

- A. After completing site furnishing installation, inspect components. Remove protective packaging and dispose properly. Remove spots, dirt, and debris. Repair damaged finishes to match original finish, or replace component.
 - 1. Touch-up Painting: Where directed by the Landscape Architect, clean field welds, bolted connections, and abraded areas of the Work. Paint exposed areas with paint or other material as supplied by the Manufacturer of the damaged Unit. Apply by brush, to thickness recommended by paint manufacturer.

END OF SECTION

END OF SECTION

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SECTION 142400 - HYDRAULIC ELEVATORS

PART 1 GENERAL

1.01 SUMMARY

- A This section specifies hydraulic elevators.
- B Work Required
 - 1. The work required under this section consists of all labor, materials and services required for the complete installation (including operational verification) of all the equipment required for the elevator(s) as specified herein.
 - 2. All work shall be performed in a first class, safe and workmanlike manner.
 - 3. In all cases where a device or part of the equipment is herein referred to in the singular, it is intended that such reference shall apply to as many of such devices or parts as are required to make complete installation.

1.02 RELATED SECTIONS

- A The following sections contain requirements that relate to this section and are performed by trades other than the elevator manufacturer/installer.
 - 1. Section 015000 – Temporary Facilities and Controls: protection of floor openings and personnel barriers; temporary power and lighting.
 - 2. Section 033000 – Cast-In-Place Concrete: elevator pit, elevator motor and pump foundation, and grouting thresholds.
 - 3. Section 051200 - Structural Steel Framing: Includes hoistway framing and overhead hoist beams.
 - 4. Section 055000 – Metal Fabrications: pit ladder, divider beams, supports for entrances and rails, and hoisting beam at top of elevator hoistway.
 - 5. Section 071300 - Sheet Waterproofing: Waterproofing of elevator pit walls and floor.
 - 6. Section 078400 - Firestopping: Fire rated sealant in hoistway.
 - 7. Section 083100 - Access Doors and Panels: Fire rated access doors into hoistway.
 - 8. Section 092116 - Gypsum Board Assemblies: Gypsum shaft walls.
 - 9. Section 211313 - Fire-Suppression Sprinkler Systems: Sprinkler heads in hoistway.
 - 10. Section 260500 – Common Work Results for Electrical:
 - a. Main disconnects for each elevator.
 - b. Electrical power for elevator installation and testing.
 - c. Disconnecting device to elevator equipment prior to activation of sprinkler system.
 - d. The installation of dedicated GFCI receptacles in the pit and overhead.
 - e. Lighting in controller area, machine area and pit.
 - f. Wiring for telephone service to controller.
 - 11. Section: 282300 - Video Surveillance Installation of video camera in car interior for security monitoring.
 - 12. Section 283100 – Fire Detection and Alarms: fire and smoke detectors at required locations and interconnecting devices; fire alarm signal lines to contacts in the machine area.

1.03 REFERENCES

- A Comply with applicable building and elevator codes at the project site, including but not limited to the following:
 - 1. ASME A17.1/CSA B44, Safety Code for Elevators and Escalators.
 - 2. ASME A17.7/CSA B44, Performance-Based Safety Code for Elevators and Escalators.
 - 3. ADAAG, American Disabilities Act Accessibility Guidelines.

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4. ANSI A117.1, Building and Facilities, Providing Accessibility and Usability for Physically Handicapped People.
5. ANSI/NFPA 70, (NEC) National Electrical Code.
6. CAN/CSA C22.1, (CEC) Canadian Electrical Code.
7. ANSI/UL 10B, Standard for Fire Test of Door Assemblies.
8. CAN/ULC-S104-10, Standard Method for Fire Test of Door Assemblies.
9. ANSI/NFPA 80, Standard for Fire Doors and Other Opening Protectives.
10. Building Codes IBC or NBCC.
11. All Local Jurisdictional applicable codes.

1.04 SYSTEM DESCRIPTION

- A Equipment Description: Hole-less Hydraulic elevator with machine-room less application
- B Equipment Control: Elevonic® Control System.
- C Quantity of Elevators: 1
- D Elevator Stop Designations: 1, 2
- E Stops: 2
- F Openings: Front Only
- G Travel: 9'-4"
- H Rated Capacity: 2100
- I Rated Speed: 100 fpm
- J Platform Size: Refer to Drawings.
- K Clear Inside Dimensions: Refer to Drawings
- L Cab Height: 93"
- M Clear Cab Height: Refer to Drawings
- N Entrance Type and Width: Single Slide - 3'0"
- O Entrance Height: 84"
- P Main Power Supply: 208 volts □ 5% of normal, three-phase, with a separate equipment grounding conductor.
- Q Car Lighting Power Supply: 120 volts, single-phase, 15 amps, 60 Hz.
- R Machine Location: No machine-room required, tank and controller in hoistway pit.
- S Signal Fixtures: Manufacturer's standard with metal button targets (excluding CA).
- T Controller Location: In a machine space or closet
- U Operation :Simplex Collective Operation: Using a microprocessor-based controller, operation shall be automatic by means of the car and hall buttons. If all calls in the system have been answered, the car shall park at the last landing served.
- V Operation Features – Standard
 1. Full Collective Operation
 2. Anti-nuisance.
 3. Fan and Light Protection.
 4. Load Weighing Bypass.
 5. Independent Service.
 6. Firefighters' Service Phase I and Phase II (USA only); or Special Emergency Service Phase I and II – Emergency Recall and In-Car Emergency Operation (Canada only).
 7. Top of Car Inspection.
- W Operation Features – Optional
 1. Zoned Access at Bottom Landing.
 2. Zoned Access at Upper Landing.
 3. Express Priority Service with key-switch(es)
 4. Emergency Hospital Service.
 5. Automatic Rescue Operation

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- 6. Automatic Standby Power Operation with Manual Override.
- X Door Control Features:
 - 1. Door control to open doors automatically when car arrives at a landing in response to a normal hall or car call.
 - 2. Elevator doors shall be provided with a reopening device that will stop and reopen the car door(s) and hoistway door(s) automatically should the door(s) become obstructed by an object or person.
 - 3. Door protection shall consist of a two-dimensional, multi-beam array projecting across the car door opening.
 - 4. Door nudging operation to occur if doors are prevented from closing for an adjustable period of time.
- Y Provide equipment for seismic conditions: Yes

1.05 SUBMITTALS

- A Product Data: Submit manufacturer's product data for each system proposed for use. Include the following:
 - 1. Signal and operating fixtures, operating panels and indicators.
 - 2. Cab design, dimensions and layout.
 - 3. Hoistway-door and frame details.
 - 4. Electrical characteristics and connection requirements.
 - 5. Expected heat dissipation of elevator equipment in hoistway (BTU).
 - 6. Color selection chart for Cab and Entrances.
- B Shop Drawings: Submit approval layout drawings. Include the following:
 - 1. Car, guide rails, buffers, and other components in hoistway.
 - 2. Maximum rail bracket spacing.
 - 3. Maximum loads imposed on guide rails requiring load transfer to building structure.
 - 4. Clearances and travel of car.
 - 5. Clear inside hoistway and pit dimensions.
 - 6. Location and sizes of access doors, hoistway entrances and frames.
- C Operations and Maintenance Manuals: Provide manufacturer's standard operations and maintenance manual.

1.06 QUALITY ASSURANCE

- A Manufacturer: Elevator manufacturer shall be ISO 9001 certified.
- B Manufacturer shall have a minimum of fifteen years of experience in the fabrication, installation and service of elevators.
- C Installer: Elevators shall be installed by the manufacturer.
- D Permits, Inspections and Certificates: The Elevator Contractor shall obtain and pay for necessary Municipal or State Inspection and permit as required by the elevator inspection authority, and make such tests as are called for by the regulations of such authorities. These tests shall be made in the presence of such authorities or their authorized representatives.

1.07 DELIVERY, STORAGE, AND HANDLING

- A Should the building or the site not be prepared to receive the elevator equipment at the agreed upon date, the General Contractor will be responsible to provide a proper and suitable storage area on or off the premises.
- B Should the storage area be off-site, and the equipment not yet delivered, then the elevator contractor, upon notification from the General Contractor, will divert the elevator equipment to the storage area. If the equipment has already been delivered to the site, then the General Contractor shall transport the elevator equipment to the storage area. The cost of elevator

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equipment taken to storage by either party, storage, and redeliver to the job site shall not be at the expense of the elevator contractor.

1.08 WARRANTY

- A The elevator contractor's acceptance is conditional on the understanding that their warranty covers defective material and workmanship. The warranty period shall not extend longer than one (1) year from the date of completion or acceptance thereof by beneficial use, whichever is earlier, of each elevator. The warranty excludes: ordinary wear and tear, improper use, vandalism, abuse, misuse, or neglect or any other causes beyond the control of the elevator contractor and this express warranty is in lieu of all other warranties, express or implied, including any warranty of merchantability or fitness for a particular purpose.

1.09 MAINTENANCE AND SERVICE

- A Maintenance service consisting of regular examinations and adjustments of the elevator equipment shall be provided by the elevator contractor for a period of 12 Months after the elevator has been turned over for the customer's use. This service shall not be subcontracted but shall be performed by the elevator contractor. All work shall be performed by competent employees during regular working hours of regular working days. This service shall not cover adjustments, repairs, or replacement of parts due to negligence, misuse, abuse or accidents caused by persons other than the elevator contractor. Only genuine parts and supplies as used in the manufacture and installation of the original equipment shall be provided.
- B The elevator control system must:
 - 1. Provide in the controller the necessary devices to run the elevator on inspection operation.
 - 2. Provide on top of the car the necessary devices to run the elevator in inspection operation.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A Manufacturer: Design based upon Otis HydroFit™ machine room-less elevator system.

2.02 DESIGN AND SPECIFICATIONS

- A Provide hydraulic elevators from Otis Elevator Company. The control system and car design based on materials and systems manufactured by Otis Elevator Company. Specifically, the system shall consist of the following components:
 - 1. The entire hydraulic system and the controller shall be located inside the hoistway. No extra machine room or control closet space is required.
 - 2. LED lighting standard in ceiling lights and elevator fixtures.
 - 3. Sleep mode operation for LED ceiling lights and car fan.
- B Approved Installer: Otis Elevator Company

2.03 EQUIPMENT: MACHINE COMPONENTS

- A The hydraulic system shall be of compact design suitable for operation under the required pressure. The power component shall be mounted in the hydraulic-fluid storage tank. The control valve shall control flow for up and down directions hydraulically and shall include an integral check valve. A control section including control solenoids shall direct the main valve and control: up and down starting, acceleration, transition from full speed to leveling speed, up and down stops, pressure relief and manual lowering. All of these functions shall be fully adjustable for maximum smoothness and to meet contract conditions. System to be provided with a low-pressure switch and a shut-off valve.

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- B The entire hydraulic system with hydraulic-fluid storage tank, power component and valves shall be located in the hoistway pit and be easily accessible for maintenance through an access door in the hoistway wall.
- C A microprocessor-based controller shall be provided, including necessary starting switches together with all relays, switches, solid-state components, and hardware required for operation, including door operation, as described herein. A three (3) phase overload device shall be provided to protect the motor against overloading.
- D The controller shall be located together with the hydraulic system in the hoistway pit and be easily accessible for maintenance through the same access door that is also used for the hydraulic system. The controller will be located in the optional remote machine room if selected.
- E A manual lowering feature shall permit lowering the elevator at slow speed in the event of power failure or for adjusting purposes.
- F Pressure Switch
- G Tank Heater- Optional
- H Low-oil control (where required)

2.04 EQUIPMENT: HOISTWAY COMPONENTS

- A Plunger(s) and Cylinder(s): Each cylinder shall be constructed of steel pipe of sufficient thickness and suitable for the operating pressure. The top of each cylinder shall be equipped with a cylinder head with a drip ring to collect any oil seepage as well as an internal guide ring and self-adjusting packing. Each plunger shall be constructed of selected steel tubing or pipe of proper diameter machined true and smooth with a fine polished finish. Each plunger shall be provided with a stop ring electrically welded to it to prevent the plunger from leaving the cylinder. Each plunger and cylinder shall be installed plumb and shall operate freely with minimum friction.
- B Car Guide Rails: Tee-section steel rails with brackets and fasteners.
- C Polyurethane type buffers shall be used.
- D Wiring: Wiring for hoistway electrical devices included in scope of the elevator system, hall panels, pit emergency stop switch, and the traveling cable for the elevator car.
- E Hoistway Entrances:
 - 1. Frames: Entrance frames shall be of bolted construction for complete one-piece unit assembly. All frames shall be securely fastened to fixing angles mounted in the hoistway and shall be of UL fire rated steel.
 - 2. Sills shall be extruded: Aluminum
 - 3. Doors: Entrance doors shall be of metal construction with vertical channel reinforcements.
 - 4. Fire Rating: Entrance and doors shall be UL fire rated for 1-1/2 hour
 - 5. Entrance Finish: Satin Stainless Steel
 - 6. Entrance Marking Plates: Entrance jambs shall be marked with 4" x 4" (102 mm x 102 mm) plates having raised floor markings with Braille located adjacent to the floor marking. Marking plates shall be provided on both sides of the entrance.
 - 7. Sight Guards: Sight guards will be furnished with all doors painted to match with painted doors, painted black for stainless steel doors.

2.05 EQUIPMENT: CAR COMPONENTS

- A Cab: Steel Shell Cab with raised laminate wall panels
 - 1. Brushed Stainless Steel finished vertical trim pieces are optional.
- B Car Front Finish: Brushed Stainless Steel.
- C Car Door Finish: Brushed Stainless Steel.
- D Ceiling Type: Dropped ceiling with LED lights
- E Car Front Finish: Brushed Stainless Steel.

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- F Car Door Finish: Brushed Stainless Steel.
- G Ceiling Finish: Brushed Steel Finish
- H Emergency Car Lighting: An emergency power unit employing a 6-volt sealed rechargeable battery and totally static circuits shall be provided to illuminate the elevator car in the event of building power failure.
- I Fan: A one-speed 120 VAC fan will be mounted to the ceiling to facilitate in-car air circulation, meeting A17.1 code requirements. The fan shall be rubber mounted to prevent the transmission of structural vibration and will include a baffle to diffuse audible noise. A switch shall be provided in the car-operating panel to control the fan.
- J Handrails: Brushed steel finish, 1 ½" diameter round bars handrails shall be provided on the side and rear walls
- K Threshold: Aluminum
- L Emergency Exit Contact: An electrical contact shall be provided on the car-top exit.
- M The LED ceiling lights, and the fan should automatically shut off when the system is not in use and be powered back up after a passenger calls the elevator and pushes a hall button.
 - 1. Note: Below are optional.
- N Certificate frame: Provide a Certificate frame with a Brushed Stainless-Steel finish.
- O Otis cab UVC light purification device
- P Otis cab air purifier

2.06 EQUIPMENT: SIGNAL DEVICES AND FIXTURES

- A The car operating panel shall be equipped with the following features:
 - 1. Raised markings and Braille to the left-hand side of each push-button.
 - 2. Car Position Indicator at the top of, and integral to the car operating panel.
 - 3. Door open and door close buttons.
 - 4. Inspection key-switch.
 - 5. Elevator Data Plate marked with elevator capacity and car number.
 - 6. Help Button: The help button shall initiate two-way communication between the car and a location inside the building, switching over to another location if the call is unanswered, where personnel are available who can take the appropriate action. Visual indicators are provided for call initiation and call acknowledgement.
 - 7. Landing Passing Signal: A chime bell shall sound in the car to signal that the car is either stopping at or passing a floor served by the elevator.
 - 8. In car stop switch (toggle or key unless local code prohibits use)
 - 9. Firefighter's hat (standard USA)
 - 10. Firefighter's Phase II Key-switch (standard USA)
 - 11. Call Cancel Button (standard USA)
 - 12. Firefighter's Phase II Emergency In-Car Operating Instructions: worded according to A17.1 2000, Article 2.27.7.2.
 - 13. Please Exit Symbol: provided with emergency hospital service, or express priority in the hall.
- B Car Position Indicator: A digital, LED car position indicator shall be integral to the car operating panel.
- C Hall Fixtures: Hall fixtures shall be provided with necessary push buttons and key switches for elevator operation.
 - 1. Integral Hall fixtures shall feature round stainless steel, mechanical buttons marked to correspond to the landings. Hall fixtures to be located in the entrance frame face. Buttons shall be in vertically mounted fixture. Fixture shall be Brushed Stainless Steel finish.
 - 2. Button: Flat flush mounted, Brushed Stainless Steel button with blue or white LED illuminating halo

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- 3. Car Lantern and Chime: A directional lantern visible from the corridor shall be provided in the car entrance. When the car stops and the doors are opening, the lantern shall indicate the direction in which the car is to travel, and a chime will sound.
- D Access key-switch at top floor in entrance jamb.
- E Access key-switch at lowest floor in entrance jamb.
- F Card Reader Provision is Optional

PART 3 EXECUTION

3.01 PREPARATION

- A Take field dimensions and examine conditions of substrates, supports, and other conditions under which this work is to be performed. Do not proceed with work until unsatisfactory conditions are corrected.

3.02 INSTALLATION

- A Installation of all elevator components except as specifically provided for elsewhere by others.

3.03 DEMONSTRATION

- A The elevator contractor shall make a final check of each elevator operation with the Owner or Owner's representative present prior to turning each elevator over for use. The elevator contractor shall determine that control systems and operating devices are functioning properly.

END OF SECTION 142400