Project Manual

Volume 1

Prepared for:

Hatboro-Horsham School District
227 Meetinghouse Road, Suite 100
Horsham, PA 19044

Project:

Simmons Elementary School Elevator Addition
411 Babylon Road
Horsham, PA 19044

Prepared by:

SCHRADERGROUP
A HORD COPLAN MACHT STUDIO

555 E. North Lane, Suite 5100, Building D
Conshohocken, Pennsylvania 19428

Bid Documents: **12 January 2026**

SECTION 00 00 10 – PROJECT MANUAL TITLE PAGE

OWNER:	**Hatboro-Horsham School District** 227 Meetinghouse Rd., Suite 100, Horsham, PA 19044
PROJECT LOCATION:	**Simmons Elementary School** 411 Babylon Rd., Horsham, PA 19044
CONSTRUCTION MANAGER:	**ICS Consulting, LLC ("ICS")** 1400 N. Providence Rd., Bldg. 2, Suite 4025, Media, PA 19063 Phone: (610) 424-4172 Project Manager: Craig Babroff Email: craig.babroff@ics-builds.com Direct: (609) 685-8818
MECHANICAL ENGINEER:	**Snyder Hoffman Associates, Inc.** 1005 West Lehigh St., Bethlehem, PA 18018 Phone: (610) 694-8020 Contact: Shane Niper Email: Seniper@snyderhoffman.com
ELECTRICAL ENGINEER:	**Snyder Hoffman Associates, Inc.** 1005 West Lehigh St., Bethlehem, PA 18018 Phone: (610) 694-8020 Contact: Corey Trumbower Email: Ctrumbower@snyderhoffman.com
STRUCTURAL ENGINEER:	**SCHRADERGROUP Architecture, LLC** **A Hord Coplan Macht Studio** 153 E. King St., Suites 211-212, Lancaster PA 17602 Phone: (717) 299-8965 Contact: Tom Forsberg Email: Tforsberg@sgarc.com
ARCHITECT:	**SCHRADERGROUP Architecture, LLC** **A Hord Coplan Macht Studio** 555 E. North Ln., Ste 5100, Bldg. D, Conshohocken, PA 19428 Phone: (215) 482-7440 Contact: Craig Lucas Email: Clucas@sgarc.com

END OF SECTION 00 00 10

TABLE OF CONTENTS

Copyright

PROJECT DRAWING INDEX

As Listed on Contract Drawings Cover Sheet

PROJECT MANUAL INDEX

Section 00 00 00 - Manual Cover
Section 00 00 10 - Project Manual Title Page
Section 00 01 00 - Table of Contents

DIVISION 00 – PROCUREMENT & CONTRACTING REQUIREMENTS

Section 00 11 13 - Advertisement for Bid
Section 00 11 53.00 - Request for Qualifications – AIA Document A305 and Exhibits
Section 00 11 53.29 - Responsible Contractor Policy 826
Section 00 11 53.32 - Responsible Contractor Qualifications Form (Exhibit F)
Section 00 21 10 - Background Checks and Other Verifications
Section 00 21 10.13 - Act 141: Public Works Employment Verification Form
Section 00 21 10.19 - Act 151: Child Abuse Clearance Form
Section 00 21 10.21 - Act 34: Pennsylvania State Police Clearance Form
Section 00 21 10.23 - Act 24/Act 82: PDE Form 6004
Section 00 21 10.26 - Act 168: PA Sexual Misconduct-Abuse Disclosure Release
Section 00 21 13 - Instructions to Bidders Cover
Section 00 21 13 - Instructions to Bidders - AIA Document A701
Section 00 31 00 - Available Project Information – Existing Drawings
Section 00 31 32.00 - Geotechnical Data
Section 00 31 32.13 - Geotechnical Exploration & Letter Report dated November 17, 2025
Section 00 41 13 - Bid Form
Section 00 43 13.00 - Bid Security Form Cover
Section 00 43 13.13 - Bid Bond Form, AIA Document A310-2010
Section 00 43 13.16 - Agreement of Surety
Section 00 43 25 - Substitution Form
Section 00 43 93 - Bid Submittal Attachments
Section 00 45 19 - Non-Collusion Affidavit
Section 00 45 46 - Waiver of Liens
Section 00 52 00 - Standard Form of Agreement between Owner & Contractor Cover
Section 00 52 13 - Standard Form of Agreement between Owner & Contractor (AIA Document A132)
Section 00 55 00 - Exhibit C – Notice to Proceed
Section 00 61 13.00 - Performance and Payment Bonds
Section 00 61 13.13 - Performance Bond
Section 00 61 13.16 - Payment Bond
Section 00 72 00 - General Conditions of the Contract for Construction Cover

Section 00 72 00 - General Conditions of the Contract for Construction (AIA Document A232)
Section 00 73 43.00 - Prevailing Wage Rate Requirements
Section 00 73 46.13 - Prevailing Wage Rate Determination Schedule
Section 00 73 46.16 - Certified Payroll Sample Form – PA Department of Labor & Industry Form LLC-25
Section 00 91 00 - Addenda

DIVISION 01 – GENERAL REQUIREMENTS

Section 01 11 00 - Summary of Work
Section 01 12 00 - General Work Scope Requirements
Section 01 13 00 - List of Work Scopes
Section 01 13 00.13 - Work Scope No.1 – General Construction
Section 01 22 00 - Unit Prices and Material Allowances
Section 01 23 00 - Alternates
Section 01 26 00 - Contract Modification Procedures
Section 01 29 00 - Payment Procedures
Section 01 30 00 - Administrative Requirements
Section 01 31 26 - Electronic Communication Protocols
Section 01 32 10.00 - Project Schedule Requirements
Section 01 32 10.01 - Project Milestone Schedule, dated December 22, 2025
Section 01 33 00 - Submittal Procedures
Section 01 40 00 - Quality Requirements
Section 01 50 00.00 - Temporary Facilities and Controls
Section 01 50 00.01 Site Logistics Plan
Section 01 52 00 - Safety
Section 01 60 00 - Product Requirements
Section 01 70 00 - Execution
Section 01 73 29 - Cutting and Patching
Section 01 77 00 - Closeout Procedures

DIVISION 02 – SITEWORK

Section 020150 - Protection of Underground Utilities
Section 022300 - Site Clearing / Demolition
Section 024113 - Selective Demolition

DIVISION 03 – CONCRETE

Section 033000 - Cast-In-Place Concrete
Section 033050 - Cast-In-Place Concrete Slabs
Section 033100 - Site Cast-In-Place Concrete
Section 033700 - Concrete Curing and Sealing
Section 035416 - Self Leveling Underlayment

DIVISION 04 – MASONRY

Section 042000 - Unit Masonry
Section 042113 - Brick Masonry

DIVISION 05 - METALS

Section 051200 - Structural Steel
Section 053100 - Steel Deck
Section 055000 - Metal Fabrications

DIVISION 06 – WOOD, PLASTICS, COMPOSITES

Section 061053 - Miscellaneous Rough Carpentry
Section 061600 - Sheathing

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

Section 071113 - Bituminous Dampproofing
Section 071326 - Self-Adhering Sheet Waterproofing
Section 071616 - Crystalline Waterproofing
Section 072100 - Thermal Insulation
Section 072726 - Liquid Membrane Vapor Permeable Air Barrier
Section 075310 - EPDM Membrane Roofing
Section 076200 - Sheet Metal Flashing and Trim
Section 077100 - Roof Specialties
Section 077129 - Manufactured Roof Expansion Joints
Section 078100 - Applied Fireproofing
Section 078413 - Penetration Firestopping
Section 078446 - Fire-Resistive Joint Systems

DIVISION 08 - OPENINGS

Section 080671 - Door Hardware Schedule
Section 083113 - Access Doors and Frames
Section 084113 - Aluminum-Framed Entrances and Storefronts
Section 088000 - Glazing

DIVISION 09 - FINISHES

Section 092216 - Non-Structural Metal Framing
Section 092900 - Gypsum Board
Section 092940 - Gypsum Trim and Accessories
Section 095113 - Acoustical Panel Ceilings
Section 096513 - Resilient Base and Accessories
Section 096813 - Tile Carpeting
Section 099113 - Exterior Painting

Section 099123 - Interior Painting
Section 099733 - Concrete Floor Sealer

DIVISION 10 - SPECIALTIES

Section 101423 - Panel Signage
Section 104413 - Fire Protection Cabinets
Section 104416 - Fire Extinguishers

DIVISION 11 – EQUIPMENT

N/A

DIVISION 12 - FURNISHINGS

N/A

DIVISION 13 - SPECIAL CONSTRUCTION

N/A

DIVISION 14 - CONVEYING EQUIPMENT

Section 142400 - Hydraulic Elevators

DIVISION 20 – NOT AVAILABLE

DIVISION 21 – FIRE SUPPRESSION

N/A

DIVISION 22 - PLUMBING

Section 220100 - General Provisions
Section 220101 - Removals
Section 220553 - Identification for Plumbing Piping and Equipment
Section 221005 - Plumbing Piping
Section 223000 - Plumbing Equipment

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

Section 230501 - HVAC General Requirements
Section 230513 - Common Motor Requirements for HVAC Equipment
Section 230554 - Mechanical Identification
Section 230593 - Testing, Adjusting, and Balancing for HVAC
Section 230714 - HVAC Duct Insulation

Section 230719 - HVAC Piping Insulation
Section 230993 - HVAC Control Sequence
Section 232113 - Hydronic Piping
Section 232114 - Hydronic Specialties
Section 232117 - Pipe Hangers, Supports and Anchors
Section 232500 - HVAC Water Treatment
Section 233100 - HVAC Ducts and Casings
Section 233300 - Air Duct Accessories
Section 233700 - Air Outlets and Inlets
Section 238101 - Terminal Heat Transfer Units

DIVISION 25 – INTEGRATED AUTOMATION

N/A

DIVISION 26 - ELECTRICAL

Section 260100 - General Requirements
Section 260519 - Low-Voltage Electrical Power Conductors and Cables
Section 260526 - Grounding and Bonding for Electrical Systems
Section 260529 - Hangers and Supports for Electrical Systems
Section 260534 - Conduit
Section 260535 - Surface Raceways
Section 260537 - Boxes
Section 260553 - Identification for Electrical Systems
Section 260923 - Lighting Control Devices
Section 262416 - Panelboards and Circuit Breakers
Section 262717 - Equipment Wiring
Section 262818 - Enclosed Switches
Section 265100 - Interior Lighting

DIVISION 27 – COMMUNICATIONS

N/A

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

N/A

DIVISION 31 – EARTHWORK

Section 312000 - Earthwork

DIVISION 32 – EXTERIOR IMPROVEMENTS

Section 329200 - Lawns and Grasses

DIVISION 33 – UTILITIES

N/A

DIVISION 34 – TRANSPORTATION

N/A

END OF TABLE OF CONTENTS

SECTION 00 11 13 – ADVERTISEMENT FOR BIDS

The Hatboro-Horsham School District (HHSD) is soliciting sealed bids for the Simmons Elementary School Elevator Addition Project located in Horsham Township, Montgomery County, PA in the form of Single Prime Lump Sum contracts. Sealed Bids shall be delivered to Joe Crowe, Director of Operations, no later than **1:00 PM prevailing time on Thursday, January 29, 2026,** to the HHSD Administrative Building, 227 Meetinghouse Road, Suite 100, Horsham, PA 19044, at which time bids will be publicly opened and read.

A **MANDATORY** pre-bid conference will be held at the HHSD Administration Building, located at the aforementioned address, at **2:00 PM prevailing time on Tuesday, January 13, 2026**. Non-attendees will not be permitted to bid.

Bidders are notified that this Project is subject to the District's Responsible Contractor Policy as more fully set forth in the Contract Documents. In compliance with the Policy, any Bidder who intends to bid the Project shall submit the completed Contractor Responsibility Certification Form included in the documents no later than **Thursday, January 15, 2026** to Bill Stone at bstone@hatboro-horsham.org. Failure to submit the form will disqualify any Bidder from submitting a bid.

The Project Architect is SCHRADERGROUP Architects, 555 E. North Ln., Ste 5100, Bldg. D, Conshohocken, PA, Phone: 215-492-7440. The Project Construction Manager is ICS Consulting, 1400 North Providence Road, Building 2, Suite 4025 Media, PA 19063, Phone: 610-424-4172.

Documents will be available digitally through the ICS Project Procore site. For electronic access to the bidding documents, contact the Project Coordinator, Magdalena Means, at Magdalena.means@ics-builds.com. Bidders must supply the following information with their request for documents: the contract(s) you are bidding on, company name, contact person, complete address, phone and cellular numbers, and email address. Documents will be available on January 12, 2026.

By Resolution of the BOARD OF SCHOOL DIRECTORS
HATBORO-HORSHAM SCHOOL DISTRICT

BILL STONE, Director of Business Affairs

TO APPEAR: December 29, 2025
January 5, 2026
January 12, 2026

AIA® Document A305® – 2020

Contractor's Qualification Statement

THE PARTIES SHOULD EXECUTE A SEPARATE CONFIDENTIALITY AGREEMENT IF THEY INTEND FOR ANY OF THE INFORMATION IN THIS A305-2020 TO BE HELD CONFIDENTIAL.

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

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

TYPE OF WORK TYPICALLY PERFORMED
(Indicate the type of work your organization typically performs, such as general contracting, construction manager as constructor services, HVAC contracting, electrical contracting, plumbing contracting, or other.)

THIS CONTRACTOR'S QUALIFICATION STATEMENT INCLUDES THE FOLLOWING:
(Check all that apply.)

[ ] Exhibit A – General Information
[ ] Exhibit B – Financial and Performance Information
[ ] Exhibit C – Project-Specific Information
[ ] Exhibit D – Past Project Experience
[ ] Exhibit F – HHSD Contractor Responsibility Certification Form

CONTRACTOR CERTIFICATION
The undersigned certifies under oath that the information provided in this Contractor's Qualification Statement and Contractor Responsibility Certification Form is true and sufficiently complete so as not to be misleading.

_____
CONTRACTOR'S Authorized Representative *(Signature)*

_____
(Printed name and title)

_____
Date

NOTARY
State of:
County of:
Signed and sworn to before me this day of

_____
Notary Signature
My commission expires:

AIA Document A305 – 2020. Copyright © 1964, 1969, 1979, 1986, and 2020. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 19:27:51 EST on 12/10/2025 under Subscription No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (6938bc14b03ac03480897b55)

AIA® Document A305® – 2020 Exhibit A

General Information

This Exhibit is part of the Contractor's Qualification Statement, submitted by and dated the Twenty-ninth day of January in the year Two Thousand Twenty-Six
(In words, indicate day, month and year.)

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

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

§ A.1 ORGANIZATION
§ A.1.1 Name and Location
§ A.1.1.1 Identify the full legal name of your organization.

§ A.1.1.2 List all other names under which your organization currently does business and, for each name, identify jurisdictions in which it is registered to do business under that trade name.

§ A.1.1.3 List all prior names under which your organization has operated and, for each name, indicate the date range and jurisdiction in which it was used.

§ A.1.1.4 Identify the address of your organization's principal place of business and list all office locations out of which your organization conducts business. If your organization has multiple offices, you may attach an exhibit or refer to a website.

§ A.1.2 Legal Status
§ A.1.2.1 Identify the legal status under which your organization does business, such as sole proprietorship, partnership, corporation, limited liability corporation, joint venture, or other.

.1 If your organization is a corporation, identify the state in which it is incorporated, the date of incorporation, and its four highest-ranking corporate officers and their titles, as applicable.

.2 If your organization is a partnership, identify its partners and its date of organization.

.3 If your organization is individually owned, identify its owner and date of organization.

.4 If the form of your organization is other than those listed above, describe it and identify its individual leaders:

§ A.1.2.2 Does your organization own, in whole or in part, any other construction-related businesses? If so, identify and describe those businesses and specify percentage of ownership.

§ A.1.3 Other Information

AIA Document A305 – 2020 Exhibit A. Copyright © 2020. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 08:45:25 EST on 12/30/2025 under Subscription No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (6953d726d00786ef41206e7e)

§ A.1.3.1 How many years has your organization been in business?

§ A.1.3.2 How many full-time employees work for your organization?

§ A.1.3.3 List your North American Industry Classification System (NAICS) codes and titles. Specify which is your primary NAICS code.

§ A.1.3.4 Indicate whether your organization is certified as a governmentally recognized special business class, such as a minority business enterprise, woman business enterprise, service disabled veteran owned small business, woman owned small business, small business in a HUBZone, or a small disadvantaged business in the 8(a) Business Development Program. For each, identify the certifying authority and indicate jurisdictions to which such certification applies.

§ A.2 EXPERIENCE

§ A.2.1 Complete Exhibit D to describe up to four projects, either completed or in progress, that are representative of your organization's experience and capabilities.

§ A.2.2 State your organization's total dollar value of work currently under contract.

§ A.2.3 Of the amount stated in Section A.2.2, state the dollar value of work that remains to be completed:

§ A.2.4 State your organization's average annual dollar value of construction work performed during the last five years.

§ A.3 CAPABILITIES

§ A.3.1 List the categories of work that your organization typically self-performs.

§ A.3.2 Identify qualities, accreditations, services, skills, or personnel that you believe differentiate your organization from others.

§ A.3.3 Does your organization provide design collaboration or pre-construction services? If so, describe those services.

§ A.3.4 Does your organization use building information modeling (BIM)? If so, describe how your organization uses BIM and identify BIM software that your organization regularly uses.

§ A.3.5 Does your organization use a project management information system? If so, identify that system.

§ A.4 REFERENCES

§ A.4.1 Identify three client references:
(Insert name, organization, and contact information)

§ A.4.2 Identify three architect references:
(Insert name, organization, and contact information)

§ A.4.3 Identify one bank reference:
(Insert name, organization, and contact information)

AIA Document A305 – 2020 Exhibit A. Copyright © 2020. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 08:45:25 EST on 12/30/2025 under Subscription No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (6953d726d00786ef41206e7e)

§ A.4.4 Identify three subcontractor or other trade references:
(Insert name, organization, and contact information)

AIA Document A305 – 2020 Exhibit A. Copyright © 2020. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 08:45:25 EST on 12/30/2025 under Subscription No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (6953d726d00786ef41206e7e)

AIA® Document A305® – 2020 Exhibit B

Financial and Performance Information

This Exhibit is part of the Contractor's Qualification Statement, submitted by and dated the day of in the year
(In words, indicate day, month and year.)

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

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

§ B.1 FINANCIAL

§ B.1.1 Federal tax identification number:

§ B.1.2 Attach financial statements for the last three years prepared in accordance with Generally Accepted Accounting Principles, including your organization's latest balance sheet and income statement. Also, indicate the name and contact information of the firm that prepared each financial statement.

§ B.1.3 Has your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management, been the subject of any bankruptcy proceeding within the last ten years?

§ B.1.4 Identify your organization's preferred credit rating agency and identification information.
(Identify rating agency, such as Dun and Bradstreet or Equifax, and insert your organization's identification number or other method of searching your organization's credit rating with such agency.)

§ B.2 DISPUTES AND DISCIPLINARY ACTIONS

§ B.2.1 Are there any pending or outstanding judgments, arbitration proceedings, bond claims, or lawsuits against your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management, or any of the individuals listed in Exhibit A, Section 1.2, in which the amount in dispute is more than $75,000?
(If the answer is yes, provide an explanation.)

§ B.2.2 In the last five years has your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management:
(If the answer to any of the questions below is yes, provide an explanation.)

.1 failed to complete work awarded to it?

.2 been terminated for any reason except for an owners' convenience?

AIA Document A305 – 2020 Exhibit B. Copyright © 2020. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:39:33 ET on 02/23/2024 under Order No.4104248744 which expires on 01/29/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1282558770)

.3 had any judgments, settlements, or awards pertaining to a construction project in which your organization was responsible for more than $75,000?

.4 filed any lawsuits or requested arbitration regarding a construction project?

§ B.2.3 In the last five years, has your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management; or any of the individuals listed in Exhibit A Section 1.2:
(If the answer to any of the questions below is yes, provide an explanation.)

.1 been convicted of, or indicted for, a business-related crime?

.2 had any business or professional license subjected to disciplinary action?

.3 been penalized or fined by a state or federal environmental agency?

AIA Document A305 – 2020 Exhibit B. Copyright © 2020. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:39:33 ET on 02/23/2024 under Order No.4104248744 which expires on 01/29/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1282558770)

Additions and Deletions Report for

AIA® Document A305® – 2020 Exhibit B

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

Note: This Additions and Deletions Report is provided for information purposes only and is not incorporated into or constitute any part of the associated AIA document. This Additions and Deletions Report and its associated document were generated simultaneously by AIA software at 09:39:33 ET on 02/23/2024.

There are no differences.

Additions and Deletions Report for AIA Document A305 – 2020 Exhibit B. Copyright © 2020. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:39:33 ET on 02/23/2024 under Order No.4104248744 which expires on 01/29/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1282558770)

AIA® Document A305® – 2020 Exhibit C

Project Specific Information

This Exhibit is part of the Contractor's Qualification Statement, submitted by and dated the day of in the year
(In words, indicate day, month and year.)

PROJECT:
(Name and location or address.)

CONTRACTOR'S PROJECT OFFICE:
(Identify the office out of which the contractor proposes to perform the work for the Project.)

TYPE OF WORK SOUGHT
(Indicate the type of work you are seeking for this Project, such as general contracting, construction manager as constructor, design-build, HVAC subcontracting, electrical subcontracting, plumbing subcontracting, etc.)

CONFLICT OF INTEREST
Describe any conflict of interest your organization, its parent, or a subsidiary, affiliate, or other entity having common ownership or management, or any of the individuals listed in Exhibit A Section 1.2, may have regarding this Project.

§ C.1 PERFORMANCE OF THE WORK

§ C.1.1 When was the Contractor's Project Office established?

§ C.1.2 How many full-time field and office staff are respectively employed at the Contractor's Project Office?

§ C.1.3 List the business license and contractor license or registration numbers for the Contractor's Project Office that pertain to the Project.

§ C.1.4 Identify key personnel from your organization who will be meaningfully involved with work on this Project and indicate (1) their position on the Project team, (2) their office location, (3) their expertise and experience, and (4) projects similar to the Project on which they have worked.

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

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

AIA Document A305 – 2020 Exhibit C. Copyright © 2020. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:39:56 ET on 02/23/2024 under Order No.4104248744 which expires on 01/29/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1481926721)

§ C.1.5 Identify portions of work that you intend to self-perform on this Project.

§ C.1.6 To the extent known, list the subcontractors you intend to use for major portions of work on the Project.

§ C.2 EXPERIENCE RELATED TO THE PROJECT

§ C.2.1 Complete Exhibit D to describe up to four projects performed by the Contractor's Project Office, either completed or in progress, that are relevant to this Project, such as projects in a similar geographic area or of similar project type. If you have already completed Exhibit D, but want to provide further examples of projects that are relevant to this Project, you may complete Exhibit E.

§ C.2.2 State the total dollar value of work currently under contract at the Contractor's Project Office:

§ C.2.3 Of the amount stated in Section C.2.2, state the dollar value of work that remains to be completed:

§ C.2.4 State the average annual dollar value of construction work performed by the Contractor's Project Office during the last five years.

§ C.2.5 List the total number of projects the Contractor's Project Office has completed in the last five years and state the dollar value of the largest contract the Contractor's Project Office has completed during that time.

§ C.3 SAFETY PROGRAM AND RECORD

§ C.3.1 Does the Contractor's Project Office have a written safety program?

§ C.3.2 List all safety-related citations and penalties the Contractor's Project Office has received in the last three years.

§ C.3.3 Attach the Contractor's Project Office's OSHA 300a Summary of Work-Related Injuries and Illnesses form for the last three years.

§ C.3.4 Attach a copy of your insurance agent's verification letter for your organization's current workers' compensation experience modification rate and rates for the last three years.

§ C.4 INSURANCE

§ C.4.1 Attach current certificates of insurance for your commercial general liability policy, umbrella insurance policy, and professional liability insurance policy, if any. Identify deductibles or self-insured retentions for your commercial general liability policy.

§ C.4.2 If requested, will your organization be able to provide property insurance for the Project written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis?

AIA Document A305 – 2020 Exhibit C. Copyright © 2020. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:39:56 ET on 02/23/2024 under Order No.4104248744 which expires on 01/29/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1481926721)

§ C.4.3 Does your commercial general liability policy contain any exclusions or restrictions of coverage that are prohibited in AIA Document A101-2017, Exhibit A, Insurance A.3.2.2.2? If so, identify.

§ C.5 SURETY

§ C.5.1 If requested, will your organization be able to provide a performance and payment bond for this Project?

§ C.5.2 Surety company name:

§ C.5.3 Surety agent name and contact information:

§ C.5.4 Total bonding capacity:

§ C.5.5 Available bonding capacity as of the date of this qualification statement:

AIA Document A305 – 2020 Exhibit C. Copyright © 2020. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:39:56 ET on 02/23/2024 under Order No.4104248744 which expires on 01/29/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1481926721)

Additions and Deletions Report for

AIA® Document A305® – 2020 Exhibit C

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

Note: This Additions and Deletions Report is provided for information purposes only and is not incorporated into or constitute any part of the associated AIA document. This Additions and Deletions Report and its associated document were generated simultaneously by AIA software at 09:39:56 ET on 02/23/2024.

There are no differences.

Additions and Deletions Report for AIA Document A305 – 2020 Exhibit C. Copyright © 2020. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:39:56 ET on 02/23/2024 under Order No.4104248744 which expires on 01/29/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1481926721)

AIA® Document A305® – 2020 Exhibit D

Contractor's Past Project Experience

	1	2	3	4
PROJECT NAME				
PROJECT LOCATION				
PROJECT TYPE				
OWNER				
ARCHITECT				
CONTRACTOR'S PROJECT EXECUTIVE				
KEY PERSONNEL (include titles)				
PROJECT DETAILS	Contract Amount Completion Date % Self-Performed Work	Contract Amount Completion Date % Self-Performed Work	Contract Amount Completion Date % Self-Performed Work	Contract Amount Completion Date % Self-Performed Work
PROJECT DELIVERY METHOD	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:
SUSTAINABILITY CERTIFICATIONS				

AIA Document A305 – 2020 Exhibit D. Copyright © 2020. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:05:50 ET on 02/23/2024 under Order No.4104248744 which expires on 01/29/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (3B9ADA35)

AIA® Document A305® – 2020 Exhibit E

Contractor's Past Project Experience, Continued

	1	2	3	4
PROJECT NAME				
PROJECT LOCATION				
PROJECT TYPE				
OWNER				
ARCHITECT				
CONTRACTOR'S PROJECT EXECUTIVE				
KEY PERSONNEL (include titles)				
PROJECT DETAILS	Contract Amount Completion Date % Self-Performed Work	Contract Amount Completion Date % Self-Performed Work	Contract Amount Completion Date % Self-Performed Work	Contract Amount Completion Date % Self-Performed Work
PROJECT DELIVERY METHOD	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:	☐ Design-bid-build ☐ Design-build ☐ CM constructor ☐ CM advisor ☐ Other:
SUSTAINABILITY CERTIFICATIONS				

AIA Document A305 – 2020 Exhibit E. Copyright © 2020. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 10:06:11 ET on 02/23/2024 under Order No.4104248744 which expires on 01/29/2025, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (3B9ADA33)

SECTION 00 11 53.29 – HATBORO-HORSHAM SCHOOL DISTRICT RESPONSIBLE CONTRACTORS POLICY

Bidders are notified that this Project is subject to the District's Responsible Contractor Policy as more fully set forth in the Contract Documents. The attached copy of the Hatboro-Horsham School District Policy 826, Responsible Contractors Policy, is hereby made a part of the Contract Documents and Specifications. All firms that perform Work valued at over $500,000 on any District property and facilities, including construction, demolition, alteration, renovation, repair, service, or maintenance work, shall meet the requirements of this Policy. Contractors shall reference the complete Policy and requirements attached. All Contractors shall be required to comply with this Policy as part of the requirements of the Contract.

In compliance with the Policy, any Bidder who intends to bid the Project shall submit the completed Contractor Responsibility Certification Form included in the documents as Section 00 11 53.32 no later than **Thursday, January 15, 2026** to Bill Stone at bstone@hatboro-horsham.org. Failure to submit the form will disqualify any Bidder from submitting a bid.

END OF SECTION 00 11 53.29

Book	Policy Manual
Section	800 Operations
Title	Responsible Contractors
Code	826
Status	Active
Adopted	June 5, 2023

Purpose

This policy is intended to ensure that all work on public construction and maintenance contracts is performed by responsible, qualified firms that maintain the capacity, expertise, personnel and other qualifications and resources necessary to successfully perform district contracts in a timely, reliable and cost-effective manner by establishing clearly defined, minimum standards relating to contractor responsibility, including requirements and criteria concerning technical qualifications, competency, experience, adequacy of resources, including equipment, financial and personnel, and satisfactory records regarding past performance, safety, legal compliance and business integrity, in selecting responsible contractors for district contracts, as hereinafter more specifically set forth.

Definitions

Firm – all general contractors, construction managers, other lead or prime contractors, and subcontractors, regardless of incorporation, of any tier that perform work on any district property and facilities.

Class A Apprenticeship Program - an apprenticeship program that is currently registered with and approved by the U.S. Department of Labor or a state apprenticeship agency and has graduated apprentices to journeyperson status for two (2) of the past seven (7) years. To permit development of recently registered programs, the graduation requirement shall not apply to an apprenticeship program registered within the past ten (10) years if the program provides apprenticeship training for a craft or trade by the U.S. Department of Labor or a state apprenticeship agency at the time the program was registered. Any program not required to meet the graduation requirements may, in addition to providing proof that it is currently registered with federal or state government, be required to provide evidence that the program is actively engaged in bona fide apprenticeship training activity.

Craft Employees - manual workers of high skill who have a thorough and comprehensive knowledge of the processes involved in their work including, but are not limited to, the building trades.

Guidelines

Requirements

All firms that perform work valued at over $500,000.00 on any district property and facilities, including construction, demolition, alteration, renovation, repair, service, or maintenance work, shall meet the requirements of this policy.

All firms engaged in contracts covered by this policy shall be qualified, responsible contractors or subcontractors that have sufficient capabilities in all respects to successfully perform contracts on which they are engaged, including the necessary experience, equipment, technical skills, and qualifications and organizational, financial and personnel resources. Qualified, responsible firms shall also have a satisfactory past performance record and a satisfactory record of law compliance, integrity, and business ethics.

This policy shall not apply to the installation of district-purchased Items through purchasing networks and programs, the installation of furniture, fixtures, and equipment (FF&E), the installation of security systems, and the installation of information technology systems provided it maintains the manufacturer warranty.

Contractor Responsibility Certification

As a condition of performing work on a district contract subject to this policy a firm seeking award of a contract shall submit a Contractor Responsibility Certification at the time it submits its bid for a contract.

The Contractor Responsibility Certification shall be completed on a form provided by the district, and the applicable departments within, and shall reference the project for which a bid is being submitted by name and contract or project number.

In the Contractor Responsibility Certification, the firm shall confirm the following facts regarding its past performance and work history and its current qualifications and performance capabilities:

1. The firm has all valid, effective licenses, registrations or certificates required by federal, state, county, or local law, including, but not limited to, licenses, registrations, or certificates required to: do business in the designated locale; and, perform the contract work it seeks to perform including, but not limited to, licenses, registrations, or certificates for any type of trade work or specialty work which the firm proposes to self-perform;

2. The firm meets the bonding requirements for the contract, as required by applicable law or contract specifications and any insurance requirements, as required by applicable law or contract specifications, including general liability insurance, workers compensation insurance and unemployment insurance requirements;

3. The firm has not been debarred or defaulted on any project by any federal, state, or local government agency or authority in the past three (3) years;

4. The firm has not had any type of business, contracting or trade license, registration or other certification suspended or revoked in the past three (3) years;

5. The firm has not committed a willful violation of federal or state safety laws as determined by a final decision of a court or government agency in the past three (3) years;

6. The firm and its owners have not been convicted of any crime relating to the contracting business by a final decision of a court or government agency for the past ten (10) years;

7. The firm has not within the past three (3) years been found by a final decision of court or government agency in violation of any law applicable to its contracting business, including, but not limited to, licensing laws, tax laws, prompt payment laws, wage and hour laws, prevailing wage laws, environment laws or others, where the result of such violation was the imposition of a fine, back pay damages or any other type of penalty in the amount of $25,000.00 or more for any single incident or penalties amounting to $50,000.00 or more

for the previous three (3) years prior to submission of the certification form;

8. The firm will pay all craft employees that it employs on the project the current wage rates and benefits as required under the Pennsylvania Prevailing Wage Act for the duration of the referenced project;

9. The firm participates in the Class A Apprenticeship Program for each separate trade or classification in which it employs craft employees and shall continue to participate in such program or programs for the duration of the project; and,

10. The firm has all other technical qualifications and resources, including equipment, personnel, and financial resources, to perform the referenced contract, or will obtain same through the use of qualified, responsible subcontractors.

All craft labor that will be employed by the firm for the project shall have completed at least the OSHA 10-hour training course for safety established by the U.S. Department of Labor, Occupational Safety & Health Administration.

The construction manager, general contractor or other lead or prime contractor responsible for the project shall ensure that at least seventy percent (70%) of the craft labor workforce employed on the project workforce shall be comprised of either journeypersons, workers who have successfully completed an apprenticeship training program registered with and approved by the U.S. Department of Labor or a state apprenticeship agency, or registered apprentices currently enrolled in such programs.

The district may require any other additional information it deems necessary to evaluate a prospective contractor's technical qualifications, financial capacity or other resources and performance capabilities. The district may require that such information be included in a separate Statement of Qualifications and Experience or as an attachment to the Contractor Responsibility Certification.

In the Contractor Responsibility Certification, the submitting firm shall stipulate that if it receives a Notice of Intent to Award Contract, it will provide a Subcontractor List and required subcontractor information as specified in this policy.

If the submitting firm has ever operated under another name or controls or is controlled by another company or business entity or in the past five (5) years controlled or was controlled by another company or business entity, whether as a parent company, subsidiary or in any other business relation, it shall attach a separate statement to its Contractor Responsibility Certification that explains in detail the nature of any such relationship. Additional information may be required from such an entity if the relationship in question could potentially impact contract performance.

Contractor Responsibility Certifications shall be executed by a person who has sufficient knowledge to address all matters in the certification and shall include an attestation stating, under the penalty of perjury, that all information submitted is true, complete, and accurate.

If a firm fails to provide a Contractor Responsibility Certification required by this section, it shall be disqualified from bidding. No action of any nature shall lie against the district because of its refusal to accept a bid for failing to provide information required by this section.

Pre-Qualification Requirements

For contracts relating to any district property and facilities, including construction, demolition, alteration, renovation, repair, service, or maintenance work, over $500,000.00 as estimated by the district, firms must submit a Contractor Responsibility Certification at least fourteen (14)

calendar days before the proposed bid submission deadline. Failure to submit a Contractor Responsibility Certification by the deadline will automatically disqualify any firm from submitting a bid or proposal for contract.

Upon the receipt of the pre-qualification Contractor Responsibility Certification, the district shall determine whether the firm meets the requirements under this policy. Notice of the district's determination shall be sent to the proposed firm at least seven (7) calendar days before the proposed bid submission deadline. All firms that are determined by the district to meet the qualification requirements of this policy shall be entitled to submit a bid or proposal for the project.

Notice of Intent to Award Contract

After it has received bids for a project, the district shall review the bids and firms submitting the bids and perform due diligence. Upon the review and conditional approval of the Board, the district shall issue a Notice of Intent to Award Contract to the firm offering the lowest responsive bid. Such notice shall stipulate that the contract award will be conditioned on the issuance of a written Contractor Responsibility Determination, as required by this policy and any other conditions determined appropriate by the district.

Subcontractor Lists, Subcontractor Responsibility Certifications

Within seven (7) days from the date of Notice of Intent to Award Contract, a prospective awardee shall submit to the district a Subcontractor List containing the name of subcontractors that will be used for the referenced project, their addresses, and a description of the work each listed subcontractor will perform on the project.

At the time a prospective awardee submits the Subcontractor List it shall also submit Subcontractor Responsibility Certifications for all listed subcontractors to the district. Subcontract Responsibility Certifications shall be executed by the respective subcontractors and contain the same information and representations required in the Contractor Responsibility Certifications.

Subcontract Responsibility Certifications shall be executed by persons having sufficient knowledge to address all matters in the certification and shall include an attestation stating, under the penalty of perjury, that all information submitted is true, complete, and accurate.

Contractor Responsibility Review and Determination

After a Notice of Intent to Award Contract has been issued and the firm was not pre-qualified pursuant to the Pre-Qualification Requirements section of this policy, the district shall undertake a review process for a period of no more than thirty (30) days, from the date the Notice of Intent to Award Contract is issued, to determine whether the prospective awardee is a qualified, responsible contractor in accordance with the requirements of this policy and other applicable law and regulations and has the resources and capabilities to successfully perform the contract.

As part of this review process, the district shall ensure that the Contractor Responsibility Certification, the Subcontractor List and Subcontractor Responsibility Certifications, as required by this act, have been submitted and properly executed.

The district may conduct any additional inquiries to verify the prospective awardee and its subcontractors have the technical qualification and performance capabilities necessary to successfully perform the contract and that the firms have a sufficient record of law compliance and business integrity to justify the award of a public contract. In conducting such inquiries, the district may seek relevant information from the firm, its prior clients or customers, its subcontractors, or any other relevant source.

In the event a firm is determined to not meet policy or district requirements, the district shall advise the firm of its finding in writing and proceed to conduct a responsibility review of the next lowest, responsive bidder or, if necessary, re-bid the project.

If the district determines that a Contractor or Subcontractor's Responsibility Certification contains false or misleading material information that was provided knowingly or with reckless disregard for the truth omits material information that was omitted knowingly or with reckless disregard of the truth, the firm for which the certification was submitted shall be prohibited from performing work for the district for a period of three (3) years and subject to any other penalties and sanctions, including termination, available to the district under law. A contract terminated under these circumstances shall further entitle the district to withhold payment of any monies due to the firm as damages.

Contract Award

In accordance with law, the contract shall be awarded within sixty (60) days of the bid deadline by written notice to the lowest responsible bidder or all bids shall be rejected. Extensions of the date for the award may be made by mutual written consent of the district and the lowest responsible bidder.

A contract subject to this policy shall not be executed until all requirements of this policy have been fulfilled. The district reserves the right to reject any defective bid, the right to waive any non-material defect in a bid and the right to reject all bids, as it determines such actions are in the district's best interests.

Subcontractor Responsibility Review Requirements

A firm shall not be permitted to use a subcontractor, or any work performed for the district unless it has identified the subcontractor on its Subcontractor List and provided a Subcontractor Responsibility Certification in accordance with the requirements of this policy.

A subcontractor listed on a firm's Subcontractor List shall not be substituted unless written authorization is obtained from the district and a Subcontractor Responsibility Certification is provided for the substitute subcontractor.

In the event that the district determines that a prospective subcontractor listed by the apparent low bidder does not meet the responsibility standards of this section, it may, after informing the prospective awardee, exercise one of the following options:

1. Permit the awardee to substitute a qualified, responsible subcontractor in accordance with the requirements of this policy;

2. Require the awardee to self-perform the work in question if the firm has the required experience, licenses, and other qualifications to perform the work in question; and/or

3. Disqualify the prospective awardee.

In the event that a subcontractor is disqualified under this policy, the firm shall not be permitted to make any type of contractual claim against the district on the basis of a subcontractor disqualification.

Public Review Process

The Contractor Responsibility Certification for a firm identified in a Notice of Intent to Award Contract, Subcontractor List and Subcontractor Responsibility Certifications shall be made immediately available to the public for inspection through a publicly accessible website or other comparable means.

Severability and Effective Date

If any provision of this policy shall be held to be invalid or unenforceable by a court of competent jurisdiction, any such holding shall not invalidate any other provision of this policy and all remaining provisions shall remain in full force and effect.

This policy shall become effective upon Board adoption. The requirements of this policy shall not apply to contracts executed prior to the adoption of this policy, except that the exercise of an option on a contract covered by this policy shall be deemed to create a new contract for purposes of this policy.

Authority

The district has final determination as to whether all requirements of this policy are met. The Board may elect to waive this policy where a qualified Responsible Contractor as defined by this policy cannot be determined.

HATBORO-HORSHAM SCHOOL DISTRICT
CONTRACTOR RESPONSIBILITY CERTIFICATION FORM

Contractor Name: _____Date: _____, 20_____

Contractor Address: _____

_____, _____Zip Code_____

Contact Name: _____ Email_____

Contact Direct Phone No.: _____ Fax No._____

Project Name:_____

To be certified, Contractor is required to check all the following boxes:

	Yes	No
1. Does the Contractor and its employees have all valid, effective licenses, registrations or certifications required by federal, state, county, or local law, including, but not limited to, licenses, registrations or certificates required to: (a) do business in the designated locale; and (b) perform the contract work it seeks to perform? These shall include, but are not limited to, licenses, registrations, or certificates for any type of trade work or specialty work which the firm proposes to self-perform.	☐	☐
2. Does the Contractor meet the bonding requirements for the contract, as required by applicable law or contract specifications and any insurance requirements, as required by applicable law or contract specifications, including general liability insurance, workers compensation insurance and unemployment insurance?	☐	☐
3. Has the Contractor been debarred or defaulted on any project by any federal, state or local government agency or authority in the past three (3) years?	☐	☐
4. Has the Contractor had any type of business, contracting or trade license, registration or other certification suspended or revoked in the past three (3) years?	☐	☐
5. Has the Contractor committed a willful violation of federal or state safety laws as determined by a final decision of a court or government agency in the past three (3) years?	☐	☐

6. Has the Contractor or its principals/owners been convicted of any crime relating to the contracting business by a final decision of a court or government agency in the past ten (10) years? ☐ ☐

7. Has the Contractor within the past three (3) years been found by a final decision of a court or government agency to be in violation of any law applicable to its contracting business, including, but not limited to, licensing laws, tax laws, prompt payment laws, wage and hour laws, prevailing wage laws, environmental laws or others, where the result of such violation was the imposition of a fine, back pay damages or any other type of penalty in the amount of $25,000.00 or more for any single incident, or penalties amounting to $50,000.00 or more, for the previous three (3) years prior to submission of this certification form? ☐ ☐

8. The Contractor will pay all craft employees employed on the project the current wage rates and benefits as required under the Pennsylvania Prevailing Wage Act for the duration of the project. ☐ ☐

9. The Contractor participates in a Class A Apprenticeship Program for each separate trade or classification in which it employs craft employees and shall continue to participate in such program or programs for the duration of the project. ☐ ☐

10. The Contractor will ensure that all craft labor it employs on the project will have completed, prior to working on the project, at least the OSHA 10 hour training course for safety established by the U.S. Department of Labor Occupational Safety & Health Administration. ☐ ☐

11. The construction manager, general contractor or other lead or prime contractor responsible for the project shall ensure that at least 70 percent of the craft labor workforce employed on the project shall be comprised of either journeypersons, workers who have successfully completed an apprenticeship training program registered with and approved by the U.S. Department of Labor or a state apprenticeship agency, or registered apprentices enrolled in such programs. ☐ ☐

12. The Contractor has all other technical qualifications and resources, including equipment, personnel and financial resources, to successfully perform the referenced contract, and shall maintain such capabilities throughout the duration of the project, or will obtain same through the use of qualified, responsible subcontractors or vendors. ☐ ☐

13. The Contractor understands that this Contractor Responsibility Certification shall be executed by a person who has sufficient knowledge to address all matters in the Certification and said signature shall constitute an attestation, under the penalty of perjury, that the information submitted is true, complete and accurate. ☐ ☐

14. Upon receipt of a Notice of Intent to Award Contract, the Contractor will provide the District with a subcontractor list and subcontractor information and certifications as specified in the Responsible Contractors Policy. ☐ ☐

15. Has the submitting firm ever operated under another name or controls or is controlled by another company or business entity or in the past five (5) years controlled or was controlled by another company or business entity, whether as a parent company, subsidiary or in any other business relation. If yes, the submitting firm shall attach a separate statement to its Contractor Responsisbility Certifiecation that explains in detail the nature of any such relationship. Additional infomration may be required from such an entity if the relationship in question could potentially impact contract performance. ☐ ☐

ATTACH ADDITIONAL SHEETS IF NECESSARY

Signature of Bidder's Authorized Representative:_____

Title:_____

Date:_____

SECTION 00 21 10 – VERIFICATIONS & BACKGROUND CHECKS

A. VERIFICATIONS

1. Competent Workmen, Prohibition of Illegal Alien Labor / Public Works Employment Verification Act

    a. No person shall be employed to perform any work under the Contract if they are not legally eligible to be employed under applicable state and federal law or if they are not a trained, competent workman or mechanic, as applicable. For purposes of this Section, no workman or mechanic, as applicable, shall be regarded as competent unless he shall be duly skilled in the applicable branch of labor, and paid the applicable prevailing wage pursuant to Article 18.04 of the Supplementary Conditions.
    b. Pursuant to the Act of May 11, 2006, (P.L. 173, No. 43), known as the Prohibition of Illegal Alien Labor on Assisted Projects Act, Contractor shall not knowingly employ, or knowingly permit any of its subcontractors to knowingly employ, the labor services of an illegal alien.
    c. The Commonwealth of Pennsylvania enacted Act 141 of 2022, 71 P.S. Secs. 656.1-656.11, known as the Public Works Employment Verification Act (‘the Act’ or ‘Act 141’) which requires all public work contractors and subcontractors to utilize the Federal Government’s E-Verify system to ensure that all employees performing work on public work projects are authorized to work in the United States. The Contractor and its Subcontractor (as such term is defined in the Act) are required to comply with the Act and the Statement of Policy as published in the Pennsylvania Bulletin, July 22, 2023, and effective January 3, 2023. A separate and complete Verification Form required by the Public Works Employment Verification Act, Act No. 141 or 2022, 71 P.S. Secs. 656.1-656.11, (formerly Senate Bill 637 and Act 127) for itself and each of the proposed Subcontractors (as such term is defined therein) acknowledging its responsibilities and its compliance with the Public Works Employment Verification Act as a precondition of the Owner's Award of the Contract. The Act requires all public work contractors and subcontractors to utilize the Federal Government’s E-Verify system to ensure that all employees performing work on public work projects are authorized to work in the United States. The Contractor and its subcontractor (as such term is defined in the Act) are required to comply with the Act and the Statement of Policy as published in the Pennsylvania Bulletin, July 22, 2023, and effective January 3, 2023. The Verification Form shall include a certification that the information is true and correct, subject to sanctions provided by law. The respective Verification Form shall be executed by a representative who has sufficient knowledge and authority to make the representations and certifications contained in the Verification Form. Form included as Section 00 21 10.13.
    d. A “Public Work” is defined to be construction, reconstruction, demolition, alteration and/or repair work other than maintenance work, done under contract and paid for in whole or in part out of the funds of a public body where the estimated cost of the total project is in excess of twenty-five thousand dollars ($25,000) but shall not include work performed under a rehabilitation or manpower training program.

e. The Department of General Services' Public Works Employment Verification Compliance Program is responsible for the administration, education and enforcement of the Act. It provides contractors and subcontractors with educational outreach, conducts investigations when complaints are received and random audits to ensure compliance with the requirements of the Act. Please direct your questions to the Public Works Employment Verification Compliance.

B. BACKGROUND CHECKS

Pennsylvania School Law, as required by Act 151 and Act 114 of 2006, as amended, requires that all applicants for employment in public and private schools, and employees of independent contractors seeking business with public and private schools undergo background checks if they will have direct contract with students. Prior to commencing Work, the Contractor and each Subcontractor shall submit on the prescribed form listed below for each employee or person performing work at the Project site on behalf of the Contractor and Subcontractor prior to such person performing any work at the Project site. The original clearances must be presented to the Owner prior to each employee, agent or subcontractor coming on the Owner's property. The Owner shall retain a copy of all such clearances in its file. Notwithstanding any other provision of the Contract, violation of this provision shall constitute grounds for immediate termination of the contract by the Owner.

Owner shall review the clearance submissions prior to each individual being permitted to come onto the Owner's property. The Owner reserves the right to reject any employee, agent or subcontractor that the Owner determines in its sole discretion has an unsatisfactory criminal history or child abuse clearance. The Owner shall retain a copy of all such clearances in its file. Notwithstanding any other provision of the Contract, violation of this provision shall constitute grounds for immediate termination of the contract by the Owner. Any individual rejected by the Owner shall not be permitted on the Owner's property. Owner's right to declare such person unfit shall not be limited to the required exclusion of persons from direct contact with children as set forth in Section 1-111 of the Pennsylvania Public School code and/or Subchapter C2 of the Child Protective Services Law.

Each employee or person performing work at the Project site on behalf of the Contractor or Subcontract must complete each of the following clearances:

A. Department of Human Services (DHA) Child Abuse History

Act 151 of December 16, 1994: Official clearance statement obtained from the Pennsylvania Department of Public Welfare pursuant to Act 151 of December 16, 1994 (P.L. 1292), subchapter C.2 of the Child Protective Services Law, as amended from time to time. Form included as Section 00 21 10.19.

Procedure for Obtaining Child Abuse History Clearance:

1. You may obtain forms from schools or the Department of Human Services website. http://keepkidssafe.pa.gov/resources/clearances/index.htm.
2. The Pennsylvania Child Abuse History Clearance can be submitted and paid online through the Child Welfare Information Solutions (CWIS) self-service portal, https://www.compass.state.pa.us/cwis/public/home, or mailed in.
3. If you chose to mail the form, please enclose money order or check for each application in the amount indicated. No cash accepted. Personal, agency or

business checks are acceptable.

4. Clearances results will be mailed within 14 days from the date that the clearance is received. There will be no replacement after 90 days.
5. Indicate SCHOOL as the "Purpose of Clearance."
6. For status of a request, please call the Department of Human Services, Childline and Abuse Registry at (717) 783-6211.

   Child Abuse reports shall be ***no more than one (1) year old*** at the time of employment.

B. Pennsylvania Access to Criminal History (PATCH)

Act 34 of 1985: Original report of criminal history record information from the Pennsylvania State Police or a statement from the Pennsylvania State Police that the Pennsylvania State Police central repository contains no such information relating to any of Contractor's employees or its subcontractor's employees working on the Project site prior to such persons performing work at the Project site. Such report of criminal history shall be no older than sixty (60) months old at any time the individual performs services under this Agreement. To obtain this document, contact the nearest Pennsylvania State Police barracks. Form included as Section 00 21 10.21.

Procedures for obtaining the PA State Police Background Clearance and associated costs can be found via the following link: **https://www.psp.pa.gov/Pages/Request-a-Criminal-History-Record.aspx#.U_Y5c010zlV.**

C. Federal Criminal History Record Information (CHRI) – FBI Report

Act 114 of 2006, 24 PS 1-111 as amended (Act 61 of 2008): Copy of the Federal Criminal History record from the Federal Bureau of Investigation in the manner prescribed by the Department of Education. The fingerprint-based background check is a multiple-step process, as follows:

1. **Registration** - The applicant must register prior to going to the fingerprint site. Walk in service is allowed but all applicants are required to complete pre-enrollment in the new Universal Enrollment system. Pre- enrollment can be completed online or over the phone. The registration website is available online 24 hours/day, seven days per week at https://uenroll.identogo.com/ Telephonic registration is available at 1- 844-321-2101 Monday through Friday, 8am to 6pm EST. During the pre-enrollment process, all demographic data for the applicant is collected (name, address, etc.) along with notices about identification requirements and other important information.

2. When registering on-line, an applicant must use the PA Department of Education specific Service ***Code #1KG6XN.*** Fingerprint requests processed through any other agency or purpose cannot be accepted and are not transferrable. If an applicant enters the wrong code by mistake, the incorrect applicant type will appear at the top of the screen. The applicant should select the "Back to Home" button and begin the process again, by reentering the correct Service Code. If the applicant proceeds with the process under the incorrect code, the pre-enrollment and/or results cannot be transferred to another state agency and the applicant will have to

start the process over and pay for the background check again.

3. **Payment** - The applicant will pay a fee of $23.85 for the fingerprint service and to secure an unofficial copy of the Criminal History Record. Major Credit Cards as well as Money orders or cashier's checks payable to MorphoTrust will be accepted on site for those applicants who are required to pay individually. No cash transactions or personal checks are allowed.

4. IDEMIA has also established a payment option for fingerprinting services for entities interested in paying the applicant's fee. This new option provides a payment 'coupon' that the entity will provide to each applicant for use. Each coupon is unique and may only be used one time. Account applications must be completed prior to the applicant visiting the fingerprint site. The authorized representative must complete the account application. To establish a billing account, you will need to complete an application at https://www.identogo.com/uploads/general/PA_NCAC_Package_Fillable_Fields.pdf with IDEMIA.

5. **Fingerprint Locations** – After registration, the applicant proceeds to the fingerprint site of their choice for fingerprinting. The location of the fingerprint sites and days and hours of operation for each site are posted on IDEMIA's website at https://uenroll.identogo.com/ . The location of fingerprint sites may change over time; applicants are encouraged to confirm the site location nearest to their location. PDE encourages entities where access to the fingerprint location is more than 25 miles away to contact IDEMIA and suggest areas where another closer site could be established.

6. **Fingerprinting** - At the fingerprint site the Enrollment Agents (EA) manages the fingerprint collection process. The fingerprint transaction begins when the EA reviews the applicant's qualified State or Federal photo ID before processing the applicant's transaction. Applicants will not be processed if they cannot produce an acceptable photo ID. After the identity of the applicant has been established, all ten fingers are scanned to complete the process. The entire fingerprint capture process should take no more than three to five minutes.

7. **Report Access** – For the public or private school or higher education institution to access the official report via the electronic system, applicants must present their UEID to the hiring entity (as shown on the receipt provided after fingerprint capture). This process allows an applicant to provide multiple potential employers with their UEID, as the report is linked to the UEID number and not assigned to a specific school. If an applicant has lost their receipt or needs to confirm UEID, the applicant may visit the UEP website (https://uenroll.identogo.com/) and simply check status of their file by providing alternate personal information. Applicants will enter their personal information after clicking in the lower portion of that screen to obtain their receipt with the UEID.

8. Applicants will receive an unofficial copy of their report.

D. Act 24: Reporting Arrests and Convictions

Act 24 of 2011 contains a number of significant changes to the Pennsylvania Public School Code that are designed to enhance the safety of school children. Among the

changes, Act 24 amends Section 111 of the School Code to expand the list of prohibitive criminal offenses and ensure that then-current employees or those who will have contact with school children who may have been subject to a previous background check were required to provide assurances that they had not been previously arrested or convicted of a Section 111(e) offense.

Act 24 of 2011 and Act 82 of 2012: Original background check in accordance with Section 111 of the Public School Code of 1949, Act 34 of March 10, 1949, P.L. 30, No. 14, as amended by from time to time including, without limitation, by Act 114 of July 11, 2006, P.L. 1092, and Act 24 of 2011 (P.L. 112, No. 24) (24 P.S. Section 1-111, et seq.) on the form PDE 6004, Arrest/Conviction Report and Certification Form, published by the Pennsylvania Department of Education. The Contractor shall require employees performing at the Project Site on behalf of the Contractor and/or its Subcontractors to file form PDE-6004 within seventy-two (72) hours of an arrest or conviction of an offense listed in Section 1-111(e)of the Pennsylvania School Code. Contractor shall immediately notify the Owner in writing of such filing and shall preclude the affected employee from performing any work at the Project Site. The Owner shall also have the right to prohibit any such individual from coming onto its property. Form included as Section 00 21 10.23.

E. Act 168: Commonwealth of Pennsylvania Sexual Misconduct/Abuse Disclosure Release

Act 168 of 2014: "Commonwealth of Pennsylvania Sexual Misconduct/Abuse Disclosure Release" has been developed by the Pennsylvania Department of Education, pursuant to Act 168 of 2014, to be used by school entities and independent contractors of school entities and by applicants who would be employed by or in a school entity in a position involving direct contact with children to satisfy the Act's requirement of providing information related to abuse or sexual misconduct. As required by Act 168, in addition to fulfilling the requirements under Section 1-111 of the School Code and the Child Protective Services Law ("CPSL"), an applicant who would be employed by or in a school entity in a position having direct contact with children, must provide the information requested in SECTION 1 of this form and complete a written authorization that consents to and authorizes the disclosure by the applicant's current and former employers of the information requested in SECTION 2 of this form. The applicant shall complete one form for the applicant's current employer(s) and one for each of the applicant's former employers that were school entities or where the applicant was employed in a position having direct contact with children (therefore, the applicant may have to complete more than one form). Upon completion by the applicant, the hiring school entity or independent contractor shall submit the form to the applicant's current and former employers to complete SECTION 2. A school entity or independent contractor may not hire an applicant who does not provide the required information for a position involving direct contact with children. No employee or person who has been convicted of any of the offenses enumerated under 24 P.S. Section 1-111(e) shall be permitted to perform any work at the Project Site. Form included as Section 00 21 10.26.

PDFs of required clearance and verification forms can be found in the Project Manual as the followings Sections:

a. 00 21 10.13 Act 141: Public Works Employment Verification Form

b. 00 21 10.19 Act 151: Child Abuse Clearance Form

c. 00 21 10.21 Act 34: Pennsylvania State Police Clearance Form

d. 00 21 10.23 Act 24/Act 82: PDE Form 6004

e. 00 21 10.26 Act 168: PA Sexual Misconduct-Abuse Disclosure Release

For additional information regarding the PDE Clearances and Background Checks please visit: https://www.education.pa.gov/Educators/Clearances/Pages/default.aspx

END OF SECTION 00 21 10

Commonwealth of Pennsylvania

Public Works Employment Verification Form

Complete and return the form to the contracting Public Body prior to the award of the contract.

Company Legal Name: _____

Doing Business As: _____
(if different from Legal Name)

Mailing Address: _____
Street Address 1

_____
Street Address 2

_____
City State Zip Code

Check one: ☐ Contractor ☐ Subcontractor

Contracting Public Body: _____

Contract/Project Number: _____

Project Description: _____

Project Location: _____

Date Enrolled in E-Verify (MM/DD/YYYY): _____

As a contractor/subcontractor for the above referenced public works contract, I hereby affirm that as of today's date, _____**,** our company is in compliance with the Public Works Employment Verification Act ('the Act') through utilization of the federal E-Verify Program (EVP) operated by the United States Department of Homeland Security. To the best of my/our knowledge, all employees hired are authorized to work in the United States.

It is also agreed to that all public works contractors/subcontractors will utilize the federal EVP to verify the employment eligibility of each new hire within five (5) business days of the employee start date throughout the duration of the public works contract. Documentation confirming the use of the federal EVP upon each new hire shall be maintained in the event of an investigation or audit.

I,_____, authorized representative of the company above, attest that the information contained in this verification form is true and correct and understand that the submission of false or misleading information in connection with the above verification shall be subject to sanctions provided by law.

_____ _____
Authorized Representative Signature **Date of Signature**

Printed Name: _____

Phone Number: _____ **Email:** _____

[THIS PAGE INTENTIONALLY LEFT BLANK]

PENNSYLVANIA CHILD ABUSE HISTORY CERTIFICATION

Type or print clearly in ink. If obtaining this certification for non-volunteer purposes or if, as a volunteer having direct volunteer contact with children, you have obtained a certification free of charge within the previous 57 months, enclose an $13.00 money order or check payable to the PENNSYLVANIA DEPARTMENT OF HUMAN SERVICES or a payment authorization code provided by your organization. **DO NOT send cash.**

Certifications for the purpose of "volunteer having direct volunteer contact with children" may be obtained free of charge once every 57 months.

Send to CHILDLINE AND ABUSE REGISTRY, PA DEPARTMENT OF HUMAN SERVICES, P.O. BOX 8170 HARRISBURG, PA 17105-8170.

APPLICATIONS THAT ARE INCOMPLETE, ILLEGIBLE OR RECEIVED WITHOUT THE CORRECT FEE WILL BE RETURNED UNPROCESSED. IF YOU HAVE QUESTIONS CALL 717-783-6211, OR (TOLL FREE) 1-877-371-5422.

PURPOSE OF CERTIFICATION (Check one box only)

- ☐ Foster parent
- ☐ Prospective adoptive parent
- ☐ Employee of child care services
- ☐ School employee governed by the Public School Code
- ☐ School employee not governed by the Public School Code
- ☐ Self-employed provider of child-care services in a family child-care home
- ☐ An individual 14 years of age or older applying for or holding a paid position as an employee with a program, activity, or service
- ☐ An individual seeking to provide child-care services under contract with a child care facility or program
- ☐ An individual 18 years or older who resides in the home of a foster parent for children for at least 30 days in a calendar year
- ☐ An individual 18 years or older who resides in the home of a certified or licensed child-care provider for at least 30 days in a calendar year
- ☐ Volunteer having direct volunteer contact with children

  If purpose is volunteer having direct volunteer contact with children, choose SUB PURPOSE:
  - ☐ Big Brother/Big Sister and/or affiliate
  - ☐ Domestic violence shelter and/or affiliate
  - ☐ Rape crisis center and/or affiliate
  - ☐ Other: _____
- ☐ PA Department of Human Services Employment & Training Program participant (signature required below)

SIGNATURE OF OIM/CAO REPRESENTATIVE

OIM/CAO PHONE NUMBER

- ☐ An individual 18 years or older, excluding individuals receiving services, who resides in a family living home, community home for individuals with an intellectual disability, or host home for children for at least 30 days in a calendar year
- ☐ An individual 18 years or older who resides in the home of a prospective adoptive parent for at least 30 days in a calendar year

AGENCY/ORGANIZATION NAME:	PAYMENT AUTHORIZATION CODE, IF APPLICABLE:

☐ Consent/Release of Information Authorization form is attached. Applicant must fill in the "Other Address" sections. By completing the other address sections, you are agreeing that the organization will have access to the status and outcome of your certification application.

APPLICANT DEMOGRAPHIC INFORMATION (DO NOT USE INITIALS)

FIRST NAME	MIDDLE NAME	LAST NAME	SUFFIX
SOCIAL SECURITY NUMBER ___ ___	**GENDER** ☐ Male ☐ Female ☐ Not reported	**DATE OF BIRTH (MM/DD/YYYY)**	**AGE**

Disclosure of your Social Security number is voluntary. It is sought under 23 Pa.C.S. §§ 6336(a)(1) (relating to information in statewide database), 6344 (relating to employees having contact with children; adoptive and foster parents), 6344.1 (relating to information relating to certified or licensed child-care home residents), and 6344.2 (relating to volunteers having contact with children). The department will use your Social Security number to search the statewide database to determine whether you are listed as the perpetrator in an indicated or founded report of child abuse.

HOME ADDRESS	MAILING ADDRESS (if different from home address)	OTHER ADDRESS (if Consent/Release of Information Authorization form is attached)
ADDRESS LINE 1	ADDRESS LINE 1	ADDRESS LINE 1
ADDRESS LINE 2	ADDRESS LINE 2	ADDRESS LINE 2
CITY	CITY	CITY
COUNTY	COUNTY	COUNTY
STATE/REGION/PROVINCE	STATE/REGION/PROVINCE	STATE/REGION/PROVINCE
ZIP/POSTAL CODE	ZIP/POSTAL CODE	ZIP/POSTAL CODE
COUNTRY	COUNTRY	COUNTRY
☐ Different mailing address	ATTENTION	ATTENTION

CONTACT INFORMATION

HOME TELEPHONE NUMBER	WORK TELEPHONE NUMBER	MOBILE TELEPHONE NUMBER

EMAIL (By submitting an email contact, you are agreeing to ChildLine contacting you at this address.)

PENNSYLVANIA CHILD ABUSE HISTORY CERTIFICATION

PREVIOUS NAMES USED SINCE 1975 (Include maiden name, nickname and aliases.)			
First	**Middle**	**Last**	**Suffix**
1.			
2.			
3.			
4.			
5.			

PREVIOUS ADDRESSES SINCE 1975 (Please list all addresses since 1975, partial address acceptable; attach additional pages if necessary.)
1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

HOUSEHOLD MEMBERS
(Please list everyone who lived with you at any time since 1975 to present.
Please include parent, guardian or the person(s) who raised you; attach additional pages as necessary.)

Name (First, Middle, Last)	Relationship	Present Age	Gender
1.	☐ Parent ☐ Guardian ☐ person(s) who raised you		
2.	☐ Parent ☐ Guardian ☐ person(s) who raised you		
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

I affirm that the above information is accurate and complete to the best of my knowledge and belief and submitted as true and correct under penalty of law (Section 4904 of the Pennsylvania Crimes Code). If I selected volunteer, I understand that I can only use the certificate for volunteer purposes.

APPLICANT'S SIGNATURE

DATE

CHILDLINE USE ONLY		
DATE RECEIVED BY CHILDLINE	SUFFICIENT PAYMENT INFORMATION RECEIVED ☐ YES ☐ NO ☐ VALID PAYMENT AUTHORIZATION CODE ☐ WAIVED (supervisor initials) _____	CERTIFICATION ID #

INSTRUCTIONS TO COMPLETE THE PENNSYLVANIA CHILD ABUSE HISTORY CERTIFICATION APPLICATION:

General:

- Type or print clearly and neatly in ink only.
- If obtaining this certification for non-volunteer purposes or if, as a volunteer having direct volunteer contact with children, you have obtained a certification free of charge within the previous 57 months, enclose an $13.00 money order or check for each application. No cash will be accepted. Personal, agency, or business checks are acceptable. Certifications for the purpose of "volunteer having direct volunteer contact with children" may be obtained free of charge once every 57 months. If no payment is enclosed for a non-volunteer purpose, you must provide a payment authorization code, otherwise your application will be rejected and returned to you.
- **DO NOT SEND POSTAGE PAID RETURN ENVELOPES** for us to return your results. Results are issued through an automated system generated mailing process.
- Certification results will be mailed to you within 14 days from the date the certification application is received at the ChildLine and Abuse Registry.
- Failure to comply with the instructions will cause considerable delay in processing the results of an applicant's child abuse history certification application.

Purpose of Certification - Do not check more than one box**:**

- Check the **foster parent** box if applying for purposes of providing foster care.
- Check the **prospective adoptive parent** box if applying for the purpose of adoption.
- Check the **employee of child care services** box if applying for the purpose of child care services in the following:
  - Child day care centers; group day care homes; family day care homes; boarding homes for children; juvenile detention center services or programs for delinquent or dependent children; mental health services for children; services for children with intellectual disabilities; early intervention services for children; drug and alcohol services for children; and day care services or other programs that are offered by a school.
- Check the **school employee governed by the Public School Code** box if you are a school employee who is required to obtain background checks pursuant to Section 111 of the Public School Code and will continue to be required to obtain background checks prior to employment in accordance with that section and on the periodic basis required by Act 153.
- Check the **school employee not governed by the Public School Code** box if you are a school employee not governed by Section 111 of the Public School Code, but covered by Act 153 (pertaining to school employees in institutions of higher education).

  Definition of school employee: A school employee is defined as an individual who is employed by a school or who provides a program, activity or service sponsored by a school. The term does not apply to administrative or other support personnel unless they have direct contact with children.

  Definition of school: A facility providing elementary, secondary or postsecondary educational services. The term includes the following:

  (1) Any school of a school district.
  (2) An area vocational-technical school.
  (3) A joint school.
  (4) An intermediate unit.
  (5) A charter school or regional charter school.
  (6) A cyber charter school.
  (7) A private school licensed under the act of January 28, 1988 (P.L.24, No. 11), known as the Private Academic Schools Act.
  (8) A private school accredited by an accrediting association approved by the state Board of Education.
  (9) A non-public school.
  (10) An institution of higher education.
  (11) A private school licensed under the act of December 15, 1986 (P.L. 1585, No. 174), known as the Private Licensed Schools Act.
  (12) The Hiram G. Andrews Center.
  (13) A private residential rehabilitative institution as defined in section 914.1-A(c) of the Public School Code of 1949.
- Check the **self-employed provider of child-care services in a family child-care home** if providing child care services in one's home (other than the child's own home) at any one time to four, five, or six children who are not relatives of the caregiver.
- Check the **individual 14 years of age or older who is applying for or holding a paid position as an employee** box if the employment is with a **program, activity, or service, as a person responsible for the child's welfare or having direct contact with children:** Applying as an employee who is responsible for the child's welfare or having direct contact (providing care, supervision, guidance, or control to children or having routine interaction with children) in any of the following in which children participate and which is sponsored by a school or public or private organization:
  - A youth camp or program;
  - A recreational camp or program;
  - A sports or athletic program;
  - A community or social outreach program;
  - An enrichment or educational program; and
  - A troop, club, or similar organization
- Check the **individual seeking to provide child care services under contract with a child care facility or program** box if you are providing child care services as part of a contract or grant funded program.
- Check the box for **individual 18 years or older who resides in the home of a foster parent for at least 30 days in a calendar year** if you are an adult household member in this setting and require certification.
- Check the box for **individual 18 years or older who resides in the home of a certified or licensed child-care provider for at least 30 days in a calendar year** if you are an adult household member in this setting and require certification.

- Check the box for **individual 18 years or older, excluding individuals receiving services, who resides in a family living home, community home for individuals with an intellectual disability, or host home for children for at least 30 days in a calendar year** if you are an adult household member in this setting and require certification.
- Check the box for **individual 18 years or older who resides in the home of a prospective adoptive parent for at least 30 days in a calendar year** if you are an adult household member in this setting and require certification.
- Check the **volunteer having direct volunteer contact with children** box if applying for the purpose of volunteering as an adult for an unpaid position as a volunteer with a child-care service, a school, or a program, activity or service as a person responsible for the child's welfare or having direct volunteer contact with children. In addition, check the box of one of the organizations listed, i.e. Big Brother/Big Sister, domestic violence shelter, rape crisis center. If you are **NOT** applying for a volunteer in one of the organizations listed, please check the **other** box and write the name of the organization in the space provided.
- Check the **PA Department of Human Services employment & training program participant** box if you are applying for the purpose of participating in a PA Department of Human Services employment and training program through a county assistance office (CAO) or the Office of Income Maintenance (OIM). The signature **AND** phone number of the CAO or OIM representative is required. If there is no signature and no phone number, your application will be rejected and returned to you.
- If you were provided a "**PAYMENT AUTHORIZATION CODE**" by an organization, please provide the **agency/organization name** in the space provided and the **payment authorization code** in the space provided.
- Please check the **CONSENT/RELEASE OF INFORMATION** box if you included a payment code in the space above and attached the completed Consent/Release of Information Authorization form to your Pennsylvania Child Abuse History Certification application when you mail it to our office. The Consent/Release of Information Authorization form allows the department to send your results to a third party. If the Consent/Release of Information Authorization form is **NOT** attached to the certification application, the results **WILL** be mailed to the applicant's home address and not to the third party.

Applicant Demographic Information:

- Name - Include the applicant's full legal name. Initials are not acceptable for a first name. If your full legal name is an initial, please provide supporting documentation along with your certification application.
- Social Security number - Include the applicant's social security number. A social security number is voluntary; **HOWEVER, PLEASE NOTE THAT APPLICATIONS THAT DO NOT INCLUDE SOCIAL SECURITY NUMBERS MAY TAKE LONGER TO BE PROCESSED.**
- Gender - Please check one box.
- Date of birth - Fill in the applicant's date of birth (Example: 01/22/1990).
- Age - Fill in the applicant's current age.

Address:

- The address listed must be the applicant's current home address. This is also where the results of the certification will be mailed, unless otherwise noted. If the **different mailing address** box is checked and a mailing address is provided in the "different" mailing address column, the results will be mailed to the "mailing" address and not the "home" address. **Note:** If the consent/release of information box is checked and an "other" address is provided, the results will be mailed to the "other" address.

Contact Information:

- Please provide your home, work or mobile telephone number. Fill in the number where the applicant can be reached in the event that there are questions about the information on the application.
- Please provide an email address. By providing an email address, you are consenting to ChildLine contacting you by email in the event that you cannot be reached by phone. **NO CONFIDENTIAL INFORMATION WILL EVER BE SHARED OR PROVIDED IN AN EMAIL FROM OUR OFFICE.**

Previous Names Used Since 1975:

- The applicant must list any and all full legal names that they have ever had since 1975. This includes maiden names, nicknames, aliases and also known as (aka) names.

Previous Addresses Since 1975:

- List all addresses where the applicant has resided since 1975. The applicant can attach an additional sheet of paper with all of the addresses listed if necessary. If the applicant cannot remember the exact mailing addresses since 1975, filling in as much information as possible about the location is acceptable.

Household Members:

- Include anyone that the applicant lived with since 1975 (parents, guardians, siblings, children, spouse (ex), paramour, friends, etc.). In addition, include the household member's relationship to the applicant, their age (to the best of your knowledge) and their gender. If the applicant was under the age of 18 in 1975, this section **MUST** include the applicant's PARENT(S) or GUARDIAN(S). If this section is left blank, the application will be rejected and returned to the applicant.

Signature:

- Applications **MUST** be signed and dated. Applications that are not signed and dated will be rejected and returned to the applicant.

CHILDLINE USE ONLY:

- Please DO NOT WRITE in this section. This is for CHILDINE staff only.

Additional Information:

Applicants can visit https://www.compass.state.pa.us/CWIS for more information about submitting the child abuse certification online or to register for a business/organization account.

SP 4-164 (12-2020)

PENNSYLVANIA STATE POLICE

REQUEST FOR CRIMINAL RECORD CHECK

1-888-QUERYPA (1-888-783-7972)

This form is to be completed in ink by the requester – (information will be mailed to the requester only). If this form is not legible or not properly completed, it will be returned unprocessed to the requester.

TRY OUR WEBSITE FOR A QUICKER RESPONSE
https://epatch.state.pa.us

REQUESTER NAME	
ADDRESS	
CITY/STATE/ ZIP CODE	
TELEPHONE NO. (AREA CODE)	

FOR CENTRAL REPOSITORY USE ONLY
CONTROL NUMBER

AFTER COMPLETION MAIL TO:

PENNSYLVANIA STATE POLICE
CENTRAL REPOSITORY – 164
1800 ELMERTON AVENUE
HARRISBURG, PA 17110-9758

DO NOT SEND CASH OR PERSONAL CHECK

CHECK ONE BLOCK

◯ **INDIVIDUAL/NONCRIMINAL JUSTICE AGENCY – ENCLOSE A CERTIFIED CHECK/MONEY ORDER IN THE AMOUNT OF $22.00, PAYABLE TO: "*COMMONWEALTH OF PENNSYLVANIA*" THE FEE IS NONREFUNDABLE**

◯ **NOTARIZED INDIVIDUAL/NONCRIMINAL JUSTICE AGENCY – ENCLOSE A CERTIFIED CHECK/MONEY ORDER IN THE AMOUNT OF $27.00, PAYABLE TO: "*COMMONWEALTH OF PENNSYLVANIA*" THE FEE IS NONREFUNDABLE**

◯ **FEE EXEMPT-NONCRIMINAL JUSTICE AGENCY – NO FEE**

SUBJECT OF RECORD CHECK

(FIRST)	(MIDDLE)	(LAST)		
MAIDEN NAME AND/OR ALIASES	**SOCIAL SECURITY NUMBER**	**DATE OF BIRTH (MM/DD/YYYY)**	**SEX**	**RACE**
			Select	Select

The Pennsylvania State Police response will be based on the comparison of the data provided by the requester against the information *contained in the files of the Pennsylvania State Police Central Repository only.*

FEES FOR REQUESTS - $22.00. NOTARIZED FEE REQUESTS - $27.00.
******MAKE ALL MONEY ORDERS PAYABLE TO: COMMONWEALTH OF PENNSYLVANIA ******

REASON FOR REQUEST

◄◄◄◄◄◄CHECK THE BOX THAT MOST APPLIES TO THE PURPOSE OF THIS REQUEST►►►►►►

◯ **INTERNATIONAL ADOPTION - INTERNATIONAL ADOPTION MUST BE NOTARIZED AND MAILED IN. ($27.00 FOR REQUEST)**

◯ **ADOPTION (DOMESTIC)** ◯ **EMPLOYMENT** ◯ **VISA** ◯ **OTHER**

WARNING: 18 Pa.C.S. 4904(b) UNDER PENALTY OF LAW - MISIDENTIFICATION OR FALSE STATEMENTS OF IDENTITY TO OBTAIN CRIMINAL HISTORY INFORMATION OF ANOTHER IS PUNISHABLE AS AUTHORIZED BY LAW.

Homeland Security is Everyone's Responsibility - Pennsylvania Terrorism Tip Line 1-888-292-1919

ARREST/CONVICTION REPORT AND CERTIFICATION FORM
(under Act 24 of 2011 and Act 82 of 2012)

Section 1. Personal Information

Full Legal Name: _____

Date of Birth: _____/_____/_____

Other names by which you have been identified: _____

Section 2. Arrest or Conviction

☐ By checking this box, I state that I have NOT been arrested for or convicted of any Reportable Offense.

☐ By checking this box, I report that I have been arrested for or convicted of an offense or offenses enumerated under 24 P.S. §§1-111(e) or (f.1) ("Reportable Offense(s)"). See Page 3 of this Form for a list of Reportable Offenses.

Details of Arrests or Convictions

For each arrest for or conviction of any Reportable Offense, specify in the space below (or on additional attachments if necessary) the offense for which you have been arrested or convicted, the date and location of arrest and/or conviction, docket number, and the applicable court.

_____

_____

Section 3. Child Abuse

☐ By checking this box, I state that I have NOT been named as a perpetrator of a founded report of child abuse within the past five (5) years as defined by the Child Protective Services Law.

☐ By checking this box, I report that I have been named as a perpetrator of a founded report of child abuse within the past five (5) years as defined by the Child Protective Services Law.

Section 4. Certification

By signing this form, I certify under penalty of law that the statements made in this form are true, correct and complete. I understand that false statements herein, including, without limitation, any failure to accurately report any arrest or conviction for a Reportable Offense, shall subject me to criminal prosecution under 18 Pa.C.S. §4904, relating to unsworn falsification to authorities.

_____

Signature *Date*

INSTRUCTIONS

Pursuant to 24 P.S. §1-111(c.4) and (j), the Pennsylvania Department of Education developed this standardized form (PDE-6004) to be used by current and prospective employees of public and private schools, intermediate units, and area vocational-technical schools.

As required by subsection (c.4) and (j)(2) of 24 P.S. §1-111, this form shall be completed and submitted by all current and prospective employees of said institutions to provide written reporting of any arrest or conviction for an offense enumerated under 24 P.S. §§1-111(e) and (f.1) and to provide notification of having been named as a perpetrator of a founded report of child abuse within the past five (5) years as defined by the Child Protective Services Law.

As required by subsection (j)(4) of 24 P.S. §1-111, this form also shall be utilized by current and prospective employees to provide written notice within seventy-two (72) hours after a subsequent arrest or conviction for an offense enumerated under 24 P.S. §§1-111(e) or (f.1).

In accordance with 24 P.S. §1-111, employees completing this form are required to submit the form to the administrator or other person responsible for employment decisions in a school entity. Please contact a supervisor or the school entity administration office with any questions regarding the PDE 6004, including to whom the form should be sent.

PROVIDE ALL INFORMATION REQUIRED BY THIS FORM LEGIBLY IN INK.

LIST OF REPORTABLE OFFENSES

- **A reportable offense enumerated under 24 P.S. §1-111(e) consists of any of the following:**

(1) An offense under one or more of the following provisions of Title 18 of the Pennsylvania Consolidated Statutes:

- Chapter 25 (relating to criminal homicide)
- Section 2702 (relating to aggravated assault)
- Section 2709.1 (relating to stalking)
- Section 2901 (relating to kidnapping)
- Section 2902 (relating to unlawful restraint)
- Section 2910 (relating to luring a child into a motor vehicle or structure)
- Section 3121 (relating to rape)
- Section 3122.1 (relating to statutory sexual assault)
- Section 3123 (relating to involuntary deviate sexual intercourse)
- Section 3124.1 (relating to sexual assault)
- Section 3124.2 (relating to institutional sexual assault)
- Section 3125(relating to aggravated indecent assault)
- Section 3126 (relating to indecent assault)
- Section 3127 (relating to indecent exposure)
- Section 3129 (relating to sexual intercourse with animal)
- Section 4302 (relating to incest)
- Section 4303 (relating to concealing death of child)
- Section 4304 (relating to endangering welfare of children)
- Section 4305 (relating to dealing in infant children)
- A felony offense under section 5902(b) (relating to prostitution and related offenses)
- Section 5903(c) or (d) (relating to obscene and other sexual materials and performances)
- Section 6301(a)(1) (relating to corruption of minors)
- Section 6312 (relating to sexual abuse of children)
- Section 6318 (relating to unlawful contact with minor)
- Section 6319 (relating to solicitation of minors to traffic drugs)
- Section 6320 (relating to sexual exploitation of children)

(2) An offense designated as a felony under the act of April 14, 1972 (P.L. 233, No. 64), known as "The Controlled Substance, Drug, Device and Cosmetic Act."

(3) An offense SIMILAR IN NATURE to those crimes listed above in clauses (1) and (2) under the laws or former laws of:

- the United States; or
- one of its territories or possessions; or
- another state; or
- the District of Columbia; or
- the Commonwealth of Puerto Rico; or
- a foreign nation; or
- under a former law of this Commonwealth.

- **A reportable offense enumerated under 24 P.S. §1-111(f.1) consists of any of the following:**

(1) An offense graded as a felony offense of the first, second or third degree, other than one of the offenses enumerated under 24 P.S. §1-111(e), if less than (10) ten years has elapsed from the date of expiration of the sentence for the offense.

(2) An offense graded as a misdemeanor of the first degree, other than one of the offenses enumerated under 24 P.S. §1-111(e), if less than (5) five years has elapsed from the date of expiration of the sentence for the offense.

(3) An offense under *75 Pa.C.S. § 3802(a)*, (b), (c) or (d)(relating to driving under influence of alcohol or controlled substance) graded as a misdemeanor of the first degree under *75 Pa.C.S. § 3803* (relating to grading), if the person has been previously convicted of such an offense and less than (3) three years has elapsed from the date of expiration of the sentence for the most recent offense.

COMMONWEALTH OF PENNSYLVANIA
SEXUAL MISCONDUCT/ABUSE DISCLOSURE RELEASE
(Pursuant to Act 168 of 2014)

Instructions

This standardized form has been developed by the Pennsylvania Department of Education, pursuant to Act 168 of 2014, to be used by school entities and independent contractors of school entities and by applicants who would be employed by or in a school entity in a position involving direct contact with children to satisfy the Act's requirement of providing information related to abuse or sexual misconduct. As required by Act 168, in addition to fulfilling the requirements under section 111 of the School Code and the Child Protective Services Law ("CPSL"), an applicant who would be employed by or in a school entity in a position having direct contact with children, must provide the information requested in SECTION 1 of this form and complete a written authorization that consents to and authorizes the disclosure by the applicant's current and former employers of the information requested in SECTION 2 of this form. The applicant shall complete one form for the applicant's current employer(s) and one for each of the applicant's former employers that were school entities or where the applicant was employed in a position having direct contact with children (therefore, the applicant may have to complete more than one form). Upon completion by the applicant, the hiring school entity or independent contractor shall submit the form to the applicant's current and former employers to complete SECTION 2. **A school entity or independent contractor may not hire an applicant who does not provide the required information for a position involving direct contact with children.**

Relevant Definitions:

Direct Contact with Children is defined as: "the possibility of care, supervision, guidance or control of children or routine interaction with children."

Sexual Misconduct is defined as: "any act, including, but not limited to, any verbal, nonverbal, written or electronic communication or physical activity, directed toward or with a child or a student regardless of the age of the child or student that is designated to establish a romantic or sexual relationship with the child or student. Such acts include, but are not limited to: (1) sexual or romantic invitation; (2) dating or soliciting dates; (3) engaging in sexualized or romantic dialogue; (4) making sexually suggestive comments; (5) self-disclosure or physical exposure of a sexual, romantic or erotic nature; or (6) any sexual, indecent, romantic or erotic contact with the child or student."

Abuse is defined as "conduct that falls under the purview and reporting requirements of the CPSL, 23 Pa.C.S. Ch. 63, is directed toward or against a child or a student, regardless of the age of the child or student."

Please Note

A prospective employer that receives any requested information regarding an applicant may use the information for the purpose of evaluating the applicant's fitness to be hired or for continued employment and shall report the information as appropriate to the Department of Education, a state licensing agency, law enforcement agency, child protective services agency, another school entity or to a prospective employer.

If the prospective employer decides to further consider an applicant after receiving an affirmative response to any of the questions listed in SECTIONS 1 and 2 of this form, the prospective employer shall request that former employers responding affirmatively to the questions provide additional information about the matters disclosed and include any related records. The **Commonwealth of Pennsylvania Sexual Misconduct/Abuse Disclosure Information Request** can be used to request this follow-up information. Former employers shall provide the additional information and records within 60 calendar days of the prospective employer's request.

The completed form and any information or records received shall not be considered public records for the purposes of the Act of February 14, 2008 (P.L. 6, No. 3) known as the "Right to Know Law."

The Department of Education shall have jurisdiction to determine willful violations of Act 168 and may, following a hearing, assess a civil penalty not to exceed $10,000. School entities shall be barred from entering into a contract with an independent contractor who is found to have willfully violated the provisions of Act 168.

COMMONWEALTH OF PENNSYLVANIA
SEXUAL MISCONDUCT/ABUSE DISCLOSURE RELEASE
(under Act 168 of 2014)

(Hiring school entity or independent contractor submits this form to ALL current employer(s) and to former employer(s) that were school entities and/or where the applicant had direct contact with children)

To:

Name of Current or Former Employer:		☐ No applicable employment
Street Address:		
City, State, Zip:		
Telephone Number:	Fax Number:	Email:
Contact Person:		Title:

The named applicant is under consideration for a position with our entity. The Pennsylvania General Assembly has determined that additional safeguards are necessary in the hiring of school employees to ensure the safety of the Commonwealth's students. The individual whose name appears below has reported previous employment with your entity. We request you provide the information requested in SECTION 2 of this form within **20 calendar days** as required by Act 168 of 2014.

SECTION 1: APPLICANT CERTIFICATION AND RELEASE (TO BE COMPLETED BY THE APPLICANT EVEN IF THE APPLICANT HAS NO CURRENT OR PRIOR EMPLOYMENT TO DISCLOSE)

Applicant's Name (First, Middle, Last):	
Any former names by which the Applicant has been identified:	
DOB:	
Last 4 digits of Applicant's Social Security Number:	PPID (if applicable):
Approximate dates of employment with the entity listed above:	
Position(s) held with the entity:	

Pursuant to Act 168, an employer, school entity, administrator, and/or independent contractor that provides information or records about a current or former employee or applicant shall be immune from criminal liability under the CPSL, the Educator Discipline Act, and from civil liability for the disclosure of the information, unless the information or records provided were knowingly false. Such immunity shall be in addition to and not in limitation of any other immunity provided by law or any absolute or conditional privileges applicable to such disclosure by the virtue of the circumstances of the applicant's consent thereto. Under Act 168, the willful failure to respond to or provide the information and records as requested may result in civil penalties and/or professional discipline, where applicable.

Have you (Applicant) ever:

Yes ◯ No ◯ Been the subject of an abuse or sexual misconduct investigation by any employer, state licensing agency, law enforcement agency or child protective services agency (unless the investigation resulted in a finding that the allegations were false)?

Yes ◯ No ◯ Been disciplined, discharged, non-renewed, asked to resign from employment, resigned from or otherwise separated from employment while allegations of abuse or sexual misconduct were pending or under investigation or due to adjudication or findings of abuse or sexual misconduct?

Yes ◯ No ◯ Had a license, professional license or certificate suspended, surrendered or revoked while allegations of abuse or sexual misconduct were pending or under investigation or due to an adjudication or findings of abuse or sexual misconduct?

By signing this form, I certify under penalty of law that the statements made in this form are correct, complete, and true to the best of my knowledge. I understand that false statements herein, including, without limitation, any willful failure to disclose the information required, shall subject me to criminal prosecution under 18 Pa.C.S. § 4904 (relating to unsworn falsification to authorities) and to discipline up to, and including, termination or denial of employment, and may subject me to civil penalties and disciplinary action under the Educator Discipline Act. I also hereby authorize the above-named employer to release to the entity listed on page 3, the information requested in SECTION 2 of this form and any related records. I hereby release, waive, and discharge the above-named employer from any and all liability of any kind that may arise from such disclosure or release of records. I understand that third party vendors may be used to process this Act 168 pre-employment history review.

_____ _____

Signature of Applicant Date

SECTION 2: CURRENT/FORMER EMPLOYER VERIFICATION (TO BE COMPLETED BY THE APPLICANT'S CURRENT EMPLOYER(S) AND ALL FORMER EMPLOYERS THAT WERE SCHOOL ENTITIES AND/OR WHERE THE APPLICANT HAD DIRECT CONTACT WITH CHILDREN)

Dates of employment of Applicant: _____ Contact telephone #:_____

To the best of your knowledge, has Applicant ever:

Yes ◯ No ◯ Been the subject of an abuse or sexual misconduct investigation by any employer, state licensing agency, law enforcement agency or child protective services agency (unless the investigation resulted in a finding that the allegations were false)?

Yes ◯ No ◯ Been disciplined, discharged, non-renewed, asked to resign from employment, resigned from or otherwise separated from employment while allegations of abuse or sexual misconduct were pending or under investigation or due to adjudication or findings of abuse or sexual misconduct?

Yes ◯ No ◯ Had a license, professional license or certificate suspended, surrendered or revoked while allegations of abuse or sexual misconduct were pending or under investigation or due to an adjudication or findings of abuse or sexual misconduct?

☐ No records or other evidence currently exists regarding the above questions. I have no knowledge of information pertaining to the applicant that would disqualify the applicant from employment.

_____ _____

Former Employer Representative Signature and Title Date

Return all completed information to:

School Entity/Independent Contractor:	
Address:	Phone:
City: State: Zip:	Fax: Email:
Contact Person:	Title:

Date Form Received: _____ Received by: _____

SECTION 00 21 13 - INSTRUCTIONS TO BIDDERS

The INSTRUCTIONS TO BIDDERS, American Institute of Architects (AIA), AIA Document A701-2018, containing Articles 1 through 8, are hereby made part of this project manual and bound herein.

Refer to Section 01 11 00 – Summary of Work for scope of work for the bid packages.

END OF SECTION 00 21 13

AIA® Document A701® – 2018

Instructions to Bidders

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

Hatboro-Horsham SD Simmons ES Elevator
411 Babylon Rd
Horsham , Pennsylvania 19044

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

Hatboro-Horsham School District
227 Meetinghouse Road, Suite 100
Horsham, PA 19044

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

SCHRADERGROUP Architecture, LLC
555 East North Lane, Suite 5100, Building D
Conshohocken, PA 19428

TABLE OF ARTICLES

1 DEFINITIONS

2 BIDDER'S REPRESENTATIONS

3 BIDDING DOCUMENTS

4 BIDDING PROCEDURES

5 CONSIDERATION OF BIDS

6 POST-BID INFORMATION

7 PERFORMANCE BOND AND PAYMENT BOND

8 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

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

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

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

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

AIA Document A701 – 2018. Copyright © 1970, 1974, 1978, 1987, 1997 and 2018. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:49:50 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1162372214)

ARTICLE 1 DEFINITIONS

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

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

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

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

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

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

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

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

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

ARTICLE 2 BIDDER'S REPRESENTATIONS

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

- **.1** the Bidder has read and understands the Bidding Documents;
- **.2** the Bidder understands how the Bidding Documents relate to other portions of the Project, if any, being bid concurrently or presently under construction;
- **.3** the Bid complies with the Bidding Documents;
- **.4** the Bidder has visited the site, become familiar with local conditions under which the Work is to be performed, and has correlated the Bidder's observations with the requirements of the Proposed Contract Documents;
- **.5** the Bid is based upon the materials, equipment, and systems required by the Bidding Documents without exception; and
- **.6** the Bidder has investigated all required fees, permits and regulatory requirement of authorities have jurisdiction and has properly included in the submitted bid the cost of such fees, permits and requirements not otherwise indicated as provided by the Owner. Refer to Specification Section 00 72 00 General Conditions of the contract for fees that the Owner is responsible for;
- **.7** the Bidder is a properly licensed Contractor according to the laws and regulations of the State of Pennsylvania and meets the qualifications indicated in the Procurement and Contracting Documents;
- **.8** the Bidder has incorporated into the Bid adequate sums for work performed by installers whose qualifications meet those indicated in the Procurement and Contracting Documents.
- **.9** the Bidder has read Hatboro-Horsham School District Policy 826: Responsible Contractors and has incorporated into the Bid adequate sums for work performed in compliance with said Policy.

AIA Document A701 – 2018. Copyright © 1970, 1974, 1978, 1987, 1997 and 2018. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:49:50 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1162372214)

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 Distribution

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

Bid documents are distributed electronically

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

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

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

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

§ 3.2 Modification or Interpretation of Bidding Documents

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

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

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

§ 3.3 Substitutions

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

§ 3.3.2 Substitution Process

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

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

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

AIA Document A701 – 2018. Copyright © 1970, 1974, 1978, 1987, 1997 and 2018. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:49:50 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1162372214)

work of other contracts or the impact on any Project Certifications (such as LEED), that will result from incorporation of the proposed substitution.

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

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

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

§ 3.3.6 Where the Contractor chooses to use an item approved by substitution request and other than the item identified in the Contract Documents (Drawings, Details and Specifications), the Contractor shall be responsible for any and all coordination and necessary changes in other work and shall bear the costs of such changes.

§ 3.4 Addenda

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

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

Addenda are distributed electronically to all contact on the current invited bidder list and to any others upon request.

§ 3.4.4.1 The Owner may elect to waive the requirement for acknowledging receipt of Addenda as follows:

.1 Information received as part of the Bid indicates that the Bid, as submitted, reflects modifications to the Procurement and Contracting Documents included in an unacknowledged Addendum/Addenda.

.2 Modifications to the Procurement and Contracting Documents in an unacknowledged Addendum/Addenda do not, in the opinion of the Owner, affect the Contract Sum or Contract Time.

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

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

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

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 Preparation of Bids

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

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

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

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

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

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

§ 4.1.7 Each copy of the Bid shall state the legal name and legal status of the Bidder. As part of the documentation submitted with the Bid, the Bidder shall provide evidence of its legal authority to perform the Work in the jurisdiction

AIA Document A701 – 2018. Copyright © 1970, 1974, 1978, 1987, 1997 and 2018. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:49:50 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1162372214)

where the Project is located. Each copy of the Bid shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further name the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached, certifying the agent's authority to bind the Bidder.

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

§ 4.1.9 Bids shall include sales and use taxes.

§ 4.2 Bid Security

§ 4.2.1 Each Bid shall be accompanied by the following bid security:
(Insert the form and amount of bid security.)

Certified Check or Bid Bond in the amount of ten percent (10%) of the total bid.

§ 4.2.2 No bid will be considered unless it is accompanied by a Certified Check or Bid Bond in the amount of ten percent (10%) of the total bid payable without condition to the Owner. Such Certified Check or Bid Bond shall be submitted with the express understanding that it shall be a guarantee that the Bidder will not withdraw his/her bid for a period of sixty (60) days after the date specified for receipt of bids, that the Bidder will enter into a formal Contract with the Owner; and that the Bidder will submit the required Performance, Labor and Material Payment Bonds and Certificates of Insurance as specified. In the event of withdrawal of the Bid by the Bidder, the Bidder will forfeit the full amount of the Bid Bond (Guarantee). All Certified Checks will be returned to the Bidders after the Owner and the successful Bidder have executed the Contract; and the executed Performance and Labor and Material Payment Bonds and Certificate of Insurance have been approved by the Owner.

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

§ 4.2.4 The Owner will have the right to retain the bid security of the three (3) lowest Bidders to whom an award is being considered until (a) the Contract has been executed and bonds, if required, have been furnished; (b) the specified time has elapsed so that Bids may be withdrawn; or (c) all Bids have been rejected. However, if no Contract has been awarded or a Bidder has not been notified of the acceptance of its Bid, a Bidder may, beginning Sixty-One (61) days after the opening of Bids, withdraw its Bid and request the return of its bid security. Upon request, the Bid Security of the other Bidders will be returned by the Owner after the Owner and successful Bidder have executed a Contract.

§ 4.3 Submission of Bids

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

Paper copy of the bid, bid security and any other documents required enclosed in a sealed envelope, addressed/labeled per instructions and delivered to the Bid Opening site prior to the bid date/time.

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

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

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

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

AIA Document A701 – 2018. Copyright © 1970, 1974, 1978, 1987, 1997 and 2018. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:49:50 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1162372214)

§ 4.3.6 Bids shall be submitted with a copy of the Bid Bond, the Contractor Qualification Statement, Bid Form for each work scope bid, Non-Collusion Affidavit, and Commonwealth of PA – Public Works Employment Verification form.

§ 4.4 Modification or Withdrawal of Bid

§ 4.4.1 A Bid may not be modified, withdrawn or canceled by the Bidder for a period of Sixty (60) days following the time and date designated for the receipt of Bids, and each Bidder so agrees in submitting a Bid. Prior to the date and time designated for receipt of Bids, and each Bidder so agrees in submitting a Bid. Prior to the date and time designated for receipt of Bids, a Bidder may submit a new Bid to replace a Bid previously submitted, or withdraw its Bid entirely, by notice to the party designated to receive the Bids. Such notice shall be received and duly recorded by the receiving party on or before the date and time set for receipt of Bids. The receiving party shall verify that replaced or withdrawn Bids are removed from the other submitted Bids and not considered. Notice of submission of a replacement Bid or withdrawal of a Bid shall be worded so as not to reveal the amount of the original Bid.

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

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

This will be handled at the Owner's discretion

ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 Opening of Bids

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

§ 5.2 Rejection of Bids

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

§ 5.3 Acceptance of Bid (Award)

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

§ 5.3.2 Unless otherwise prohibited by law, the Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the lowest responsive and responsible Bidder on the basis of the sum of the Base Bid and Alternates accepted. Alternates offered by the Bidder and not listed on the Bid Form will not be considered, nor will they be a determining factor in the low Bidder.

ARTICLE 6 POST-BID INFORMATION

§ 6.1 Intentionally Deleted.

§ 6.2 Owner's Financial Capability

A Bidder to whom award of a Contract is under consideration may request in writing, fourteen days prior to the expiration of the time for withdrawal of Bids, that the Owner furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. The Owner shall then furnish such reasonable evidence to the Bidder no later than seven days prior to the expiration of the time for withdrawal of Bids. Unless such

AIA Document A701 – 2018. Copyright © 1970, 1974, 1978, 1987, 1997 and 2018. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:49:50 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1162372214)

reasonable evidence is furnished within the allotted time, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

§ 6.3 Submittals

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

.1 a designation of the Work to be performed with the Bidder's own forces;

.2 names of the principal products and systems proposed for the Work and the manufacturers and suppliers of each; and

.3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

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

§ 6.3.3 Intentionally Deleted

§ 6.3.4 Intentionally Deleted

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 Bond Requirements

§ 7.1.1 The Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder.

§ 7.1.2 Bonds shall be furnished on the forms included in the Contract Documents, Refer to specification A232™–2019, General Conditions of the Contract, as modified, for Construction for Bond Requirements.

§ 7.1.3 Intentionally deleted.

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

§ 7.2 Form of Bonds

§ 7.2.1 Intentionally deleted.

§ 7.2.2 The bonds shall be written on the forms included in the Contract Documents.

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

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

ARTICLE 8 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

§ 8.1 Copies of the proposed Contract Documents have been made available to the Bidder and consist of the following documents:

.1 AIA Document A132™–2019, Standard Form of Agreement Between Owner and Contractor, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

.2 AIA Document

(Paragraphs deleted)

A232™–2019, General Conditions of the Contract for Construction, unless otherwise stated below.

AIA Document A701 – 2018. Copyright © 1970, 1974, 1978, 1987, 1997 and 2018. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:49:50 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1162372214)

(Insert the complete AIA Document number, including year, and Document title.)

.3 Payment and Performance Bond Forms.

.4 Drawings as issued in the Contract Documents dated:

.5 Specifications as issued in the Contract Documents dated:

(Table deleted)

.6 Addenda as issued prior to the Bid Date published in the Bidding Documents dated :

(Table deleted)

.7

(Paragraphs deleted)

Other Exhibits:

(Paragraph deleted)

[X] Exhibit C – Other Provisions to Standard Contractor Agreement

(Paragraphs deleted)

.8 Other documents listed below:

(List here any additional documents that are intended to form part of the Proposed Contract Documents.)

Contractor Responsibility Certification

AIA Document A701 – 2018. Copyright © 1970, 1974, 1978, 1987, 1997 and 2018. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:49:50 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1162372214)

SECTION 00 31 00 – AVAILABLE PROJECT INFORMATION – EXISTING DRAWINGS

A. All Prime Bidders will receive the below listed items as part of the Bidding Documents:

1. The following drawing set(s) of the Simmons Elementary School are being included as part of the Bidding Documents for reference only:

   a. [Former] Keith Valley Middle School Drawings dated December 1, 1970, 30 Drawings
   b. Alternations to the [Former] Keith Valley Elementary School Drawings dated December 17, 1990, 37 Drawings.

B. Bidder shall determine the adequacy of the attached drawings for use in preparing their Bid for the Work. Bidders should visit the site to familiarize themselves with existing conditions. No claims will be honored for inadequacy of data. Should Bidder determine that additional information is required, the Bidder shall make, prior to bidding, his own exploration, tests, and analyses.

C. Existing drawings that have been made available to Bidders shall not constitute a Contract Document and shall be considered as “general information” only. The Existing Drawings set is not a representation or guarantee of the continuity of any condition. The Owner, Construction Manager, or Architect will not be responsible for interpretations or conclusions drawn from the existing drawings by the Bidder. The Owner, Construction Manager, and Architect are not responsible for the accuracy or completeness of the information given in the existing drawings.

D. Contact ICS, Construction Manager (CM), Craig Babroff at 609-685-8818 to schedule site visits for further evaluation of existing conditions. Bidders shall provide insurance certificates as per General Conditions Article 11 and other information required prior to performing additional exploration or tests.

END OF SECTION 00 31 00

SECTION 00 31 32.00 - GEOTECHNICAL DATA

PART 1 - GENERAL

1.1 INFORMATION AVAILABLE TO BIDDERS – GEOTECHNICAL DATA

A. This Document and its referenced specifications and drawings are included in the Procurement and Contracting Requirements for Project as they provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information and are not a warranty of existing conditions. All Bidders will receive the following list of reference documents:

1. Geotechnical Exploration and Letter Report, including all Appendices, for the Simmons Elementary School Elevator Addition Project (the “Project”) prepared by David Blackmore & Associates, Inc. dated November 17, 2025, is included as Specification Section 003132.13.

B. Geotechnical Data provided as part of this Section and its referenced documents shall not constitute a Contract Document and shall be considered as “general information” only. The data indicated for subsurface conditions is not a representation or guarantee of the continuity of such conditions including variations in kind, depth, quantity, and conditions of soil. The Owner, Construction Manager, and Architect will not be responsible for interpretations or conclusions drawn from the Geotechnical Report(s) by the Bidder. The Owner, Construction Manager, and Architect are not responsible for the accuracy or completeness of the information given in the Geotechnical Report(s).

C. Bidders may rely on the technical data contained in such reports and information presented herein, but not upon non-technical data, interpretations, recommendations, or opinions contained therein or for the completeness thereof for Bidder’s purposes. Bidders shall determine the adequacy of the included geotechnical data for use in preparing the Bid. Should the data contained in the above referenced document(s) not be adequate for the Bidder’s purposes, the Bidder may make, prior to bidding, his own exploration, tests, and analyses.

D. Bidders should visit the site to familiarize themselves with existing conditions. No claims will be honored for inadequacy of data contained within the provided geotechnical reports. Should Bidder determine that additional information is required, the Bidder shall make, prior to bidding, his own exploration, tests, and analyses.

E. Contact ICS, Construction Manager (CM), Craig Babroff at 609-685-8818 to schedule additional exploration or tests. Bidders shall provide insurance certificates as per General Conditions Article 11 and other information required prior to performing additional exploration or tests.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 00 31 32

DAVID BLACKMORE & ASSOCIATES, INC.
GEOTECHNICAL & ENVIRONMENTAL ENGINEERS

Project 5772G1L1
November 17, 2025

ICS, INC.
400 N. PROVIDENCE ROAD, BUILDING 2,
SUITE 4025
MEDIA, PA 19063

ATTN: Mr. Craig Babroff, Project Manager

RE: Geotechnical Exploration and Letter Report
Proposed Elevator Addition
Simmon Elementary School
Horsham Township, Montgomery County, PA

Dear Mr. Babroff:

David Blackmore Associates, Inc (DBA) has completed the Geotechnical exploration at the subject site in accordance with our proposal 5772 dated September 30, 2025. The purpose of this testing was to evaluate the subsurface conditions beneath the proposed Elevator Addition. DBA's findings, recommendations, and conclusions are included in this letter report.

BACKGROUND

DBA was contacted by ICS, Inc. regarding the proposed elevator addition planned for the subject site. During an evaluation of the existing school building exterior wall foundation, adjacent to where the elevator addition was planned, it was determined that the wall foundation consisted of a grade beam supported on deep piers. Due to this construction, there was a concern regarding the potential presence of existing fill and/or loose/soft soil conditions which may preclude the planned shallow foundation system which was anticipated to be used to support the elevator addition. DBA proposed completing a subsurface exploration consisting of test borings drilled within the planned elevator addition footprint. The scope of this exploration, our findings and recommendation are summarized herein.

GEOTECHNICAL EXPLORATION

A total of two (2) borings were drilled to auger refusal on siltstone bedrock within the footprint of the planned elevator addition. Bedrock depths based on auger refusal were encountered in borings B1 and B2 at depths of 15.42 feet and 11.58 feet, respectively. All boring locations encountered auger

refusal on siltstone bedrock within the proposed addition footprint. The test locations were determined and field located using the ENLARGED ELEVATOR PLANS, drawing A102 prepared by Schrader Group Architects dated September 26, 2025. A copy of an excerpt of this plan which has been annotated with our test boring locations is included in the appendix of this report.

The test boring was drilled by our subcontractor, The Corcoran Drilling Company, under the direction of DBA personnel. Test boring logs and a location plan are included in the appendix of this report.

GEOTECHNICAL BACKGROUND

Site Description

The subject site is located at 411 Babylon Rd in Horsham. The planned elevator addition is located at the northwest corner of the existing elementary school. The addition area included a concrete sidewalk and landscaped lawn area adjacent to the walkway entrance. The area is relatively flat.

A copy of the USGS Topographical Map, Ambler Quadrangles, indicating the site is included as Figure I.

Geology

Available geological sources indicate the site is underlain by the Stockton Formation, a light gray to buff, coarse grained arkosic sandstone including red to purple red sandstone, shale, and siltstone. Bedding is thin to flaggy, joints are seamy to platy, highly fractured, moderately developed, vertical and open. This formation is highly weathered to a moderate depth, contains a thin overlying mantle, provides good surface drainage, can be excavated with moderate ease, and has a poor to fair cut slope stability due to rapid disintegration when exposed to moisture.

A copy of the USGS Geological Map of the Ambler Quadrangle, indicating the site is included as Figure II

Soils

Soil records indicate the site soils to be of the following series:

Urban land, 0 to 8 percent slopes (UgB)- The soil profile of this land type cannot be practically described as it has been disturbed, moved, and/or covered over by land development activities.

A copy of the soil mapping created using the National Cooperative Soil Survey website developed by the USDA's Natural Resources Conservation Service, indicating the site is included as Figure III.

SUBSURFACE CONDITIONS

The results of the drilling program revealed a fairly consistent subsurface profile. The following strata, beneath 7" of topsoil or 10 inches of concrete and subbase stone, can describe a typical soil profile:

Stratum IF: 0.75' thick; Fill consisting of orange, brown fine sand, and clayey silt. Insufficient SPR[1] data is available to estimate strength, however fill appears to be clean and free of deleterious inclusions. This stratum was encountered in test boring B1.

Stratum I: 7.25' to 7.50' thick; Orange brown and reddish-brown fine sand and silt with occasional to some siltstone fragments. This stratum is medium dense to dense with SPR values ranging from 19 B/F to 40 B/F. The average SPR value is 29 B/F. This stratum was encountered in each of the boring completed.

Stratum II: 2' to 6.75' thick; Reddish brown weathered siltstone and shale. This stratum is considered to be very dense with SPR values ranging from 50 blows per two inches to 50 blows per three inches. The average SPR value for this stratum is over 100 B/F.

Bedrock: Siltstone bedrock was encountered in borings B1 and B2 at depths ranging from 11.42 feet to 15.25 feet, respectively. This corresponds to a bedrock surface elevation ranging from 257.58 to 261.26.

Groundwater[2]: Groundwater was not encountered in test borings completed.

NOTES:

1. SPR = the Standard Penetration Resistance or number of blows required of a 140-pound hammer dropping 30", to drive a 2" OD split spoon sampler one foot.

2. The groundwater information provided is based on conditions encountered during the drilling program. Seasonal fluctuations in the groundwater table are to be expected.

GEOTECHNICAL ANALYSIS AND RECOMMENDATIONS

The results of our exploration revealed a fairly consistent profile beneath the existing sidewalk and/or topsoil. A thin(8 inch) layer of existing fill was encountered in boring B1. Beneath fill is a relatively dense fine sand and silt with siltstone fragments that grades into a weathered rock stratum at a depth of approximately 8 feet. Siltstone bedrock was encountered at a depth ranging from 11.42 to 15.25 feet.

Foundations shall bear on the undisturbed soils of Stratum I, Stratum II, or on structural fill. Soft conditions encountered during foundation construction shall be excavated and replaced with structural fill. Refer to Fill and Compaction Criteria.

Foundations shall be designed for a maximum soil bearing capacity of 4.0 KSF on of Stratum I, Stratum II, or on structural fill. If the column loads are to be revised during a re-design of the structure, then the bearing capacity of the soils may have to be subsequently modified. DBA shall be notified of any significant changes in this regard.

Foundation settlements for the bearing capacities provided herein are to be within a tolerance of a half inch total and quarter inch differential. It is anticipated that the bulk of this settlement will take place during the construction period. Settlements of this magnitude are within normal construction tolerances. In the event more stringent settlement tolerances are required a reduction of the allowable bearing capacity and/or a change in depth to bearing strata may be required.

Should foundation excavation encounter hard bedrock, the foundation is to be undercut a minimum of 12 inches. The undercut area is to be backfilled with a structural fill or a low strength flowable fill (max 500 psi) “cushioning” layer to limit the potential for differential foundation settlement and the development of stress concentrations caused by rock protrusion.

Exterior foundations or foundations in unheated areas shall be provided with a minimum of 36" compacted soil cover above the footing bottom for frost protection.

A review of Section 1613.2.2 of the International Building Code (IBC 2023 edition), ASCE 7 Chapter 20, and the existing soil profile indicates that a site class C should be used in the design of the proposed structure for seismic load resistance.

NOTE: Due to the existing school building exterior wall foundation being supported on a grade beam system with deep piers and not a standard shallow foundation, there may be a concern with transferring lateral loads from the elevator foundation system to the existing pier foundations. Additionally, depending on how these deep piers were installed, there may be some loose/disturbed soils at the pier locations. Due these concerns, of the planned elevator addition foundation coincides with an existing pier it is recommended to lower or step the foundation to match the existing pier

bottom elevation or to within a distance above the pier bottom elevation which is equivalent to the later distance between the new and existing foundation. If the anticipated foundation loads are not anticipated to present a significant lateral load transfer and the existing soils around the deep piers are found to be stable, this recommendation may be revised to allow the foundation to be installed to meet the existing grade beam depth.

FILL AND COMPACTION CRITERIA

Fill supporting slabs, pavements, and foundations is considered herein to be *structural fill*. *Structural fill* shall be placed on an approved, proof rolled, nonyielding, level subgrade, in lifts not exceeding 8 inches (loose thickness), unless otherwise directed by the Geotechnical Engineer. *Structural fill* shall be maintained nominally at *Optimum Moisture Content* (ASTM D-698) and uniformly compacted to the percentages of *Maximum Dry Density* (ASTM D-698) provided in Table I - Compaction Criteria.

Suitable *structural fill* shall consist of clean soils without deleterious inclusions. On-site soils identified as Stratum I and Stratum II are acceptable for use as *structural fill* if given the opportunity to dry and the soils are maintained nominally at *Optimum Moisture Content*. Samples retrieved from the upper 5 feet of the subgrade indicated moisture contents ranging from 8 to 18 percent. The optimum moisture content for compaction of these soils is estimated to range between 10 and 16 percent. Therefore, some of these soils may require aeration and drying prior to re-using as structural fill, which is best accomplished in the summer months. Specific moisture content test results and associated depths are indicated on the test boring logs in the appendix of this report.

Borrow fill shall be clean well-graded soils with good strength characteristics with a maximum particle size of 3 inches and containing not more than 20% silt/clay (by weight). Samples of on-site or borrow sources of fill shall be submitted to the Geotechnical Engineer for testing at least 1 week before use on site. A minimum of 65 lbs. or two (2) five-gallon buckets is required for testing.

LATERAL EARTH PRESSURES - RETAINING WALLS

The retaining/loading dock walls of the structure, if proposed, should be designed for an at rest condition (Ko). The foundations and walls must be fully drained to relieve potential hydrostatic pressure. A foundation/wall drainage system is recommended. Soil backfill around the basement walls shall be well compacted and should consist of granular soils to prevent the trapping of water.

Retaining walls outside the structure which are free to rotate should be similarly designed except with an active earth pressure as opposed to Ko condition. Soil parameters used to establish the

effective fluid pressures (excluding hydrostatic loads) and some additional parameters which may be used in the design of a retaining wall system are summarized in the following table:

SOIL PROPERTIES FOR DETERMINATION OF LATERAL LOADS

Parameter	**Stratum I/IF**	**Stratum II**
Angle of Internal Friction, ϕ	30 degrees	34 degrees
Moist unit weight, γ_m	125 pcf	130 pcf
Active Earth Pressure Coefficient, K_a	0.33	0.28
Passive Earth Pressure Coefficient, K_p	3.03	3.53
At Rest Earth Pressure Coefficient, K_o	0.50	0.44
Soil/Mass concrete interface friction Angle, δ	20 degrees	23 degrees

QUALITY CONTROL

This report was prepared to provide design criteria for the design team. DBA assumes that Geotechnical and Construction Quality Control Services will be provided in order to implement the recommendations provided herein and to identify unanticipated or changed conditions. The Geotechnical Engineer's representative should review the consistency and texture of the exposed soils with the conditions encountered by this exploration as described herein. Since localized loose and yielding subgrade conditions may be encountered between test locations, provisions for the undercutting and subsequent replacement of these materials should be anticipated in the construction documents. The environmental quality of the subgrade soils was not reviewed as part of this evaluation. All materials generated by grading and excavation shall be managed in accordance with regulatory requirements.

DBA can provide a contract for Geotechnical and Construction Quality Control Services (Special Inspections), as required. A pre-work meeting with the design professionals, contractors, and the Geotechnical Engineer is strongly recommended.

LIMITATIONS

Services performed by DBA, including this Geotechnical Exploration report, any subsequent supplemental site exploration, and construction monitoring have been or will be conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions. No other warranty or guarantee is indicated or intended in this report or any opinion, document or otherwise stated.

If you have any questions regarding this letter please contact our office.

Sincerely,
DAVID BLACKMORE & ASSOCIATES, INC.

Marc Utti Hodge, EIT
Geotechnical Engineer

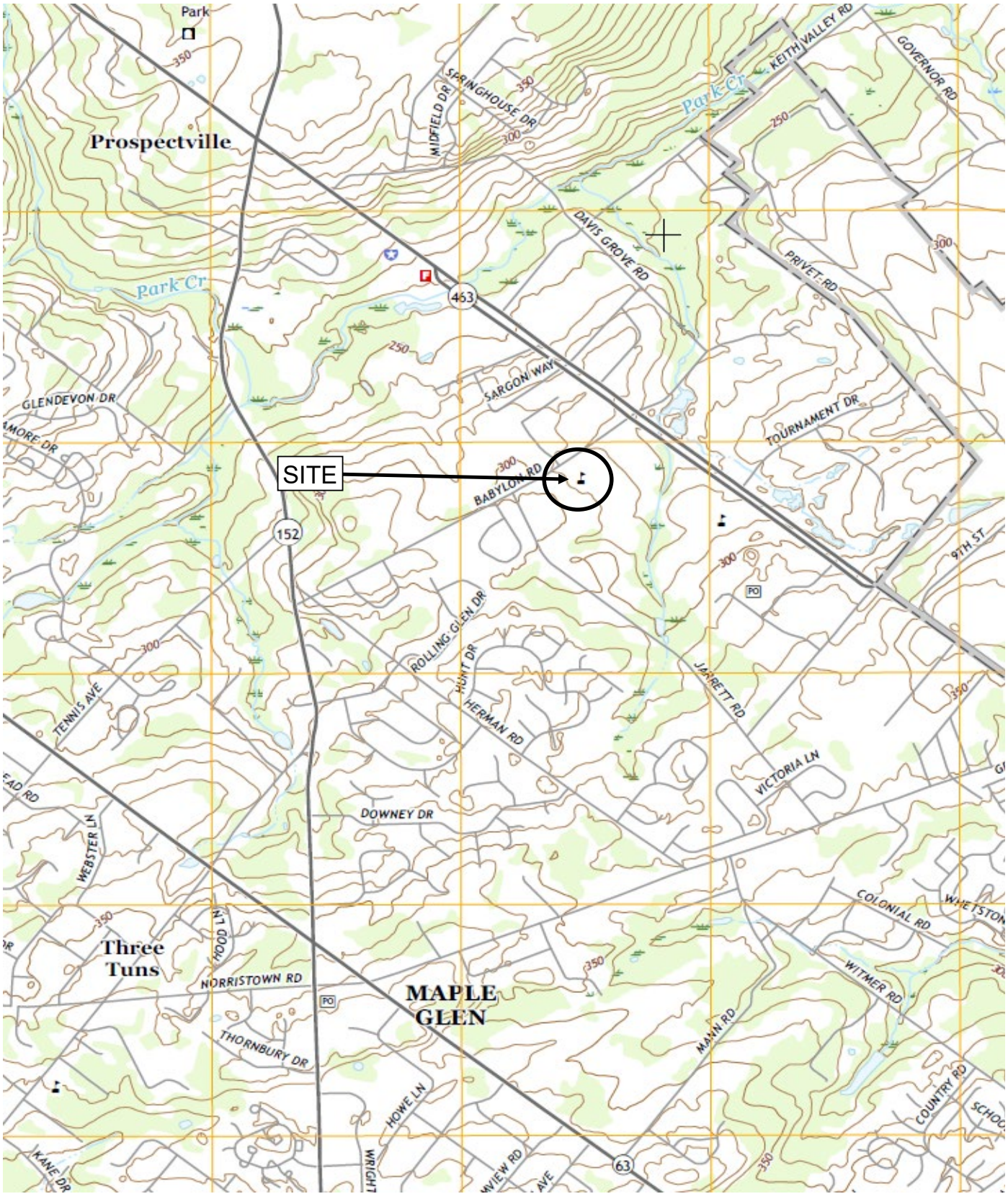
Brian D. McCree, PE
President

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
BRIAN D. MCCREE
ENGINEER
PE048432E

Attachments:

Figures I: Site Location and Topography
Figure II: Site Geology
Figure III: Site Soils
Test Boring Logs
Test Boring Location Plan

FIGURES & TABLES



GEOTECHNICAL & ENVIRONMENTAL ENGINEERS

DAVID BLACKMORE & ASSOC., INC.

3335 West Ridge Pike

Pottstown, Pennsylvania 19464

Telephone: (610) 495-6255 FAX: (610) 495-7353

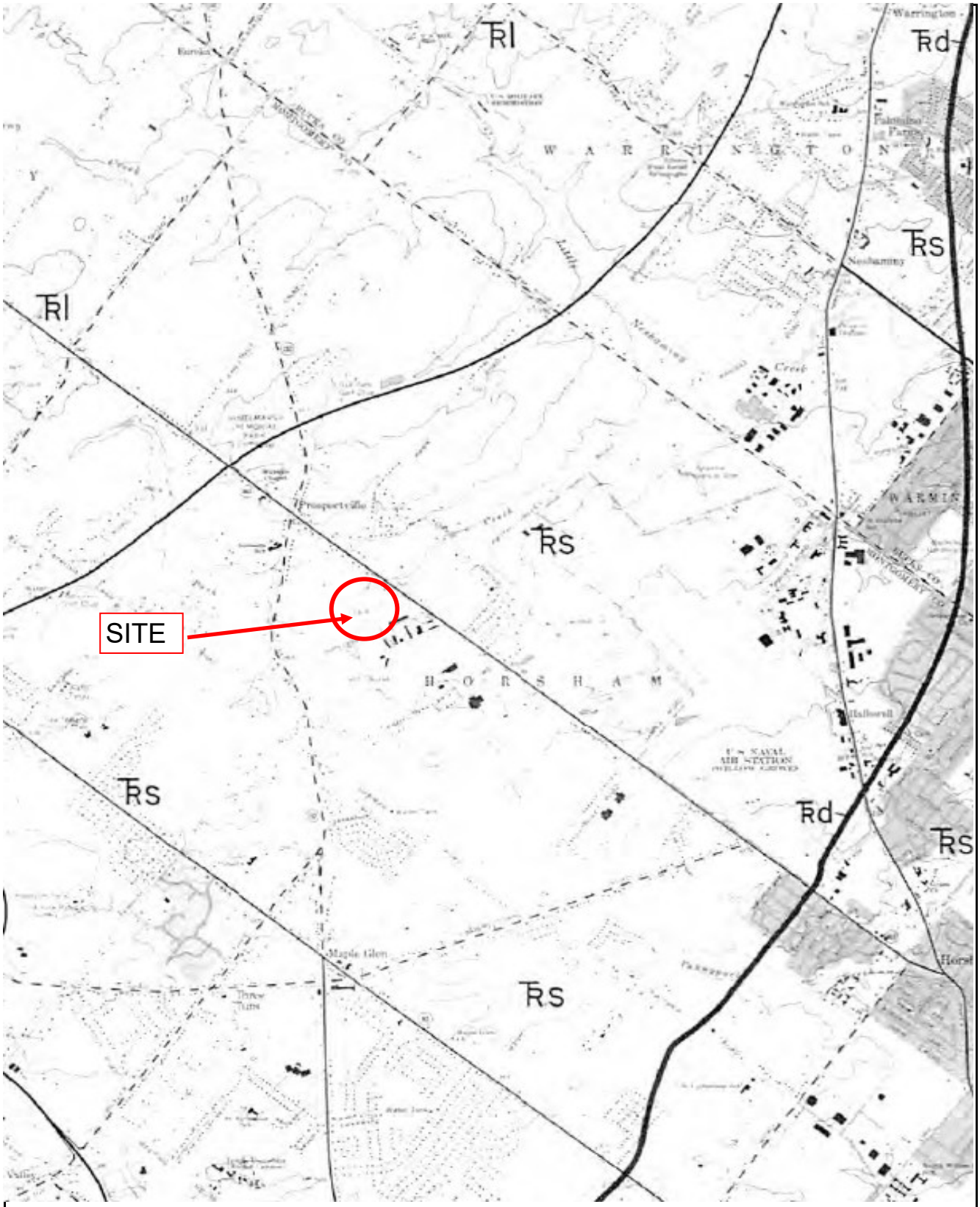
Project 5772G1

Figure I

SITE LOCATION & TOPOGRAPHY

U.S.G.S. 7.5 Minute Topographic Quadrangle

Ambler Quadrangle



KEY

Trs - Stockton Formation

GEOTECHNICAL & ENVIRONMENTAL ENGINEERS	**Project 5772G1**
DAVID BLACKMORE & ASSOC., INC. **3335 West Ridge Pike** **Pottstown, Pennsylvania 19464** Telephone: (610) 495-6255 FAX: (610) 495-7353	**Figure II** **SITE GEOLOGY** USGS Geologic Quadrangle Maps of PA Reading Quadrangle

KEY

UgB- Urban Land, 0 to 8 percent slopes

GEOTECHNICAL & ENVIRONMENTAL ENGINEERS

DAVID BLACKMORE & ASSOC., INC.

3335 West Ridge Pike

Pottstown, Pennsylvania 19464

Telephone: (610) 495-6255 FAX: (610) 495-7353

Project 5772G1

Figure III

Soils

Soil Mapping via

USDA Natural Resources Conservation Service Website

TABLE I
COMPACTION CRITERIA

LOCATION	PERCENT COMPACTION (ASTM-D698)
Foundations	98%
Floor Slabs	98%
Pavements	95%
Berms (non-structural)	93%

TEST BORING LOGS

DAVID BLACKMORE & ASSOCIATIES, INC.
Geotechnical & Environmental Engineers
Phone: 610-495-6255 Fax: 610-495-7353
www.dbaengineering.com

Boring Number: B1

Project: Simmons Elementary Elevator Addition
Location: 411 Babylon Road
Twp/City/State: Horsham Township, Montgomery County, PA
Drilling Contractor: Corcoran Drilling Co., INC.
X Coordinate (ft): Y Coordinate (ft):
Drilling Method #1: 6" Solid Auger from 0 to 15'5"
Drilling Method #2:

Project Number: 5772G1
Date Drilled: 10/20/25
Inspected By: MUH
Boring Depth: 15.42'
Ground Surface Elevation (ft msl): 273.00
Water Level - Immediate (ft bgs): Dry (5 Min)
Water Level - Static (ft bgs): Dry (2 Hrs)

DEPTH BELOW SURFACE (FT)	WATER LEVEL	LITHOLOGY: LITHOLOGIC SYMBOL	LITHOLOGY: GEOLOGIC DESCRIPTION OF SOIL AND ROCK STRATA	LITHOLOGY: DEPTH (FT)	LITHOLOGY: ELEVATION (FT)	SAMPLING DATA: NUMBER	SAMPLING DATA: Water Content	SAMPLING DATA: SPT DATA	SAMPLING DATA: SPT Value	SAMPLING DATA: SPT GRAPH (Blows Per Foot)
0			Concrete (4")	0.33	272.67		10 20 30 40			10 20 30 40 60 80
			Crushed Stone (3")	0.58	272.42					
			Modified Stone (3")	0.83	272.17					
			Stratum IF	1.50	271.50					
			Fill consisting of orange brown fine sand and clayey silt							
3			Stratum I	3.00	270.00	S-1*		6-8-12-13	20	
			Orange brown and some reddish brown fine sand and silt with occasional siltstone fragments							
			Reddish brown and orange brown fine sand and silt with occasional siltstone fragments			S-2*		17-17-18-19	35	
6										
				8.75	264.25					
9			Stratum II							
			Reddish brown weathered siltstone			S-3**		15-18-50/3"	100	
12										
						S-4		50/2"	100	
15				15.42	257.58					
			Auger Refusal on Siltstone Bedrock							
18			Notes: * Sample was wet ** Sample was Damp Hard augering from 10'3" Very hard augering from 15'3"							
21										

The boring results represent subsurface conditions at the boring locations only and are not necessarily representative of conditions at other locations. Water levels are taken at the time of drilling and are not indicative of seasonal variations in the ground water lovel. NR = No Recovery, S = Split Spoon sample (2" O.D.), C = Rock Coring Run.

DAVID BLACKMORE & ASSOCIATIES, INC.
Geotechnical & Environmental Engineers
Phone: 610-495-6255 Fax: 610-495-7353
www.dbaengineering.com

Boring Number: B2

Project: Simmons Elementary Elevator Addition
Location: 411 Babylon Road
Twp/City/State: Horsham Township, Montgomery County, PA
Drilling Contractor: Corcoran Drilling Co., INC.
X Coordinate (ft): Y Coordinate (ft):
Drilling Method #1: 6" Solid Auger from 0 to 11'7"
Drilling Method #2:

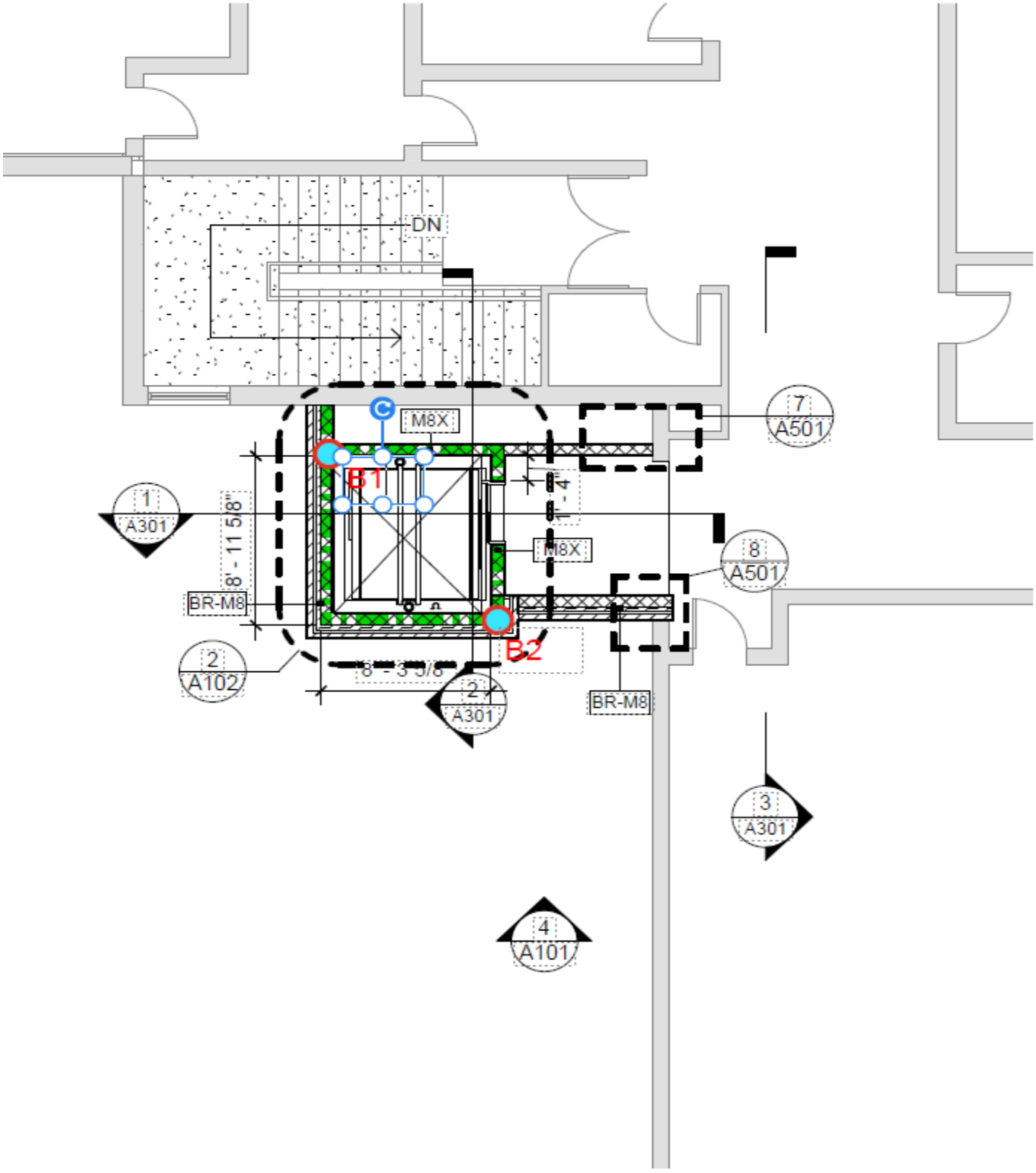
Project Number: 5772G1
Date Drilled: 10/20/25
Inspected By: MUH
Boring Depth: 11.58'
Ground Surface Elevation (ft msl): 272.84
Water Level - Immediate (ft bgs): Dry (5 Min)
Water Level - Static (ft bgs): Dry (1 Hr)

DEPTH BELOW SURFACE (FT)	WATER LEVEL	LITHOLOGY: LITHOLOGIC SYMBOL	LITHOLOGY: GEOLOGIC DESCRIPTION OF SOIL AND ROCK STRATA	LITHOLOGY: DEPTH (FT)	LITHOLOGY: ELEVATION (FT)	SAMPLING DATA: NUMBER	SAMPLING DATA: Water Content	SAMPLING DATA: SPT DATA	SAMPLING DATA: SPT Value	SAMPLING DATA: SPT GRAPH (Blows Per Foot)
0			Topsoil (7")	0.58	272.26					
			Stratum I Orange brown and reddish brown fine sand and silt with some siltstone fragments							
3						S-1*		6-7-12-14	19	
						S-2*		14-21-19-23	40	
6				8.00	264.84					
			Stratum II Weathered red shale	9.42	263.42					
9			Reddish brown weathered siltstone			S-3		9-50/3"	100	
				11.58	261.26					
12			**Auger Refusal on Siltstone Bedrock**							
			Notes: * Sample was moist Hard augering from 9'9" Very hard augering from 11'5"							
15										
18										
21										

Water Content: 10 20 30 40
SPT GRAPH (Blows Per Foot): 10 20 30 40 60 80

The boring results represent subsurface conditions at the boring locations only and are not necessarily representative of conditions at other locations. Water levels are taken at the time of drilling and are not indicative of seasonal variations in the ground water lovel. NR = No Recovery, S = Split Spoon sample (2" O.D.), C = Rock Coring Run.

TEST BORING LOCATION PLAN



KEY

Test Boring Location

GEOTECHNICAL & ENVIRONMENTAL ENGINEERS	Project 5772G1
DAVID BLACKMORE & ASSOC., INC. **3335 West Ridge Pike** **Pottstown, Pennsylvania 19464** Telephone: (610) 495-6255 FAX: (610) 495-7353	**TEST BORING LOCATION PLAN** **ELEVATOR ADDITION** SIMMONS ELEMENTARY 411 Babylon Rd, Horsham, PA

SECTION 00 41 13 – BID FORM

BID TO: Hatboro-Horsham School District
227 Meetinghouse Road, Suite 100
Horsham, PA 19044

BID FROM: _____

_____

_____

THIS BID FORM SHALL NOT BE ALTERED IN ANY MANNER. ANY ALTERED BID FORMS SHALL BE CONSIDERED NON-RESPONSIVE AND WILL BE REJECTED.

1. The undersigned Bidder proposed and agrees, if written notice of the acceptance of this Bid is received by the undersigned within 60 days after date set for opening of this Bid, or at any other time thereafter before Bid is withdrawn, the undersigned agrees to enter into and execute a Contract with the Owner in accordance with this Bid as accepted. This shall be in a form acceptable to Owner, and the successful Bidder shall furnish and deliver to Owner the Performance Bond, Labor and Material Payment Bond, and proof of insurance coverage, all within ten (10) days after notice of acceptance of this Bid.

2. BIDDER accepts all of the terms and conditions of the Instructions to Bidders, including without limitation, those dealing with disposition of Bid Security. This Bid will remain open for 60 days after the day of Bid Opening unless the OWNER is delayed in awarding the Contract due to the failure to receive a required approval/permit from one or more reviewing bodies/governmental agencies having jurisdiction over the Project, the sale of bonds or the award of a Grant, in which case, Bids shall be irrevocable for 120 days. BIDDER will sign the Agreement and submit the required bonds and other documents required by the Contract Documents within ten (10) days after the date of OWNER'S Notice of Award.

3. In submitting this Bid, BIDDER represents, as more fully set forth in the Agreement, that:

    a. Bidder has certified that it has examined copies of all Contract Documents. Bidder has made a thorough inspection of the premises and that the equipment and the construction activities that form the basis of this agreement can be completed in a good and workman-like manner for the amount of its Bid. Further, Bidder certifies that all of the equipment, installation, and construction activities to be supplied pursuant to this Bid and an agreement with Owner, if awarded. Bidder has reported any discrepancies, duplications, errors, or omissions in the Contract Documents, as required in the Contract Documents and hereby waives any claims for additional cost or time for such matters that were apparent or discoverable by Bidder from a thorough and complete review of the Contract Documents prior to submission of this Bid. Additionally, the Bidder hereby acknowledges receipt of the following addenda:

Addenda No. _____ Dated _____

Addenda No. _____ Dated _____

Addenda No. _____ Dated _____

Addenda No. _____ Dated _____

Addenda No. _____ Dated _____

Addenda No. _____ Dated _____

Addenda No. _____ Dated _____

Addenda No. _____ Dated _____

Addenda No. _____ Dated _____

Addenda No. _____ Dated _____

b. The Undersigned here certifies that this Bid is genuine and not a sham, collusive or fraudulent or made in the interest of or in behalf of any person, firm or corporation not herein named; and that the Undersigned has not, directly or indirectly, inducted or solicited any bidder to submit a sham bid, or any other person, firm or corporation from bidding, and that the Undersigned has not, in any manner, sought by collusion to secure for himself any advantage over any other Bidder.

c. In accordance with the Advertisement for Bids and the proposed Construction Documents distributed by ICS, 1400 N. Providence Rd, Building 2, Suite 4025, Media, PA 19063, dated January 12, 2026, for Work generally described as the Simmons Elementary School Elevator Addition Project, the undersigned, having visited the site of proposed construction and having become thoroughly familiar with local conditions affecting the cost and performance of the work and with all requirements of the Contract Documents and related Addenda, hereby proposes and agrees to provide all labor, materials and equipment required to construct and complete the Work in accordance with the Contract Documents and Addenda for the following amounts:

4. Base Bid:

Base Bid Price (INCLUDING Project Allowances) for all Work indicated on the Contract Documents:

$_____ | $ |

5. Alternates:

Reference Section 01 23 00, Alternates, for the full description of included Project Alternates. Do not adjust material allowances under any alternate bid items. Indicate whether alternate cost is an add or deduct when a choice is provided.

Alternate No. 1 as described in Specification Section 01 23 00 Alternates. $ _____

(Add, Deduct, No Change) $_____
(Circle One)

Alternate No. 2A as described in Specification Section 01 23 00 Alternates. $ _____

(Add, Deduct, No Change) $_____
(Circle One)

Alternate No. 2B as described in Specification Section 01 23 00 Alternates. $ _____

(Add, Deduct, No Change) $_____
(Circle One)

Alternate No. 3 as described in Specification Section 01 23 00 Alternates. $ _____

(Add, Deduct, No Change) $_____
(Circle One)

6. Unit Prices:

The Bidder is required to bid unit prices on the following items as identified in Section 01 22 00 – Unit Prices and Material Allowances in accordance with the Contract Documents. Unit Prices shall include costs for furnishing and installing all materials, labor, tools, equipment, and other incidental costs necessary to complete the specified operation. Unit Prices will be used to ADD/DEDUCT to the Contract cost where appropriate. The BIDDER agrees that in the event of any inconsistency between a Unit Price and the extension of a Unit Price in a Material Allowance, the Unit Price shall control and the Material Allowance extension shall be recalculated.

If any extra work is required in these categories beyond the contract requirements, the unit prices shall be used as a basis for determining the amount of additional payment to the Contractor. The Bidder agrees that Owner reserves the right to reject or otherwise not agree to use the Unit Prices submitted, if in the Owner's opinion, the nature or quantity of the Work encountered is such that the Unit Price cost no longer applies to the Work. The Owner also reserves the right to solicit independent proposals as required by the Department of Education guidelines, under a separate contract, to perform the services required. **The responsiveness of the Bid may be determined by the Owner on the basis of the Unit Prices proposed by the BIDDER. Unit Prices shall be consistent with verifiable average**

costs for the Work to be performed. Bidders agree that a Bid may be rejected if the Unit Prices submitted are inconsistent with the average cost. Under NO circumstances will BIDDER perform Unit Price Work without prior written authorization from OWNER. The Construction Manager must field measure and approve all allowance work prior to the Contractor performing the Work. Should the allowance amount be exceeded, the Contractor will be paid by Change Order addition at the Unit Price established for the related Work. Similarly, should the allowance used be less than the allowance amount, the Contractor will credit the Owner for the unused quantity in accordance with the related Unit Price by a Change Order deduction.

The contract Unit Price per (UOM) for WS-1-1 as described in Section 01 22 00, Unit Prices and Material Allowances is:

$ _____per (UOM) x Cost extension of quantity indicated in Section 01 22 00:

$_____ (total cost allowance for Unit Price).

The contract Unit Price per (UOM) for WS-1-2 as described in Section 01 22 00, Unit Prices and Material Allowances is:

$ _____per (UOM) x Cost extension of quantity indicated in Section 01 22 00:

$_____ (total cost allowance for Unit Price).

The contract Unit Price per (UOM) for WS-1-3 as described in Section 01 22 00, Unit Prices and Material Allowances is:

$ _____per (UOM) x Cost extension of quantity indicated in Section 01 22 00:

$_____ (total cost allowance for Unit Price).

The contract Unit Price per (UOM) for WS-1-4 as described in Section 01 22 00, Unit Prices and Material Allowances is:

$ _____per (UOM) x Cost extension of quantity indicated in Section 01 22 00:

$_____ (total cost allowance for Unit Price).

The contract Unit Price per (UOM) for WS-1-5 as described in Section 01 22 00, Unit Prices and Material Allowances is:

$ _____per (UOM) x Cost extension of quantity indicated in Section 01 22 00:

$_____ (total cost allowance for Unit Price).

The contract Unit Price per (UOM) for WS-1-6 as described in Section 01 22 00, Unit Prices and Material Allowances is:

$ _____per (UOM) x Cost extension of quantity indicated in Section 01 22 00:

$_____ (total cost allowance for Unit Price).

The contract Unit Price per (UOM) for WS-1-7 as described in Section 01 22 00, Unit Prices and Material Allowances is:

$ _____per (UOM) x Cost extension of quantity indicated in Section 01 22 00:

$_____ (total cost allowance for Unit Price).

The contract Unit Price per (UOM) for WS-1-8 as described in Section 01 22 00, Unit Prices and Material Allowances is:

$ _____per (UOM) x Cost extension of quantity indicated in Section 01 22 00:

$_____ (total cost allowance for Unit Price).

The contract Unit Price per (UOM) for WS-1-9 as described in Section 01 22 00, Unit Prices and Material Allowances is:

$ _____per (UOM) x Cost extension of quantity indicated in Section 01 22 00:

$_____ (total cost allowance for Unit Price).

The contract Unit Price per (UOM) for WS-1-10 as described in Section 01 22 00, Unit Prices and Material Allowances is:

$ _____per (UOM) x Cost extension of quantity indicated in Section 01 22 00:

$_____ (total cost allowance for Unit Price).

The contract Unit Price per (UOM) for WS-1-11 as described in Section 01 22 00, Unit Prices and Material Allowances is:

$ _____per (UOM) x Cost extension of quantity indicated in Section 01 22 00:

$_____ (total cost allowance for Unit Price).

The contract Unit Price per (UOM) for WS-1-12 as described in Section 01 22 00, Unit Prices and Material Allowances is:

$ _____per (UOM) x Cost extension of quantity indicated in Section 01 22 00:

$_____ (total cost allowance for Unit Price)

The contract Unit Price per (UOM) for WS-1-13 as described in Section 01 22 00, Unit Prices and Material Allowances is:

$ _____per (UOM) x Cost extension of quantity indicated in Section 01 22 00:

$_____ (total cost allowance for Unit Price).

The contract Unit Price per (UOM) for WS-1-14 as described in Section 01 22 00, Unit Prices and Material Allowances is:

$ _____per (UOM) x Cost extension of quantity indicated in Section 01 22 00:

$_____ (total cost allowance for Unit Price).

The contract Unit Price per (UOM) for WS-1-15 as described in Section 01 22 00, Unit Prices and Material Allowances is:

$ _____per (UOM) x Cost extension of quantity indicated in Section 01 22 00:

$_____ (total cost allowance for Unit Price).

In witness whereof, the undersigned has caused this Proposal to be executed this _____day of _____ 20_____.

Name of Contractor: _____

State of Incorporation for Contractor: _____

Contractor (Entity) Type: _____

Street Address: _____

City: _____State: _____Zip: _____

Phone Number: _____Fax Number: _____

Name of Representative: _____

Title of Representative: _____

Signature of Representative: _____

Date of Signature: _____

Name of Witness: _____

Signature of Witness: _____

Date of Signature: _____

END OF SECTION 00 41 13

SECTION 00 43 13.00 - BID SECURITY FORM

The Bid Security Form utilized for this project shall be a “Bid Bond”, AIA Document A310-2010, included herein as Section 00 43 13.13. Reference Section 00 21 13, “Instructions to Bidders” for the execution of the Bid Bond.

END OF SECTION 00 43 13.00

AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:
(Name, legal status and address)

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

BOND AMOUNT: $

PROJECT:
(Name, location or address, and Project number, if any)
Hatboro-Horsham SD Simmons ES Elevator
411 Babylon Road, Horsham, PA 19044

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

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

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

Signed and sealed this Twenty-ninth day of January , Two Thousand Twenty-Six

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

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

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

AIA Document A310 – 2010. Copyright © 1963, 1970 and 2010. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 20:46:56 EST on 12/10/2025 under Subscription No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (6938ceaeb03ac03480897b87)

CONTRACTOR AS PRINCIPAL *(Signature)*	**SURETY** *(Signature)*
(Printed name and title)	*(Printed name and title)*
(Witness)	*(Witness)*

AIA Document A310 – 2010. Copyright © 1963, 1970 and 2010. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 20:46:56 EST on 12/10/2025 under Subscription No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (6938ceaeb03ac03480897b87)

SECTION 00 43 13.16 – AGREEMENT OF SURETY

KNOW ALL MEN BY THESE PRESENTS, that we, _____, as Surety, a corporation existing under the laws of the State of _____, and authorized to transact business in the Commonwealth of Pennsylvania hereby agrees intending to be legally bound hereby, to execute and deliver to the Hatboro-Horsham School District, within the time limit specified in the Contract Documents, the Performance Bond and Payment Bond in the forms included in the Contract Documents each in an amount of 100% of the Contract Sum, in favor of the Hatboro-Horsham School District, as required for the faithful performance and proper fulfillment of the Contract for the Simmons Elementary School Elevator Addition Project, Horsham Township, Montgomery County, Pennsylvania, on behalf of _____ (hereinafter called the Bidder) provided that the above contract be awarded to the Bidder within sixty (60) days after the date of opening of the bids or otherwise as set forth in the Instructions to Bidders.

Surety further agrees that should the Surety, after notification of intent to make such award, omit or refuse to execute the required bonds and agreement, then the Surety shall pay to the Hatboro-Horsham School District hereinafter called the Obligee, any difference between the total amount specified in said Bidder's proposal for the required work and the amount of which said Obligee may procure the same work, if the latter amount be in excess of the former, plus any advertising, architectural, legal, and other expenses incurred by Obligee; provided, however, that the obligations of Surety hereunder shall not exceed the amount of bid security provided by the Bidder together with interest.

Dated: _____, 20_____

_____
(CORPORATE SURETY)

WITNESS OR ATTEST:

_____ By: _____
Attorney-in-Fact*

NAME: _____
(Please type)

*Attach an appropriate Power of Attorney, dated as of the same date as this Agreement, evidencing the authority of the Attorney-in-Fact to act on behalf of the Corporation.

END OF SECTION 00 43 13.16

Substitution Request

Form to be used during bidding. Incomplete forms will not be processed.

SUBSTITUTION REQUEST # _____

PROJECT NAME: Simmons Elementary School Elevator Addition

TO Craig Babroff (craig.babroff@ics-builds.com)

FROM: _____

DATE: _____

Specification

Section Title: _____

Section Number: _____

Paragraph: _____

Description: _____

Proposed Substitution (*Note: Limit this Request to one substitution)*

Manufacturer: _____ Address: _____

Trade Name: _____ Model Number: _____

Phone Number: _____ Contact Person: _____

Installer: _____ Address: _____

Phone Number: _____ Contact Person: _____

History: ☐ New Product ☐ 2 to 5 years old
☐ 5 to 10 years old ☐ More than 10 years old

Differences between proposed substitution and specified product:

_____

_____

_____

_____

Point by point comparison data attached – REQUIRED

Reason for Not Providing Specified Item:

_____

_____

_____

Similar Installation: Include Date Installed Project: _____

Architect: _____ Address: _____

Owner: _____

_____

Proposed substitution affects other parts of Work: ☐ No ☐ Yes; Explain:

_____

_____

_____

Amount of Savings to Owner for this Substitution:$_____

Will Requested Substitution Impact Schedule:☐ No ☐ Yes, Add _____days.

Attached Supporting Data: ☐ Product Data ☐ Drawings ☐ Tests ☐ Reports ☐ Samples

---

Contractor's Certification
The undersigned party, proposing this Substitution, certifies the following as true and correct and accepts all conditions relating to this request:

- This Substitution has been fully investigated and determined to be equal or superior in all respects.
- The same warranty will be furnished.
- The same maintenance service and source of replacement parts, as applicable, is available.
- The change to the Construction Progress Schedule is as stated above.
- The cost data as stated above is complete. All claims for any additional costs related to this Substitution, if accepted, are explicitly waived by the Contractor.
- The Substitution does not affect dimensions or functional clearances.
- All architectural/engineering design fees associated with the review, evaluation, and or design and detailing changes as a result of this Substitution Request are the responsibility of the Contractor. The amount of these fees will be deducted from the Contract Sum due to the Contractor.
- Coordination, installation, and changes to the Work as necessary for an accepted Substitution will be complete in all respects.

Submitted By: _____

Signature: _____

Firm: _____

Address: _____ Telephone: _____

Consultant's Review and Recommendation

☐ Substitution Recommended: Make submittals in accordance with Specifications.

☐ Substitution Recommended as Noted: Make submittals in accordance with Specifications.

☐ Substitution Rejection Recommended: Use specified products. Architect shall not be held responsible for the performance of any substitution accepted or approved by Owner over the recommendation of the Architect (Release and Indemnification Agreement between Owner and Architect required).

☐ Substitution Request returned: Incomplete submittal, use specified products.

Comments:

_____

_____

_____

Signature: _____ Date: _____

SECTION 00 43 93 - BID SUBMITTAL ATTACHMENTS

1.01 GENERAL

A. The below referenced forms with corresponding Specification Section number shall be submitted in conjunction with Bids. Substitute forms will not be acceptable. All forms shall be fully executed by an authorized person and notary seals applied where indicated.

1. Section 00 11 53, Request for Qualifications, and associated Exhibits A through F:

   a. Exhibit A: General Information
   b. Exhibit B: Financial and Performance Information
   c. Exhibit C: Project-Specific Information
   d. Exhibit D: Past Project Experience
   e. Exhibit F: Hatboro-Horsham School District Contractor Responsibility Certification Form (Section 00 11 53.32) must be submitted as a separate attachment prior to the Bid opening date no later than **Thursday, January 15, 2026, to Bill Stone via email at bstone@hatboro-horsham.org, in order to qualify to bid the Project**. **Failure to submit the form will disqualify any Bidder from submitting a bid.**

2. Section 00 21 10.13, Act 141: Public Works Employment Verification Form.

3. Section 00 41 13, Bid Form.

4. Bid Security:

   a. Section 00 43 13.13, Bid Bond Form, if bid security provided is a Bid Bond.
   b. Section 00 43 13.16, Agreement of Surety if bid security provided is a certified check or bank cashier's check.

5. Section 00 45 19, Non-Collusion Affidavit.

END OF SECTION 00 43 93

SECTION 00 45 19 – NON-COLLUSION AFFIDAVIT OF CONTRACTOR

STATE OF _____

COUNTY OF _____

_____, being duly sworn, deposes and says that:

(1) He is _____ of _____.
(owner, partner, officer, representative, or agent) (company)

the Bidder who has submitted the attached Bid, and is authorized to make this Affidavit on behalf of the company, and its Owners, Directors, and officers:

(2) He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid;

(3) Such Bid is genuine and is not collusive or sham Bid;

(4) Neither the said Bidder nor any if its officers, partners, owners, agents, representatives, employees or parties of interest, including the affiant, has, in any way, colluded, conspired, connived, or agreed to any of the following:

- To work directly or indirectly with any other Bidder, firm or person to submit this Bid.
- To collude in any way to submit or to have submitted a sham Bid for the Contract for which this Bid has been submitted.
- To collude in any way to prevent another Bidder from bidding for this Contract.
- To agree, collude, communicate or conference with any other Bidder, firm or person to fix the price or prices in the attached Bid, or in the Bids of any other Bidder.
- To fix any overhead, profit or cost element of the Bid price or the Bid price of any other Bidder.
- To secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the Hatboro-Horsham School District (Owner) or any person(s) in the proposed Contract.

(5) The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest

including this affiant.

(6) I state that, _____,
(Name of My Firm)

understands and acknowledges that the above representations are material and important and will be relied on by the Hatboro-Horsham Area School District in awarding the contract(s) for which this Bid is submitted. I understand, and my firm understands, that any misstatement in this Affidavit is and shall be treated as fraudulent concealment from the Hatboro-Horsham School District of the true facts relating to the submission of bids for this contract.

_____/S/

_____Title

Subscribed and sworn to before me this

_____day of_____20_____.

Notary Public:_____

My Commission Expires:_____

Note: This document must be completed, signed, notarized and returned with your bid.

END OF SECTION 00 45 19

SECTION 00 45 46 – WAIVER OF LIENS/MECHANICS' LIEN WAIVER

_____ County, Pennsylvania _____, 20___

OWNER: _____ ("Owner")

CONTRACTOR: _____ ("Contractor")

CONTRACT: Contract between Owner and Contractor dated _____, 20___

PROJECT: All labor and material necessary for the _____

_____
(Project Name)

1. Contractor hereby stipulates and agrees for payment of _____ Dollars ($_____) and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, that Contractor, any Subcontractor, any Sub-subcontractor, any materialman, or any other person furnishing labor or materials to any of them, shall not file a lien, commonly called a mechanics' lien, or claim for any and all amounts that are, from time-to-time, owed by the Owner against the Project or improvements thereon, and any leasehold interests therein, or any part thereof, for any labor or materials furnished. All Subcontractors, Sub-subcontractors, materialmen, or any other person furnishing labor or materials to any of them or to the Contractor for the Project or improvements thereon, any leasehold interests therein, or any part thereof, shall look to and hold the Contractor personally liable for all Subcontracts, labor or materials furnished to the Project or improvements thereon, so that there shall not be any legal or lawful claim of any kind whatsoever against the Owner for and about the erection, construction and completion of the Project or improvements thereon, and any leasehold interests therein, or any part thereof, or with respect to labor and materials furnished under any supplemental contract or arrangement for extra work in connection with alterations and related improvements on the Project and any leasehold interests therein, or any part thereof.

2. This Waiver of Liens/Mechanics' Lien Waiver, waiving the right of lien, shall be an independent covenant and shall also operate and be effective with respect to work done and materials furnished under any supplemental contract or arrangement for extra work in connection with alterations and related improvements at the Project and any leasehold interests therein.

3. In the event Contractor, any Subcontractor, any Sub-subcontractor, any materialman, or any other person furnishing labor and materials to any of them, files any mechanics' lien or claim, each hereby irrevocably waives any right to jury trial in any action to strike or discharge the lien.

4. Without limitation of the foregoing, this Waiver of Liens/Mechanics' Lien Waiver is made

and intended to be filed with the Office of the Prothonotary of the county or counties in which the Project is located in accordance with the requirements of Section 402 of the Mechanics' Lien Law of 1963 of the Commonwealth of Pennsylvania (49 P.S. § 1402), as amended and supplemented.

5. Each of the terms, provisions, covenants, conditions of this Waiver of Liens/Mechanics' Lien Waiver, as the case may be, shall be binding upon and inure to the benefit of Owner, Contractor, each Subcontractor of Contractor, each Sub-subcontractor of each Subcontractor, and each party acting for, through, or under Contractor, Subcontractor, or Sub-subcontractor, and their respective heirs, executors, administrators, successors and assigns.

6. In order to give the Owner full power and authority to protect itself and the Project against any and all claims filed by the Contractor, any Subcontractor, any Sub-subcontractor, any materialmen, any other person furnishing labor or materials to any of them, or anyone acting under or through them in violation of the foregoing covenant, the said Contractor, for itself and all persons or entities acting through it, hereby irrevocably authorizes and empowers any Attorney of any Court of Common Pleas of the Commonwealth of Pennsylvania, to appear for it or any of them, in any of the said Courts of Common Pleas as Attorney for it and in its name, mark any and all claims satisfied of record at the cost and expense of the Contractor, including, without limitation, all legal fees (e.g., fees of attorneys, paralegals, and any other legal professionals) related thereto, any and all claims or claim, lien or liens, filed by or for the Contractor, any Subcontractor, any Sub- subcontractor, any materialmen, any other person furnishing labor or materials to any of them, or anyone acting under or through them in violation of the foregoing covenant, or in its or their name against the Project or any part thereof. For such act or acts this shall be good and sufficient warrant and authority and a reference to the Court, Term, and Number in which and where this Waiver of Liens/Mechanics' Lien Waiver shall have been filed shall be a sufficient exhibit of the authority herein contained to warrant such action, and the Contractor does hereby remise, release and quit-claim all rights and all manner of errors, defects and imperfections whatsoever in entering such satisfaction or in anyway touching or concerning the same.

7. In the event of a dispute between the Contractor and the Owner, to the extent that the Owner incurs any legal fees, professional fees, or other costs or expenses in defending, removing, marking satisfied any mechanics' liens or any other expenses incurred by Owner in connection with mechanics' lien claims and/or judgments related to the Project, the Contractor will be solely responsible for those amounts incurred by the Owner, which will be deducted to the extent available, from any amounts due the Contractor under the Contract. If the amount due the Contractor is not sufficient to cover such cost, the Contractor shall pay the difference to the Owner within ten (10) days of receipt of the Owner's invoice for such legal fees, professional fees or other costs and expenses.

[Signature page follows]

IN WITNESS WHEREOF, Contractor, acting by its duly authorized officers and intending to be legally bound, has hereunto caused this instrument to be duly executed as of the day and year first above written.

CONTRACTOR:

By:_____ _____

Title:_____ Witness

COMMONWEALTH OF PENNSYLVANIA : : ss.

COUNTY OF _____

On this_____day of_____, 20____, before me, a notary public, the undersigned officer, personally appeared_____, who acknowledged himself/herself to be the_____of_____, a Pennsylvania _____, and that he/she as such officer, being authorized to do so, executed the foregoing Waiver of Liens/Mechanics' Lien Waiver for the purposes therein contained by signing the name of the company by himself/herself as such officer.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal.

_____

Notary Public

My Commission Expires: _____

TO THE PROTHONOTARY:

Please index this instrument in the name of the Owner as plaintiff and Contractor as defendant and in the name of the Owner as defendant and Contractor as plaintiff.

END OF SECTION 00 45 46

SECTION 00 52 00 – STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR - AIA A132

The attached copy of AIA Document A132, Standard Form of Agreement Between Owner and Contractor, as modified, is hereby made a part of the Contract Documents and Specifications. There is no implied permission to reproduce this document. The original document purchased by the user is intended to be consumed in the course of this project.

END OF SECTION 00 52 00

AIA® Document A132® – 2019

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

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

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

Hatboro-Horsham School District
227 Meetinghouse Road, Suite 100
Horsham, PA 19044

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

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

Hatboro-Horsham SD Simmons ES Elevator
411 Babylon Rd
Horsham , Pennsylvania 19044
Construction of a new exterior elevator addition, located adjacent to the existing stairwell, and associated interior and site modifications to improve building accessibility.

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

ICS Consulting, LLC
1400 N. Providence Rd, Building 2, Suite 4025
Media, PA 19061

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

SCHRADERGROUP Architecture, LLC
555 East North Lane, Suite 5100, Building D
Conshohocken, PA 19428

The Owner and Contractor agree as follows.

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

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

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

AIA Document A132 – 2019. Copyright © 1975, 1980, 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 13:00:00 on 01/12/2026 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (2034978104)

TABLE OF ARTICLES

1 THE CONTRACT DOCUMENTS

2 THE WORK OF THIS CONTRACT

3 DATE OF COMMENCEMENT AND DATES OF SUBSTANTIAL COMPLETION

4 CONTRACT SUM

5 PAYMENTS

6 DISPUTE RESOLUTION

7 TERMINATION OR SUSPENSION

8 MISCELLANEOUS PROVISIONS

9 ENUMERATION OF CONTRACT DOCUMENTS

ARTICLE 1 THE CONTRACT DOCUMENTS

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

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, or reasonably inferable by the Contractor as necessary to produce the results intended by the Contract Documents except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND DATES OF SUBSTANTIAL COMPLETION

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

[**X**] The date of this Agreement.

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

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

§ 3.3 Substantial Completion of the Project or Portions Thereof

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

Owner requires work to be substantially complete by August 27, 2026.

AIA Document A132 – 2019. Copyright © 1975, 1980, 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 13:00:00 on 01/12/2026 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (2034978104)

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

Portion of Work	Substantial Completion Date

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

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

(Check one of the following boxes and complete the necessary information.)

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

[X] By the following date: As per specification section 01 32 10 Project Schedule Requirements with the Project Manual

§ 3.4.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work of this Contract are to be substantially complete prior to when the entire Work of this Contract shall be substantially complete, the Contractor shall substantially complete such portions by the following dates:

Portion of Work	Date to be substantially complete

§ 3.4.3 The Contractor acknowledges and recognizes that the Owner is entitled to full and beneficial occupancy and use of the completed Work following expiration of the Contract Time and that the Owner has entered into, or will enter into, binding agreements with third parties based upon the Contractor's achieving Substantial Completion of the Work within the Contract Time. The Contractor further acknowledges and agrees that if the Contractor fails to complete substantially or cause the Substantial Completion of any portion of the Work within the Contract Time, the Owner will sustain extensive damages and serious loss as a result of such failure.

ARTICLE 4 CONTRACT SUM

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

[X] Stipulated Sum, in accordance with Section 4.2 below

§ 4.2 Stipulated Sum

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

§ 4.2.2 Alternates

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

Item	Price

§ 4.2.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.

(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance

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

AIA Document A132 – 2019. Copyright © 1975, 1980, 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 13:00:00 on 01/12/2026 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (2034978104)

(Identify each allowance.)

Item	Price

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

Item	Units and Limitations	Price per Unit ($0.00)

§ 4.3 Intentionally Deleted

(Paragraph deleted)
(Table deleted)
(Paragraphs deleted)
§ 4.4 Intentionally Deleted

(Paragraphs deleted)
(Table deleted)
(Paragraphs deleted)
(Table deleted)
(Paragraphs deleted)
(Table deleted)
(Paragraphs deleted)
(Table deleted)
(Paragraphs deleted)
§ 4.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any, to be assessed in accordance with Section 3.4.)

Five Hundred Dollars ($500.00) per calendar day from the date of Substantial Completion set forth in Section 3.3.1 above until the date of Substantial Completion of the Work is actually achieved.

(Paragraphs deleted)
ARTICLE 5 PAYMENTS
§ 5.1 Progress Payments
§ 5.1.1 Based upon Applications for Payment submitted to the Construction Manager by the Contractor, and Certificates for Payment issued by the Construction Manager and Architect, the Owner shall make progress payments on account of the Contract Sum, to the Contractor, as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

As set forth in § 5.1.3 of this Agreement

§ 5.1.3 Provided that an Application for Payment is received by the Construction Manager not later than the twenty-fifth day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the last day of the following month. If an Application for Payment is received by the Construction Manager after the application date fixed above, payment of the amount certified shall wait until the following months cycle for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Progress Payments Where the Contract Sum is Based on a Stipulated Sum
§ 5.1.4.1 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to

AIA Document A132 – 2019. Copyright © 1975, 1980, 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 13:00:00 on 01/12/2026 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (2034978104)

substantiate its accuracy, as the Construction Manager and Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

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

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

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

- **.1** That portion of the Contract Sum properly allocable to completed Work;
- **.2** That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- **.3** That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

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

- **.1** The aggregate of any amounts previously paid by the Owner;
- **.2** The amount, if any, for Work that remains uncorrected and for which the Construction Manager or the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A232–2019;
- **.3** For Work performed or defects discovered since the last payment application, any amount for which the Construction Manager or the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A232–2019; and
- **.4** Retainage withheld pursuant to Section 5.1.7

(Paragraphs deleted)
§ 5.1.5-5.1.6 Intentionally omitted as N/A

§ 5.1.7 Retainage
§ 5.1.7.1 For each progress payment made prior to when the Work of this Contract is substantially complete, the Owner may withhold
(Paragraphs deleted)
retainage as set forth in AIA A232-2019.

§ 5.1.7.1.1 Intentionally omitted as N/A

§ 5.1.7.2 Intentionally omitted as N/A

§ 5.1.7.3 Intentionally omitted as N/A

§ 5.2 Final Payment
§ 5.2.1 Final Payment Where the Contract Sum is Based on a Stipulated Sum
§ 5.2.1.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

AIA Document A132 – 2019. Copyright © 1975, 1980, 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 13:00:00 on 01/12/2026 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (2034978104)

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A232–2019, and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect or the Construction Manager.

§ 5.2.1.2 The Owner's final payment to the Contractor shall be made no later than 60 days after the issuance of the final Certificate for Payment or Project Certificate for Payment, or as follows:

§ 5.2.2 Intentionally omitted as N/A

§ 5.2.2.1
(Paragraphs deleted)
Intentionally omitted as N/A

§ 5.2.2.2 Intentionally omitted as N/A

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

%

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

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

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A232–2019, the method of binding dispute resolution shall be as follows:
(Check the appropriate box.)

[

[**X**] Litigation in a court of competent jurisdiction.

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

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 Where the Contract Sum is a Stipulated Sum

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

AIA Document A132 – 2019. Copyright © 1975, 1980, 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 13:00:00 on 01/12/2026 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (2034978104)

§ 7.1.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A232–2019, then the Owner shall pay the Contractor within seven (7) days payment for Work properly performed consistent with the Contract Documents prior to termination, reasonable reimbursable expenses incurred, and reasonable costs attributable to termination.

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

§ 7.2 Intentionally omitted as N/A

(Paragraphs deleted)
§ 7.3 Intentionally omitted as N/A

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Terms in this Agreement shall have the same meaning as those in AIA Document A232–2019, as amended for the Project, where reference is made in this Agreement to a provision of AIA Document A232-2019 or another Contract Document, the reference refers to that provision as amended, modified, deleted or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:
(Name, address, email address, and other information)

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

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

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as amended for the Project.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, as amended for the Project.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A232–2019, may be given in accordance with a building information modeling exhibit, if completed, or as otherwise set forth below:
(If other than in accordance with a building information modeling exhibit, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

AIA Document A132 – 2019. Copyright © 1975, 1980, 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 13:00:00 on 01/12/2026 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (2034978104)

§ 8.7 Intentionally omitted as N/A

§ 8.8 The Owner and Contractor acknowledge that no representations, inducements, promises, or agreements, orally or otherwise, have been made by any party or by anyone acting on behalf of any party which are not embodies in this Agreement, and that any agreement, statement or promise that is not contained in this Agreement shall not be valid or binding on any party and shall not have any force or effect.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

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

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

.3 Payment and Performance Bond Forms

.4 Drawings

Number	Title	Date
Exhibit A		

.5 Specifications

Section	Title	Date	Pages
Exhibit B			

.6 Addenda, if any:

Number	Date	Pages

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

(Paragraph deleted)

.7 Other Exhibits:

Exhibit C – Other Provisions to Standard Contractor Agreement

(Paragraphs deleted)

.8 Other documents, if any, listed below:

Contractor Responsibility Certification

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

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

AIA Document A132 – 2019. Copyright © 1975, 1980, 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 13:00:00 on 01/12/2026 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (2034978104)

SECTION 00 55 00

EXHIBIT C - OTHER PROVISIONS TO STANDARD CONTRACTOR AGREEMENT

Within ten (10) business days after this Notice to Proceed this Contractor must submit to ICS via the Submittals tool within Procore unless noted otherwise. Once logged into Procore, go to the Submittal Tool to see any and all required submittals that are the responsibility of the Contractor.

- Notice to Proceed: This Exhibit shall serve as the official "Notice to Proceed" document.

- Request for Payment: Submit applications for payment through Procore to ICS for review and approval by the 25th of the Month. The completed schedule of values must be uploaded into Procore through the Invoicing module for approval and acceptance before any request for payment will be considered. No payment will be made until materials are delivered to the site and work at the site has commenced.

- Submission of Contractor's Construction Schedule/Dates: All prime contractors are asked to submit a preliminary milestone schedule for their portions of the work to be reviewed and incorporated into the overall project schedule created by the Project Manager. Scheduling of the work will be coordinated with the Project Manager.

- Shop Drawings & Required Submittals: The Construction Manager (ICS) will set up the submittal log and apply the submittal reviewers in Procore. This needs to be done before Submittals can be uploaded. Shop drawings and submittals shall be forwarded via the Construction Manager's web-based project management software system Procore by the Prime Contractor. All shop drawings and submittals shall include an approval stamp from the Prime Contractor.

- Schedule of Values: Please submit a detailed breakdown of all material and labor in the Procore Invoicing module. Construction Manager will provide a CSV import template with instructions to complete the SOV following Contract Agreement

- Safety Plan: Please submit a detailed Site Specific Safety Plan within 10 business days of Notice to Proceed.

- Supervision Staff: Provide the name and qualifications of proposed Project Manager and Superintendent.

- List of Subcontractors & Vendors: Provide a list of names and telephone numbers for any subcontractors and vendors of equipment and supplies in compliance with the required items listed in Section 01 30 00, Administrative Requirements, Part 1, List of Subcontractors.

END OF SECTION 00 55 00

SECTION 00 61 13.00 – PERFORMANCE AND PAYMENT BOND FORMS

A. Within ten (10) days of receipt of the Notice of Intent to Award , the successful Bidder shall furnish a Performance Bond (00 61 13.13) and a Payment Bond (00 61 13.16) in the forms provided in these Bid Documents, each in the amount of one hundred percent (100%) of the Contract Sum. No other forms will be accepted. There is no implied permission to reproduce this document. The original document purchased by the user is intended to be consumed in the course of this project.

B. The Attorney-in-Fact who executes the Performance and Payment Bonds on behalf of the surety shall affix to the bonds a certified and current copy of its Power of Attorney, authorizing said Attorney-in-Fact to act on behalf of the surety, and a valid Certificate of Authority from the Pennsylvania Department of Insurance. The Power of Attorney must be dated the same day as the bonds and both the bonds and Power of Attorney shall have affixed the raised corporate seal of the surety.

C. The Performance and Payment Bonds must be executed by a surety licensed and authorized to conduct business within the Commonwealth of Pennsylvania and named in the current list of companies holding Certificates of Authority as accepted sureties on Federal Bonds and as acceptable reinsuring companies as published in Circular 570 (as amended) by the Audit Staff, Bureau of Government Financial Operations, U.S. Treasury Department, and the amount of the bond shall not exceed the underwriting risk of such surety set forth in said Circular or revision thereof.

END OF SECTION 00 61 13.00

SECTION 00 61 13.13 – PERFORMANCE BOND

And Now, we _____ as Principal (the "Principal"), and _____, a Corporation organized and existing under the laws of the _____ of _____, and authorized to do business in the Commonwealth of Pennsylvania as Surety (the "Surety"), are jointly and severally held and firmly bound to the Hatboro-Horsham School District, its successors and assigns as Obligee, (the "Obligee"), for the performance of the Contract hereinafter identified and incorporated herein by this reference in the sum of _____ _____, lawful money of the United States of America to be paid to the Obligee; to which performance or payment, well and truly to be made, we bind ourselves and each of our successors and assigns, jointly and severally.

I. RECITALS

WHEREAS, the Principal has submitted to the Obligee a certain Bid, dated _____ (the "Bid"), to perform certain _____ (Name of Contract) Work for the Obligee, in connection with the Hatboro-Horsham School District Simmons Elementary School Elevator Addition Project, pursuant to plans, specifications and other related documents constituting the Contract Documents, which are incorporated into the Bid by reference (the "Contract Documents"); and

WHEREAS, the Obligee, is a "contracting body" under provisions of Act No. 385 of the General Assembly of the Commonwealth of Pennsylvania, approved by the Governor on December 20, 1967, known as and cited as the "Public Works Contractors' Bond Law of 1967" (the "Act");

WHEREAS, the Act, in Section 3 (a), requires that, before an award shall be made to the Principal by the Obligee in accordance with the Bid, the Principal shall furnish this Bond to the Obligee, with this Bond to become binding upon the award of a contract to the Principal by the Obligee in accordance with the Bid; and

WHEREAS, it also is a condition of the Contract Documents that this Bond shall be furnished by the Principal to the Obligee and

WHEREAS, under the Contract Documents, it is provided, inter alia, that if the Principal shall furnish this Bond to the Obligee, and if the Obligee shall make an award to the Principal in accordance with the Bid, then the Principal and the Obligee shall enter into an agreement with respect to performance of such work (the "Agreement"), the form of which Agreement is set forth in the Contract Documents.

II. TERMS AND CONDITIONS OF BOND

NOW, THEREFORE, the terms and conditions of this Bond are and shall be that if:

(a) the Principal shall remedy, without cost to the Obligee, all defects, deficiencies or failures and any labor, materials or equipment performed or provided by the Principal in its performance of the Agreement which may develop during the period of one (1) year from the date of substantial completion by the Principal and final acceptance of the Obligee of the work to be performed under the Agreement in accordance with the Contract Documents, which defects, in the sole judgment of the Obligee or its legal successors in interests, shall be caused by or shall result from defective or inferior materials or workmanship.

(b) the Principal well, truly, and faithfully shall comply with and shall perform the Agreement in accordance with the Contract Documents, at the time and in the manner provided in the Agreement and in the Contract Documents, and if the Principal shall satisfy all claims and demands incurred in or related to the performance of the Agreement by the Principal or growing out of the performance of the Agreement by the Principal, and if the Principal shall indemnify completely and shall save harmless the Obligee and all of its officers, directors, agents or employees from any and all costs and damages which the Obligee and any or all of its officers, directors, agents and employees may sustain or suffer including, but not limited to, attorney's fees, costs, expenses and interest by reason of the failure of the Principal to do so, and if the Principal shall reimburse completely and pay to the Obligee any and all costs, damages and expenses, including interest and attorney's fees) which the Obligee and any or all of its officers, directors, agents and employees may incur by reason of any such default or failure by the principal and if the Principal shall remedy, without cost to the Obligee, all defects which may develop during the period of one (1) year from the date of substantial completion by the Principal and final acceptance of the Obligee of the work to be performed under the Agreement in accordance with the Contract Documents, which defects, in the sole judgment of the Obligee or its legal successors in interests, shall be caused by or shall result from defective or inferior materials or workmanship, then this Bond shall be void; otherwise, this Bond shall be and shall remain in force and effect.

We further agree to indemnify and hold harmless the Obligee against any and all costs, liabilities, expenses, attorney's fees and obligations which the Obligee sustains by reason of the failure of the Principal or the Surety to comply with the terms of the Contract Documents or this Obligation. This Bond is executed and delivered under and subject to the Act, to which reference hereby is made.

The Principal and the Surety agree that any alterations, changes or additions to the Contract Documents, or any alterations, changes or additions to the work to be performed under the Agreement in accordance with the Contract Documents, or any alterations, changes or additions to the Agreement, or any act of forbearance of either the Principal or the Obligee toward the other with respect to the Contract Documents and the Agreement, or the reduction of any percentage to be retained by Obligee as permitted by the Contract Documents and by the Agreement, shall not release in any manner whatsoever, the Principal and the Surety or either of them, their heirs, executors, administrators, successors and assigns, from liability and obligations under this Bond; and the Surety, for value received, waives notice of any such alterations, changes, additions, extensions of time, acts of forbearance or reduction of retained percentage.

It is further agreed that, in the sole discretion of the Obligee and upon notice therefrom, the

Surety may be required to perform and carry out the provisions of the Agreement in the event of a breach thereof by the Principal, whereupon the rights and responsibilities of the Surety and the Obligee to each other shall be the same as those of the Principal and the Obligee immediately prior to the breach giving rise to the Surety's obligation hereunder. If the Surety does not proceed promptly to render such performance or cause such performance to be rendered by a third party satisfactory to the Obligee, then, the Surety shall be deemed to be in default on this obligation fifteen (15) days after the receipt of notice from Obligee that the Surety shall so proceed, and the Obligee shall be entitled to enforce against Surety any remedy it may then or thereafter have against the Principal.

It is expressly agreed that this Bond shall be deemed amended automatically and immediately, without formal and separate Amendments hereto, upon Amendment to the Contract Documents not increasing the Contract price in the aggregate by more than twenty (20%) percent of the Bond amount set forth herein, so as to bind the Principal and the Surety to the full and faithful performance of the Contract Documents as so amended. The term "Amendment" wherever used in this Bond and whether referring to this Bond, the Contract Documents, or the Agreement, shall include any alteration, addition, extension or modification of the Bond, Contract Documents and/or Agreement

The Principal and the Surety agree that any alterations, changes and/or additions to the Contract Documents, and/or any alterations, changes and/or additions to the work to be performed under the Agreement in accordance with the Contract documents, and/or any alterations, changes and/or additions to the Agreement, and/or any giving by the Obligee of any extensions of time for the performance of Agreement in accordance with the Contract Documents, and/or any act of forbearance of either the Principal or the Obligee toward the other with respect to the Contract Documents and the Agreement, and/or the reduction of any percentage to be retained by the Obligee as permitted by the Contract Documents and by the Agreement, shall not release, in any manner whatsoever , the Principal and the Surety, or either of them, or their heirs, executors, administrators, successors and assigns, from liability and obligations under this Bond; and the Surety, for value received, does waive notice of any such alterations, changes, additions, extensions of time, acts of forbearance and/or reduction of retained percentage.

If the Principal is a foreign corporation (incorporated under any laws other than those of the Commonwealth of Pennsylvania) then further terms and conditions of this Bond are and shall be that the Principal or the Surety shall not be discharged from liability on this Bond, nor this Bond surrendered until such Principal files with the Obligee a certificate from the Pennsylvania of Revenue evidencing the payment in full of all bonus taxes, penalties and interest, and a certificate from the Bureau of Employment and Unemployment Compensation of the Pennsylvania Department of Labor and industry, evidencing the payment of all unemployment compensation, contributions, penalties and corporations, subcontractors thereunder or for such liability has accrued but the time for payment has not arrived, all in accordance with provisions of the Act of June 10,1947, P.L. 493, of the Commonwealth of Pennsylvania.

Every action upon this Bond shall be instituted only in the Court of Common Pleas of Montgomery County, Pennsylvania, and the Surety and Principal hereby submit to the exclusive jurisdiction of said court and agree that the venue of said court shall be proper in all respects and shall consent to service of process by any means authorized by Pennsylvania law.

This Bond is executed and delivered under and subject to the Public Works Contract's Bond Law of 1967.

IN WITNESS WHEREOF, the Principal and Surety cause this Bond to be signed, sealed and delivered this day of , 20_____

(Partnership Principal)

_____
(Name of Partnership)

Witness:

_____ By:_____(SEAL)
Partner

_____ By:_____(SEAL)
Partner

_____ By:_____(SEAL)
Partner

(Corporate Principal)

_____
(Name of Corporation)

ATTEST:

_____ By:_____(SEAL)
President

CORPORATE SEAL

or (if appropriate)

Witness:

_____ *By:_____
Authorized Representative

*Attach appropriate proof, dated as of the same date as the Bond, evidencing authority to execute in behalf of the corporation.

(Corporate Surety)

_____
(Name of Corporation)

Witness:

_____ **By:_____
Attorney-in-Fact

**Attach an appropriate power of attorney, dated as of the same date as the Bond, evidencing the authority of the Attorney-in-Fact to act in behalf of the Corporation. Attach a valid Certificate of Authority from the Pennsylvania Department of Insurance.

END OF SECTION 00 61 13.13

SECTION 00 61 13.16 – PAYMENT BOND

KNOW THESE MEN BY THESE PRESENTS that we, _____,
as Principal (the “Principal"), and_____,
a corporation organized and existing under laws of _____
of_____,
and authorized to do business in the Commonwealth of Pennsylvania, as Surety (the “Surety"), are held and firmly bound unto Hatboro-Horsham School District as Obligee (the “Obligee"), as hereinafter set forth, in the full and just sum of_____Dollars ($_____) lawful money of the United States of America, for the payment of which we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WITNESSETH THAT:

WHEREAS, the Principal heretofore has submitted to the Obligee a certain Bid, dated ,20_____ (the “Bid”), to perform certain _____Work for the Obligee, in connection with the Hatboro-Horsham School District Simmons Elementary School Elevator Addition Project, pursuant to plans, specifications and other related documents, which are incorporated into the Bid by reference (the “Contract Documents"), as prepared by the Obligee.

WHEREAS, the Obligee, is a “contracting body” under the provisions of Act No. 385 of the General Assembly of the Commonwealth of Pennsylvania, approved by the Governor on December 20, 1967, known as and cited as the “Public Works Contractors’ Bond Law of 1967" the “Act");

WHEREAS, the Act, in Section 3 (a), requires that, before an award shall be made to the Principal by the Obligee in accordance with the Bid, the Principal shall furnish this Bond to the Obligee, with this Bond to become binding upon the award of a contract to the Principal by the Obligee in accordance with the Bid; and

WHEREAS, it also is a condition of the Contract Documents that this Bond shall be furnished by the Principal to the Obligee and

WHEREAS, under the Contract, it is provided, inter alia, that if the Principal shall furnish this Bond the Obligee, and if the Obligee shall make an award to the Principal in accordance with the Bid, then the Principal and the Obligee shall enter into an agreement with respect to performance of such work (the “Agreement"), the form of which Agreement is set forth in the Contract Documents.

NOW, THEREFORE, the terms and conditions of the bond are and shall be that if the Principal and any subcontractor of the Principal to whom any portion of the work under the Agreement shall be subcontracted, and if all assignees of the Principal and of any such subcontractor, promptly pay or shall cause to be paid, in full, all money which may be due any claimant supplying labor or materials in the prosecution and performance of the work in accordance with the Agreement and in accordance with the Contract Documents, including any amendment, extension or addition to the Agreement and/or to the Contract Documents, for material furnished or labor supplied or labor performed, then this Bond shall be void, otherwise, the Bond shall be and shall remain in force and effect.

This Bond, as provided by the Act, shall be solely for the protection of claimants supplying labor or materials to the Principal or to any subcontractor of the Principal in the prosecution of the work covered by the Agreement, including any amendment, extension or addition to the Agreement. The term “Claimant", when used herein and as required by the Act, shall mean any individual, firm, partnership, association or corporation. The phase “Labor or Materials” when used herein and as required by the Act, shall include public utility services and reasonable rentals of equipment, but only for periods when the equipment rented is actually used at the site of the work covered by the Agreement. As required by the Act, the provisions of this Bond shall be applicable whether or not the material furnished or labor performed enters into and becomes a component part of the public building, public work or public improvement contemplated by the Contract Documents and the Agreement.

As provided and required by the Act, the Principal and the Surety agree that any claimant, who has performed labor or furnished material in the prosecution of the work in accordance with the Agreement and in accordance with the Contract Documents, including any amendment, extension or addition to the Agreement, and/or to the Contract Documents, and who has not been paid therefore, in full, before the expiration of ninety (90) days after the day on which such claimant performed the last of such labor or furnished the last of such materials for which payment is claimed, may institute an action upon this Bond, in the name of the claimant to recover any amount due the claimant for such labor or material; and may prosecute such action to final judgment and may have execution upon the judgment provided however, that: (a) any claimant who has a direct contractual relationship with any subcontractor of the Principal but has no contractual relationship, express or implied, with the Principal, may institute an action upon this Bond only if such claimant first shall have given written notice, served in the manner provided in the Act, to the Principal, within ninety (90) days from the date upon which such claimant performed the last of the labor or furnished the last of the materials for which payment is claimed, stating, with substantial accuracy, the amount claimed and the name of the person for whom the work was performed or to whom the material was furnished; and (b) no action upon this bond shall be commenced after the expiration of one (1) year from the day upon which the last of the labor was performed or material supplied, for the payment of which such action is instituted by the claimant; and (c) every action upon this Bond shall be instituted either in the appropriate court of the County where the Agreement is to be performed or of such other County as Pennsylvania statutes shall provide, or in the United States District Court for the district in which the project, to this Agreement relates, is situated, and not elsewhere. Every action upon this Bond shall be instituted only in the Court of Common Pleas of Montgomery County, Pennsylvania, and the Surety and Principal hereby submit to the exclusive jurisdiction of said court and agree that the venue of said court shall be proper in all respects and shall consent to service of process by any means authorized by Pennsylvania law.

The Principal and the Surety agree that any alterations, changes and/or additions to the

Contract Document, and/or any alterations, changes and/or additions to the work to be performed under the Agreement in accordance with the Contract Documents, and/or any alterations, changes and/or additions to the Agreement, and/or any giving by the Obligee of any extensions of time for the performance of the Agreement in accordance with the Contract Documents, and/or any act of forbearance of either the Principal or the Obligee toward the other with respect to the Contract Documents and the Agreement, and/or the reduction of any percentage to be retained by the Obligee as permitted by the Contract Documents and by the Agreement, shall not release in any manner whatsoever, the Principal and the Surety, or either of them, their heirs, executors, administrators, successors and assigns, from liability and obligations under this Bond; and the Surety, for value received, does waive notice of any such alterations, changes, additions, extensions of time acts of forbearance and/or reduction of retained percentage.

It is expressly agreed that this Bond shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract Documents not increasing the contract price in the aggregate by more than twenty percent (20%) of the Bond amount set forth herein, so as to bind the Principal and the Surety to the full and faithful performance of the Contract Documents as so amended. The term "Amendment", wherever used in this Bond and whether referring to this Bond, the Contract Documents, or the Agreement, shall include any alteration, addition, extension or modification of the Bond, the Contract Documents, and/or Agreement.

If the Principal is a foreign corporation (incorporated under any laws other than those of the Commonwealth of Pennsylvania) then further terms and conditions of this Bond are and shall be that the Principal or the Surety shall not be discharged from liability on this Bond, nor this Bond surrendered until such Principal files with the Obligee a certificate from the Pennsylvania Department of Revenue evidencing the payment in full of all bonus taxes, penalties and interest, and a certificate from the Bureau of Employment and Unemployment Compensation of the Pennsylvania Department of Labor and Industry, evidence the payment of all unemployment compensation, contributions, penalties and interest due the Commonwealth from said Principal or any foreign corporations, subcontractors thereunder or for which liability has accrued but the time for payment has not arrived, all in accordance with provisions of the Act of June 10, 1947, P.L. 493, of the Commonwealth of Pennsylvania.

This Bond is executed and delivered under and subject to the Act, to which reference hereby is made.

IN WITNESS WHEREOF, the Principal and the Surety cause this Bond to be signed, sealed and delivered this_____day of_____, 20_____

(Individual Principal)

_____(SEAL)
(Signature of Individual)

Witness:

Trading and doing business as:

_____

_____

(Partnership Principal)

_____
(Name of Partnership)

Witness:

_____ By:_____(SEAL)
Partner

_____ By:_____(SEAL)
Partner

_____ By:_____(SEAL)
Partner

(Corporate Principal)

_____
(Name of Corporation)

ATTEST:

_____ By:_____(SEAL)
President

CORPORATE SEAL

or (if appropriate)

Witness:

_____ *By:_____
Authorized Representative

*Attach appropriate proof, dated as of the same date as the Bond, evidencing authority to execute in behalf of the corporation.

(Corporate Surety)

_____
(Name of Corporation)

Witness:

_____ **By:_____
Attorney-in-Fact

**Attach an appropriate power of attorney, dated as of the same date as the Bond, evidencing the authority of the Attorney-in-Fact to act in behalf of the Corporation. Attach a valid Certificate of Authority from the Pennsylvania Department of Insurance.

END OF SECTION 00 61 13.16

SECTION 00 72 00 – GENERAL CONDITIONS OF THE CONTRACT COVER

1.01 GENERAL

A. The attached copy of AIA Document A232, General Conditions of the Contract for Construction, 2019 Edition, Articles 1 through 15, is hereby made a part of the Contract Documents and Specifications. There is no implied permission to reproduce this documents. The original document purchased by the used is intended to be used during the course of this Project. This document shall always be the most recent form unless otherwise noted by ICS to be a certain year or edition posted by the AIA.

END OF SECTION 00 72 00

AIA® Document A232® – 2019

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

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

Hatboro-Horsham SD Simmons ES Elevator
411 Babylon Rd
Horsham , Pennsylvania 19044

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

ICS Consulting, LLC
1400 N. Providence Rd, Building 2, Suite 4025
Media, PA 19061

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

Hatboro-Horsham School District
227 Meetinghouse Road, Suite 100
Horsham, PA 19044

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

SCHRADERGROUP Architecture, LLC
555 East North Lane, Suite 5100, Building D
Conshohocken, PA 19428

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

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

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

TABLE OF ARTICLES

1 GENERAL PROVISIONS

2 OWNER

3 CONTRACTOR

4 ARCHITECT AND CONSTRUCTION MANAGER

5 SUBCONTRACTORS

6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

7 CHANGES IN THE WORK

8 TIME

9 PAYMENTS AND COMPLETION

10 PROTECTION OF PERSONS AND PROPERTY

11 INSURANCE AND BONDS

12 UNCOVERING AND CORRECTION OF WORK

13 MISCELLANEOUS PROVISIONS

14 TERMINATION OR SUSPENSION OF THE CONTRACT

15 CLAIMS AND DISPUTES

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. “The American Institute of Architects,” “American Institute of Architects,” “AIA,” the AIA Logo, and “AIA Contract Documents” are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

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

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

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

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

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

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

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

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

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

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

§ 1.1.11 All references to "Architect" shall mean "Architect/Engineer."

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results unless it is specified that the Contract includes specific phases or elements to complete a certain part of the Work for reason of coordination or responsibility. Where the Specification has been divided into sections, it is for convenience in use. Unless otherwise specified, the scope of Work of each section shall be to furnish labor, materials, equipment, skill, erection, installation, services and related items for the phase of Work of that section, as required by the Drawings, as specified or as otherwise required to provide and complete the entire Work of the section.

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

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings. In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities:

1. Agreement
2. Change Orders and Supplementary Instructions
3. Addenda, with those of later date having precedence over those of earlier date
4. The Supplementary Conditions
5. The General Conditions of the Contract for Construction as modified
6. Drawings and Specifications

In the case of an inconsistency between Drawings and Specifications or within either Document not clarified by Addendum, the better quality or greater quantity of Work shall be provided in accordance with the Initial Decision Maker's interpretation.

§ 1.3 Capitalization

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

§ 1.4 Interpretation

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

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

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

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, or the Agreement, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

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

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

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of, and reliance on, Instruments of Service or any other information or documentation in digital form.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

ARTICLE 2 OWNER

§ 2.1 General

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

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

§ 2.2 Evidence of the Owner's Financial Arrangements

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

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

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

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

§ 2.3 Information and Services Required of the Owner

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

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

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

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

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

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

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

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

§ 2.4 Owner's Right to Stop the Work

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a five (5) business-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, after such five (5) business-day period without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to review by the Construction Manager and prior approval of the Architect, and the Construction Manager or Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Construction Manager's and Architect's and their respective consultants' additional services made necessary by such default, neglect, or failure including, without limitation, the Owner's reasonable attorney's fees. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner, the Construction Manager or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

ARTICLE 3 CONTRACTOR

§ 3.1 General

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

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

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

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

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

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

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

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities unless the Contractor recognized such error, inconsistency, omission or difference and knowingly failed to report it to the Architect and Owner.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner, the Construction Manager, and the Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Contractor shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

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

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

§ 3.3.4 Contractor's supervision of Work shall include expediting and coordination of Work of trades. Contractor shall perform all supervising and procuring required to ensure delivery of materials to maintain Work schedules of Subcontractors and progress schedule of project to ensure full completion of Work, to supply equipment or instruments necessary to complete specified test, checks, balancing of system, to furnish operating instructions, etc. The outlined work is to be completed in the timeframe set forth in the original project schedule shared with the bidding contractors.

§ 3.3.5 The Contractor, his employees, or his Subcontractors shall not install any product or equipment in a manner which is in direct conflict with the manufacturer's recommended requirements. If the manufacturer of the product or equipment has requirements which cannot be met by the specific application indicated, the Contractor shall bring this information to the attention of the Architect and Construction Manager. Products or equipment installed contrary to their manufacturer's requirements shall be replaced at no additional cost to the Owner unless specifically authorized in writing by the Architect or Construction Manager.

§ 3.4 Labor and Materials

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

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect, in consultation with the Construction Manager, and in accordance with a Change Order or Construction Change Directive. After the Contract has been executed, the Owner, Construction Manager and Architect will consider a formal request for the substitution of products in place of those specified only under the conditions set forth in Specification Section 01 60 00 Product Requirements.

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

or unsuitable to be permitted on the Project Property. Upon written notice or verbal direction from the Owner or Construction Manager, the Contractor shall have all such persons removed from the Project. Obscene language, excessive noise, loitering, unauthorized use of kitchen facilities, smoking and possession, use or being under the influence of alcohol or a controlled substance, etc., will not be tolerated. The Contractor, its employees, subcontractors and suppliers are required to act in a professional and orderly manner when on and around the District property.

§ 3.4.4 The Contractor shall supply the Owner with state and federal criminal history reports and child abuse clearances for all employees, agents and Subcontractors and their employees and agents who will be on the Owner's property. Original clearances must be presented to the Owner prior to each employee, agent or Subcontractor coming on the Owner's property. All such clearances shall be no older than sixty (60) months old at any time the individual is permitted on the Owner's property. The Owner shall retain a copy of all such clearances in its file. The Contractor shall also supply the Owner with executed PDE-6004 forms for all employees, agents and Subcontractors and their employees and agents who will be on the Owner's property. Notwithstanding any other provision of this Contract, violation of this provision shall constitute grounds for immediate termination of the Contract by the Owner. The Contractor shall notify the Construction Manager in writing within seventy-two (72) hours if any person working on the Project under the Contractor's supervision (employee, agent, Subcontractor, Subcontractor's employee, etc.) is arrested or convicted of offense listed in 24 P.S. §1-111.1. Owner specifically reserves the right to reject any person Owner deems unfit to be permitted on school grounds and in proximity to students. Upon written notice or verbal direction from the Owner or Construction Manager, Contractor shall have all such persons removed from the Project. Owner's right to declare such person unfit shall not be limited to the required exclusion of persons from school property as set forth in Section 1-111 of the Pennsylvania Public School Code and/or Subchapter C.2 of the Child Protective Services Law.

§ 3.4.5 The Contractor must comply with the Public Works Employment Verification Act (the "Act"), including but not limited to, the following:

1. The Contractor and every Subcontractor performing work under the Contract shall utilize the E-Verify Program (EVP) operated by the United States Department of Homeland Security to electronically verify employment eligibility of each new employee hired after January 1, 2013.
2. The Contractor, as precondition of the Contract, shall submit the Public Works Employment Verification Form to the District along with its Payment Bond, Performance Bond, Certificates of Insurance and Form Contract.
3. Every Subcontractor shall submit completed Public Works Employment Verification Form to the District prior to performing work on the Project.
4. During term of the Contract, each new employee hired by the Contractor, regardless of whether employee will be working onsite or offsite of the Project, shall be verified within five (5) business days of his or her start date.
5. During the Project, new employee hired by Subcontractor, regardless of whether employee will be working onsite or offsite of the Public Work or otherwise, shall be verified within five (5) business days of his or her start date.
6. Subcontracts between the Contractor and its Subcontractors and between Subcontractors of any tier and their Subcontractors are required to contain notification of applicability of the Act, information regarding use of the EVP and reference to the Departments website at www.dgs.state.pa.us to obtain a copy of the Form.
7. The Contractor and all Subcontractors shall cooperate with the Department during investigation or audit arising under the Act.
8. The Contractor and every Subcontractor shall maintain documentation of continued compliance with the Act by utilizing the EVP for new employees hired throughout duration of the Public Work Contract.

§ 3.4.6 The Contractor will comply with all applicable requirements of Hatboro-Horsham School District Policy 826: Responsible Contractors for the duration of the Contract.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner, Construction Manager, and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Construction Manager or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4. Warranty period shall be a minimum of "One Year" from the date of Substantial Completion.

§ 3.6 Taxes

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

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

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

The Owner will pay any Sewer, Water, Gas and Electrical Utility Connection Charges.

The Owner has paid for the plan review fee; the Contractor is responsible to pay any remaining plan review fees and permit fees to the governing jurisdiction. The Owner will pay for the building permit fee. The Contractor is responsible for completing the permit application and coordinating the submission of the fee and permit application.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work. . In any instance where requirements of the Contract Documents are in excess of but not in conflict with or violation of requirements of a public authority, the provisions of the Contract Document shall govern.

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

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

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner, Construction Manager, and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

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

§ 3.8.2 Unless otherwise provided in the Contract Documents:

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

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

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

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

§ 3.9 Superintendent

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

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect, through the Construction Manager, of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Construction Manager may notify the Contractor, stating whether the Owner, the Construction Manager, or the Architect (1) has reasonable objection to the proposed superintendent or (2) require additional time for review. Failure of the Construction Manager to provide notice within the 14-day period shall constitute notice of no reasonable objection.

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

§ 3.9.4 In the event that concerns and/or a pattern of failure arise with the superintendent's performance in carrying out their assigned duties as a representative of the Contractor, the Owner and Architect through the Construction Manager reserve the right to request that the superintendent be removed from the project and replaced with another qualified person. The proposed replacement superintendent is subject to review pursuant to the process outlined in § 3.9.2 prior to acceptance by the Owner and Architect.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information, a Contractor's construction schedule for the Work as required by Section 01 32 10 Project Schedule Requirements. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project, including "Recovery Schedules", required to place the project back on its original schedule path. The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other Contractors, or the construction or operations of the Owner's own forces or Separate Contractors.

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Construction Manager's and Architect's approval as required by Section 01 32 10 Project Schedule Requirements. The Architect and Construction Manager's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Construction Manager and Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

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

§ 3.10.4 The Contractor shall promptly perform the Work in accordance with the most recent schedules submitted to the Owner, Construction Manager, and Architect, and incorporated into the approved Project schedule and in such sequence as to cause no delay in the Work or in the activities of other Contractors, Separate Contractors, or the Owner's own forces. The Contractor shall bear all costs and expenses for its delay in failing to meet schedules and milestones for the Project.

§ 3.11 Documents and Samples at the Site

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

§ 3.12 Shop Drawings, Product Data, and Samples

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

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

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

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect and Construction Manager is subject to the limitations of Sections 4.2.10 through 4.2.12. Informational submittals upon which the Construction Manager and Architect are not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Construction Manager or Architect without action. Shop drawings submitted prior to issuance of the building permit solely at the Contractor's risk.

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

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

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

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

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

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

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

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

§ 3.13 Use of Site

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

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

§ 3.13.3 The Contractor's use of and operations on the site shall not interfere with the Owner's continued operation. The Contractors shall take care to exercise and use processes that avoid any impact on the Owner's ongoing operations.

§ 3.14 Cutting and Patching

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

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

§ 3.15 Cleaning Up

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

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

§ 3.16 Access to Work

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

§ 3.17 Royalties, Patents and Copyrights

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

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify, defend and hold harmless the Owner, Construction Manager, Architect, Construction Manager's and Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent, intentional or wrongful acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18. The indemnification obligation herein shall survive termination, expiration or cancellation of the Contract. The Contractor shall at all times during the term of the Contract keep in force policies of insurance providing coverage for its indemnification obligation is this § 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

§ 3.19 EQUAL OPPORTUNITY IN EMPLOYMENT

§ 3.19.1 The Contractor shall not discriminate against any employee or applicant for employment because of sex, creed, color, religion, national origin, marital status, race, status with respect to public assistance, disability, age, or sexual preference. The Subcontractor shall take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard to the following: employment, upgrading, demotion or transfer, recruitment, recruitment advertising, layoff or termination, rates of pay or other form of compensation and selection for training, including apprenticeship. The Subcontractor shall incorporate these same equal opportunity, antidiscrimination and affirmative action requirements into all agreements between the Subcontractor and its Sub-subcontractors.

§ 3.20 PROJECT MANAGER

§ 3.20.1 The Contractor shall employ a competent project manager who shall be present during all construction progress meetings. The project manager shall be responsible for providing accurate and up-to-date construction and submittal schedules at each construction progress meeting.

§ 3.20.2 When requested by the Owner or Architect, the project manager shall:

1. Assist in resolving scope conflicts between sub-contractors in a timely fashion to ensure project progress matches published construction schedule.
2. Have sub-contractors attend construction progress meetings.
3. Manage the resolution of issues that arise during the punch list/closeout/warranty period when the job superintendent is no longer on site.

§ 3.20.3 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed project manager. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed project manager or (2) that the Architect required additional time to review. Failure of the Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

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

§ 3.20.5 In the event that concerns and/or a pattern of failure arise with the project manager's performance in carrying out their assigned duties as a representative of the Contractor, the Owner and Program Manager through the Construction Manager reserve the right to request that the project manager be removed from the project and replaced with another qualified person. The proposed replacement project manager is subject to review pursuant to the process outlined in paragraph 3.20.3 prior to acceptance by the Owner and Program Manager.

ARTICLE 4 ARCHITECT AND CONSTRUCTION MANAGER

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Architect" shall mean the Architect/Engineer or the authorized representative thereof.

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

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

§ 4.2 Administration of the Contract

§ 4.2.1 The Construction Manager and Architect will provide administration of the Contract as described in the Contract Documents and will be the Owner's representatives during construction until the end of the warranty period which ends one (1) year from the date the Architect issues the final Certificate for Payment. The Construction Manager and Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

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

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

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

§ 4.2.5 The Construction Manager and Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, and neither will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Neither the Construction Manager nor the Architect will have control over or charge of, or be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing portions of the Work.

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

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

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

§ 4.2.9 Intentionally Omitted

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

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

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

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

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

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

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

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

§ 4.2.18 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of the Construction Manager, Owner, or Contractor through the Construction

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

Manager. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

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

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

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

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

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

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

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

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

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

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

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

§ 5.3 Subcontractual Relations

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

§ 5.4 Contingent Assignment of Subcontracts

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

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

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

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

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

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

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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

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

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

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

§ 6.2 Mutual Responsibility

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

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

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

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

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

§ 6.3 Owner's Right to Clean Up

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

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

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

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

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

§ 7.1.4 For proposed changes in the Work on the lump sum or time and material methods under Clauses 7.3.1.1 and 7.3.3.4, the costs shall be determined as provided under this Subparagraph 7.1.4. The Contractor shall submit an itemized list of quantities with the applicable unit costs and extended price for each, in such form and detail as required by the Contractor.

§ 7.1.4.1 As a minimum the detailed breakdown shall include and indicate the items enumerated below. Items (a) and (b) constitute the cost of labor, and items (a), (b), (c) and (d) constitute the basic costs referred to under this Article 7.

(a) Labor costs, itemized by each trade involved, showing the hourly rates for each, and the hours required for the change. Labor rates shall be the same for extra and credit computations and shall be the actual rate paid workmen in accordance with established management labor agreement.

(b) Burden on labor, which shall be only the actual costs of mandatory fringe benefits required by established agreements, taxes on labor, workers or workmen's compensation, insurance on labor as affected by payroll,

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

unemployment taxes and insurance, including FICA and FUTA.

(c) Quantities of materials, equipment and supplies, at their actual cost, with unit costs indicated.

(d) The cost of subcontracted work, computed in the same way as provided for under this Subparagraph 7.1.4.

(e) Overhead, profit or commission.

(f) Applicable sales tax on materials, added after the above computations are complete.

§ 7.1.4.2 The maximum that will be allowed for overhead and profit, or commission, shall be as follows, expressed as a percentage of the basic cost of the change. The maximum allowable percentages for profit, overhead and commission may be less, depending on the nature, extent or complexity of the change, where the percentage is not commensurate with the responsibility and administration involved (such as the Contractor merely processing a substantial Change Order to a Sub-subcontractor) but in no event shall they exceed the following:

Overhead / Profit

1. To the Contractor and/or Subcontractor for work performed with their own forces –10%
2. To the Contractor for work performed by other than its own forces (i.e. their subcontractors) – 5%

§ 7.1.4.3 Not more than two percentages for overhead, profit and commission will be allowed. The mark-up on any part of the Work a Subcontractor contracts will be limited to the one overhead/profit figure, in addition to the Contractor's commission. The Subcontractor and Subcontract may divide the overhead and profit amount as they agree upon.

§ 7.1.4.4 The burden on labor may be indicated as a dollar/cents addition to the hourly rate or may be expressed as a percentage of the extended hourly rate costs.

§ 7.1.4.5 Material, equipment and supply costs shall be quoted at the actual cost to the Contractor or the Subcontractor. Upon request, the Contractor (or the Subcontractor) shall submit evidence to substantiate the costs. Said costs shall be quoted at trade discount prices, with quantity discounts also applied where the quantities warrant. Cash or prompt payment discounts need not be credited. In any proposal with material, equipment and supply credits, the credit shall be based on the actual Contract cost of the material (including trade and quantity discounts) less any charges actually incurred for handling or returning a material which has been delivered. No cancellation, restocking or similar charge will be allowed unless actually incurred by the purchaser and generally will not be allowed when the product has not been shipped.

§ 7.1.4.6 The percentages allowed for overhead, profit or commission under clause 7.1.4.2 shall be deemed to include, and no further addition allowed for : (1) field and office supervision and administration, including the field superintendent and foremen; (2) general insurance, except that listed as the labor burden; (3) use or replacement of tools; (4) shop burden; (5) equipment rental (other than specifically required additional hoisting equipment, required excavating equipment or similar equipment necessary solely as a result of the change); (6) engineering and estimating costs; (7) performance (guaranty) bond; (8) cost of safety measures (including those imposed by OSHA); (9) shipping, drayage and demurrage; (10) parking charges; (11) clean up and debris removal; (12) testing; (13) permits, unless a new permit type is required, (14) or any other costs except those enumerated under clause 7.1.4.

§ 7.1.4.7 Cost changes shall be computed by determining the basic costs enumerated under clause 7.1.4 (as further specified under this subparagraph), to which the overhead may be added, then the profit figure may be added and finally adding the sales tax on materials.

§ 7.1.4.8 Subcontractors shall compute their costs in the same way and are subject to the same conditions of what may be included in the cost and the same maximum percentages for overhead and profit. To the Subcontractor's price, the Contractor may add up to 5% commission.

§ 7.1.4.9 For changes involving Work of the Subcontractor with its own forces and Work by a Subcontractor, the commission shall be applied directly to the Subcontractor's price, with the overhead and profit figure applied only to

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

the Work the Subcontractor performs with its own forces.

§ 7.1.4.10 For changes involving both extra and credit amounts, the overhead and profit, or commission, shall be applied only to net difference where the extra exceeds the credit.

§ 7.1.4.11 For changes resulting in a credit in the basic costs, a reasonable allowance for overhead, profit or commission may be required to be credited to the Owner. In general, no credit for overhead, profit or commission will be required where the net change credit is minor or where the change in Work indicated it is reasonable that no credit be allowed to the Owner due to the effort, cost or responsibility of the Contractor. In the event of substantial subcontract credits, or for Work not performed by the Contractor, a reasonable overhead, profit or commission credit shall be allowed to the Owner.

§ 7.2 Change Orders

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

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

§ 7.3 Construction Change Directives

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

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

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

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

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

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

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

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

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

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

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

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

§ 7.4 Minor Changes in the Work

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

ARTICLE 8 TIME

§ 8.1 Definitions

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

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

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

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

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work. By bidding and by executing the Agreement, the Contractor confirms that the contract duration is a reasonable period for performing the work. Any preliminary construction schedule, if provided, is for information purposes only and constitutes a proposed sequence of events based on standard practices. Contractor shall independently analyze all required activities and durations necessary to perform their own work and shall not rely on dates or duration suggested by the preliminary

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

construction schedule. The Contractor is responsible to provide the Construction Manager a detailed Construction Schedule of their work within fifteen (15) business days after the date of execution of the Contract and a Construction Progress Schedule that will be updated periodically to reflect progress.

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

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time. The Contractor agrees to increase manpower, increase work hours, and to increase equipment, necessary to maintain projected progress schedule.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner, Owner's own forces, Construction Manager, Architect, any of the other Multiple Prime Contractors or an employee of any of them, or by changes ordered in the Work, or by unavoidable labor disputes, unavoidable delay in deliveries, unavoidable casualties, fire, flood, epidemic, pandemic, disease, declared state of emergency by local, state or federal government, or other proven causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration, or by litigation, or by other proven causes that the Architect, based on the recommendation of the Construction Manager, determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine. No time extension shall be provided for any delay due to rain, wind, flood or any other natural phenomena of normal intensity for the locality where the Project is located.

§ 8.3.2 Time extension shall be the Contractor's sole remedy for all proven delays determined by the Architect under this Paragraph 8.3. This Paragraph 8.3 shall control and take precedence over any other conflicting provision in this Agreement.

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

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

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

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

§ 9.2 Schedule of Values

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

§ 9.2.1 Projects with multiple sites or multiple phased projects, provided separate schedule of values for each building, phase or site.

§ 9.2.2 The schedule of values shall include the following line items with values calculated as follows:

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

Final Paperwork: 1% of Contract value.

§ 9.3 Applications for Payment

§ 9.3.1 At least fifteen days before the date established for each progress payment, the Contractor shall submit to the Construction Manager an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner, Construction Manager or Architect require, such as copies of requisitions, and releases of waivers of lien from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

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

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

§ 9.3.1.3 The Owner shall retain ten percent (10%) of all amounts due the Contractor until the Work is 50% complete then 5% substantially complete. Payments are subject to the provisions of Paragraph 9.6 and provided that reduction in retainage is approved by the Owner, Architect and Construction Manager. Any reduction in retainage must be requested in writing by the Contractor.

The Owner shall retain 10 percent (10%) of all amounts due the Contractor until 50% billed, then five percent (5%) until the work is substantially complete, provided however, that in the event a dispute arises between the Owner and the Contractor, which dispute is based upon increased costs claimed by any other Contractor occasioned by damages or other actions of any other Contractor, additional retainage in the sum of one and one half times the amount of any possible liability may be withheld until such time as a final resolution is agreed to by all parties directly or indirectly involved, unless the Contractor causing the additional claim furnishes a bond satisfactory to the Owner to indemnify the Owner against the claim. Notwithstanding anything to the contrary contained herein, in the event the Owner determines that the Contractor is not responsibly performing the Work, either by failure to reasonably follow the schedule, or by failure to adequately perform the Work, the Owner shall have the right to continue to make progress payments at the rate of only ninety percent (90%) of the amount due to the Contractor for each payment and the amount due the Contractor shall not include the value of work dispute. At Substantial Completion, Owner shall develop a list of uncompleted and disputed items (i.e. punch list). This list of uncompleted items shall be given a value. The Contractor, at Substantial Completion, shall be paid one hundred percent (100%) of the Contract Sum less one and one-half (1 ½) times the value of the uncompleted items and disputed items. As these items are completed or corrected, the Owner will pay the value of the completed items to the Contractor in a timely fashion.

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

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

§ 9.4 Certificates for Payment

§ 9.4.1 Where there is only one Contractor, the Construction Manager will, within seven days after the Construction Manager's receipt of the Contractor's Application for Payment, review the Application, certify the amount the

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

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

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

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

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

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

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

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

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Construction Manager or Architect may withhold a Certificate for Payment or Project Certificate for payment in whole or in part, to the extent reasonably necessary to protect the Owner. If the Construction Manager or

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

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

.1 defective Work not remedied;
.2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
.3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
.5 damage to the Owner or a Separate Contractor or
.6 repeated failure to carry out the Work in accordance with the Contract Documents.
.7 failure to comply with government statutes, regulations and laws.

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

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

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

§ 9.6 Progress Payments

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

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than twenty (20) days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner. In accordance with 62 Pa. C.S.A. Section 3922: In the absence of good and sufficient reasons,
within 20 days of the receipt of payment by the Contractor, the Contractor shall pay all subcontractors with whom he has contracted, their earned share of the payment the Contractor received. The Owner, Architect or Construction Manager may as a pre-condition to payment require proof of payment to subcontractors, sub-subcontractors and suppliers at any time and from time to time.

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

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

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

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents. Issuance of a Certificate for Payment by the Architect, payment on the Contract Sum or in reducing any retaining amount, or any use or occupancy of the Work shall not relieve the Contractor of its the obligations under the Contract Documents, including warranty of the Work. At any time the surety shall have the right to examine the status of the Work, as well as any payments.

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

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

§ 9.7 Failure of Payment

If the Construction Manager and Architect do not issue a Certificate for Payment or a Project Certificate for Payment, through no fault of the Contractor, within fourteen days after the Construction Manager's receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Construction Manager and Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner, Construction Manager and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

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

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

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

§ 9.8.4 When the Architect, assisted by the Construction Manager, determines that the Work of all of the Contractors, or designated portion thereof, is substantially complete, the Construction Manager will prepare, and the Construction Manager and Architect shall execute, a Certificate of Substantial Completion that shall establish the date of

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion. All items on the punch list or list of uncompleted or disputed work, attached to the Certificate of Substantial Completion, will have a value of 150% of the work affixed to them. These amounts will be deducted from the payment and held until the items are completed or corrected and accepted by Owner. If due to the Contractor's failure to satisfactorily progress the Work, the Architect has to make more than 2 inspections for Substantial completion, then the Contractor shall reimburse the Owner for any costs incurred as a result of the Architect's additional inspections.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents. The payment shall be sufficient to increase the total payments to one hundred percent (100%) of the Contract Sum, less such amounts as the Owner and Architect shall determine for incomplete work and unsettled claims. The Owner has no obligation to make incremental retainage reductions after the initial determination for the incomplete work and unsettled claims.

§ 9.9 Partial Occupancy or Use

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

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

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

§ 9.10 Final Completion and Final Payment

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

make more than 2 inspections for final completion, then the Contractor shall reimburse the Owner/Construction Manager for any costs incurred as a result of the additional inspections.

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

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

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

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

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

§ 9.10.6 Owner shall not release/make final payment to the Contractor, nor shall the Contractor release/make final payment to any Subcontractor unless required payroll audits have been successfully completed as required by Article 11 of this Contract and the Contractor/Subcontractor is in compliance with the payroll reporting requirements included in the Project Insurance Manual.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

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

§ 10.2 Safety of Persons and Property

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

.1 employees on the Work and other persons who may be affected thereby;
.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor;
.3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction; and
.4 construction or operations by the Owner, Separate Contractors, or other Contractors.

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

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

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

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2, 10.2.1.3 and 10.2.1.4. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner, Construction Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, and not attributable to the fault, acts, omissions or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner, Construction Manager and Architect.

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

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

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

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor, Construction Manager and Architect the names and qualifications of persons or

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor, the Construction Manager and the Architect will promptly reply to the Owner in writing stating whether or not any of them has reasonable objection to the persons or entities proposed by the Owner. If the Contractor, Construction Manager or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor, the Construction Manager and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

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

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

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

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

§ 10.4 Emergencies

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

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor and each Subcontractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- **.1** Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- **.2** Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- **.3** Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- **.4** Claims for damages insured by usual personal injury liability coverage; which are sustained (1) by a person as a result of an offense directly or indirectly related to employment of such person by the Contractor, or (2) by another person;

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

.5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;

.6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;

.7 Claims for bodily injury or property damage arising out of completed operations; and

.8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

.9 Liability insurance shall include all major divisions of coverage and be on a comprehensive basis including:

1. Premises Operations (including X, C, and U coverages as applicable).
2. Independent Contractors' Protective.
3. Products and Completed Operations.
4. Personal Injury Liability with Employment Exclusion deleted, or Employment Practices Liability.
5. Contractual – including specified provision for Contractor's obligations under Paragraph 3.18.
6. Owned, non-owner and hired motor vehicles.
7. Broad Form Property Damage including Completion Operations.
8. Umbrella Excess Liability.

.10 A General Liability or Umbrella Liability Policy on a claims-made basis will not be accepted.

.11 The insurance required by subparagraph 11.1.1 shall include an Indemnification clause for Commercial General Liability and Worker's Compensation coverages.

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

(1). Workers' Compensation

a. State: Statutory

b. Voluntary Compensation (by exempt entities): Same as State Workers' Compensation

c. Applicable Federal (e.g., Longshoremen, harbor work, Work at or outside U.S. Boundaries): Statutory

d. Maritime:

Not applicable

e. Employer's Liability:

$ 500,000 Each accident
$ 500,000 Disease, Policy Limit
$ 500,000 Disease, Each Employee;

f. Benefits required by union labor contracts: As applicable.

(2). General Liability (including Premises-Operations; Independent Contractor's Protective; Products and Completed Operations; Broad Form Property Damage):

a. Bodily and Property Damage (Combined Single Limit):

$1,000,000 Each Occurrence
$2,000,000 Aggregate

b. Products and Completed Operations Insurance shall be maintained for a minimum period of one year after final payment and the Contractor shall continue to provide evidence of such coverage to the Owner on an annual basis during the aforementioned period.

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

c. Property Damage Liability shall include coverage for the following hazards:

X (Explosion)
C (Collapse)
U (Underground)

d. Contractual Liability (Hold Harmless Coverage):

Bodily and Property Damage (Combined Single Limit):

$1,000,000 Each Occurrence
$2,000,000 Aggregate

e. Personal Injury (with Employment Exclusion deleted, if applicable):

$1,000,000 Each Occurrence.

(3). Umbrella Excess Liability:

$5,000,000 Over Primary Insurance
$10,000 Retention

(4). Automobile Liability (owned, non-owned, hired):

Bodily and Property Damage (Combined Single Limit):

$1,000,000 Each Occurrence

If this insurance is written on the Comprehensive General Liability policy form, the Certificates shall be AIA Document G705, Certificate of Insurance or equivalent. If this insurance is written on a Commercial General Liability policy form, ACORD Form 25S or equivalent will be acceptable. The Owner, Construction Manager and Architect shall be added as an additional named insureds on the Contractor's liability policy in force for the Project, and endorsements shall be issued and provided to Owner reflecting such coverage.

Certificates of insurance acceptable to the Owner shall be submitted to the Construction Manager for transmittal to the Owner with a copy to the Architect prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by this Agreement and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage shall be furnished by the Contractor with reasonable promptness.

The Contractor shall cause the commercial liability coverage required by the Contract Documents to include the Construction Manager, the Construction Manager's consultants, the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations.

§ 11.1.2 The Contractor shall furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder. Bonds may be obtained through the Contractor's usual source and the cost thereof shall be included in the Contract Sum. The amount of each bond shall be equal to 100 percent of the Contract Sum and furnished on AIA A312 Performance Bond and AIA A312 Payment Bond forms or equivalent. The bonds shall comply with all applicable laws, rules, regulations and industry standards. The Contractor shall deliver the required bonds to the Owner not later than three (3) days following the date the Agreement is entered into, or if the Work is to be commenced in response to a letter of intent, the Contractor shall, prior to the commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished. The Contractor shall require the attorney-in-fact

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney. Duly executed, notarized and updated Acknowledgements of both the Principal and Surety and the Surety's Power of Attorney must be attached to each of the two required bonds.

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

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

§ 11.2 Owner's Insurance

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

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

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

§ 11.3 Owner's Property Insurance

§ 11.3.1 The Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

final payment has been made as provided in Section 0.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project. The Contractor will be responsible for $25,000.00 deductible for any claims made.

(Paragraph deleted)

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

§ 11.3.1.2 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.3 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.4 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.1.5 Boiler and Machinery Insurance. The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Construction Manager, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.1.7 Loss of Use Insurance. The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

.

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

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

§ 11.5 Adjustment and Settlement of Insured Loss

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

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

§ 11.6 Waivers of Subrogation

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

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

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

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

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

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

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

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof, or after the date for commencement of warranties established

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

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

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

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2, but shall be extended with respect to portions of incomplete or defective Work noted on the Certificate of Substantial Completion.

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

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

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

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

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located excluding that jurisdiction's choice of law rules.

§ 13.1.1 The Contractor shall comply with all applicable laws of the Commonwealth of Pennsylvania, including the provisions of the Solid Waste Management Act (1980) and any amendments thereto and shall comply with applicable laws of the United States, along with all local laws and ordinances, and all environmental protection acts.

§ 13.1.2 Non-discrimination: By Submitting a bid and executing Contract Documents, the Contractor shall be deemed to agree as follows:

§ 13.1.3 No Contractor, Subcontractor, or any person acting on his or their behalf shall, by reason of race, creed, or color, discriminate in the hiring of any employee for work hereunder, against any citizen of the Commonwealth of Pennsylvania, who is qualified and available to perform work to which the employment relates, or thereafter discriminate against or intimidate any employee so hired; If the Contractor, its employees, subcontractor, suppliers, or any other person or entity responsible to the Contractor fails to comply with any applicable law or requirement of this Agreement or the Contract Documents, upon written notice from Construction Manager, Contractor shall commence

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

to cure such non-compliance within twenty-four (24) hours and shall achieve compliance within seventy-two (72) hours of receipt of written notice. Any failure of the Contractor to do so after written notice to comply shall constitute a breach of Contract and the Owner, in addition to its other rights in the event of a breach, shall have the right to terminate Contractor's right to perform the Work.

§ 13.1.4 That the Contractor will comply with the Pennsylvania Human Relation Act in providing equal employment opportunities in connection with all work performed by him at the jobsite, pursuant to the provisions of Act No. 222, October 27, 1955, as amended and supplemented, known as the "Pennsylvania Human Relations Act".

(a) Contractor shall not discriminate against any employee, applicant for employment, independent Contractor any other person because of race, color, religious creed, ancestry, age, sex, national religion, handicap or disability.

§ 13.1.5 In accordance with Act 3 of the 1978 General Assembly of the Commonwealth of Pennsylvania, if any steel or steel products are to be used or supplied in the performance of the contract, only those produced in the United States as defined therein shall be used or supplied in the performance of the contract or any subcontracts thereunder.

§ 13.1.6 In accordance with Act 161 of 1982, cast iron products shall also be included and produced in the United States. Act 144 of 1984 further defines "steel products" to include machinery and equipment. The act also provides clarifications and penalties.

§ 13.1.7 According to section 755 of the Public School Code of Pennsylvania of 1949, as amended, the Contractor agrees:

(a) That in the hiring of employees for the performance of work under this Contract, or any Subcontract hereunder, no such Contractor shall, by reason of race, creed, or color, discriminate against any citizen of the Commonwealth of Pennsylvania, who is qualified and available to perform work to which the employment relates;
(b) That no Contractor, Subcontractor, nor any person on his or their behalf, shall in any manner discriminate against or intimidate any employee hired for the performance of the work under this Contract on account of race, creed, or color, and;
(c) That this Contract may be canceled or terminated by the District, and all money due or to become due hereunder may be forfeited, for a second or any subsequent violation of the terms or conditions of this portion of the Contract.

§ 13.1.8 The provisions of the Pennsylvania Human Relations Act, Act 222 of October 27, 1956 (P.L. 744) (43 P.S. Section 951, et. seq.) of the Commonwealth of Pennsylvania prohibit discrimination because of race, color, religious creed, ancestry, age, sex, national origin, handicap or disability by employers, employment agencies, labor organizations, contractors, and others. The Contractor shall agree to comply with the provisions of this Act as amended that are made part of this Contract.

§ 13.1.9 The Contractor shall comply with all terms and conditions of the Pennsylvania Right to Know Act, Act No. 159 of 1984, 35 P.S. Section 7301 et. seq. and its implementing regulations.

§ 13.1.10 The Contractor shall comply with the Pennsylvania Prevailing Wage Act.

§ 13.1.11 Site Excavation: The Contractor shall agree that, not less than three (3) working days prior to beginning excavation or demolition Work as defined in Act 172 of Commonwealth of Pennsylvania, amending Act 287 of December 10, 1974, he shall request the information required by Section 5 of the Act and shall inform each operator employed at the site of the Work of the information received with respect to location of underground installations. Contractor shall agree to report immediately, to the user of the underground installations, and to the Owner and Architect, any break in the line or dent, gouge, groove, or other damages to such lines, to their coating or cathodic protection, made or discovered in the course of the excavation or demolition Work.

§ 13.1.12 Anti-Pollution Legislation and Erosion Control: Contractor shall comply with all applicable statutes, rules, regulations.

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

§ 13.2 Successors and Assigns

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

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

§ 13.3 Rights and Remedies

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

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

§ 13.4 Tests and Inspections

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

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

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

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

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

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate governed by Section 3941 of the Pennsylvania Commonwealth Procurement Act. 62 Pa. C.S. §3941.

§ 13.6 Prompt Payment

The Contractor and all Subcontractors and Sub-Subcontractors shall comply with the Pennsylvania Prompt Payment Act, 62 Pa. C.S. §3931.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

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

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

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

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

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

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

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

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

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

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

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

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

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

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, after consultation with the Construction Manager, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

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

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

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

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

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

§ 14.3 Suspension by the Owner for Convenience

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

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

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

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

§ 14.4 Termination by the Owner for Convenience

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

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

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

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

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

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; the termination fee, if any, set forth in the Agreement along with reasonable overhead and profit on the Work not executed.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition. A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract.

§ 15.1.2 Time Limits on Claims

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

§ 15.1.3 Notice of Claims

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

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

§ 15.1.4 Continuing Contract Performance

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

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

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

§ 15.1.6 Claims for Additional Time

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

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

§ 15.1.7 Waiver of Claims for Consequential Damages. The Contractor waives Claims against the Owner for consequential damages arising out of or relating to this

(Paragraphs deleted)

Contract including but not limited to damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

(Paragraph deleted)

.

§ 15.2 Initial Decision

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

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5)

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

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

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

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

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

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

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

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

§ 15.3 Mediation

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

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be privately administered by a mediator mutually selected by the parties within ten (10) days after the demand for mediation demand is received by the other party to the Contract. If the parties cannot not agree on a mediator with this 10 day period the court in the jurisdiction of their Project location shall select a mediator for the parties. A request for mediation shall be made in writing- and, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order.

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

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

(Paragraphs deleted)

§ 15.4 Arbitration

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

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

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

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

§ 15.4.4 Consolidation or Joinder

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

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

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

AIA Document A232 – 2019. Copyright © 1992, 2009, and 2019. All rights reserved. "The American Institute of Architects," "American Institute of Architects," "AIA," the AIA Logo, and "AIA Contract Documents" are trademarks of The American Institute of Architects. This document was produced at 09:44:33 on 11/20/2025 under Order No.20240071941 which expires on 10/18/2026, is not for resale, is licensed for one-time use only, and may only be used in accordance with the AIA Contract Documents® Terms of Service. To report copyright violations, e-mail docinfo@aiacontracts.com.
User Notes: (1632129103)

SECTION 00 73 43.00 - PREVAILING WAGE RATE REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Prevailing Wage Act.
2. Pennsylvania Prevailing Wage Determination Schedule follows as Section 00 73 46.13.
3. Pennsylvania Department of Labor and Industry “Weekly Payroll Certification for Public Works Projects” Form LLC-25 follows as Section 00 73 46.16.

1.3 Prevailing Wage Rates

A. The general provisions of the Pennsylvania Prevailing Wage Act, approved August 15, 1961, as amended are applicable to this project.

B. The general prevailing minimum wage rates including contributions for employee benefits as shall have been determined by the Secretary of Labor and Industry (hereinafter “Secretary”), which must be paid to the workmen, employed in the performance of the Contract.

C. The Contractor shall pay no less than the wage rates as determined in the decision of the Secretary and shall comply with the conditions of the Pennsylvania Prevailing Wage Act approved August 15, 1961 (Act No. 442), as amended August 9, 1963 (Act No. 342), and the Regulations issued pursuant thereto, to assure the full and proper payment of said rates. Contact PA Department of Labor and Industry for clarification of any classification of workers.

D. These Contract provisions shall apply to all work performed on the Contract by the Contractor and to all work performed on the Contract by all subcontractors.

E. The Contractor shall insert in each of his subcontracts all of the stipulations contained in these required provisions.

F. No workmen may be employed on the Work except in accordance with the classifications set forth in the decision of the Secretary. In the event that additional or different

classifications are necessary, the procedure set forth in the Regulations shall be followed.

G. All workmen employed or working on the Work shall be paid unconditionally, regardless of whether any contractual relationship exists or the contractual relationship which may be alleged to exist between any contractor, subcontractor, and workmen, not less than once a week without deductions or rebate, on any account, either directly or indirectly, except authorized deductions, the full amount due at the time of payment, computed at the rates applicable to the time worked in the appropriate classification. Nothing in this Contract, the Act or the Regulations shall prohibit the payment of more than the general prevailing minimum wage rates as determined by the Secretary to the workmen on the Work.

H. The Contractor and each subcontractor shall post for the entire period of construction the wage determination decisions of the Secretary, including the effective date of any changes thereof, in a prominent and easily accessible place or places at the site of the work and at such place or places used by them to pay workmen their wages. The posted notice of wage rates must contain the following information:

1. Name of project.
2. Name of public body of which it is constructed.
3. The crafts and classifications of workmen listed in the Secretary's general prevailing minimum wage rate determination for the particular project.
4. The general prevailing minimum wage rates determined for each craft and classification and the effective date of any changes.
5. A statement advising workmen that if they have been paid less than the general prevailing minimum wage rate for their job classification or that the Contractor and/or subcontractor are not complying with the Act or the Regulations in any manner whatsoever, they may file a protest with the Secretary within three (3) months of the date of the occurrence, objecting to the payment to the Contractor to the extent of the amount or amounts due or to become due to them as wages for work performed on the Project. Any workmen paid less than the rate specified in the Contract shall have a civil right of action for the difference between the wage paid and wages stipulated in the Contract, which right of action must be exercised within six (6) months from the occurrence of the event creating such right.

I. The Contractor and all subcontractors shall keep an accurate record **showing the name, craft and/or classification, number of hours worked per day, and the actual hourly rate of wage paid (including employee benefits) to each workman employed by him in connection with the Work and such record must include any deductions from each workman.** The record shall be preserved for two (2) years from the date of payment and shall open at all reasonable hours to the inspection of the Owner and to the Secretary or his duly authorized representative.

1. Apprentices shall be limited to such numbers as shall be in accordance with a bona fide apprenticeship program registered with and approved by the Pennsylvania Apprenticeship and Training Council and only apprentices whose training and employment are in full compliance with the provisions of the Apprenticeship and Training Act approved July 14, 1961 (Act No. 304) and the Rules and Regulation issued pursuant thereto shall be employed on the Work.

Any workmen using the tools of a craft that does not qualify as an apprentice within the provisions of this submission shall be paid the rate predetermined for journeyman in that particular craft and/or classification.

J. Wages shall be paid without any deductions except authorized deductions. Employers not party to a contract requiring contributions for employee benefits which the Secretary has determined to be included in the general prevailing minimum wage rate shall pay the monetary equivalent thereof directly to the workman.

K. Payment of compensation to workmen for work performed on public work on a lump sum basis, or apiece work system, or a price certain for the completion of a certain amount of work, or the production of a certain result shall be deemed a violation of the Act and the Regulations, regardless of the average hourly earnings resulting therefrom.

L. Each Contractor and each subcontractor shall file a statement each week and a final statement at the conclusion of the Work on the Contract with Owner, under oath, and in form satisfactory to the Secretary, certifying that all workmen have been paid wages in strict conformity with the provisions of the Contract as prescribed by the Regulations, or if any wages remain unpaid, to the amount of wages due and owing to each workman respectively.

M. The provision of the Act and the Regulations are incorporated by reference in the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

A. Prevailing wage certification forms are to be produced weekly and are to be submitted monthly. Prevailing wage certificates are to be sent to Architect and CM with a pencil copy of the Application for Payment. No Applications for Payment will be processed without the proper prevailing wage certificates. Contractor may be requested to submit the prevailing wage certification forms in any of the following manners:

1. If hard paper copies are submitted, Contractor shall submit two (2) copies of each prevailing wage certification form.
2. If digital copies are submitted, Contractor shall submit to Architect and CM in PDF form.
3. Redacted certified payroll:

    a. Prevailing wage certification forms submitted to the Owner may not be redacted by law; however, if there is a Project Right-to-Know request, the Contractor will be required to submit redacted prevailing wage certification forms **in addition** to the required unredacted forms. The following information may be redacted:

        1) Employee Name
        2) Employee Address

3) Employee Social Security Number

B. Contractor shall use the Commonwealth of Pennsylvania Department of Labor and Industry Form LLC-25 (form can be accessed at: http://www.dli.pa.gov/Individuals/Labor-Management-Relations/Documents/llc-25.pdf), as revised from time to time, and ensure proper classification of workmen are assigned to each person. Certificates must be filled out in their entirety. Form is included as Specification Section 00 73 46.16. Certified Payroll submitted on U.S. Wage and Hour Division forms are NOT accepted and will be returned to the Contractor.

C. Regardless of the submission type, the first and the final certification forms must be notarized, signed, and dated.

END OF SECTION 00 73 43.00

BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES

Project Name:	Simmons ES Elevator Addition
General Description:	Provide new addition for installation of a 2-stop hydraulic elevator
Project Locality	411 Babylon Road, Horsham, PA
Awarding Agency:	Hatboro-Horsham School District
Contract Award Date:	2/23/2026
Serial Number:	25-10818
Project Classification:	Building
Determination Date:	12/22/2025
Assigned Field Office:	Philadelphia
Field Office Phone Number:	(215)560-1858
Toll Free Phone Number:	
Project County:	Montgomery County

BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES

Project: 25-10818 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Asbestos & Insulation Workers	5/1/2025		$60.84	$48.71	$109.55
Boilermaker (Commercial, Institutional, and Minor Repair Work)	3/1/2024		$36.71	$19.13	$55.84
Boilermakers	1/1/2024		$52.10	$35.72	$87.82
Bricklayer	5/1/2023		$47.50	$31.42	$78.92
Bricklayer	5/1/2025		$50.00	$32.57	$82.57
Carpenter - Chief of Party (Surveying & Layout)	5/1/2025		$54.59	$29.02	$83.61
Carpenter - Instrument Person (Surveying & Layout)	5/1/2025		$47.47	$29.02	$76.49
Carpenter - Rodman (Surveying & Layout)	5/1/2025		$23.74	$20.62	$44.36
Carpenters	5/1/2024		$45.72	$29.02	$74.74
Carpenters	5/1/2025		$47.47	$29.02	$76.49
Cement Finishers & Plasterers	5/1/2022		$38.57	$32.39	$70.96
Cement Masons	5/1/2024		$46.70	$32.46	$79.16
Cement Masons	5/1/2025		$48.70	$32.46	$81.16
Dockbuilder, Pile Drivers	5/1/2025		$55.23	$37.99	$93.22
Dockbuilder, Pile Drivers	5/1/2026		$56.98	$37.99	$94.97
Dockbuilder/Pile Driver Diver	5/1/2025		$64.35	$41.74	$106.09
Dockbuilder/Pile Driver Diver	5/1/2026		$66.54	$41.74	$108.28
Dockbuilder/pile driver tender	5/1/2025		$55.23	$37.99	$93.22
Dockbuilder/pile driver tender	5/1/2026		$56.98	$37.99	$94.97
Drywall Finisher	5/1/2025		$40.14	$32.35	$72.49
Electricians	5/1/2024		$69.58	$45.66	$115.24
Electricians	5/1/2025		$70.97	$47.27	$118.24
Elevator Constructor	1/1/2025		$71.85	$45.77	$117.62
Floor Coverer	5/1/2025		$51.67	$31.69	$83.36
Floor Coverer	5/1/2026		$52.84	$32.86	$85.70
Glazier	5/1/2024		$48.00	$37.50	$85.50
Glazier	5/1/2025		$49.96	$38.34	$88.30
Interior Finish	5/1/2023		$34.60	$25.80	$60.40
Iron Workers (Bridge, Structural, Ornamental, Precast)	7/1/2024		$53.20	$45.01	$98.21
Iron Workers (Riggers)	7/1/2024		$44.64	$34.39	$79.03
Iron Workers (Riggers)	7/1/2025		$44.77	$36.27	$81.04
Iron Workers (Rodman/Reinforcing)	7/1/2024		$47.70	$34.77	$82.47
Iron Workers (Rodman/Reinforcing)	7/1/2025		$47.80	$36.65	$84.45
Laborers (Class 01 - See notes)	5/1/2024		$35.85	$26.00	$61.85
Laborers (Class 01 - See notes)	5/1/2025		$37.25	$26.10	$63.35
Laborers (Class 02 - See notes)	5/1/2024		$39.40	$27.55	$66.95
Laborers (Class 02 - See notes)	5/1/2025		$41.00	$27.70	$68.70
Laborers (Class 03 - See notes)	5/1/2024		$36.27	$26.18	$62.45
Laborers (Class 03 - See notes)	5/1/2025		$37.67	$26.28	$63.95
Laborers (Class 04 - See notes)	5/1/2024		$36.27	$26.18	$62.45
Laborers (Class 04 - See notes)	5/1/2025		$37.67	$26.28	$63.95
Laborers (Class 05 - See notes)	5/1/2024		$35.85	$26.00	$61.85
Laborers (Class 05 - See notes)	5/1/2025		$37.25	$26.10	$63.35
Landscape Laborer	5/1/2024		$30.70	$24.23	$54.93

BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES

Project: 25-10818 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Landscape Laborer	5/1/2025		$32.15	$24.30	$56.45
Marble Finisher	5/1/2023		$39.52	$29.30	$68.82
Marble Finisher	5/1/2025		$41.17	$30.75	$71.92
Marble Mason	5/1/2023		$47.20	$31.95	$79.15
Mason Tender, Cement	5/1/2023		$35.02	$25.98	$61.00
Millwright	5/1/2025		$57.39	$35.81	$93.20
Millwright	5/1/2026		$60.20	$35.81	$96.01
Operators (Building, Class 01 - See Notes)	5/1/2024		$53.36	$33.65	$87.01
Operators (Building, Class 01 - See Notes)	5/1/2025		$54.52	$34.49	$89.01
Operators (Building, Class 01 - See Notes)	5/1/2026		$55.67	$35.34	$91.01
Operators (Building, Class 01A - See Notes)	5/1/2024		$56.37	$34.53	$90.90
Operators (Building, Class 01A - See Notes)	5/1/2025		$57.52	$35.38	$92.90
Operators (Building, Class 01A - See Notes)	5/1/2026		$58.68	$36.22	$94.90
Operators (Building, Class 02 - See Notes)	5/1/2024		$53.11	$33.58	$86.69
Operators (Building, Class 02 - See Notes)	5/1/2025		$54.27	$34.42	$88.69
Operators (Building, Class 02 - See Notes)	5/1/2026		$55.43	$35.26	$90.69
Operators (Building, Class 02A - See Notes)	5/1/2024		$56.13	$34.45	$90.58
Operators (Building, Class 02A - See Notes)	5/1/2025		$57.29	$35.29	$92.58
Operators (Building, Class 02A - See Notes)	5/1/2026		$58.44	$36.14	$94.58
Operators (Building, Class 03 - See Notes)	5/1/2024		$49.03	$32.37	$81.40
Operators (Building, Class 03 - See Notes)	5/1/2025		$50.18	$33.22	$83.40
Operators (Building, Class 03 - See Notes)	5/1/2026		$51.34	$34.06	$85.40
Operators (Building, Class 04 - See Notes)	5/1/2024		$48.73	$32.28	$81.01
Operators (Building, Class 04 - See Notes)	5/1/2025		$49.88	$33.13	$83.01
Operators (Building, Class 04 - See Notes)	5/1/2026		$51.04	$33.97	$85.01
Operators (Building, Class 05 - See Notes)	5/1/2024		$47.00	$31.78	$78.78
Operators (Building, Class 05 - See Notes)	5/1/2025		$48.16	$32.62	$80.78
Operators (Building, Class 05 - See Notes)	5/1/2026		$49.32	$33.46	$82.78
Operators (Building, Class 06 - See Notes)	5/1/2024		$46.02	$31.48	$77.50
Operators (Building, Class 06 - See Notes)	5/1/2025		$47.17	$32.33	$79.50
Operators (Building, Class 06 - See Notes)	5/1/2026		$48.34	$33.16	$81.50
Operators (Building, Class 07A- See Notes)	5/1/2024		$64.80	$38.61	$103.41
Operators (Building, Class 07A- See Notes)	5/1/2025		$66.26	$39.55	$105.81
Operators (Building, Class 07A- See Notes)	5/1/2026		$67.73	$40.48	$108.21
Operators (Building, Class 07B- See Notes)	5/1/2024		$64.50	$38.53	$103.03
Operators (Building, Class 07B- See Notes)	5/1/2025		$65.97	$39.46	$105.43
Operators (Building, Class 07B- See Notes)	5/1/2026		$67.44	$40.39	$107.83
Painters Class 1 (see notes)	5/1/2024		$42.97	$34.11	$77.08
Painters Class 1 (see notes)	5/1/2025		$44.38	$34.55	$78.93
Painters - Line Stripping	12/1/2024		$44.12	$27.91	$72.03
Painters - Line Stripping	12/1/2025		$45.12	$29.41	$74.53
Painters Class 4 (see notes)	5/1/2024		$45.06	$34.11	$79.17
Painters Class 4 (see notes)	5/1/2025		$46.47	$34.55	$81.02
Plasterers	5/1/2024		$39.88	$33.08	$72.96

BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES

Project: 25-10818 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
plumber	5/1/2024		$67.53	$38.31	$105.84
plumber	5/1/2025		$70.53	$39.46	$109.99
Pointers, Caulkers, Cleaners	5/1/2023		$48.80	$30.70	$79.50
Pointers, Caulkers, Cleaners	5/1/2025		$51.35	$31.80	$83.15
Roofers (Composition)	5/1/2024		$44.13	$34.77	$78.90
Roofers (Composition)	5/1/2025		$46.03	$34.77	$80.80
Roofers (Shingle)	5/1/2023		$32.85	$22.10	$54.95
Roofers (Shingle)	5/1/2024		$34.35	$22.20	$56.55
Roofers (Slate & Tile)	5/1/2023		$35.85	$22.10	$57.95
Roofers (Slate & Tile)	5/1/2024		$37.35	$22.20	$59.55
Sheet Metal Workers	5/1/2024		$59.22	$50.56	$109.78
Sheet Metal Workers	5/1/2025		$62.62	$52.17	$114.79
Sign Makers and Hangars	7/15/2024		$32.32	$25.82	$58.14
Sign Makers and Hangars	7/15/2025		$33.48	$26.41	$59.89
Sprinklerfitters	1/1/2023		$62.23	$31.99	$94.22
Sprinklerfitters	5/1/2025		$70.37	$34.85	$105.22
Steamfitters	5/1/2024		$70.32	$43.09	$113.41
Steamfitters	5/1/2025		$72.52	$44.89	$117.41
Stone Masons	5/1/2023		$47.20	$31.95	$79.15
Stone Masons	5/1/2025		$50.00	$32.80	$82.80
Terrazzo Finisher	5/1/2023		$43.75	$27.86	$71.61
Terrazzo Finisher	5/1/2025		$45.61	$29.41	$75.02
Terrazzo Grinder	5/1/2023		$44.02	$27.86	$71.88
Terrazzo Grinder	5/1/2025		$45.88	$29.41	$75.29
Terrazzo Mechanics	5/1/2023		$50.26	$29.56	$79.82
Terrazzo Mechanics	5/1/2025		$52.21	$31.26	$83.47
Tile Finisher	5/1/2023		$39.52	$29.30	$68.82
Tile Finisher	5/1/2025		$41.17	$30.75	$71.92
Tile Setter	5/1/2023		$50.26	$29.56	$79.82
Tile Setter	5/1/2025		$52.21	$31.26	$83.47
Truckdriver class 1(see notes)	5/1/2024		$36.79	$22.54	$59.33
Truckdriver class 2 (see notes)	5/1/2024		$36.89	$22.54	$59.43
Window Film / Tint Installer	6/1/2019		$24.52	$12.08	$36.60
Window Film / Tint Installer	6/1/2024		$26.37	$14.83	$41.20

BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES

Project: 25-10818 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Bricklayer	5/1/2025		$50.00	$32.57	$82.57
Carpenter - Chief of Party (Surveying & Layout)	5/1/2025		$65.96	$30.09	$96.05
Carpenter - Chief of Party (Surveying & Layout)	5/1/2026		$67.52	$30.44	$97.96
Carpenter - Instrument Person (Surveying & Layout)	5/1/2025		$58.39	$29.06	$87.45
Carpenter - Instrument Person (Surveying & Layout)	5/1/2026		$60.09	$29.06	$89.15
Carpenter - Rodman (Surveying & Layout)	5/1/2025		$45.88	$23.19	$69.07
Carpenter - Rodman (Surveying & Layout)	5/1/2026		$46.97	$23.54	$70.51
Carpenter	5/1/2025		$57.36	$30.09	$87.45
Carpenter	5/1/2026		$58.71	$30.44	$89.15
Cement Masons	5/1/2023		$43.20	$32.91	$76.11
Cement Masons	5/1/2025		$46.55	$32.66	$79.21
Dockbuilder, Pile Drivers	5/1/2025		$55.23	$37.99	$93.22
Dockbuilder, Pile Drivers	5/1/2026		$56.98	$37.99	$94.97
Dockbuilder/ Pile driver diver	5/1/2025		$60.31	$44.97	$105.28
Dockbuilder/ Pile driver diver	5/1/2026		$61.88	$45.47	$107.35
Dockbuilder/Pile Driver Diver	5/1/2025		$64.35	$41.74	$106.09
Dockbuilder/Pile Driver Diver	5/1/2026		$66.54	$41.74	$108.28
Dockbuilder/pile driver tender	5/1/2025		$55.23	$37.99	$93.22
Dockbuilder/pile driver tender	5/1/2026		$56.98	$37.99	$94.97
Electric Lineman	6/3/2024		$62.07	$33.96	$96.03
Iron Workers (Bridge, Structural, Ornamental, Precast)	7/1/2024		$53.20	$45.01	$98.21
Iron Workers (Riggers)	7/1/2023		$42.53	$34.14	$76.67
Iron Workers (Rodman/Reinforcing)	7/1/2023		$45.70	$34.77	$80.47
Laborers (Class 01 - See notes)	5/1/2024		$38.80	$27.65	$66.45
Laborers (Class 01 - See notes)	5/1/2025		$40.20	$27.80	$68.00
Laborers (Class 02 - See notes)	5/1/2024		$39.00	$27.65	$66.65
Laborers (Class 02 - See notes)	5/1/2025		$40.40	$27.80	$68.20
Laborers (Class 03 - See notes)	5/1/2024		$39.00	$27.65	$66.65
Laborers (Class 03 - See notes)	5/1/2025		$40.40	$27.80	$68.20
Laborers (Class 04 - See notes)	5/1/2024		$33.60	$27.65	$61.25
Laborers (Class 04 - See notes)	5/1/2025		$35.00	$27.80	$62.80
Laborers (Class 05 - See notes)	5/1/2024		$39.65	$27.65	$67.30
Laborers (Class 05 - See notes)	5/1/2025		$41.05	$27.80	$68.85
Laborers (Class 06 - See notes)	5/1/2024		$39.70	$27.65	$67.35
Laborers (Class 06 - See notes)	5/1/2025		$41.10	$27.80	$68.90
Laborers (Class 07 - See notes)	5/1/2024		$39.55	$27.65	$67.20
Laborers (Class 07 - See notes)	5/1/2025		$40.95	$27.80	$68.75
Laborers (Class 08 - See notes)	5/1/2024		$39.30	$27.65	$66.95
Laborers (Class 08 - See notes)	5/1/2025		$40.70	$27.80	$68.50
Laborers (Class 09 - See notes)	5/1/2024		$39.15	$27.65	$66.80
Laborers (Class 09 - See notes)	5/1/2025		$40.55	$27.80	$68.35
Laborers (Class 10- See notes)	5/1/2024		$39.30	$27.65	$66.95
Laborers (Class 10- See notes)	5/1/2025		$40.70	$27.80	$68.50
Laborers (Class 11 -See Notes)	5/1/2024		$39.20	$27.65	$66.85

BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES

Project: 25-10818 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Laborers (Class 11 -See Notes)	5/1/2025		$40.60	$27.80	$68.40
Laborers (Class 12 -See Notes)	5/1/2024		$40.90	$27.65	$68.55
Laborers (Class 12 -See Notes)	5/1/2025		$42.30	$27.80	$70.10
Laborers (Class 13 -See Notes)	5/1/2024		$42.93	$27.65	$70.58
Laborers (Class 13 -See Notes)	5/1/2025		$44.33	$27.80	$72.13
Laborers (Class 14 -See Notes)	5/1/2024		$39.50	$27.65	$67.15
Laborers (Class 14 -See Notes)	5/1/2025		$40.90	$27.80	$68.70
Laborers Utility (PGW ONLY) (Flagperson)	5/1/2024		$32.67	$19.63	$52.30
Laborers Utility (PGW ONLY) (Flagperson)	5/1/2025		$34.07	$19.73	$53.80
Laborers Utility (PGW ONLY)	5/1/2024		$39.70	$19.63	$59.33
Laborers Utility (PGW ONLY)	5/1/2025		$41.10	$19.73	$60.83
Landscape Laborer	5/1/2024		$30.28	$24.05	$54.33
Landscape Laborer	5/1/2025		$31.73	$24.15	$55.88
Millwright	5/1/2025		$57.39	$35.81	$93.20
Millwright	5/1/2026		$60.20	$35.81	$96.01
Operators Class 01 - See Notes (Building, Heavy, Highway)	5/1/2024		$53.36	$33.65	$87.01
Operators Class 01 - See Notes (Building, Heavy, Highway)	5/1/2025		$54.52	$34.49	$89.01
Operators Class 01 - See Notes (Building, Heavy, Highway)	5/1/2026		$55.67	$35.34	$91.01
Operators Class 01a - See Notes (Building, Heavy, Highway)	5/1/2024		$56.37	$34.53	$90.90
Operators Class 01a - See Notes (Building, Heavy, Highway)	5/1/2025		$57.52	$35.38	$92.90
Operators Class 01a - See Notes (Building, Heavy, Highway)	5/1/2026		$58.68	$36.22	$94.90
Operators Class 02 - See Notes (Building, Heavy, Highway)	5/1/2024		$53.11	$33.58	$86.69
Operators Class 02 - See Notes (Building, Heavy, Highway)	5/1/2025		$54.27	$34.42	$88.69
Operators Class 02 - See Notes (Building, Heavy, Highway)	5/1/2026		$55.43	$35.26	$90.69
Operators Class 02a - See Notes (Building, Heavy, Highway)	5/1/2024		$56.13	$34.45	$90.58
Operators Class 02a - See Notes (Building, Heavy, Highway)	5/1/2025		$57.29	$35.29	$92.58
Operators Class 02a - See Notes (Building, Heavy, Highway)	5/1/2026		$58.44	$36.14	$94.58
Operators Class 03 - See Notes (Building, Heavy, Highway)	5/1/2024		$49.03	$32.37	$81.40
Operators Class 03 - See Notes (Building, Heavy, Highway)	5/1/2025		$50.18	$33.22	$83.40
Operators Class 03 - See Notes (Building, Heavy, Highway)	5/1/2026		$51.34	$34.06	$85.40
Operators Class 04 - See Notes (Building, Heavy, Highway)	5/1/2024		$48.73	$32.28	$81.01
Operators Class 04 - See Notes (Building, Heavy, Highway)	5/1/2025		$49.88	$33.13	$83.01
Operators Class 04 - See Notes (Building, Heavy, Highway)	5/1/2026		$51.04	$33.97	$85.01

BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES

Project: 25-10818 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Operators Class 05 - See Notes (Building, Heavy, Highway)	5/1/2024		$47.00	$31.78	$78.78
Operators Class 05 - See Notes (Building, Heavy, Highway)	5/1/2025		$48.16	$32.62	$80.78
Operators Class 05 - See Notes (Building, Heavy, Highway)	5/1/2026		$49.32	$33.46	$82.78
Operators Class 06 - See Notes (Building, Heavy, Highway)	5/1/2024		$46.02	$31.48	$77.50
Operators Class 06 - See Notes (Building, Heavy, Highway)	5/1/2025		$47.17	$32.33	$79.50
Operators Class 06 - See Notes (Building, Heavy, Highway)	5/1/2026		$48.34	$33.16	$81.50
Operators Class 07 (A) - See Notes (Building, Heavy, Highway)	5/1/2024		$64.80	$38.61	$103.41
Operators Class 07 (A) - See Notes (Building, Heavy, Highway)	5/1/2025		$66.26	$39.55	$105.81
Operators Class 07 (A) - See Notes (Building, Heavy, Highway)	5/1/2026		$67.73	$40.48	$108.21
Operators Class 07 (B) - See Notes (Building, Heavy, Highway)	5/1/2024		$64.50	$38.53	$103.03
Operators Class 07 (B) - See Notes (Building, Heavy, Highway)	5/1/2025		$65.97	$39.46	$105.43
Operators Class 07 (B) - See Notes (Building, Heavy, Highway)	5/1/2026		$67.44	$40.39	$107.83
Painters - Line Stripping	12/1/2024		$44.12	$27.91	$72.03
Painters - Line Stripping	12/1/2025		$45.12	$29.41	$74.53
Painters Class 2 (see notes)	2/1/2025		$50.85	$33.91	$84.76
Painters Class 3 (see notes)	2/1/2025		$61.81	$33.95	$95.76
Pointers, Caulkers, Cleaners	5/1/2025		$51.35	$31.80	$83.15
Steamfitters (Heavy and Highway - Gas Distribution)	5/1/2024		$66.80	$42.93	$109.73
Steamfitters (Heavy and Highway - Gas Distribution)	5/1/2025		$68.89	$44.73	$113.62
Truckdriver class 1(see notes)	5/1/2024		$36.64	$22.54	$59.18
Truckdriver class 2 (see notes)	5/1/2024		$36.74	$22.54	$59.28

WEEKLY PAYROLL CERTIFICATION FOR PUBLIC WORKS PROJECTS

☐ Contractor or ☐ Subcontractor (Please check one) **ALL INFORMATION MUST BE COMPLETED**

CONTRACTOR ADDRESS	SUBCONTRACTOR ADDRESS	DEPARTMENT OF LABOR & INDUSTRY COMMONWEALTH OF PENNSYLVANIA BUREAU OF LABOR LAW COMPLIANCE PREVAILING WAGE DIVISION 7TH & FORSTER STREETS HARRISBURG, PA 17120 1-800-932-0665

PAYROLL NUMBER	WEEK ENDING DATE	PROJECT AND LOCATION PROJECT SERIAL # PROJECT #

EMPLOYEE NAME	APPR. RATE (%)	WORK CLASSIFICATION	DAY AND DATE Su M Tu W Th F Sa HOURS WORKED EACH DAY	S-TIME 0-TIME	BASE HOURLY RATE	TOTAL FRINGE BENEFITS (C=Cash) (FB=Contributions)*	TOTAL DEDUCTIONS	GROSS PAY FOR PREVAILING RATE JOB(S)	CHECK #
						C: FB:			
						C: FB:			
						C: FB:			
						C: FB:			
						C: FB:			

*SEE REVERSE SIDE

PAGE NUMBER _____ OF _____

THE NOTARIZATION MUST BE COMPLETED ON FIRST AND LAST SUBMISSIONS ONLY. ALL OTHER INFORMATION MUST BE COMPLETED WEEKLY.

*FRINGE BENEFITS EXPLANATION (FB): Bona fide benefits contribution, except those required by Federal or State Law (unemployment tax, workers' compensation, income taxes, etc.)

Please specify the type of benefits provided and contributions per hour:

1) Medical or hospital care _____
2) Pension or retirement _____
3) Life insurance _____
4) Disability _____
5) Vacation, holiday _____
6) Other (please specify) _____

CERTIFIED STATEMENT OF COMPLIANCE

1. The undersigned, having executed a contract with _____
(AWARDING AGENCY, CONTRACTOR OR SUBCONTRACTOR)

_____ for the construction of the above-identified project, acknowledges that:

(a) The prevailing wage requirements and the predetermined rates are included in the aforesaid contract.

(b) Correction of any infractions of the aforesaid conditions is the contractor's or subcontractor's responsibility.

(c) It is the contractor's responsibility to include the Prevailing Wage requirements and the predetermined rates in any subcontract or lower tier subcontract for this project.

2. The undersigned certifies that:
   (a) Neither he nor his firm, nor any firm, corporation or partnership in which he or his firm has an interest is debarred by the Secretary of Labor and Industry pursuant to Section 11(e) of the PA Prevailing Wage Act, Act of August 15, 1961, P.L. 987 as amended, 43 P.S.§ 165-11(e).

   (b) No part of this contract has been or will be subcontracted to any subcontractor if such subcontractor or any firm, corporation or partnership in which such subcontractor has an interest is debarred pursuant to the aforementioned statute.

3. The undersigned certifies that:
   (a) the legal name and the business address of the contractor or subcontractor are: _____
   _____

   (b) The undersigned is: ☐ a single proprietorship ☐ a corporation organized in the state of _____
   ☐ a partnership ☐ other organization (describe) _____

   (c) The name, title and address of the owner, partners or officers of the contractor/subcontractor are:

NAME	TITLE	ADDRESS

The willful falsification of any of the above statements may subject the contractor to civil or criminal prosecution, provided in the PA Prevailing Wage Act of August 15, 1961, P.L. 987, as amended, August 9, 1963, 43 P.S. § 165.1 through 165.17.

_____
(DATE)

_____
(SIGNATURE)

_____
(TITLE)

_____
SEAL

Taken, sworn and subscribed before me this _____ Day

of _____ A.D., _____

SECTION 00 91 00 – ADDENDA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

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

C. Addenda will be serially numbered and dated, identifying the Project, Owner, Construction Manager, and Engineer(s).

D. Addenda will be distributed electronically, by email, or mail to all known bidders at the address furnished by them when bidding documents were obtained. Copies of the Addenda will be distributed at the same time to all parties recorded as having bidding documents on file.

E. Bidders shall not rely on oral instructions made to bidders by any officer, agent, or employee of the Owner, Construction Manager, or Engineer(s).

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION – NOT USED

END OF SECTION 00 91 00

SECTION 01 11 00 - SUMMARY OF WORK

PART 1: GENERAL

1.01 CONDITIONS OF THE CONTRACT

A. The Conditions of the Contract (General, Supplemental General Conditions or other Conditions) and the General Requirement Sections of Divisions 00-01 are hereby made part of this Section.

1.02 PROJECT INFORMATION

A. All work furnished under this Project Manual shall be installed at the following locations in accordance with the Contract Documents:

B. Project Identification:

1. Project Location: Simmons Elementary School 411 Babylon Rd., Horsham, PA 19044
2. Applicable County: Montgomery
3. Applicable Local Municipality: Horsham Township

C. Owner: Hatboro-Horsham School District, 227 Meetinghouse Rd., Suite 100, Horsham, PA 19044

D. The provisions of the General Conditions, Supplemental General Conditions, and Divisions 00-01, Procurement and Contracting Requirements and General Requirements, shall apply to all work of the Contracts.

E. The Scope of Work for the Prime Contractors includes all work required for complete construction of their Work Scope in accordance with the Summary of Work.

F. Construction Contract: Construction for this project will be accomplished under single prime construction contract as described in Document 00 11 13 – Advertisement for Bids.

1.03 RESPONSIBILITY OF THE CONTRACTOR

A. The Contractor shall be responsible for the scheduling and general management of the work of the project and for the acts and omissions of all of their employees; all subcontractors, their agents and employees; and all other persons performing any of the work under a contract with the Contractor.

B. The Contractor will have supervision on site full-time during the duration of the project for their respective scope of work. The Supervisor must be on site while all work is in process.

C. The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work.

D. The Contractor shall supervise and direct the work, using their best skills and attention. They shall be solely responsible for all construction means, methods, techniques and procedures and for coordination of all portions of the work under this Contract.

E. The Contractor shall accept the project as it exists. All existing conditions, whether or not specifically noted on the Contract Documents, shall be verified by the Contractor in-person prior to the start of work.

F. The Contractor shall not proceed with any items of the work, which are reasonably questionable without consulting the Construction Manager.

G. Contractor's questions regarding this project must be directed to the Construction Manager. The Owner's employees are not authorized to make decisions or give direction regarding any aspect of this project. Consult ICS employees involved on the project only. You can find these people on Procore in the directory. These employees will be identified in the Pre-Construction Meeting.

H. Construction Limits: Except as specifically indicated or as may be necessary to complete the work under the Contract, activities of the Contract shall be limited to within the limits designated on the drawings.

I. Testing:

1. Contractors are to perform all factory, Source Quality Control, or shop testing and any other testing required.
2. Contractors are to perform any field testing of electrical systems or data wiring systems.
3. Contractors are to perform testing of above or below ground pipes, ductwork, and mechanical systems including pressure, air, water, or vacuum testing required.
4. Contractors are to perform any other field testing that may be required by Specification Divisions 02-33 or not included by the Owner’s Testing Agent.
5. All contractor testing shall be performed in the presence of the Construction Manager and/or (if required) in the presence of the municipal agency having jurisdiction.

J. The Contractor responsible for installation of the systems and equipment is responsible for commissioning each system. The minimum commissioning requirements in accordance with specific project requirements, including coordination and verification, shall be the responsibility of the Contractor.

1.04 USE OF BUILDING BY OWNER

A. Owner reserves the right to let other contracts in connection with this Project or in connection with existing buildings. Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and execution of their work, and shall properly connect and coordinate his work with theirs. Cooperate fully with Owner and separate Owner-hired firms and/or agencies so work may be carried out smoothly, without interfering with or delaying Work under this Contract.

B. Owner reserves the right to jointly occupy the premises with the Contractor in the performance of his duties and functions. The Owner also reserves the rights to: enter into the Project and premises at all times; make installations or removal of materials and equipment at appropriate times as the Work progresses; and install or remove equipment, furniture, and furnishings when spaces are at appropriate stages of completion. Contractor shall coordinate work with the Owner and cooperate with the Owner to minimize undue interferences.

C. If any part, unit, phase, or the entire Project is substantially complete or ready for occupancy, the Owner may, upon notice to the Contractor, enter into and make use of the Work that is substantially complete.

1.05 CONTRACTOR'S USE OF PREMISES

A. General: During the construction period, the Contractor shall have limited use of the premises for construction operations as shown in the project plans. The Contractor's use of the premises is limited by the Owner's right to perform construction operations with its own forces or to employ separate contractors on portions of the project, and by the Owner’s right to continue daily school operations. The Contractor must coordinate activities and cooperate with adjacent uses including any of their construction activities. Contractor must also schedule, coordinate, and perform construction activities to avoid disruption of ongoing operations. Contractor must schedule and perform certain work on weekends and holidays to avoid disruptions. This may include street and utility work.

1. The site is currently occupied as an Elementary School and such daily activities/functions revolving around the educational process, cannot be interrupted and must be considered in the scheduling of work for this project. The Contractor is responsible to make accommodations to not disrupt regular school activities/functions, such as: (arrival/dismissal, physical education, etc.). In addition, the Contractor is required to provide adequate safety measures and separation of any and all, construction activities.
2. Confine operations to areas within Contract limits indicated. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed.
3. Keep driveways and entrances serving the premises clear and available to the Owner at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.

4. No use of owner restrooms will be permitted. The Contractor will provide portable toilets for Contractor use.

B. Site Protection: Protect existing trees and other plantings which are not to be removed, and paved surfaces which are to remain and are susceptible to damage from ordinary operations of the Contractor, trucking or other activity. Provide appropriate safety signage and barricades to keep unauthorized person(s) out of the project area.

C. Restoration: All improvements on or about the site and adjacent property which are not shown to be altered, removed or otherwise changed, and which have been damaged or disturbed by any work or operations under this contract, shall be restored to the conditions which existed previous to starting work. All features labeled to remain shall be protected from damage by any operation in connection with the Project. The Contractor shall replace or repair, at their own expense (and to the satisfaction of the Owner), all damage to existing drives, lawns, plants, trees, shrubbery and other property resulting from work of this Contract, from whatever cause.

D. Interior Protection: Each contractor/ Work Scope is responsible to protect existing facility and components/ materials. Flooring shown not to be removed must be covered with poly and high traffic areas should be covered with poly and Masonite to protect the existing flooring. The flooring protection must be monitored and corrected if showing signs of deterioration. If damage occurs, that contractor will be responsible to clean and if that is not sufficient it will be replaced by the contractor at their expense. Contractor is to cover owner items with poly while construction activity is taking place in that room, ie; book shelves, desks, etc. When working in a clean room, ie; computer lab or data closet, contractor is to maintain cooling, and dust free environment as to not damage equipment, Temporary enclosures may be needed to protect equipment.

1.06 WORK UNDER SEPARATE CONTRACTS

A. None. All Work will be performed under this Contract.

1.07 OWNER-FURNISHED PRODUCTS

A. Owner will furnish products indicated for installation by the Contractor. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products.

B. Owner-Furnished Products:

1. Flooring (VCT) will be provided for hallway tile installation.
2. Acoustical ceiling tiles (ACT).

1.08 CONSTRUCTION SCHEDULE

A. Scheduling of Work and Time of Completion is an essential condition of this Contract. The entire Work shall be completed in compliance with the Project milestone completion dates listed. Any deviations from these requirements shall be subject to the approval of the Construction Manager. The Owner reserves the right to enforce liquidated damages for contractor's non-compliance with any of the phasing, milestone, and substantial completion dates.

B. Completion of all contracts is as follows:

a. Work under this Bid Package for all work scopes will commence within five (5) days of Notice to Proceed.
b. Final completion of all Work Scopes shall be noted in Section 01 32 10, Project Schedule Requirements.

C. Construction work shall be performed in a sequence to ensure that all building systems are systematically installed in an efficient manner.

1.09 MEASUREMENTS

A. All Contractors shall be responsible for all measurements, layout work, and quantity and quality of materials. They shall also be required to employ craftsmen skilled in their trade. All work shall be completed in conformance to specifications/plans as well as prevailing codes and standard construction practices.

B. All Contractors shall verify measurements and layout all work from dimensions given on Drawings; and shall be responsible for the corrections of all measurements, and shall verify all grades, lines, levels, elevations and dimensions shown on the drawings. Contractors shall take measurements and verify dimensions of existing work, if any, that affect their work or to which their work is to be fitted. Report any errors or inconsistencies to the Construction Manager/Engineer prior to commencing work.

1.10 PROJECT MEETINGS

A. Prior to commencement of construction, a pre-construction meeting will be conducted with representatives of the Owner/Construction Manager/Engineer and the Contractor including their principal subcontractors, for the purpose of coordination and construction scheduling. Any known conflicts, organizational issues, or specific delays should be brought up here before construction begins and at progress meetings as needed.

B. Regular progress meetings shall be conducted at the project site with representatives of the Owner/Construction Manager/Engineer and the Contractor including their principal subcontractors. The agenda will be to review timely submittals, items of significance that could affect progress, progress since the last meeting and determine where each activity is in relation to the Contractor's

Construction Schedule. Meeting Minutes will be taken and distributed by the Construction Manager. All logs, progress updates or percentages of work done will be maintained by the Contractor and be submitted to the Construction Manager each week.

1.11 CLEAN UP AND FINAL CLEANING

A. The Contractors at all times shall keep the premises free form accumulation of waste materials or rubbish caused by their operations, employees, and keep areas clean and free from fire hazards. The Contractors shall be responsible for the removal and hauling of all of their debris, cartons, crates and surplus materials, maintaining their work neat and orderly throughout the construction period, as well as the cleaning of all their work and equipment. The Owner's waste containers are not to be used.

END OF SECTION 01 11 00

SECTION 01 12 00 – GENERAL WORK SCOPE REQUIREMENTS

PART 1 GENERAL

1.01 CONTRACT REQUIREMENTS APPLICABLE TO ALL WORK SCOPES

A. Comprehensive Scope of Work: Provide labor, material, and equipment necessary to properly execute the work of this Work Scope in accordance with Contract Documents and specifically the specifications sections listed herein.

1. Contract Documents are complimentary and what is required by one shall be as binding as if required by all. i.e., bi-weekly site clean-up from all contractors of work areas.
2. Each contractor is responsible for the general, civil, structural, architectural, mechanical, and electrical notes as they relate to your Work.
3. It is the intent of this Work Scope and responsibility for this contractor to provide a complete operational assembly/system, unless specifically indicated below.
4. Review the entire project so that proceeding, concurrent, and succeeding work of other contractors can proceed without harm to the Project as a whole.
5. Each contractor is required to coordinate their work with other contractors, as directed by the Construction Manager, without additional compensation.
6. By submitting your Proposal/Bid, each contractor acknowledges they have reviewed all appropriate contract documents, including previously issued documents and have anticipated, based on information provided or available, impact of future Work as it affects their Work Scope Category.

B. Contract Scope and Assigned Responsibilities: Refer to individual Work Scope descriptions for additional requirements.

1. Anything contained in the Contract Documents designated as "by General Contractor", “Contractor”, or similar terms, shall be by the Contractor performing the same work as so designated by the work scope delineation.
2. Work Scopes do not delineate jurisdictional portions of work. In case a jurisdictional dispute arises, the contractor shall be responsible for any associated cost of the “Claimed” work.

C. Clarification: The Specifications are written in imperative and abbreviated form.

1. It shall be clearly understood that all imperative statements are directed at the subcontractor responsible for that portion of the Work, unless specifically indicated otherwise.
2. Incomplete sentences shall be completed by inserting “shall”, “contractor shall”, and similar mandatory phrases by inference in the same manner as they are applied to notes on Drawings.
3. The words “shall be” shall be supplied by inference where a colon is used within sentence or phrases.
4. Where stated “Provide” in Work Scopes. Provide equals furnish and install.

5. Each Contractor is responsible for the protection of their work.
6. Temporary Enclosures of Window and Door Openings will be completed as outlined in Section 01 50 00.
7. Fire Extinguishers and appropriate signage will be supplied as per Section 01 50 00.

D. Interpretations or Corrections of Contract Documents: Carefully study and compare Documents with each other and with other work being performed concurrently or presently under construction to the extent that it relates to the Work for which this Contract is awarded. Contractor shall examine the site and local conditions and shall at once report to the Construction Manager inconsistencies or ambiguities discovered or requirements not understood.

1. Using Request for Information (RFI) on the web-based project management platform (Procore, as provided by ICS), contractors shall submit to ICS Request for Information prior to performing work in question.
2. The Contractor will forward Request for Information on form acceptable to Owner, Architect, and Construction Manager prior to performing work in question. All RFIs should be submitted though Procore.
3. Responses provided to an RFI by Owner, Architect or Construction Manger are intended to be clarifications only and are not an authorization for a Contract Time extension or an increase in the Contract Amount.
4. If the contractor believes the response is a change in either Contract Time or Contract Amount, contractor shall comply with requirements of the Owner/Contractor Agreement.
5. Request for Information (RFI's) agreed to by Owner and ICS that change either the Contract Time or Contract Amount will be included in an appropriate Change Order prior to performing work in question.

E. Conflicts and Duplication in Work: In the case of a duplication of scope responsibility either on Drawings, Specification, or Work Scope Descriptions, Contractor is responsible to bid the work as called out regardless of potential oversight duplications.

1. In the case of duplication, the Construction Manager will make the final decision as to which Work Scope will do the work and the appropriate cost adjustment will be made.

1.02 SCOPE CLARIFICATIONS APPLICABLE TO ALL WORK SCOPE CATEGORIES

A. Special Coordination and Scheduling Required: Contractor acknowledges that the performance of this Work Scope must be closely interfaced with the performance of others and that multiple mobilizations will be required.

1. It is understood that punctuality and compliance with agreed-upon deliveries is of the essence on the Project.
2. Comply with Project Schedule and ensure preparatory work of other trades are erected first or carried forward simultaneously where installation sequence requires it.
3. Contractor shall provide reasonable notice of its intentions to those affected, and if other contractors, after such reasonable notice, fail to have their work in readiness, Construction Manager shall be consulted, and their directions followed.

4. Where indicated or required to maintain Project Schedule or to accommodate Owner's on-going operations, provide required "after-hours" shift work to maintain Project Schedule. It is the contractor's responsibility to properly staff and accommodate where necessary to maintain the schedule. Overtime work by each contractor necessary to conform with these requirements shall be considered a normal practice under this contract. No claims for additional compensation will be accepted by the Owner.

B. Submittal and Fabrication Time Requirements: In accordance with Part 1 of individual specification section requiring Submittals and Division 1 requirements: coordinate, prepare, and submit a complete package of design submittals in accordance with the Project Schedule and requirements of the Subcontract Agreement.

1. Schedule Requirements for Design Submittals: Durations will be mutually agreed to between the Construction Manager, Architect and this contractor for the task identified herein and will be specifically listed within the Agreement.

    a. Preparation of Design Submittals.
    b. Fabrication and Delivery Time.
    c. Duration of On-Site Installation.

2. For items requiring "design submittals" prepare submittals for review and acceptance by the A/E to comply with the milestone dates outlined within the Project Schedule and Agreement.
3. For items NOT requiring "design submittals" and upon return of approved submittals for those items requiring submittals, fabricate and deliver items to Site to comply with Project Schedule and Agreement.

C. Document Management and Control Procedures: Ensure on-site contractor's personnel have current contract documents, including, but not limited to: Specifications, Drawings and clarifications (RFI's and ASI's) and other modifications (PR's and field orders) affecting the Work.

1. Contractor is responsible to copy and distribute (at their cost) sufficient copies of documents to contractor's personnel, vendors, and suppliers.
2. Ensure field personnel are familiar with requirements of Contract Documents.
3. Contractor to have an established document control procedure to ensure compliance.

D. Field Engineering and Layout: Refer to individual Work Scope Descriptions for layout requirements.

1. The Construction Manager will provide control points.

E. Coordinate Layout and Clearances: Coordinate space requirements and installation for items that are indicated diagrammatically on Documents.

1. Follow routing indicated for pipes, ducts and wiring, place runs parallel with line of building. In finished areas, unless expressly indicated otherwise, conceal pipes,

ducts and wiring within construction. Coordinate locations of plumbing and electrical fixtures and electrical outlets with finish elements.

2. Use space efficiently to maximize accessibility for other installations, maintenance, and repairs.
3. Installing entities shall modify their installations, if needed, to eliminate conflicts and achieve effective coordination of systems and work.
4. Contractor's failure to exercise coordination responsibilities constitutes a waiver of claims for an increase in Contract Sum if design modifications are required to resolve conflicts that might have been avoided by complying with requirements of this Section and the overall provided schedule.

F. Field Verification of Existing Conditions and Substrates: Inspect existing conditions and substrates to receive work prior to installation, field verify dimensions that will affect the layout or performance of your work, and confirm preparatory work is complete and acceptable to receive work of this Work Scope.

G. Professional Errors and Omission Insurance Requirements: Where Work Scope Categories included requirements for "Delegated Design", "third party engineering", "Signed Shop Drawings by licensed engineer", or "submission of design calculations" as part of the individual specification sections or structural notes, refer to Insurance Requirements in the General Conditions for additional requirements.

H. Construction Cleaning: Each Work Scope is responsible for clean-up of debris, rubbish and other similar items resulting from their operations on a daily basis.

1. Refer to individual Work Scope for additional requirements regarding cleanup.

1.03 MATERIAL HANDLING AND STORAGE

A. Delivery and Receiving of Materials: Provide labor and equipment necessary to receive materials, unload, inspect, sort, and distribute materials to individual work areas. Store materials in an organized manner as not to obstruct other trades and the normal day-to-day operation of this project.

1. Coordinate storage areas with the Construction Manager.
2. Schedule deliveries to minimize onsite storage and coordinate with all trades.
3. Provide flagmen for operation in contact with public traffic for deliveries.

B. Hoisting: Provide hoisting equipment, labor, means and operations to complete your Work Scope.

C. Scaffolding: Each Work Scope is responsible for your own working platforms, scaffolding, and equipment necessary to access Work. Coordinate scope and timing with all trades.

D. Protection of Adjacent Work: Each subcontractor shall provide necessary protection of roof and adjacent surfaces during the production of this work.

1. Interior scaffolding and carts must be utilized with rubber, locking wheels.

1.04 WORK RESTRICTIONS

A. Contractor's Field Offices: As directed by the Construction Manager and Owner.

B. Construction Staging Area: As directed by the Construction Manager and Owner.

C. Construction Parking: As directed by the Construction Manager and Owner.

D. Egress and Access Routes: Do not obstruct existing access and egress from adjacent Site areas or portions of existing facilities which remain operational throughout Construction Period.

1. Move stored products that interfere with operations of Owner.
2. Obtain and pay for use of additional storage or work areas needed for operations.
3. Keep a path for emergency services to access remaining operational facilities and the site.
4. Do not store materials on existing roof areas.

E. Limit activities to Construction Limits: Notify the Construction Manager if Work activities require work outside Construction Limits. Contactor will coordinate activities with the Construction Manager.

F. Work in Occupied Areas: Work in occupied areas of the facility must be coordinated with the Construction Manager and Owner.

G. Hot Work Permits: Work activities using and causing sparks and open flame must be coordinated with the Construction Manager and the Owner and special procedures shall be complied with as directed by the Construction Manager and Owner.

H. Working Hours: Conduct Work during normal working hours unless expressly agreed to by the Construction Manager and their Representative.

Construction Times (Subject to Revision)

It is understood that the project construction schedule will meet the following Owner schedules (i.e work can proceed during the following periods with prior approval by the District):

Project work hours permitted
Weekdays, Monday – Friday 7:00 a.m. – 3:00 p.m.

Material Deliveries are permitted only during project work hours unless coordinated with and approved by the Construction Manager.

Work may not negatively affect occupied spaces during school hours.

Saturday work schedules are permitted with prior scheduling and approval with possible extra charges from the Owner. Sunday and Holiday times must be scheduled with the Owner by permission and will involve overtime charges for the Owner staff.

System shutdowns will be permitted during non-student periods only, and only with Owner approval and favorable weather conditions pertinent to the system.

Contractor shall provide proposed construction schedule and proposed phasing plan in order to meet the construction time criteria above

I. Tobacco Free Site: Project Site is a “tobacco free” zone; there is absolutely no smoking, or use of tobacco products of any kind. Tobacco products are prohibited on the Owner’s Property as required by State Law.

J. Noise Restrictions: Maintain a level of conduct and decorum consistent with the environment in which the Work is being performed.

END OF SECTION 01 12 00

SECTION 01 13 00.00 – LIST OF WORK SCOPES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Summary of Work Scope packages currently being bid. See Section 01 11 00, Summary of Work for other Work Scopes being bid separately by the Owner that are to be coordinated with the Work Scopes of this package.

1.02 WORK SCOPES BEING BID IN THIS PACKAGE

A. Local Trade union jurisdictional settlements do not control the scope of work included in a Work Scope.

1. When a potential jurisdictional dispute or similar interruption of construction activities is identified, affected contractors shall promptly negotiate a reasonable settlement with the Construction Manager and affected parties to avoid or minimize interruption and delays.
2. Unless otherwise indicated, Work Scopes include a complete section of Work, including but not limited to labor, materials, equipment, scaffolding, hoisting, applicable permits and taxes as required by the Contract Documents.

B. By submitting a Bid, bidder acknowledges they have reviewed all Contract Documents, including previously issued documents and have anticipated, based on information provided, the impact of future Work as it affects their Work Scope.

C. The following Work Scopes included in this Bidding Package are as follows:

1. Work Scope 1 – General Construction

END OF SECTION 01 13 00.00

SECTION 01 13 00.13 - WORK SCOPE No. 1 – General Construction

1.01 WORK SCOPE

A. Scope of Work: The Scope of Work for the Project consists of all Work directly and indirectly required by the Specification Sections listed below for the Simmons Elementary School Elevator Addition Project, plus project drawings, addenda, and other documents identified as part of the Agreement, regardless of design discipline, drawing sheet identification, or jurisdictional requirements.

1. Specific Specifications Sections that are the responsibility of this Work Scope:

Division 00	Procurement and Contracting Requirements	Complete
Division 01	General Requirements	Complete
Division 02	Sitework	Complete
Division 03	Concrete	Complete
Division 04	Masonry	Complete
Division 05	Metals	Complete
Division 06	Wood, Plastics, and Composites	Complete
Division 07	Thermal and Moisture Protection	Complete
Division 08	Openings	Complete
Division 09	Finishes	Complete
Division 10	Specialties	Complete
Division 14	Conveying Equipment	Complete
Division 22	Plumbing	Complete
Division 23	Heating, Ventilating and Air Conditioning (HVAC)	Complete
Division 26	Electrical	Complete
Division 31	Earthwork	Complete
Division 32	Exterior Improvements	Complete

1.02 PROJECT SPECIFIC SCOPE CLARIFICATIONS

A. General Requirements: Refer to Section 01 12 00 for additional requirements affecting this Work Scope.

B. Coordination: Coordination must take place between all Contractors and the Construction Manager. Contractor is required to coordinate schedule and substrate requirements with all other subcontractors.

C. All Cutting and Patching related to this Work Scope.

D. Functional System: Provide complete functional systems consistent with the design intent of the specifications sections identified above and other project documents, including but not limited to:

1. Items not shown but necessary to provide a properly functioning system shall be included in this Work Scope.
2. Main power, power distribution, and emergency systems.
3. Required permits and inspections fees.
4. City and State required testing.

E. Fire-Stopping Assemblies occurring within and around drywall, concrete, and masonry assemblies: Provide firestopping for penetrations required by this Work Scope through fire rated assemblies and were indicated in accordance with requirements of Section 07 84 13.

F. Fire Alarm: This Work Scope is responsible for providing fire alarm devices, accessories, and wiring as indicated on the Construction Documents.

G. Temporary Partitions: This Work Scope is responsible for providing temporary walls during construction to separate the work and the occupants.

H. Demolition: This Work Scope is responsible for all demolition shown on the Drawings as it pertains to existing site features.

I. Concrete Slab Cutting and Patching: Furnish and install concrete slab cutting and concrete patching.

J. System Start-up: Start, test and adjust systems prior to completion.

K. Coordinate with Construction Manager for any Owner-supplied equipment.

L. Include all applicable fees.

M. Refer to Section 01 50 00 Temporary Facilities and Controls for additional information and temporary lighting and power requirements.

N. Sleeve: Layout, cutting openings, and setting sleeves and embeds required by this Work Scope.

1.03 SPECIAL COORDINATION OR INSTALLATION REQUIREMENTS

A. This Contractor shall provide all field measurement and layout work necessary for the completion of the contractor’s work.

B. This Contractor shall provide all equipment necessary for the completion of the contractor’s work, including scaffold, hoists, forklifts, and other equipment necessary for the completion of the work.

C. Multiple mobilizations as/if required to complete this scope of work

D. Acceptance of Substrates and Existing Conditions: This Contractor acknowledges starting work constitutes acceptance of existing conditions, preparatory work, and substrates that may affect the performance of this Work Scope.

E. Safety: Compliance and enforcement of site-specific safety programs.

F. Identification stickers must be worn by all Contractor Employees working on the project site.

G. Permits: The Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities. Unless otherwise provided under the Contract Documents, the Owner, assisted by the Construction Manager, shall secure and pay for the building permit.

H. Inspections: This Contractor shall coordinate all Federal, State and Local inspections required for this Project as it relates to this Work Scope, unless item is specifically identified as being provided by the Owner.

I. Warranty: Contractor shall provide all extended warranties required to meet the Contract Documents. Labor and material warranties shall start at Substantial Completion unless specifications require a special warranty for the equipment or material.

1.04 MATERIAL HANDLING AND STORAGE

A. Delivery and Receiving of Materials: Refer to Section 01 12 00 for additional requirements.

1. This Contractor shall receive, unload, sort, and distribute all materials pertaining to this work scope to individual work areas.

B. Material Storage: This Contractor shall coordinate material storage with the Construction Manager.

C. Hoisting: Refer to Section 01 12 00 for additional requirements regarding hoisting.

D. Special Protection: This Contractor shall take special care while working above other trades and to provide protection necessary to protect trades below from falling objects.

END OF SECTION 01 13 00.13 – WORK SCOPE No. 1

SECTION 01 22 00 – UNIT PRICES AND MATERIAL ALLOWANCES

PART 1: GENERAL

1.01 SUMMARY

A. This Section specifies administrative and procedural requirements for unit prices and allowances.

1. In the space indicated on the Bid Form, submit unit prices as required by this section and listed in the Unit Price Schedule. Only one value for each unit price will be allowed.
2. A unit price is a price per unit of measurement for materials or services that will be added to or deducted from the Contract Sum by Change Order in the event the quantities of Work required by the Contract Documents are increased, decreased, or exceeds the allowance.
3. Unit prices include all but not limited to necessary delivery, materials, labor, overhead, profit, insurance and applicable taxes.
4. Refer to individual Specification Sections for construction activities requiring the establishment of unit prices.

B. While unit prices are not to be used in the selection of the successful Bidder, they must be submitted and approved prior to execution of the Contract.

1. The Owner reserves the right to reject a unit price they deem unsatisfactory and to require a resubmittal.
2. The Owner reserves the right to reject the Contractor's measurement of quantities, and to have this Work measured by an independent surveyor or third party before accepting contract amount.

C. The Owner reserves the right to reject any bid that does not include a unit price or assign a unit price based on other bidders' unit prices.

D. Prior to utilizing any allowances, the Contractor will review the proposed utilization with the Construction Manager. If the utilization is approved of in writing, then the Contractor must coordinate all work for which it plans to utilize the allowance with the Construction Manager to ensure that the Construction Manager can observe and confirm the quantities utilized. Allowances include cost of all labor, equipment, material, receiving, handling, and installation as well as Contractor overhead and profit.

E. Allowances are considered part of the base bid contract and are in addition to amounts otherwise specified or stated in the Contract Documents or that are otherwise reasonably necessary to complete the Work.

F. Upon Substantial Completion, or earlier if it becomes clear than an allowance will not be utilized, the Contractor will execute a Change Order reducing the Contract Sum by the unused quantity allowance, multiplied by the applicable Unit Price.

G. NO CASH allowances for any purpose are included in the Project.

PART 2: PRODUCTS – (Not Applicable).

PART 3: EXECUTION

3.01 WORK SCOPE 1: GENERAL CONTRACTOR/SITE WORK – SCHEDULE OF UNIT PRICES AND CORRESPONDING QUANTITY ALLOWANCES

A. Unit Price No. WS-1-1: VCT Flooring
   1. Description: Provide replacement VCT flooring, including any required floor patching and prep of substrate to receive new flooring.
   2. Unit of Measurement: Per Square Feet
   3. Quantity Allowances: 200 SF

B. Unit Price No. WS-1-2: Acoustic Ceiling
   1. Description: Provide Acoustic Ceiling Tile and grid
   2. Unit of Measurement: Per Square foot
   3. Quantity Allowances: 200 SF

C. Unit Price No. WS-1-3: Self-Leveling Floor
   1. Description: Provide 1/2" thick cementitious self-leveling floor underlayment and primer including floor patching and preparation of substrate to receive new flooring.
   2. Unit of Measurement: Per Square Foot
   3. Quantity Allowances: 200 SF

D. Unit Price No. WS-1-4: Unsuitable Soils
   1. Description: Remove and legally dispose off-site, unsuitable soil encountered and replace with compacted 2A modified natural stone. All removal must be measured in situ by Construction Manager prior to and during removal.
   2. Unit of Measurement: Per Cubic Yard
   3. Quantity Allowances: 125 CY

E. Unit Price No. WS-1-5: Concrete Sidewalk
   1. Description: Provide exterior concrete sidewalk or flatwork including demolition (if required) and excavation and consisting of 4" compacted 2A modified stone base and 4" of 4000 PSI air entrained concrete
   2. Unit of Measurement: Per Square foot
   3. Quantity Allowances: 150 SF

F. Unit Price No. WS-1-6: Wall repair and painting
   1. Description: Provide additional preparation, drywall primer, and painting on drywall surfaces
   2. Unit of Measurement: Per Square foot
   3. Quantity Allowances: 200 SF

G. Unit Price No. WS-1-7: Demo HVAC Piping
   1. Description: Remove existing 4" insulated HVAC piping and accessories
   2. Unit of Measurement: Per Linear foot
   3. Quantity Allowances: 125 LF

H. Unit Price No. WS-1-8: Relocate ¾" Conduit and wiring
   1. Description: Provide for relocation of ¾" conduit with wiring. Furnish and install 30 linear feet of conduit, plus (16) #12 AWG THHN conductors. Provide for disconnection of existing 3/4" conduit, two junction boxes, disconnection, and reconnection of conductors after relocation.
   2. Unit of Measurement: 30-foot section
   3. Quantity Allowances: 4 Sections

I. Unit Price No. WS-1-9: Relocate 2" Conduit and wiring
   1. Description: Provide for relocation of 2" conduit with wiring. Furnish and install 30 linear feet of conduit, plus (4) #1/0 AWG THHN conductors
   2. Unit of Measurement: 30-foot section
   3. Quantity Allowances: 4 Sections

J. Unit Price No. WS-1-10: Fire Alarm Devices
   1. Description: Provide and install additional fire alarm audio/visual device assembly consisting of device, backbox, cabling, conduit, necessary wall or ceiling penetration cutting and patching, terminations, connections to fire alarm system required programming, and 100' of cabling
   2. Unit of Measurement: Each
   3. Quantity Allowances: 2 Devices

K. Unit Price No. WS-1-11: 2" Copper Piping
   1. Description: Provide 2" Type L copper piping including hangers and insulation
   2. Unit of Measurement: Per Linear Foot
   3. Quantity Allowances: 40 Linear Feet

L. Unit Price No. WS-1-12: Fire Wrap PVC Pipe
   1. Description: Provide fire wrap insulation on existing 4" PVC piping within plenum spaces
   2. Unit of Measurement: Per Linear Foot
   3. Quantity Allowances: 40 Linear Feet

M. Unit Price No. WS-1-13: Laborer
   1. Description: Provide journeyman Class 03 laborer at a fully burdened rate.
   2. Unit of Measurement: Per Hour
   3. Quantity Allowances: 20 Hours

N. Unit Price No. WS-1-14: Sheet Metal Worker
   1. Description: Provide journeyman Sheet Metal Worker at a fully burdened rate.
   2. Unit of Measurement: Per Hour
   3. Quantity Allowances: 20 Hours

O. Unit Price No. WS-1-15: Electrician
   1. Description: Provide journeyman Electrician at a fully burdened rate.
   2. Unit of Measurement: Per Hour
   3. Quantity Allowances: 20 Hours

END OF SECTION 01 22 00

SECTION 01 23 00 – ALTERNATES

PART 1: GENERAL

1.01 DESCRIPTION

A. This Section describes the limits of the requested alternates to the Contract work. Refer to the Product/Execution Articles of the appropriate Specifications and the Drawings for information pertaining to the work of each alternate.

B. Each proposal under an alternate shall include all incidental work and all adjustments necessary to accommodate the changes. All work shall meet the requirements of the Drawings, Specifications and appropriate details.

C. Submit each alternate proposal as an individual cost for the particular alternate. The alternate shall be proposed under the premise that no other alternates have been accepted. Should the work of an alternate called for by the Bid Form not affect the cost of the work, state "No Change" in the space provided. If an alternate is left blank, the Owner reserves the right to throw out the entire bid or interpret the alternate as "No Change".

D. Include taxes which are applicable to work involved in alternates as well as costs, if any, for increased coverage of bonds and insurance.

E. Any of the alternates may be accepted by Owner and will be used in determining the low bidder.

F. Owner may, at their option, vary the scope of the work by authorizing alternates which will add to the work, deduct from the work or substitute materials, equipment or methods.

G. Each Bidder shall examine the Drawings and Specifications to determine the extent to which their work is affected by bid alternates. Include in the space provided on the bid form the cost of any added or deducted work resulting from each alternate.

H. Contractor is responsible for providing work if applicable to each alternate, whether or not an added or deducted cost is included on their bid form.

PART 2: PRODUCTS (Not Used)

PART 3: EXECUTION

3.01 IMPLEMENTATION

A. If the Owner elects to proceed on the basis of one or more of the alternates, make all modifications to the Work required in the furnishing and installation of the selected alternate or alternates subject to the approval of the Architect at no additional cost to the

Owner except as proposed in the Bid.

B. Coordinate pertinent related work and modify surrounding work as required to properly integrate the work under each alternate, and to provide the complete construction required by Contract Documents.

C. If so stated in the Agreement, or modifications thereto, provide alternate materials, equipment and/or construction as specified.

3.02 ALTERNATES

1. **Alternate No**. 1**:** Provide all Work associated with the removal of the existing elevator and required new Work to convert the shaft into two storage rooms (one each floor) as outlined in the Construction Documents.
2. **Alternate No. 2A:** The Bidder shall state the adjustment in price to be added to the Base Bid to provide Work associated with providing an elevator manufactured by Otis and revising the existing elevator structure, power, etc. to accommodate the alternate stated manufacturer.
3. **Alternate No. 2B:** The Bidder shall state the adjustment in price to be added to the Base Bid to provide Work associated with providing an elevator manufactured by Schindler Elevator and revising the existing elevator structure, power, etc. to accommodate the alternate stated manufacturer.
4. **Alternate No. 3**: Provide card access for new elevator. Under this Alternate, the Bidder shall provide pathways and cabling to two card readers on the existing access control system to be provided by the Owner.

END OF SECTION 01 23 00

SECTION 01 26 00 – CONTRACT MODIFICATION PROCEDURES

PART 1: GENERAL

1.01 CONDITIONS OF THE CONTRACT

A. The Conditions of the Contract (General, Supplemental General Conditions or other Conditions) and the General Requirement Sections of Divisions 00-01 are hereby made part of this Section.

1.02 SUMMARY

A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications. Changes in the Project scope of work affecting the project will be made through Procore.

B. See General Conditions of the Work for methods of determining cost or credit, mark-up and schedule for submitting claims.

1.03 MINOR CHANGES IN THE WORK

A. Construction Manager or Architect will issue Supplemental Instructions (SI) which are used to authorize minor changes in the Work not involving adjustment to Contract Sum or time.

B. This no cost change is to be carried out in accordance with the modifications to the Contract Documents described therein. If this change effects cost, do not proceed with this change. Notify the Construction Manager in writing within 10 days of receipt that an itemized (labor and material) quotation will be submitted within 21 days of initial receipt of this Supplemental Instruction. If a cost is not submitted within 21 days, this Supplemental Instruction will be accepted at no additional cost.

1.04 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Construction Manager 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 Construction Manager 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 of receipt of Proposal Request, Contractor submit an itemized quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
c. Include costs of labor and supervision directly attributable to the change.
d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
e. If a cost is not submitted within 10 days, this Proposal Request can be accepted at no additional cost. Written approval is required prior to proceeding with this change.

B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Construction Manager.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Division 01 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

C. Proposal Request Form: For Change Order Proposals, use forms provided by the Construction Manager.

1.05 CHANGE ORDER PROCEDURES

A. The Construction Manager will review the Contractor’s labor and material itemized quotation and respond in writing whether it is acceptable, or needs revision. When all pricing is accepted by the Construction Manager and Owner, a Change Order will be processed. Change Orders will be processed at intervals determined by the Construction Manager throughout the construction schedule.

1.06 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive (CCD): The Construction Manager may issue a

Construction Change Directive to instruct the Contractor to proceed with a change in the Work for subsequent inclusion in a Change Order. The CCD contains a complete description of the change in the Work and designates a method to be followed to determine change in the Contract Sum or time.

a. Proceed immediately to carry out changes as directed in the issued CCD in the Contract Documents as described therein.
b. Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
c. 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 01 26 00

SECTION 01 29 00 – PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of each Prime Contract (Each Work Scope), including General Conditions and other Division 00-01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment. ICS utilizes Procore for the invoicing process.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule. The Schedule of Values are to be provided by the Contractor for entry into Procore.

1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:

   a. Application for Payment forms with Continuation Sheets.
   b. Submittals Schedule.

2. Provide the Schedule of Values information within template provided by Construction Manager at the earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
3. Sub-schedules: Where the Work is separated into phases requiring separately phased payments, provide sub-schedules showing values correlated with each phase of payment.

B. Format and Content:. Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least two line items (labor and material) for each Specification Section. If invoicing for shop drawings break that amount into a separate line item. Construction Manager will enter the Schedule of

Values within the “Commitments” section of Procore for use with the Project.

1. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
2. Round amounts to nearest whole dollar, total shall equal the Contract Sum.
3. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
4. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on site and items stored off site.
5. Allowances: Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
6. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
7. Temporary facilities and other major cost items that are not direct costs of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
8. Schedule Updating: Update and resubmit the Schedule of Values before the next Application for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

A. Procore’s “Invoicing” tool to be utilized

1. CPM will issue an Invitation to Bill monthly.
2. Under the “Do you want to bill this period,” area, choose the following:

    i. If you want to submit the invoice, click Yes. Then click Post Response and continue with step 3. OR
    ii. If you are not ready to submit the invoice, click No. Then click Post Response.

3. At the Create New Invoice page in Procore, the Period Start, Period End and Billing Date is pre-filled with what the CPM set. Enter the invoice number.
4. In the Detail section, enter either your percent complete or amount complete for each line item in your original Schedule of Values
5. Enter the materials presently stored amount. This will be added to the percent complete for each line item. Reference Stored Material requirements within the specifications.
6. In the Approved Commitment Change Orders section, repeat the process for each change order’s line items by entering the percent or amount complete for

each line item. Any new approved change orders will automatically be added at this location.

7. Pencil copies shall be submitted through Procore's "Invoicing" tool for Construction Manager and/or Construction Manager review, no later than the 15th of each month forecast for work performed to the end of the month.
8. Once pencil copies are approved, attach required backup documentation; at a minimum, a signed, notarized copy of the application. Contact the CPM to determine if additional documentation is required.
    - How to export the Pay Application in Procore:
        i. Click Save
        ii. Click Export and select PDF
        iii. Sign the PDF
        iv. Return to Procore and select the Summary Tab
        v. Click Edit
        vi. Attach the signed PDF's

B. Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect, Construction Manager and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.

C. Payment Application Times: The date for submission of each application for payment is the 25th day of each month. The period covered by each Application for Payment ends on the FINAL day of each month. Pencil copies of applications for payment shall be submitted in advance for review by Architect, Owner, and Construction Manager no later than the 20th day of each month. All payment applications must comply with project scheduling requirements. These dates are subject to change for the duration of the Project by the Owner prior to the first application for payment. No faxed, emailed or mailed, Applications for Payment will be accepted. The period of Construction Work covered by each Application for Payment is the period indicated in the Agreement.

D. Accuracy – All Payment Applications must accurately reflect work completed through the end of the month. Any Payment Application deemed inaccurate by the Construction Manager will be rejected in its entirety.

E. Monthly payments will be made per Section 5.1 of the A132-2019. Retainage will be held in accordance with Article 9.3. of Section 00 72 00, General Conditions. Payment will be made for material stored on the project site, and material stored off the project site with prior agreement.

F. Payment Application Forms: Procore's preset AIA form to be utilized.

G. Application Preparation: Complete every entry in Procore. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Construction Manager will return incomplete applications without action.

1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

H. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on site and items stored off site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:
4. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
5. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
6. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

I. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of Values.
3. Contractor's Construction Schedule (preliminary if not final).
4. Products list.
5. Schedule of unit prices.
6. Submittals Schedule (preliminary if not final).
7. List of Contractor's staff assignments.
8. List of Contractor’s principal consultants
9. Copies of building permits.
10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
11. Initial progress reports.
12. Report of pre-construction conferences.
13. Initial settlement survey and damage report if required.

The first payment application will not be processed unless these, and any other items required by the Construction Manager or Architect, are processed.

J. A separate Application(s) for Payment shall be submitted for when reduction in retainage is requested shall be submitted along with AIA Document G707A-1994, "Consent of Surety to Reduction or Partial Release of Retainage" and surety’s executed

appropriate Power of Attorney.

K. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment.

1. This Application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
2. Administrative actions and submittals that shall precede this Application include:

    a. Occupancy permits and similar approvals. Warranties (guarantees) and maintenance agreements.
    b. Test/adjust/balance records.
    c. Maintenance instructions.
    d. Meter readings.
    e. Startup performance reports.
    f. Changeover information related to Owner's occupancy, use, operation and maintenance.
    g. Final clean
    h. Application for reduction of retainage and consent of surety to reduction of retainage.
    i. List of incomplete Work, recognized as exceptions to Construction Manager's Certificate of Substantial Completion. Provide Operation and Maintenance (O+M) materials or supplies listed in all pertaining Specification Sections.

L. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted. Administrative actions and submittals that must precede the final Application for Payment include the following:

1. Evidence of completion of Project closeout requirement.
2. Certification of completion of final punch list items.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706-1994, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A-1994, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707-1994, "Consent of Surety to Final Payment."
7. Completion of items specified for completion after Substantial Completion.
8. Evidence that claims have been settled.
9. Ensure that incomplete Work will be completed without undue delay.
10. Transmittal of required Project construction records to the Construction Manager, including As-Builts, warranty, O+M's.
11. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
12. Removal of temporary facilities and services.
13. Removal of surplus materials, rubbish, and similar elements.
14. Final, liquidated damages settlement statement.
15. Any other waivers and releases as required.

Part 2 - PRODUCTS (Not Used)

Part 3 - EXECUTION (Not Used)

END OF SECTION 01 29 00

SECTION 01 30 00 – ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 CONDITIONS OF THE CONTRACT

A. The Conditions of the Contract (General, Supplemental General Conditions or other Conditions) and the General Requirement Sections of Divisions 00-01 are hereby made part of this Section.

1.02 SUMMARY OF SECTION

A. Coordination
B. Site mobilization meeting
C. Progress Meetings
D. Construction Schedule
E. List of Subcontractors
F. Shop drawings, product data, samples, test reports
G. Submittal Procedures
H. Contractor Review
I. List of Materials
J. Guarantees and Warranties
K. Instruction Manuals
L. Record Set of Drawings

1.03 COORDINATION

A. Coordinate construction organization and start-up:

1. Prior to construction mobilization, submit to the Construction Manager a detailed "Plan for use of the site", indicating location and access to field offices, work/storage areas, parking, road access, staging areas, temporary facilities, etc.
2. Establish on-site lines of communication.
3. Verify that their Subcontractors have obtained all permits and inspections for their work.

B. Coordinate a pre-construction meeting with Construction Managers, Building Officials, Engineer, and major subcontractors prior to on-site work.

C. Coordinate submittals, tracking logs, scheduling, and work with other contractors to ensure efficient and orderly sequence of installation of interdependent construction systems.

D. After Owner occupancy of premises, coordinate access to site for correction of

defective work or work not in accordance with contract documents, to minimize disruption of Owner's activities.

1.04 SITE MOBILIZATION MEETING

A. Schedule a meeting at the project site or other convenient location prior to the start of construction.

B. Attendance is required by Contractor, Owner, Construction Manager, Engineer, Contractor's Superintendent, and Major Subcontractors.

C. The meeting agenda shall include, but is not limited to: Use of site, Owner's requirements, Temporary facilities, Survey and building layout, Security and housekeeping procedures, Construction schedule, Application for payment procedures, Procedures for testing, Requirements for maintaining record documents, and Requirements for equipment start-up.

D. Construction Manager is to record minutes and distribute copies within four days after meeting.

1.05 PROGRESS MEETINGS

A. Regular progress meetings shall be conducted at the project site with representatives of the Owner, Construction Manager, Engineer, and the Contractor including their principal subcontractors. The agenda will be to review: timely submittals, items of significance that could affect progress, progress since the last meeting, and determine where each activity is in relation to the Construction Schedule. Meeting Minutes will be taken and distributed by the Construction Manager.

1.06 CONSTRUCTION SCHEDULE

A. Submit initial progress schedule to Construction Manager within ten (10) days after the Notice to Proceed. The Construction Manager will review schedule and return reviewed copy within seven (7) days after receipt. If required, revise and resubmit within seven (7) days after return of reviewed copy. One copy of construction schedule to be maintained at the site. Indicate the completion date within the contract time.

B. The Contractor shall update the construction schedule bi-weekly during construction to conform to the current status of the work and give timely notice to all parties as necessitated by revisions. Submit revised construction schedule at each progress meeting, identifying changes since previous version.

C. Format of the construction schedule shall be computerized as Precedence Diagram Method Network using: Horizontal bar chart, provide a separate line for each major section of work or operation, provide horizontal time scale, identifying first workday of each week, and identify construction activities by major

specification numbers and titles.

D. The content of the schedule shall:

1. Show the complete sequence of construction by activity.
2. Show the early and late start dates, early and late finish dates, float time, and duration of each activity.
3. Show estimated percentage of completion for each activity.
4. Show submittal dates required for shop drawings, product data, samples, and product delivery dates, including items furnished by Owner.

E. Distribute copies of reviewed schedules to the Engineer, Construction Manager, Owner, Subcontractors, and those affected by decisions made.

1.07 LIST OF SUBCONTRACTORS

A. Within ten (10) business days after the Notice to Proceed, the Contractor shall submit three (3) copies of a complete list of all work they propose to subcontract. The list shall include Specification Division, or Section, full legal name, address, telephone numbers and name of contact for this project. No subcontracts shall be executed until the proposed list of subcontractors is accepted by Owner, Construction Manager, and Engineer.

1.08 SHOP DRAWINGS / PRODUCT DATA

A. All shop drawings, submittals and product data will be completed in electronic format through the use of Procore which is a web-based Project Management solution. Access to the web-based Project Management Software solution will be given to each individual by the Construction Manager. Submittals will be assigned and sent directly to the Construction Manager after Contractor has reviewed, stamped, and verified the information is per specification and drawings.

B. Electronic Transmittal Form(s) will include:

a. Title
b. Specification Section Number
c. Manufacturers Name
d. Any notes from the Supplier or Contractor of special interest to Engineer
e. Anticipated Lead time (after approval) of product
f. Date Shop Drawing is due back (default is set at 10 days)
g. Approvers Selected
h. Distribution List Selected

C. Preparation of product data submittal:

a. Mark each copy to identify applicable products, models, options, and other data
b. Show dimensions or clearances required
c. Show wiring or piping diagrams and/or controls

d. Modify drawings and diagrams to delete information that is not applicable to the work

D. Use only the shop drawings bearing the Engineer review stamp for construction.

E. After review, reproduce and distribute in accordance with the General Conditions.

1.09 SAMPLES AND FIELD MOCK-UPS

A. Submit samples that illustrate characteristics of the product including finishes from the full range of manufacturer's standard colors, textures, and patterns or as specified, for Engineer review and selection.

B. Field mock-ups shall be erected at the project site at a location acceptable to the Engineer and/or Construction Manager in a size as specified in the respective specification section. Remove mock-ups at conclusion of work or when acceptable to the Engineer and/or Construction Manager.

1.09.1 TEST REPORTS

A. When specified in individual specification sections, submit independent testing laboratory reports and certifications in duplicate where indicated for materials and products.

1.09.2 SUBMITTAL PROCEDURES

A. All Submittals shall be accompanied by transmittal letter containing:

a. Section Number(s)
b. Submittal Description
c. Manufacturer's Name
d. Any notes from the Supplier or Contractor of special interest to Engineer
e. Anticipated Lead time (after approval) of product

B. All submittals shall include: Project title, Date and revision dates, Names of the Contractor/Subcontractor, Identification of product or material, Field dimensions, Applicable drawings sheet and detail numbers or specification section numbers and pages, A blank space of 16" for reviewer's stamp.

C. Schedule submittals to expedite the project and coordinate submission of related items. The Engineer will promptly notify the Contractor when a submittal being processed must be delayed for coordination with a related submission.

D. Allow at least 14 calendar days for Engineer's review following receipt of a submittal.

E. Distribute copies of reviewed submittals for coordination of other contractors.

F. No extension of Contract Time will be authorized because of failure to transmit

submittals to the Engineer sufficiently in advance of the work to permit processing.

1.09.3 CONTRACTOR REVIEW

A. Contractor shall review submittals prior to submission. Submittals not reviewed or not bearing Contractor's certification of their review will not be reviewed or processed by the Engineer and will be returned to the Contractor.

B. Contractor shall be responsible for details and accuracy, for confirming and correlating quantities and dimensions, for selection of fabrication processes, for techniques of assembly, for coordination of work between trades and for performing work in a safe manner.

C. Contractor shall determine and verify field dimensions, field construction criteria, catalog numbers, completeness, and conformance of submittal with requirement of contract documents.

D. Make submittals in groups containing all related systems, devices, equipment, and products to ensure that information is available for checking each item when it is received. Partial submittals may be rejected as not complying with the provisions of the Contract Documents and the Contractor shall be strictly liable for all delays.

1.10 LIST OF MATERIALS

A. Refer to Section 00 72 00 - General Conditions as follows:

B. Within ten (10) days after the award of the contract (notice to proceed), the Contractor shall submit a complete list of all materials, products, and equipment proposed to be used in construction to the Engineer for acceptance. Materials shall not be ordered until the proposed listed materials, products and equipment proposed to be used in construction are reviewed and accepted by the Construction Manager.

C. Where two or more makes or kinds of items are named in the specifications (or additional names are called for in an addendum), the Contractor shall state which particular make or kind of each item they propose to provide. If the Contractor fails to state a preference, the Owner shall have the right to select any of the makes or kinds named without change in price.

D. This list shall be arranged in order of specification sections. The items listed shall fully conform to project requirements and specifications. All materials are subject to the Engineer's acceptance. After acceptance, there shall be no changes or substitutions.

E. The list shall clearly identify the material, product or equipment by manufacturer and brand by listing the names, for all items, including those where only one material or product is specified. All material, products and equipment shall be specifically named, not listed “as specified”.

1.10 GUARANTEES AND WARRANTIES

A. Refer to Section 00 72 00 - General Conditions.
B. Special Warranties: Contractor shall complete all manufacturers' warranty registrations and shall submit to Owner.

1.11 INSTRUCTION MANUALS

A. For all items of mechanical equipment and electrical apparatus, the Contractor shall obtain from the manufacturer and furnish to the Engineer or Construction Manager two (2) hard copies and two (2) electronic copies of the following:

1. Operating instructions.
2. Parts lists (including name and address of nearest vendor or service agent).
3. Maintenance instructions.
4. Shop Drawings.

B. These items are separate from and in addition to the operating placards required to be attached to or posted near the equipment.

C. Contractor shall provide field instruction to Owner's personnel as required to fully instruct them in correct operating and maintenance procedure, for all equipment installed under this contract.

D. Manual shall be submitted in 8-1/2" x 11" form in adequately sized three (3) ring loose leaf binders with entire contents indexed and thumb-tabbed. Two copies of the binder shall also be submitted on CD or Flash Drive.

1.12 RECORD SET OF DRAWINGS

A. Contractor shall provide the record set of drawings to the Construction Manager at the completion of Contract.

B. During construction, Contractor shall maintain a clean set of drawings for the sole purpose of recording changes and actual "as installed" information.

C. As a general guide, the type of information to be recorded on the record set includes: (1) changes, deviations or revisions made, except minor or non-critical dimensions, including those made by Change Order or Supplementary Instructions; (2) omissions, including work omitted by accepted alternates; (3) dimensioned locations of major or main utility lines, such as main conduit runs, piping mains and similar work; (4) locations of control valves; (5) additions to the work; (6) changes in significant details; (7) changed footing or other elevations; (8) changes in locations of panel boards, outlets, drains, piping, opening, dampers and similar features; (9) other similar data.

D. Record Set will be one (1) hard copy and two (2) electronic copies such as removable storage device.

PART 2- PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 30 00

SECTION 01 31 26 – ELECTRONIC COMMUNICATION PROTOCOLS

PART 1: GENERAL

1.01 SUMMARY

A. The Architect will provide the Contractor with one (1) electronic copy of the background drawing at their request. Requested files will be provided via email to the Contractor in AutoDesk AutoCAD format.

B. The terms and conditions on the attached form "Agreement Between Architect and Contractor for Transfer of Computer Aided Drafting (CAD) Files on Electronic Media" apply to all Electronic Documents issued by SCHRADERGROUP Architecture, LLC or its consultants for the project.

1. Exceptions:

a. For access to electronic documents by Structural Engineer, SCHRADERGROUP Architecture, the Contractor will need to sign an additional Agreement for Electronic File Transfer that can be made available upon request.
b. For access to electronic documents by Mechanical/ Electrical Engineer, Synder Hoffman Associates, Inc., Contractor will need to sign an additional Agreement for Electronic File Transfer that can be made available upon request.
c. For access to electronic documents by other consultants on the project, the Contractor may need to sign an additional Agreement for Electronic File Transfer that can be made available upon request.

C. Electronic Document Availability

1. Pre Bid: AutoCAD backgrounds pertaining only to Survey and/or proposed grading will be available prior to bid. Requesting Contractors must complete "Attachment A - Agreement Between Civil Engineer and Contractor for Transfer of Computer Aided Drafting (CAD) Files on Electronic Media" at time of request.
2. After Bid: Backgrounds as requested by the awarded contractors are provided at the discretion of the Architect or Engineer. Electronic Documents are available upon completion of "Attachment A - Agreement Between Architect and Contractor for Transfer of Computer Aided Drafting (CAD) Files on Electronic Media" by the Construction Manager on project.

D. See attached form "Attachment A – Agreement Between Architect and Contractor for Transfer of Computer Aided Drafting (CAD) Files on Electronic Media."

PART 2: PRODUCTS – (Not Applicable)

PART 3: EXECUTION **–** (Not Applicable)

END OF SECTION 01 31 26

ATTACHMENT A – AGREEMENT BETWEEN ARCHITECT AND CONTRACTOR FOR THE TRANSFER OF COMPUTER AIDED DRAFTING (CAD) FILES ON ELECTRONIC MEDIA

SIMMONS ELEMENTARY SCHOOL ELEVATOR ADDITION

The purpose of this agreement is to grant permission from the Transmitting Party (Architect and/or Engineer) to the Receiving Party for the Receiving Party's use of electronic media on the Project, and to set forth the terms. All data transmitted is defined as the electronic media and is considered confidential and containing business proprietary information. SCHRADERGROUP Architecture, LLC and its consultants grant Bidders and Contractors a limited license to use Electronic Media issued by SCHRADERGROUP Architecture, LLC exclusively for this project. The terms are set forth as follows:

1. The files are transmitted for the Receiving Party's convenience and remain the sole property of SCHRADERGROUP Architecture, LLC and/or its consultants. No warranty, expressed or implied, is made respecting this electronic data.

2. The Architect and/or Engineer makes no representation regarding the accuracy, completeness, or permanence of Electronic Media files (ie CAD files). Addenda information or revisions made after the date indicated on the files may not have been incorporated. In the event of a conflict between the Architect and/or Engineers sealed Contract Drawings and Electronic Media files, the sealed Contract Drawings shall govern. It is the Owner, Contractor, or Third Party's responsibility to determine if any conflicts exist.

3. The information contained in the Electronic Media may not include final data or represent exact as-built conditions. The accuracy of the information is not guaranteed and the recipient shall be solely responsible to verify and check all field conditions against the information and to make all adjustments necessary to utilize such information for its work.

4. The Electronic Media files shall not be considered to be Contract Documents as defined by the General Conditions of the Contract for Construction.

5. SCHRADERGROUP Architecture, LLC and their consultants shall not be responsible for any decline in accuracy or readability due to the medium on which the Electronic Media are stored, or for any unintentional transmission of computer viruses.

6. Information contained in the Electronic Media shall not be used by Contractor (Receiving Party) for any purpose other than as a convenience in the preparation of Shop Drawings, layout, and other purposes related to the Project. Any other use or reuse by the Receiving Party or others, will be at the Receiving Party's sole risk and without liability or legal exposure to the Architect, Engineers, or their consultants.

7. This Agreement is entered into as of the day and year written below and will terminate upon Substantial Completion of the Project, as defined in the General Conditions of the Contract for Construction, unless otherwise agreed by the parties and set forth below.

8. The Architect reserves the right to determine what content will be distributed to the Receiving Party.

By signing below, the Receiving Party agrees to the terms set for by this Agreement.

AUTHORIZED ACCEPTANCE:

By Receiving Party/Contractor of Record

_____
Signature

_____
Print Name and Title

_____
Print Name of Company

_____
Date

SECTION 01 32 10.00 - PROJECT SCHEDULE REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Project schedule requirements.

1.02 COORDINATION

A. Contractor shall coordinate scheduling with the Construction Manager. In particular, the Contractor shall provide close coordination of progress schedule, schedule of values, listing of subcontractors, schedule of submittals, progress reports and payment requests.

B. Close coordination will be required between all construction trades in order that individual areas of construction can be completed by their scheduled time. Consult the proposed construction sequence schedule for start and completion dates of individual work areas.

1.03 PRELIMINARY SCHEDULE

A. Construction Manager has developed a Preliminary Schedule included at the end of this section, showing work areas of the project, which directly impacts the orderly use of the facility during construction. The timing of these activities has been approved by the Owner.

B. The Preliminary Schedule may not list the work completely and may vary from the drawings and specifications.

1.04 CONSTRUCTION SCHEDULE

A. The Contractor shall computerize a Critical Path Method (CPM) using data supplied by the subcontractors. The Contractor will be responsible for their own methods and procedures and the performance of the work consistent with good practice.

B. Neither the Construction Manager nor the Owner warrants the information supplied by the Contractors is accurate or correct or that the project can be performed as scheduled based upon data supplied by the Contractors.

C. Contractor shall be responsible for providing all data to develop, update, and maintain the schedule. The Contractor shall supervise all work activities to maintain progress in accordance with the schedule.

D. Contractor and Subcontractor shall provide their own data reflecting the actual plan of operation for the Project.

E. Schedule input data shall include a comprehensive list of all activities of the construction phase of the project, including submittals (shop drawings, samples, product data), procurement of material, and on-site activity (erection, installation, construction). Activities for procurement of materials shall be included to delineate between material purchasing and fabrication/delivery.

F. Contractor shall assign durations and sequencing to each activity. Submittal activities shall be listed with the anticipated date of submittal. Procurement activities shall be listed with the duration required for fabrication and delivery from date of purchase.

G. Construction Manager will guide the Contractor in determining the level of detail to be included in the PDM Networks. The schedule shall be adequate enough to evaluate progress, cost of work in place and serve as a control technique for the Contractor's Field Superintendent.

H. Contractor and subcontractors shall be obligated to perform in accordance with the Construction Schedule and to participate in updating the schedule. The Contractor shall include provisions in all subcontracts binding Subcontractors to participate in revisions of the schedule as are necessary, and to supply data throughout the project.

I. Upon request, Contractor shall submit to Construction Manager purchase orders and subcontracts. Such information shall be submitted as soon as available so the Construction Manager will be aware of the progress being made by the Contractor in the placing of orders and the status of material. Contractor shall be solely responsible for expediting the delivery of all material furnished by them and coordinating their subcontractors so construction progress shall be maintained according to Contract Schedule.

1.05 COMPLIANCE WITH THE CONSTRUCTION SCHEDULE

A. If Contractor shall fail to adhere to the Construction Schedule, or to the said schedule as revised, they must promptly adopt such other or additional means and methods of construction as will make up for the time lost and will assure completion of the work in accordance with said Construction Schedule at no additional cost to the Owner, except in accordance with the provision of the contract governing such costs. If Owner or Construction Manager notifies Contractor of any change in the contract or any extra work performed, or if any other conditions arise which are likely to cause delays, Contractor shall notify the Construction Manager in writing within five (5) days of the receipt of such notice or occurrence of such condition. This notice shall document the effect, if any, of such change, or extra work, of suspension or other condition upon the Construction Schedule. No time extensions will be granted due to a delay in any activity unless Owner deems the length of the delay exceeds the float time associated with the activity at the time the delay occurs.

B. Refer to Section 00 52 13, Agreement between Owner and Contractor, Article 4.5 for liquidated damages clause as a Contractor's result of failing to meet the Project schedule.

1.06 FLOAT TIME

A. Contractor, in directing the compliance with Construction Schedule shall cooperate with the Owner and the Construction Manager in utilizing float time. Full control over use of total float time in the Schedule rests with the Owner and will be utilized by them in any necessary rescheduling of the Construction Schedule occasioned by design changes, field conditions, strikes, Acts of God, or unavoidable equipment and material delays. If rescheduling of any activity adversely affects the Contractor's operation, they shall advise the Construction Manager in writing no later than five (5) days after the receipt of the revised schedule or Notice of Intent to revise the schedule.

1.07 PRELIMINARY SCHEDULE DATES

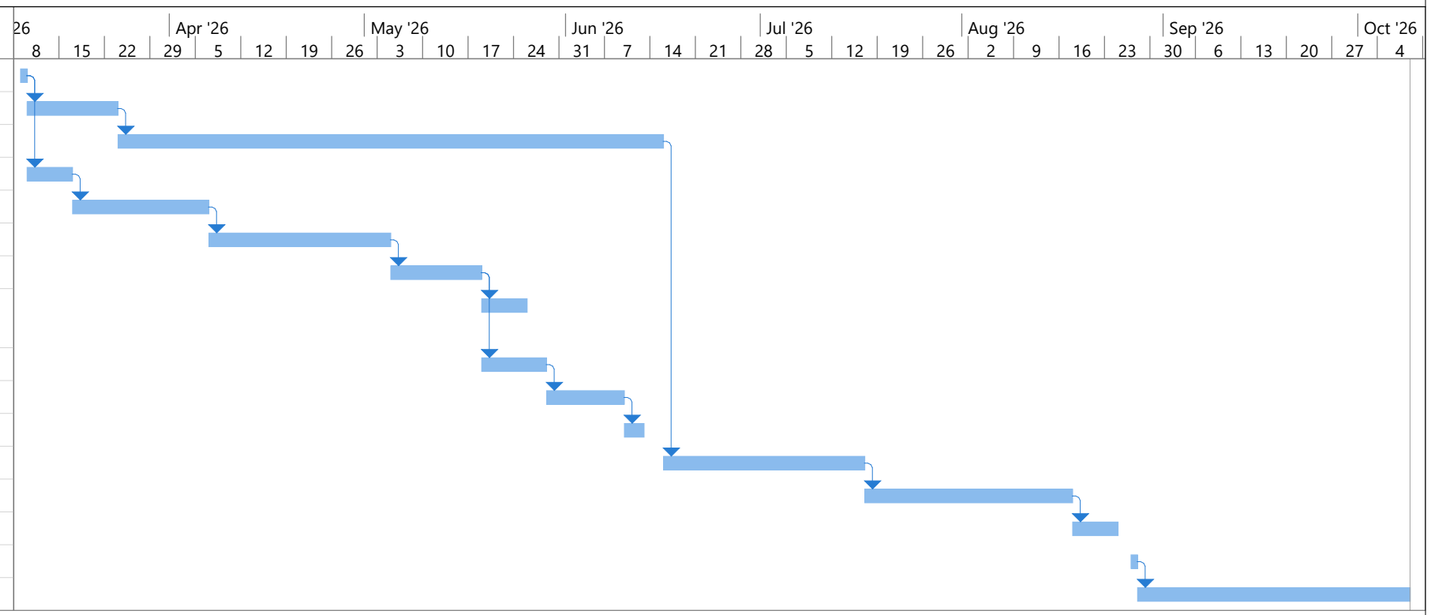
A. Work will begin after receipt of the Notice to Proceed. The anticipated Award date will be February 23, 2026. Pre-construction and submittals work related to the project is to commence immediately after letter of intent is received.

B. See complete milestone schedule that follows this Section and is included in the documents as Section 01 32 10.01, Simmons ES Elevator Addition Project Milestone Schedule, dated December 22, 2025.

END OF SECTION 01 32 10

HHSD Simmons ES Elevator Addition Milestone Schedule

ID	Task Mode	Task Name	Duration	Start	Finish
1		Anticipated Notice to Proceed	1 day	Mon 3/9/26	Mon 3/9/26
2		Submittals - Long Lead Items	10 days	Tue 3/10/26	Mon 3/23/26
3		Elevator Fab/Deliver	60 days	Tue 3/24/26	Mon 6/15/26
4		Mobilization	5 days	Tue 3/10/26	Mon 3/16/26
5		Site Work & Foundation Work	15 days	Tue 3/17/26	Mon 4/6/26
6		Shaft & Tower Construction	20 days	Tue 4/7/26	Mon 5/4/26
7		Roof Work	10 days	Tue 5/5/26	Mon 5/18/26
8		Temporary Partitions & Demo Existing Conditions	5 days	Tue 5/19/26	Mon 5/25/26
9		Interior Carpentry & Ceiling Work	8 days	Tue 5/19/26	Thu 5/28/26
10		Electrical & Mechanical Rough Ins	8 days	Fri 5/29/26	Tue 6/9/26
11		Install Flooring	3 days	Wed 6/10/26	Fri 6/12/26
12		Elevator Equipment Installation	23 days	Tue 6/16/26	Thu 7/16/26
13		Exterior Finishes & Tie Ins	22 days	Fri 7/17/26	Mon 8/17/26
14		Elevator Inspections	5 days	Tue 8/18/26	Mon 8/24/26
15		Substantial Completion	1 day	Thu 8/27/26	Thu 8/27/26
16		Final Completion	30 days	Fri 8/28/26	Thu 10/8/26



Date: 12/22/25

Task	Project Summary	Manual Task	Start-only	Deadline			
Split	Inactive Task	Duration-only	Finish-only	Progress			
Milestone	Inactive Milestone	Manual Summary Rollup	External Tasks	Manual Progress			
Summary	Inactive Summary	Manual Summary	External Milestone				

SECTION 01 33 00 – SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of each Prime Contract (Each Work Scope), including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Related Sections include the following:

1. Division 01 Section "Payment Procedures" for submitting Applications for Payment.
2. Division 01 Section "Closeout Procedures" for submitting warranties and Project Record Documents.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Engineer's responsive action.

B. Informational Submittals: Written information that does not require Architect's approval. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

A. General: Prepare and submit Action Submittals required by individual Specification Sections.

B. Submit each submittal online, via Procore, where the Construction Manager, and/or Engineer will review and return electronically to the contractor. Mark up and retain one (1) returned copy as a Project Record Document.

C. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal via Procore with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of a need to review submittals concurrently for coordination.

a. Construction Manager/Engineer or Architect reserves the right to

withhold action on a submittal requiring coordination with other submittals until related submittals are received.

D. Submittals Schedule: Comply with requirements in Division 01 for list of submittals and time requirements for scheduled performance of related construction activities.

E. Processing Time: Allow enough time for submittal review, including time for resubmittals. Construction Manager / Engineer shall have 3 weeks collectively to return submittal reviews.

F. Identification: Place a permanent label or title block on each submittal for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 4 by 5 inches (100 by 125 mm) on label or beside title block to record Contractor's review and approval markings and action taken by Engineer.
3. Include the following information on label for processing and recording action taken:

    a. Project name.
    b. Date.
    c. Name and address of Engineer.
    d. Name and address of Contractor.
    e. Name and address of subcontractor.
    f. Name and address of supplier.
    g. Name of manufacturer.
    h. Unique identifier, including revision number.
    i. Number and title of appropriate Specification Section and paragraphs.
    j. Drawing number and detail references, as appropriate.
    k. Other necessary identification.

G. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals. No substitutions will be accepted without approval by addendum prior to bid.

H. Additional Copies: Unless additional copies are required for final submittal, and unless Engineer observes noncompliance with provisions of the Contract Documents, initial submittal may serve as final submittal.

1. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies (if applicable) via Procore.
2. Additional copies submitted for maintenance manuals will not be marked with action taken and will be returned.

I. Transmittal: Package each submittal individually and appropriately for transmittal and handling via the required submittal log within Procore. Construction Manager/Engineer will return submittals, without review, that are received from sources other than assigned Contractor.

1. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by

Construction Manager/Engineer on previous submittals, and deviations from requirements of the Contract Documents, including minor variations and limitations. Include the same label information as the related submittal.

2. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.

J. Distribution: Furnish copies (if required) of final submittals to manufacturers, subcontractors, suppliers, fabricators, and installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

K. Use for Construction: Use only final submittals with mark indicating action taken by Construction Manager/Engineer in connection with construction.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections.

1. Submit each submittal online with cover sheet as indicated above, via Procore, where the Construction Manager and/or Engineer will review and return electronically to the contractor. Mark up and retain one (1) returned copy as a Project Record Document.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment. Submit individually as identified with Procore.

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

a. Manufacturer’s written recommendations.
b. Manufacturer's product specifications
c. Manufacturer’s installation instructions.
d. Standard color charts.
e. Manufacturer’s catalog cuts.
f. Wiring diagrams showing factory-installed wiring.
g. Printed performance curves.
h. Operational range diagrams.
i. Mill reports.
j. Standard product operating and maintenance manuals.
k. Compliance with recognized trade association standards.
l. Compliance with recognized testing agency standards.
m. Application of testing agency labels and seals.
n. Notation of coordination requirements.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Include the following information, as applicable:

a. Dimensions.
b. Identification of products.
c. Fabrication and installation drawings.
d. Roughing-in and setting diagrams
e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
f. Shopwork manufacturing instructions.
g. Templates and patterns.
h. Schedules.
i. Design calculations.
j. Compliance with specified standards.
k. Notation of coordination requirements.
l. Notation of dimensions established by field measurement.

2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
3. Submit electronic copies of each submittal and cover sheet, unless prints are required for operation and maintenance manuals. Submit four (4) prints where prints are required for operation and maintenance manuals. Construction Manager/Engineer and CM will each retain one (1) print; remainder will be returned. Mark up and retain one (1) returned print as a Project Record Drawing.

D. Samples: Prepare physical units of materials or products, including the following:

1. Comply with requirements in Division 1 Section "Quality Requirements" for mockups.
2. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
3. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.

a. If variation in color, pattern, texture, or other characteristic is inherent in the product represented by a Sample, submit at least three sets of paired units that show approximate limits of the variations.

1. Provide sample substitutions where applicable if samples do not meet standards or are not approved due to an issue with quality, quantity, etc.

b. Refer to individual Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, and details of

assembly, connections, operation, and similar construction characteristics.

4. Number of Samples for Initial Selection: Submit one (1) full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Engineer will return submittal with options selected.
5. Disposition: Maintain sets of approved Samples at Project site, available for quality- control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

    a. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

PART 3 – EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.

B. Approval Stamp: Stamp each submittal with a uniform approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 CONSTRUCTION MANAGER'S/ENGINEER'S ACTION

A. General: Construction Manager/Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Construction Manager/Engineer will review each submittal, make marks to indicate corrections or modifications required, and return it within 3 weeks. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.

C. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION 01 33 00

SECTION 01 40 00 – QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Drawings and general provisions of each Prime Contract (Each Work Scope), including General and Supplementary Conditions and Division 01 Specification Sections apply to this Section.

B. This section specifies the general requirements for testing and inspection services.

C. Cooperate with Owner's testing laboratory and all others responsible for testing and inspecting the Work.

D. Provide other testing and inspecting as specified to be furnished by the Contractor in this Section and/or elsewhere in these Specifications.

E. Provide quality control by the observation and acceptance of work by others being built upon.

F. Related work described elsewhere:

1. See Divisions 02 through 49 for specific test and inspection requirements.
2. Where no testing requirements are described, but the Engineer/Architect and/or Construction Manager decides that testing is required, they may direct that such testing be performed under current standards for testing and the General Conditions.

G. Selection of testing laboratory: The Owner shall hire and pay for an independent testing laboratory.

1.02 CODES AND STANDARDS

A. Testing, when required, will be in accordance with pertinent codes and regulations and with selected standards of the American Society for Testing and Materials (ASTM).

1.03 REVIEW OF THE CONTRACT DOCUMENTS

A. On all Project Drawings, figures take precedence over measurement by scale, and any scaling is done at the Contractor's own risk. Before ordering any materials or performing any Work, the Contractor shall verify all measurements at the project site and be responsible for the correctness of same.

B. Promptly respond to test reports and related instructions to ensure necessary retesting and replacement of materials with the least possible delay in progress of the Work.

1.04 FIELD CONDITIONS

A. The Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions with the Contract Documents and any shop drawings and product data before commencing any related work. Errors, inconsistencies, or omissions shall be reported to the Engineer/Architect and/or the Construction Manager at once.

1.05 PAYMENT FOR TESTING

A. Initial Services: The Owner's Testing Laboratory shall be responsible for initial testing services as outlined in various sections and the General Conditions.

B. Re-Testing Services: When initial tests indicate non-compliance with the Contract Documents, all subsequent retesting occasioned by the non-compliance shall be performed by the same testing agency and the costs thereof will be borne by the Contractor responsible for the work that is non- compliant.

1.06 TESTING

A. Code Compliance Testing: Inspections and tests required by codes or ordinances, or by a plan approval authority, and which are made by a legally constituted authority, shall be the responsibility of and shall be paid for by the Contractor, unless otherwise provided in the Contract Documents.

B. Contractor's Convenience Testing: Inspecting and testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

1.07 INSPECTION

A. Inspection by Owner's Personnel: From time to time, personnel in the employ of the Owner may inspect the Work where the Work is in progress, but shall have no authority to direct the Contractor or request changes in the Work except through the Engineer/Architect and/or the Construction Manager.

B. Inspection of Work by Others: Each Contractor shall inspect Work of others which will receive or is adjacent to his Work before commencing his Work. Do not proceed until conditions which would result in a less than first class installation are satisfactorily corrected. Commencing Work shall be construed as acceptance of the Work of others, by the Contractor, as satisfactory to receive his Work. The Contractor shall bear all costs to correct the unsatisfactory Work.

1.08 COOPERATION WITH TESTING LABORATORY

A. Representatives of the testing laboratory shall have access to the Work at all times. Provide facilities for such access in order that the laboratory may properly perform its function.

B. Specimens and samples for testing, unless otherwise provided in the Contract Documents, will be taken by the testing personnel. Sampling equipment and personnel will be provided by the testing laboratory. Deliveries of specimens and samples to the testing laboratory will be performed by the testing laboratory.

C. Test results and reports shall be furnished simultaneously to the Engineer/Architect two (2) copies and the Owner/Construction Manager one (1) copy within one (1) week of testing.

1.09 TESTING SCHEDULE

A. The Owner shall pre-qualify and identify qualified independent inspection agencies in a timely manner, allowing Engineer/Architect adequate time for review and approval.

B. Special Structural Testing Schedule to be implemented per specifications.

C. When changes to construction schedule are necessary during construction, the Contractor shall coordinate such changes of schedule with the testing laboratory as required.

D. When the testing laboratory is ready to test according to the established schedule, but is prevented from testing or taking specimens due to incompleteness of the Work, all extra charges for testing attributable to the delay may be back charged to the Contractor and shall not be borne by the Owner.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 01 40 00

SECTION 01 50 00 – TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 CONDITIONS OF THE CONTRACT

A. The Conditions of the Contract (General, Supplemental General Conditions or other Conditions) and the General Requirement Sections of Divisions 00-01 are hereby made part of this Section.

1.02 SUMMARY OF SECTION

A. This Section includes requirements for temporary facilities and controls, including temporary utilities, support facilities, and security and protection facilities.

B. Temporary utilities include, but are not limited to, the following

1) Temporary Utilities
2) Temporary Facilities
3) Security and Protection Requirements
4) Vehicular Parking
5) Temporary enclosures and partitions
6) Miscellaneous Provisions

1.03 USE CHARGES

A. General: Cost or use charges for required temporary facilities shall be included in the Contract Sum and are not chargeable to Owner or Construction Manager as extra costs. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the following:

1) Owner's construction forces.
2) Occupants of Project.
3) Construction Manager/Engineer.
4) Testing agencies.
5) Personnel of authorities having jurisdiction.

B. Water Service: Use water from Owner's existing water system without metering and without payment of use charges.

C. Electric Power Service: Use electric power from Owner's existing system without metering and without payment of use charges.

1.04 SUBMITTALS

A. Implementation and Termination Schedule: Within 15 days of date established for commencement of the Work, submit schedule indicating implementation and termination dates of each temporary utility.

B. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

C. Temporary Utility Reports: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.

1.05 PROJECT CONDITIONS

A. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:

1) Keep temporary services and facilities clean and neat.
2) Maintain temporary fencing around all disturbed areas of work until the work is complete.
3) Relocate temporary services and facilities as required by progress of the Work.

B. Areas of Use: Contractors shall comply with use of indicated Project lay down area and designated contractor parking areas as outlined in the included Site Logistics Plan that follows this Section.

1.06 REQUIREMENTS OF REGULATORY AGENCIES

A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to:

1) Building code requirements
2) Health and safety regulations
3) OSHA Regulations
4) Utility company regulations
5) Police, fire department and rescue squad rules
6) Environmental protection regulations
7) Local authorities having jurisdiction requirements

B. Standards: Comply with NFPA Code 241, "Building Construction and Demolition Operations", ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition", and NECA Electrical Design Library "Temporary Electrical Facilities".

Refer to "Guidelines for Bid Conditions for Temporary Job Utilities and Services", prepared jointly by AGC and ASC, for industry recommendations.

C. Electrical Service: Comply with NECA and UL standards and regulations for temporary electric service. Install service in compliance with National Electric Code (NFPA 70).

D. Tests and Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.07 TEMPORARY LIGHT AND POWER

A. General:

1) Contractor shall provide all temporary power to the site.
2) The Contractor and each Subcontractor shall provide their own temporary wiring, cords, outlets, lamps, devices and connections. Installation, service, wiring and devices shall be safe, substantially supported and adequately connected. Demand shall not exceed service and any damage resulting from misuse, faulty equipment or overloading shall be paid for by persons responsible. Wiring to job offices shall be the responsibility of the Contractor and each Subcontractor, including fixtures and bulbs.
3) The Owner will allow the use of temporary services for the use by the Contractor, including utilities. Existing light and power may be used from existing sources with distribution furnished by the Contractor. The Contractor shall provide all temporary facilities required.
4) Temporary Lighting: Provide LED temporary lighting for construction areas when required. Unless noted otherwise, each “lamp” shall be a minimum of 1600 lumens, either screw-in type or native LED type Where higher lumens are specified, lighting shall be native LED, not screw-in type. Lamps shall be uniformly distributed in all areas requiring temporary lighting to meet the minimum illumination intensity noted for the area or operation as outlined by the Occupational Safety and Health Administration (OSHA) standard for minimum illumination requirements at construction sites (OSHA 29 CFR 1926.56).
5) Contractor shall remove all temporary installations installed by them after completion of this Contract Work.

1.08 CONSTRUCTION WATER

A. General: Use of Owner’s existing water service facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to the Owner. The Contractor (and Subcontractor where appropriate) shall provide their own hoses (or piping), connections and other equipment to use water. This service shall be protected from freezing and damage at all times. Immediately replace leaking hoses or connections. At Substantial Completion, restore these facilities to condition before initial use.

1.09 DUMPSTERS

A. The Contractor will pay for, provide, and coordinate metal containers (dumpsters) for the collection of debris. Contractor shall not abuse nor cross-

contaminate any designated containers.

B. Contractors shall not use the Owner's trash containers.

1.10 SANITARY FACILITIES

A. The Contractor will pay for and provide an adequate number of temporary toilets during construction for their use. Units provided will be self-contained toilet units that are single-occupant units of chemical, aerated recirculation, or combustion type; vented; fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.

1.11 STORAGE AND ENCLOSURES

A. Each Contractor shall provide storage and enclosures to protect and preserve the materials stored at and off the site. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines. Comply with NFPA 241.

B. Materials such as wood, metal, cement, masonry materials, equipment of any type, conduit and similar materials, shall not be piled directly on ground. Coverings shall be durable, watertight (fully cover sides, as well as top) substantial and well anchored to prevent blowing away. Shed type of enclosures shall be provided for easily damaged and small items. Store combustible materials apart from building. Any protection which becomes damaged shall be replaced immediately.

C. All storage facilities shall be neatly constructed and maintained, including protective covering. Loose, torn, or inadequate coverings shall be immediately replaced.

D. When storage or enclosure facilities are no longer required, they shall be removed from the site by the Contractor.

1.12 TEMPORARY SECURITY AND PROTECTION FACILITIES

A. Temporary Fire Protection: Until fire protection needs are supplied by permanent facilities, the Contractor shall install and maintain temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers", and NFPA 241 "Standard for Safeguarding Construction, Alterations and Demolition Operations".

1) Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
2) Extinguisher shall have a valid inspection log.
3) Store combustible materials in containers in fire-safe locations.
4) Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities and access routes for fighting fire.

5) Provide supervision of welding operations, combustion type temporary heating units and similar sources of fire ignition.
6) Tobacco and vaping products are prohibited at all times on the Owner's premises.

B. The Contractor will provide, if required, the power to maintain fire alarm systems and monitoring. If power is not available a manned 24 hour fire watch will be required.

C. Portable Chain-Link Fencing:

1) The Contractor shall provide the portable chain link fencing and gates for the site. The General Contractor shall secure the site and gates as shown on Phasing Plan(s) or as required for project and directed by Construction Manager.

1.13 PARKING

A. Coordinate parking areas to accommodate construction personnel with Owner Parking will be allowed on existing parking lots in the areas designated for the contractor's use. On-street parking will be allowed along the curbs directly connected with the project site. Obey all existing traffic and parking ordinances.

1.14 PROJECT SIGNAGE

A. Job signs will be permitted only with prior approval of the Owner.

B. Each Contractor may provide a sign to identify his office. Any signs must be approved by the Owner.

C. No other signs permitted, including signs on structure.

1.15 SECURITY AND PROTECTION OF THE WORK

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects. Avoid using tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near Project site.

C. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft and similar violations of security. Lock entrances at end of each workday.

D. Site Security: Ensure all windows, doors and gates are closed and secured at the conclusion of each day in scheduled work areas.

E. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

F. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.

1) Construction dustproof partitions of not less than nominal 4-inch studs, 5/8-inch gypsum wallboard with joints taped on occupied side, and 1/2-inch fire retardant plywood on construction side.
2) Construct dustproof, floor-to-ceiling partitions of not less than nominal 4-inch studs, 2 layers of 3-mil polyethylene sheets, inside and outside temporary enclosure. Cover floor with 2 layers of 3-mil polyethylene sheets, extending sheets 18 inches up the side walls. Overlap and tape full length of joints. Cover floor with 3/4-inch fire-retardant plywood.
3) Seal joints and perimeter. Equip partitions with dustproof doors and security locks.
4) Protect air-handling equipment.
5) Weatherstrip openings.

G. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.

H. Permanent Fire Protection: At earliest feasible date in each area of Project, complete installation of permanent fire-protection in facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.

I. Contractor shall be responsible for protection of its own work, including but not limited to freeze- thaw protection, until completion of the work and acceptance by the Owner.

J. All flooring, walls, furniture and equipment in construction areas will be required to be protected from potential damage or construction debris throughout the length of construction.

1.16 TERMINATION AND REMOVAL

A. Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair

damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

B. Materials and facilities that constitute temporary facilities are the property of Contractor. Owner reserves right to take possession of Project identification signs.

C. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements in Division 01 Section "Closeout Procedures."

1.17 COMPLIANCE WITH TEMPORARY FACILITIES AND CONTROLS

A. If contractor does not comply with any of the requirements of this Section, CM reserves the right to recommend to Owner to withhold adequate funds from payment applications to pay for completing the Work as required.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 50 00

SECTION 01 50 00.01 SITE LOGISTICS PLAN

SECTION 01 52 00 - SAFETY

PART 1 - GENERAL

1.1 OVERVIEW

A. The personal safety and health of all workers at the project site is of primary importance. The prevention of occupationally induced injuries/illnesses and the compliance with regulatory requirements will be given precedence over operating productivity whenever necessary.

1.2 RELATED SECTIONS

A. 00 72 00 General Conditions of the Contract.

B. 01 33 00 Submittal Procedures

1.3 SUBMITTALS

A. Submission of the following is required prior to commencement of work and per 01 33 00 Submittal Procedures.

1. Site Specific Safety Plan including process for weekly toolbox talks
2. Silica Plan (if your scope of work creates silica concerns, this must be included)
    i. Proper training documentation to be included.
3. Fall Protection Plan (if your work will require any activity above 6', lifts, roof work, etc.)
    i. A Competent Person must be identified along with proper training documentation.
4. Steel/Pre-cast Erection Plan (must be specific to this project)
5. Crane and pick plan if applicable (certification of crane operator & rigger)
6. Trench / Excavation Safety (if your scope will be trenching or have open excavations this is required)
    i. A Competent Person must be identified along with proper training documentation.
7. Confined Space Plan (if your scope requires work in a confined space, this is required)
    i. Proper training documentation to be included.
8. Hot Work Plan (if your scope requires hot work, this is required)

i. Must also include training documentation and example of hot work permit.

9. COVID 19 Preparedness Plan
10. SDS Sheets

    i. Must be readily available (identify the process i.e., paper copies, smartphone, etc.)

1.4 OUTLINE OF RESPONSIBILITIES

A. Each Contractor is responsible for compliance with all applicable governmental safety regulations for their operations, and the coordination of safety precautions with other Contractors on-site.

B. Each Contractor shall appoint an on-site safety representative who is responsible for administering the Contractor's safety program and has the authority to act on behalf of the Contractor on safety issues.

C. The Contractor's on-site safety representative shall train and instruct their employees, attend project safety meetings, immediately supervise the correction of unsafe acts or conditions, investigate all accidents and injuries involving Contractor employees and conduct weekly safety meetings with their employees.

D. Each Contractor shall submit a written report of all accidents causing personal injury or property damage to Construction Manager's Project Manager within 24 hours of their occurrence. The report must include the date and time of the occurrence, damage to equipment or work, names of injured employees, nature of injury, description of the accident/incident and what will be done to prevent the accident/incident from happening again.

E. An ICS representative or their 3rd party consultant will periodically evaluate contractor safety activities and performance in conjunction with each Contractor safety representative. Non- conforming activities or performance shall be corrected by the Contractor immediately."

F. The use of alcohol or drugs by workers on-site is strictly prohibited.

G. Each Contractor shall maintain the construction site and building premises in a clean and orderly manner, in conformity with all governmental regulations, OSHA standards and recommendations.

H. Reference Article 10 of the General and Supplemental Conditions of the contract for other Contractor safety responsibilities.

1.5 SAFE WORK PRACTICES

A. Any condition or practice that a worker observes that might cause personal injury or damage to equipment should be reported to his supervisor immediately.

B. Workers shall not operate any equipment that, in their opinion, is not in safe

working condition.

C. Trade Contractors shall ensure that their employees who operate any equipment have been trained & authorized by Trade Contractor and supply this information to the CM upon request.

D. All prescribed safety and personal protective equipment must be used when warranted and said equipment shall be maintained in good working condition. Boots, hard hats and class 2 safety vests must be worn at all times. Eye protection and ear protection shall be available and ready to use when there is a hazard exposure i.e. cutting, grinding, etc.

E. Radios will be allowed at a reasonable level; however, earbuds will not be allowed.

F. Trade Contractors shall train their employees in proper lifting techniques.

G. Trade Contractors engaged in, but not limited to, excavation, scaffolding, fall protection, etc. shall identify their respective competent person (OSHA 1926.32(f) to Construction Manager prior to the commencement of their work.

H. Horseplay will not be permitted on the project.

I. Any Trade Contractor whose employees use powder actuated tools must train their employees in their safe operation, and each employee using such tools shall carry certification that they have been properly trained.

J. Trade Contractors shall not move or disable access/egress lighting. Each Trade Contractor shall provide his own task lighting.

K. Each Trade Contractor shall be responsible to install guardrails, toe boards, etc.

L. Shirts shall be worn at all times. Shirts with sleeves less than 4" or that do not fully cover the torso are not permitted. Tennis shoes (or soft soled shoes) shall not be worn on-site.

M. The use of all tobacco products on public property is prohibited and will be strictly enforced.

N. The use of alcohol or drugs by workers on site is absolutely prohibited. Any worker who violates this policy or is found to be impaired by alcohol or drugs shall be immediately removed from the site by his employer. The Owner or Construction Manager shall have the authority to direct a Trade Contractor to remove a worker from the site.

1. Drug or alcohol "use" means consuming, possessing, distributing, concealing, buying, or selling, being under the influence, or reporting for duty while under the influence of alcohol or drugs to any degree.
2. The term "alcohol or drugs" means any form of alcohol or other intoxicating beverage and every type of drug, narcotic plant, or similar narcotic substance, whether illegal or not. Workers who are taking prescription drugs in

accordance with a valid prescription must advise their supervisor. The supervisor must determine whether any work restrictions are appropriate. The supervisor shall notify the Project Superintendent of any such work restrictions.

O. Each Trade Contractor shall ensure that their employees are trained and knowledgeable of the specifics of this Safety Policy and must attend safety orientation prior to them working.

P. Trade Contractors violating the Safety Policy will be issued via Procore a "Safety and Health Violation Observation" as warranted by the Project Superintendent. All violations must be corrected immediately and responded to in Procore.

Q. No tools or equipment will be allowed on-site if factory installed or supplied guards and safety devices have been removed, altered, or not used.

R. Warning signage applicable to operations being performed shall be posted prior to commencing work i.e., lasers in use, controlled access to roof, etc.

S. All contractors shall provide current OSHA approved asbestos awareness training to all of its employees prior to jobsite mobilization. Contractors shall include certification of this training in their jobsite specific Safety Manual.

T. Contractors are strongly encouraged to conduct daily pre-task plans to help identify potential safety risks and methods to mitigate them.

1.6 ENFORCEMENT

A. Contractors or employees failing to comply with safety requirements shall be subject to disciplinary action. Disciplinary action could include, but is not limited to the following:

1. Removal of a Contractor, Sub-Contractor, or employee from the site.
2. Reduction or withholding of progress payments until safety violations are corrected.
3. Payment of costs for correction of a safety hazard created by the Contractor when an imminent safety hazard exists, or when previous notices are not adequately responded to.
4. Termination of the contract.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 01 52 00

SECTION 01 60 00 – PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for selecting products for use in the Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.
B. See Division 01 Section "Closeout Procedures" for submitting warranties for contract closeout.
C. See Divisions 02 through 49 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation, shown or listed in manufacturer's published product literature, which is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model

number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

D. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.

E. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

1.4 SUBMITTALS

A. Product List: Submit a list, in tabular from, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.

1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
2. Form: Tabulate information for each product under the following column headings:

a. Specification Section number and title.
b. Generic name used in the Contract Documents.
c. Proprietary name, model number, and similar designations.
d. Manufacturer's name and address.
e. Supplier's name and address.
f. Installer's name and address.
g. Projected delivery date or time span of delivery period.
h. Identification of items that require early submittal approval for scheduled delivery date.

3. Initial Submittal: Within 30 days after date of commencement of the Work, submit (1) copy of initial product list. Include a written explanation for omissions of data and for variations from Contract requirements.

a. At Contractor's option, initial submittal may be limited to product selections and designations that must be established early in Contract period.

4. Completed List: Within 60 days after date of commencement of the Work, submit (1) copy of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.

5. Architect/Engineer and/or Construction Manager Action: If necessary, Architect/Engineer and/or Construction Manager will request additional information or documentation for evaluation within one week of receipt of a request for substitution. Architect/Engineer and/or Construction Manager will

notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later. Architect's response, or lack of response, does not constitute a waiver of requirement that products comply with the Contract Documents.

B. Pre-bid Substitution Requests: Submit one copy of each Pre-bid Substitution Request not later than 10 days prior to receipt of Bids for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Refer to Specification Section 00 43 25, Substitution Request Form.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

    a. Statement indicating why specified material or product cannot be provided.
    b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
    c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
    d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
    e. Samples, where applicable or requested.
    f. List of similar installations for completed projects with project names and addresses and names and addresses of Architects and owners.
    g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
    h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
    i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified 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 lack of availability or delays in delivery.
    j. Cost information, including a proposal of change, if any, in the Contract Sum.
    k. Bidder’s certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
    l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.

    a. Form of Acceptance: Addendum.
    b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated from the information provided it will be rejected.

C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section 013300 "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project; product selected shall be compatible with products previously selected, even if previously selected products were also options.

1. Each Contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect and Owner will determine which products shall be used.
3. The material selected by the Architect shall be provided at no additional cost to the Owner.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions. Deliveries addressed to the project, in general, the Owner, Architect/Engineer, or Construction Manager, will be refused and returned to shipper.

1. Notify Construction Manager and Owner 48 hours in advance of major deliveries.
2. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
3. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
4. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
5. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

6. Store products to allow for inspection and measurement of quantity or counting of units.
7. Store materials in a manner that will not endanger Project structure.
8. Store products that are subject to damage by the elements, under cover in a weather tight enclosure above ground, with ventilation adequate to prevent condensation.
9. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
10. Protect stored products from damage.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: Forms are included with the Specifications. Prepare a written document using appropriate form properly executed.
3. Refer to Divisions 02 through 33 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.01 PRODUCT OPTIONS

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Project Engineer will make selection.

5. Where products are accompanied by the term "match sample," sample to be matched is provided by Architect/Engineer and/or Program Manager.
6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures: Procedures for product selection include the following:

1. Product: Where Specification paragraphs or subparagraphs titled "Product" name a single product and manufacturer, provide the product named.
2. Manufacturer/Source: Where Specification paragraphs or subparagraphs titled "Manufacturer" or "Source" name single manufacturers or sources, provide a product by the manufacturer or from the source named that complies with requirements.
3. Products: Where Specification paragraphs or subparagraphs titled "Products" introduce a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
4. Manufacturers: Where Specification paragraphs or subparagraphs titled "Manufacturers" introduce a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
5. Available Products: Where Specification paragraphs or subparagraphs titled "Available Products" introduce a list of names of both products and manufacturers, provide one of the products listed or another product that complies with requirements. Comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.
6. Available Manufacturers: Where Specification paragraphs or subparagraphs titled "Available Manufacturers" introduce a list of manufacturers' names, provide a product by one of the manufacturers listed or another manufacturer that complies with requirements. Comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.
7. Product Options: Where Specification paragraphs titled "Product Options" indicate that size, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide either the specific product or system indicated or a comparable product or system by another manufacturer. Comply with provisions in "Product Substitutions" Article.
8. Basis-of-Design Products: Where Specification paragraphs or subparagraphs titled "Basis-of-Design Product(s)" are included and also introduce or refer to a list of manufacturers' names, provide either the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.
9. Visual Matching Specification: Where Specifications require matching an established Sample, select a product (and manufacturer) that complies with requirements and matches Project Engineer's sample. Project Engineer's decision will be final on whether a proposed product matches satisfactorily.

a. If no product available within specified category matches satisfactorily and complies with other specified requirements, comply with provisions of the Contract Documents on "substitutions" for selection of a matching product.

10. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product (and manufacturer) that complies with other specified requirements.

a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect and Owner will select color, pattern, or texture from manufacturer's product line that does not include premium items.
b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect and Owner will select color, pattern, or texture from manufacturer's product line that includes both standard and premium items.

2.02 COLOR SELECTION

A. Pre-Selected Colors:

1. Where colors have been specifically identified in the Contract Documents, the products provided by the Contractor shall match the selected color to the satisfaction of the Architect or the product will be rejected as non-conforming materials.
2. Manufacturers listed in the specification sections are capable of manufacturing the product specified but may not manufacture the specific selected color identified in the Contract Documents as part of their running line.

B. If additional up-charges are associated with providing the colors identified in the Contract Documents, the Contractor shall be responsible for all such costs and no additional cost to the Owner above the Contract Sum will be considered.

C. Colors Selected During Construction:

1. Products will be selected by the Architect from the standard colors of any of the listed or approved manufacturers, unless a specific color or color price range has been identified prior to bidding.

D. Location of Selected Colors: In general, preselected colors are identified in the following locations:

1. Exposed Interior Finishes: Room Finish Schedule - Color Legend.
2. Other Materials: Individual Specification Sections or notes to the Drawings.

2.03 SUBSTITUTIONS AFTER EXECUTION OF THE AGREEMENT

A. Substitution of Materials: No substitutions of materials will be considered after the Execution of the Contract without a Credit to the Owner unless a Product becomes unavailable through no fault of the Contractor.

B. NO ACTION TO REVIEW THE PROPOSED SUBSTITUTION WILL BE TAKEN BY THE ARCHITECT OR ENGINEER UNTIL THE CONTRACTOR HAS SUBMITTED THE FOLLOWING:

1. A letter itemizing the proposed credit to Owner.
2. A copy of the warranty.
3. A summary of the schedule impact.
4. Properly executed Document 00 43 25, Substitution Request Form.

C. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request as included above, or when acceptance will require revision to the Contract Documents.

D. In submitting a substitution request the Contractor acknowledges that:

1. The Contractor shall coordinate installation of the substitution including modifications to other Work.
2. The use of this Substitution will not adversely affect the Project Schedule.
3. If modifications to the work of this contract or another contract are required because of the substitution these modifications shall be made at no additional cost to Owner.
4. The Contractor waives all rights to claims for additional costs or time extension which may subsequently become apparent.

2.04 COMPARABLE PRODUCTS

A. Where products or manufacturers are specified by name, submit the following, in addition to other required submittals, to obtain approval of an unnamed product:

1. Evidence that the proposed product does not require extensive revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of Project Engineers and owners, if requested.
5. Samples, if requested.

2.05 USE OF NON-HAZARDOUS MATERIALS:

A. Materials used in this Project shall have no detectable levels of the following hazardous materials.

1. Asbestos of any form or type.
2. Lead in water supply line solder.
3. Lead in paint coatings and finishes.
4. Polychlorinated Biphenyls (PCBs).

B. Upon substantial completion, the Contractor shall submit, on its company letterhead, a signed statement certifying that the products supplied under its Contract had no detectable levels of the hazardous materials listed above in Paragraph 2.5.A. Final payment will not become due until five (5) copies of this letter are submitted (one each for the CM and Architect's files and three for Owner).

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 60 00

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. General installation of products.
3. Progress cleaning.
4. Starting and adjusting.
5. Protection of installed construction.
6. Correction of the Work.

B. Related Sections include the following:

1. Division 01 Section 017329 "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
2. Division 01 Section 017700 "Closeout Procedures".

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 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.

1. Before construction, verify the location and points of connection of utility services.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning site work, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, water-service piping, and underground electrical services.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

    a. Description of the Work.
    b. List of detrimental conditions, including substrates.
    c. List of unacceptable installation tolerances.
    d. Recommended corrections.

2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to 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.

B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner not less than 30 days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner’s written permission.
3. All utility interruptions shall be scheduled for weekends or holidays.

C. 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.

D. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

E. 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.

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

1. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
2. Inform installers of lines and levels to which they must comply.
3. Check the location, level and plumb, of every major element as the Work progresses.
4. Notify Architect when deviations from required lines and levels exceed allowable tolerances.

3.4 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels exceeding 80 dBA.

F. Templates: Obtain and distribute to the parties involved templates for Work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

G. 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.

H. 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.

I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.5 PROGRESS CLEANING

A. Each prime contractor is responsible to comply with progress cleaning. The General Contractor shall be responsible for overall progress cleaning. If in the opinion of the Construction Manager, any contractor fails to comply with progress cleaning, and upon written request by the Construction Manager to the affected contractor, the Construction Manager shall direct the Architect to prepare a deduct change order. The Owner also reserves the right to perform progress cleaning and deduct the cost from the contractor or contractors responsible. If multiple contractors are at fault, the costs may be apportioned solely in the judgment of the Construction Manager. The Construction Manager may also withhold processing of contractor’s payment until cleanup duties are resumed to Construction Manager’s satisfaction.

B. 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 (27 deg C).
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

C. Site: Maintain Project site free of waste materials and debris.

D. Work Areas: Clean areas where Work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

E. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

F. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

G. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

H. Cutting and Patching: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

1. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

I. 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.

J. 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.

K. 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.

L. 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.

3.6 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.

D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 01 Section "Quality Requirements."

3.7 PROTECTION OF INSTALLED CONSTRUCTION

A. When finished work is installed, such as, but not limited to, flooring materials, toilet fixtures, roofing, doors, casework, countertops, finished wall surfaces or other materials that can be damaged during construction, provide appropriate protection immediately after installation to prevent damage.

B. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

C. Comply with manufacturer's written instructions for temperature and relative humidity.

D. Contractors shall not use finished materials and surfaces as ladders, platforms or storage shelves. Tools and toolboxes shall not be placed on finished surfaces without adequate protection.

3.8 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 Section 017329 "Cutting and Patching."

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

END OF SECTION 01 73 00

SECTION 01 73 29 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes general administrative and procedural requirements governing execution of the Work.

B. Requirements and limitations for cutting and patching of Work.

1. A Contractor, subcontractor, or sub-subcontractor requiring the cutting of openings in new Work installed by others shall have such openings cut and patched by the trade which installed the work, and such cutting and patching shall be at the expense of the Contractor, subcontractor, or sub-subcontractor requiring the opening.
2. A Contractor, subcontractor, or sub-subcontractor requiring the cutting of openings or patching of existing materials shall be performed by a sub-contractor with experience in cutting and patching of material being modified and shall be at the expense of the Contractor, subcontractor, or sub-subcontractor requiring the opening.
3. Approval to do such cutting and patching shall be received from the Architect prior to proceeding with the work and shall include installation of such reinforcement of the work as the Architect may direct.
4. All blocking, bracing, reinforcement, or structural enhancement required due to cutting and patching shall be provided at no additional cost to Owner. All patching work shall match adjacent existing Work unless otherwise noted.
5. Contractor, subcontractors, and sub-sub-contractors shall conduct Work in accordance with the Occupational Safety and Health Act of 1970 (OSHA) and all additions, amendments, and revisions thereto.

C. Related Sections include the following:

1. Division 01 Section 017300 “Execution" for additional general administrative and procedural requirements governing execution of the Work.
2. Divisions 02 through 33 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

    a. Requirements in this Section apply to plumbing, mechanical, and electrical installations. Refer to Divisions 21 through 28 Sections for other requirements and limitations applicable to cutting and patching plumbing, mechanical, and electrical installations.

1.3 DEFINITIONS

A. Cutting: Removal of existing or in-place 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.

1.4 PREINSTALLATION MEETINGS

A. Cutting and Patching Conferences: Prior to commencing Work requiring cutting and patching, meet at Project site with parties involved in cutting and patching to review extent of cutting and patching anticipated and examine procedures for ensuring satisfactory result from cutting and patching Work. Inform Architect and Construction Manager of scheduled meeting. Require representatives of each Prime Contract directly concerned or affected by the cutting and patching to attend, including the following:

   a. Contractor's superintendent.
   b. Trade supervisor responsible for cutting operations.
   c. Trade supervisor(s) responsible for patching of each type of substrate.
   d. Mechanical, electrical, and utilities subcontractors' supervisors, to the extent each trade is affected by cutting and patching operations.

B. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.5 SUBMITTALS

A. 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. Extent: Describe cutting and patching, show how they will be performed, and indicate why they 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. Products: List products to be used and firms or entities that will perform the Work.
   4. Dates: Indicate when cutting and patching will be performed.
   5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.

      a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.

6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and structural calculations showing integration of reinforcement with original structure.
7. Architect’s 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.

1.6 QUALITY ASSURANCE

A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

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.

1. Primary operational systems and equipment.
2. Fire separation assemblies.
3. Air or smoke barriers.
4. Fire-protection systems.
5. Plumbing piping systems.
6. Mechanical systems piping and ducts.
7. Control systems.
8. Communication systems.
9. Fire-detection and -alarm systems.
10. Conveying systems.
11. Electrical wiring systems.
12. Operating systems of special construction.

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.

1. Water, moisture, or vapor barriers.
2. Membranes and flashings.
3. Exterior curtain-wall construction.
4. Sprayed fire-resistive material.
5. Equipment supports.
6. Piping, ductwork, vessels, and equipment.
7. Noise- and vibration-control elements and systems.

D. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

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.
    b. Stonework and stone masonry.
    c. Ornamental metal.
    d. Preformed metal panels.
    e. Roofing.
    f. Firestopping.
    g. Window wall system.
    h. Stucco and ornamental plaster.
    i. Terrazzo.
    j. Finished wood flooring.
    k. Wall covering.
    l. HVAC enclosures, cabinets, or covers.

1.7 WARRANTY

A. Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void warranties.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections of these Specifications.

B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials. Use materials that are not considered hazardous.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

3.3 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 in-place construction to provide for installation of other components or performance of other construction, and subsequently, patch as required to restore surfaces to their original condition.

B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations. Cutting tools or saws shall be equipped with bays or containers, or connected to vacuum systems, to minimize dust.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering, and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as a carborundum saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

C. 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, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

    a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

    a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

D. Each Prime Contractor shall do cutting and patching in existing work or work already constructed required for the work involved in their Contract. Patch holes or openings left by him to match the unaltered existing construction:

1. In Work already constructed, lintels and structural supports required to maintain structural integrity shall be provided by the Contractor whose work requires the opening.
2. Cutting of holes, installation of curbs, and temporary, weatherproof, and secured enclosures for penetrations through the existing Work shall be the responsibility of the Prime Contractor whose work requires the penetration. Actual roof flashing and associated work must be executed by a subcontractor, hired by the Prime Contractor, who is acceptable to the manufacturer of the existing roof which shall be certified, in writing, to the Owner and Architect/Engineer by the manufacturer. Existing warranty/guarantee shall be certified as remaining valid.
3. For penetrations through new work, the Prime Contractor whose work requires the penetration shall be responsible to provide the General Contractor of location, size, and configuration required for the penetration well in advance of the scheduled work. Prime Contractor who requires penetrations through the new

roof construction shall provide the prefabricated roof curb and temporary, weatherproof, and secured enclosure on top of curb.

E. Each Prime Contractor shall employ skilled and experienced installer to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.

F. Each Prime Contractor shall submit written request in advance of cutting or altering elements affecting:

1. Structural integrity of element.
2. Integrity of weather-exposed or moisture-resistant elements.
3. Efficiency, maintenance, or safety of element.
4. Visual qualities of sight-exposed elements.
5. Work of Owner or separate contractor.

G. Should conditions of work or the schedule indicate a change of products from original installation, each Prime Contractor shall submit request for substitution as specified in Section 016000 “Product Requirements”.

1. Inspect existing conditions of project, including elements subject to damage or to movement during cutting and patching.
2. After uncovering work, inspect conditions affecting installation of products or performance of work.
3. Report unsatisfactory or questionable conditions to Construction Manager and Architect/Engineer, in writing; do not proceed with Work until Architect/Engineer has provided further instructions.

H. Each Prime Contractor shall submit written notice to Construction Manager designating the date and time the work will be uncovered.

1. Provide adequate temporary support as necessary to assure structural value or integrity of affected portion of work.
2. Provide devices and methods to protect other portions of project from damage.
3. Provide protection from elements for that portion of the project exposed by cutting and patching work and maintain excavations free from water.

I. Each Prime Contractor shall execute cutting, fitting, and patching including excavation and fill, to complete Work and to:

1. Make its several parts fit together properly.
2. Uncover portions of the work to provide for installation of ill-timed work.
3. Remove and replace defective work.
4. Remove and replace work not conforming to requirements of the Contract Documents.
5. Remove samples of installed work as specified for testing.
6. Provide routine penetrations of non-structural surfaces for installation of piping and electrical conduit.

J. Each Prime Contractor shall execute Work by avoiding damage to other work and providing proper surfaces to receive patching and finishing.

K. Each Prime Contractor shall execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances, and finishes.

L. Each Prime Contractor shall restore Work with new products in accord with requirements of Contract Documents.

M. Each Prime Contractor shall fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

N. Each Prime Contractor shall maintain integrity of wall, ceiling, or floor construction, and completely seal voids.

O. Each Prime Contractor shall refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.

P. Each Prime Contractor shall identify hazardous substance or condition exposed during the Work and report to the Construction Manager for decision or remedy.

3.4 HAZARDOUS MATERIAL PROVISIONS

A. Potential for Hazardous Materials that may affect the Work: Certain environmental conditions or hazardous materials may exist or be encountered during the Work. Each Prime Contractor shall follow the guidelines listed below for the environmental conditions listed that may exist or be encountered during the Work.

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

1. Lead-Based Paint: Painted and varnished surfaces in buildings built prior to 1978 must be assumed to be coated with lead-based paint. Contractors shall immediately report to Construction Manager any areas suspected to be lead paint for decision or remedy. Contractor shall be responsible for all costs related to removal of lead-based paint items in areas affected by their Work as noted below. All required testing shall be performed in accordance with applicable EPA and HUD standards and guidelines pertaining to lead-based paint inspections.

    a. Lead-Based Paint Disturbance. Each Prime Contractor shall be responsible for lead-based paint disturbance precautions.

i. For buildings defined as a Child-Occupied Facility (children under the age of 6). When these surfaces are disturbed, that disturbance shall be conducted in accord with the Environmental Protection Agency (EPA) 40 CFR, Part 745 “Lead, Renovation, Repair and Painting Program”. Compliance is to include using EPA licenses and certified trained renovators, Owner and occupant notifications, work area containment, dust minimization, and clean-up certification. Architect/Engineer shall be copied on the Owner and occupant notifications.

ii. For buildings that are not defined as a Child-Occupied Facility (children under the age of 6), all renovation or new construction work that impacts painted components containing lead shall be performed in accordance with the OSHA Lead-in Construction Standard (29 CFR 1926.62), as applicable to the work being performed; and a proper waste management plan shall be utilized to certify that the waste is tested for hazardous waste classification, as applicable, and properly disposed or recycled. Contractors working on the project are responsible for fulfilling all applicable OSHA requirements pertaining to lead, as well as all other applicable federal, state, or local requirements or regulations pertaining to lead-in construction.

b. Lead-Based Paint: Demolition and Handling

i. Contractor shall handle, contain, store, test, transport, and dispose of demolition debris with lead-containing surface coating in accordance with applicable local, state, and federal regulations. Most painted architectural components in fair condition (not blistering, peeling, etc.), by law, may be disposed of as Construction and Demolition (C&D) debris. If deemed necessary for disposal, Contractor shall be responsible for collecting and having analyzed representative samples of the waste. If necessary, samples shall be tested for toxicity using the Toxicity Characteristics Leaching Procedure (TCLP) for lead sufficient to determine whether the debris is a hazardous waste as defined in 40 CFR 261.3, or a residual waste, as defined in 25 PA Code 287.1, and shall include such analysis as required by the disposal facility. A qualified environmental laboratory acceptable to the Architect and Construction Manager shall conduct tests. A copy of all testing shall be forwarded to the Architect, Construction Manager and Owner.

ii. The Contractor shall be responsible for the costs of sample collection and laboratory analysis. Alternately, Contractor can assume lead waste generated is a hazardous waste and TCLP testing is not required, but the waste must then be disposed of and transported as hazardous waste.

iii. If, based on testing, there is any hazardous waste generated and transferred to a hazardous waste disposal facility, Contractor shall provide, within 45 days from the time the material is transferred to the disposal facility, a waste manifest to the Owner that identifies the disposal facility name and address, EPA Identification Number, the identity of the waste material, and a statement certifying that the

waste was disposed at that facility, including the date. Forward original document to Owner with a copy to the Architect and Construction Manager.

2. Polychlorinated Biphenyl (PCB) Light Ballasts and Mercury-Containing Fluorescent Light Fixture Recycling and Disposal

   a. PCB Light ballasts:

      i. Ballasts demarcated as non-PCB containing may be recycled as non-PCB ballasts in accordance with applicable industry standards for those types of ballasts.
      ii. Ballast that do not carry a demarcation of non-PCB should be assumed to contain PCB's and recycled as PCB ballasts in a facility that accepts PCB ballasts as universal waste unless they are electronic (no suspect oil). Leaking PCB light ballasts shall be disposed of as hazardous waste unless testing is performed to classify the waste for PCB's.

   b. Fluorescent light tubes should be assumed to contain mercury at levels that could deem them "hazardous waste" for disposal purposes. All fluorescent light tubes impacted by renovation or new construction work shall be sent for recycling as universal waste to a facility that accepts mercury-containing light tubes as part of their universal waste program.

END OF SECTION 01 73 29

SECTION 01 77 00 – CLOSEOUT PROCEDURES

PART 1 – GENERAL

1.01 CONDITIONS OF THE CONTRACT

A. The Conditions of the Contract (General, Supplemental General Conditions or other Conditions) and the General Requirement Sections of Divisions 00-01 are hereby made part of this Section.

1.02 SUMMARY OF SECTION

A. This Section specifies administrative and procedural requirements for the following, but not limited to:
   1. Operation, Maintenance and Emergency Manuals
   2. Project Record Procedures
   3. Closeout procedures

B. Closeout requirements for specific construction activities are included in the appropriate Sections in included Divisions.

1.03 OPERATION, MAINTENANCE, AND EMERGENCY MANUAL CLOSEOUT SUBMITTALS

A. Manual Content: Operations, maintenance, and emergency manual content is specified in individual specification sections to be reviewed at the time of respective Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

   1. Where applicable, clarify and update reviewed manual content to correspond to modifications and field conditions.

B. Format: Submit operations and maintenance manuals in the following format:

   1. PDF electronic file. Assemble each manual into a composite electronically-indexed file. Submit on digital media acceptable to Architect.

      a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically-linked operation and maintenance directory.
      b. Enable inserted reviewer comments on draft submittals.

C. Initial Manual Submittal: Submit a draft copy of each manual at least 30 days before commencing demonstration and training and requesting inspection for Substantial Completion. Include a Operation, Maintenance, and Emergency directory. Architect and

Construction Manager will comment on whether general scope and content of manual are acceptable.

D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect and Commissioning Agent will return copy with comments. Correct or modify each corrected manual within 15 days of receipt of comments.

E. Coordination: Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

1.04 PREPARATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Organization: Include a section in the directory for each of the following:

1. List of documents.
2. List of systems.
3. List of equipment.
4. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of a system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.05 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.

3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Architect.
7. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in the manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single electronic file.

E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Enable bookmarking of individual documents based upon file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel upon opening file.

1.06 EMERGENCY MANUALS

A. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.

7. System, subsystem, or equipment failure.
8. Chemical release or spill.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

1.07 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has been delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9 Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.

3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed and identify color-coding where required for identification.

1.08 PRODUCT MAINTENANCE MANUALS

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

1.09 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

C. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

1.10 MANUAL PREPARATION

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.

B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of operation and maintenance manuals.
2. Comply with requirements of Owner for newly prepared record Drawings for "Project Record Documents."

G. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

PART 2 – PROJECT RECORDS

2.01 ADMINISTRATIVE AND PROCEDURAL REQUIREMENTS

A. Administrative and procedural requirements for Project Record Documents.

1. Project Record Documents required include:

a. Marked-up copies of Contract Drawings.
b. Marked-up copies of Shop Drawings.
c. Newly prepared Drawings.
d. Marked-up copies of Specifications, addenda and Change Orders.
e. Marked-up Product Data submittals.
f. Record Samples.
g. Field records for variable and concealed conditions.
h. Record information on Work that is recorded only schematically.

2. Maintenance of Documents and Samples: Store record documents and Samples in the field office apart from Contract Documents used for construction. Do not permit Project Record Documents to be used for construction purposes. Maintain record documents in good order, and in a clean, dry, legible condition. Always make documents and Samples available for inspection by the Architect.

2.02 RECORD DRAWINGS

A. Mark-up Procedure: During the construction period, maintain a set of blue-line or black-line white-prints of Contract Drawings and Shop Drawings for Project Record documentation purposes.

1. Mark these Drawings to indicate the actual installation where the installation varies appreciably from the installation shown originally. Give particular attention to information on concealed elements which would be difficult to identify or measure and record later. Items required to be marked include but are not limited to:

a. Dimensional changes to the Drawings.
b. Revisions to details shown on the Drawings.
c. Changes made by Change Order.
d. Details not on original Contract Drawings.

2. Mark completely and accurately record on prints of Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions. Where Shop Drawings are marked, show cross-reference on Contract Drawings location.
3. Mark record sets with red erasable colored pencil; use other colors to distinguish between changes for different categories of the Work at the same location.
4. Mark important additional information which was either shown schematically or omitted from original Drawings.
5. Note construction change directive numbers, alternate numbers, Change Order numbers and similar identification.
6. Responsibility for Markup: Where feasible, the individual or entity who obtained record data, whether the individual or entity is the installer, subcontractor, or similar entity, is required to prepare the mark-up on record Drawings.

a. Accurately record information in an understandable Drawing technique.
b. Record data as soon as possible after it has been obtained. In the case of concealed installations, record and check the mark-up prior to concealment.
c. At time of Substantial Completion, submit record Drawings to Engineer/Architect or Construction Manager for the Engineer/Architect's approval. Upon Engineer/Architect's approval, the Drawings will then become the Owner's records. Organize into sets, bind and label sets for Owner's continued use.

7. Preparation of Transparencies: Immediately prior to inspection for Certification of Substantial Completion, review completed marked-up record Drawings with the Architect. When authorized, prepare a full set of corrected transparencies of Contract Drawings and Shop Drawings.

a. Incorporate changes and additional information previously marked on print sets. Erase, redraw, and add details and notations where applicable. Identify and date each Drawing; include the printed designation "PROJECT RECORD DRAWINGS" in a prominent location on each Drawing.
b. Refer instances of uncertainty to the Architect for resolution before submitting.
c. One set of original Contract Drawings will be furnished to the Contractor by the Owner for use in recording changes and additional information. Other printing as required is the Contractor's responsibility.
d. The Contractor is responsible for printing original Contract Drawings and other Drawings as required to produce transparencies. The Engineer/Architect will make original Contract Drawings available to the Contractor's print shop.
e. Copies and Distribution: After completing the preparation of transparency record drawings, print two (2) blue-line or black-line prints of each Drawing, whether or not changes and additional information were recorded. Organize the copies into manageable sets. Bind each set with durable paper cover sheets, with appropriate identification, including titles, dates and other information on cover sheets.

(1) Organize and bind original marked-up set of prints that were maintained during the construction period in the same manner.
(2) Organize record transparencies into sets matching the print sets. Place these sets in durable tube-type Drawing containers with end caps. Mark the end cap of each container with suitable identification.
(3) Submit the marked-up record set, transparencies, and two (2) copy sets to the Architect for Owner's records; the Architect will retain one copy set.

2.03 RECORD SPECIFICATIONS

A. During the construction period, maintain one (1) copy of the Project Specifications, including addenda and modifications issued, for Project Record Document purposes.

1. Mark the Specifications to indicate the actual installation where the installation varies substantially from that indicated in Specifications and modifications issued. Note related Project Record Drawing information, where applicable. Give particular attention to substitutions, selection of product options, and information on

concealed installations that would be difficult to identify or measure and record later.

a. In each Specification Section where products, materials or units of equipment are specified or scheduled, mark the copy with the proprietary name and model number of the product furnished.

2. Upon completion of mark-up, submit record Specifications to the Architect for Owner's records.

2.04 RECORD PRODUCT DATA

A. During the construction period, maintain one (1) copy of each Product Data submittal for Project Record Document purposes.

1. Mark Product Data to indicate the actual product installation where the installation varies substantially from that indicated in Product Data submitted. Include significant changes in the product delivered to the site, and changes in manufacturer's instructions and recommendations for installation.
2. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
3. Note related Change Orders and mark-up of record Drawings, where applicable.
4. Upon completion of mark-up, submit a complete set of record Product Data to the Architect for the Owner's records.
5. Where record Product Data is required as part of maintenance manuals, submit marked-up Product Data as an insert in the manual, instead of submittal as record Product Data.
6. Each Contractor is responsible for mark-up and submittal of record Product Data for its own Work.

2.05 RECORD DOCUMENT SUBMITTALS

A. General: Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Engineer/Architect's reference during normal working hours.

B. Record Drawings: Maintain a clean, undamaged set of blue or black-line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date. See Section 01 30 00 Administrative Requirements for additional information on Record Drawings.

1. Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the Work.
2. Mark new information that is important to the Owner but was not shown on Contract Drawings or Shop Drawings.

3. Note related Change Order numbers where applicable.
4. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set.

C. Record Specifications: Maintain one complete copy of the Project Manual, including addenda, and one copy of other written construction documents such as Change Orders and modifications issued in printed form during construction. Mark these documents to show substantial variations in actual Work performed in comparison with the test of the Specifications and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observations. Note related record drawing information and Product Data.

1. Upon completion of the Work, submit record Specifications to the Architect for the Owner's records. See Section 01 30 00 Administrative Requirements for additional information on Record Drawings.

D. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record-keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Engineer/Architect and/or Construction Manager for the Owner's records. See Section 01 30 00 Administrative Requirements for additional information on Record Drawings.

2.06 MISCELLANEOUS RECORD SUBMITTALS

A. Refer to other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Immediately prior to Substantial Completion, complete miscellaneous records and place in good order, properly identified, and bound or filed, ready for use and reference. Submit to the Engineer/Architect or Construction Manager for the Owner's records.

1. Categories of requirements resulting in miscellaneous records include, but are not limited to the following:

a. Field records on excavations and foundations.
b. Field records on underground construction and similar Work.
c. Survey showing locations and elevations of underground lines. Invert elevations of drainage piping.
d. Surveys establishing building lines and levels.
e. Authorized measurements utilizing unit prices or allowances. Records of plant treatment.
f. Ambient and substrate condition tests.
g. Certifications received in lieu of Labels on bulk products. Batch mixing and bulk delivery records.
h. Testing and qualification of tradesmen.
i. Documented qualification of installation firms.

j. Load and performance testing.
k. Inspections and certifications by governing authorities.
l. Leakage and water-penetration tests.
m. Fire resistance and flame spread test results.
n. Final inspection and correction procedures.

2.07 RECORDING

A. Post changes and modifications to the Documents as they occur. Do not wait until the end of the Project. The Engineer/Architect and/or Construction Manager will periodically review record documents to assure compliance with this requirement.

PART 3 – COMPLETION AND FINAL CLEANING

3.01 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following: List exceptions in the request.

1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.

    a. 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.

2. Advise Owner of pending insurance change-over requirements.
3. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.
4. Remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.

B. Inspection Procedures: On receipt of a request for inspection, the Engineer/Architect will either proceed with inspection or advise the Contractor of unfilled requirements. The Engineer/Architect will prepare the Certificate of Substantial Completion following inspection or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.

1. The Engineer/Architect will repeat inspection when requested and assured that the Work has been substantially completed.
2. Results of the completed inspection will form the basis of requirements for final acceptance.

3.02 FINAL ACCEPTANCE

A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.

1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required. Conform to the requirements of Section 01 20 00 - Price and Payment Procedures.
2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
3. Submit a certified copy of the Engineer/Architect's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, and the list has been endorsed and dated by the Engineer/Architect.
4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion, or when the Owner took possession of and responsibility for corresponding elements of the Work.
5. Submit consent of surety to final payment.
6. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Re-inspection Procedure: The Engineer/Architect will re-inspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to the Engineer/Architect.

1. Upon completion of re-inspection, the Engineer/Architect will prepare a certificate of final acceptance or advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
2. If necessary, re-inspection will be repeated.

3.03 CLOSEOUT SUBMITTALS

A. When the Owner has determined that the Work is acceptable under the Contract Documents and the Contract fully performed, Contractor shall prepare and submit final Application for Payment to the Engineer/Architect together with, but not limited to, the following:

1. Contractor's Affidavit of Payment of Debts and Claims, AIA Document G706 (most recent edition of form).
2. Contractor's Affidavit of Release of Liens, AIA Document G706A (most recent edition of form).
3. Contractor's Lien waiver in the full amount of the Contract Sum.
4. Lien waivers from all subcontractors, sub-subcontractors and major material suppliers who have furnished material for the work under the contract with the Trade Contractor or a subcontractor. The lien waivers shall be in the full amount of the contract involved.
5. Consent of Surety Company to Final Payment, AIA Document G707, (most recent edition of form).
6. Evidence of Compliance with requirements of governing authorities:

a. Certificate of Inspection from all required agencies and departments.
b. Certificate of Occupancy.

8. Project Record Documents.
9. Operating and Maintenance Data, Instructions to Owner's Personnel.
10. Warranties and Bonds.
11. Special tools required for Owner maintenance.

B. Submit three (3) copies each of Items #1 through #5 above, and two (2) copies each of Items #6 and #7 above.

3.04 FINAL CLEANING

A. The Contractors shall furnish all labor, materials, tools, equipment, and perform all work and services necessary for cleaning up required in conjunction with work performed, as shown on drawings and as specified, in accordance with provisions of the Contract Documents and completely coordinated with work of all other trades.

B. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

C. Administrative and procedural requirements for final cleaning at Substantial Completion:

1. Special cleaning requirements for specific elements of the Work are included in appropriate Sections of included Divisions.
2. Multiple Prime Contracts: Except as otherwise indicated, each Prime Contractor is responsible for coordination of final cleaning where more than one Prime Contractor is involved in final cleaning a single area or piece of equipment.
3. Environmental Requirements: Conduct cleaning and waste disposal operations in compliance with local laws and ordinances. Comply fully with federal and local environmental and anti-pollution regulations.

a. Do not dispose of volatile wastes such as mineral spirits, oil or paint thinner in storm or sanitary drains.
b. Burning or burying of debris, rubbish or other waste material on the premises is not permitted.
c. Cleaning Agents: Use cleaning materials and agents recommended by the 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.

END OF SECTION 01 77 00

SECTION 020150 - PROTECTION OF UNDERGROUND UTILITIES

PART 1- GENERAL

1.1 PROJECT CONDITIONS:

A. In preparation for performing and prior to commencing with the excavation work required by this Project, Contractor shall comply with requirements of Pennsylvania Underground Utility Line Protection law (Act 287 of 1974, as amended by Act 121 of 2008, the "Act") and this specification Section.

B. The existence and location of underground utilities has been shown on the Drawings based on information supplied by the underground utility owners in accordance with the Act. It is expressly understood that neither the Owner nor the Engineer warrants the accuracy of this information; this information is intended to serve as notification that such utilities do exist in the general proximity of the Work. The Contractor shall take the necessary steps to protect, from direct or indirect injury, known existing underground pipes, conduits, utilities, and structures or other property in the vicinity of the Work, or that may be discovered during performance of the Work. The Contractor shall maintain a sufficient quantity of suitable material on-site during the performance of the Work for sustaining or supporting any structure or utility that may be uncovered which may be undermined, weakened, or otherwise compromised, whether or not such structure or utility is indicated on the Drawings.

C. The Contractor shall comply with notification provisions of the Act. Excavation shall begin on or after the third business day after notification to the One-Call System of its intent to dig. In case of complex projects notification shall be not less than ten business days in advance of the beginning of excavation, or demolition work. If the Contractor removes its equipment and vacates the worksite for more than two business days, he shall re-notify the One Call System, unless other arrangements have been made directly with the utility owner(s) involved. If the location of excavation changes, a new notification shall be made. Damage to existing utilities resulting from the failure of the Contractor to follow the notification requirements of the Act shall be at Contractor's expense and no additional compensation will be provided.
   1. Contractor shall cooperate with agents of the utility owners during the progress of the Work.
   2. Contractor shall provide the One-Call System with specific information to identify the site of the proposed work. Contractor shall provide any other information requested by One-Call System.
   3. Contractor shall obtain serial number from One Call System evidencing compliance with notification requirements of the Act.
   4. Contractor shall schedule and conduct a preconstruction meeting with the utility owners. Notice of this meeting shall be provided, in writing, to the Engineer a

minimum of seven (7) business days in advance of the meeting. When a utility owner, with facilities located within the project area, requests a meeting with the Contractor, the Contractor shall promptly arrange and attend such a meeting. Contractor shall provide full accounting of any such meetings to the Engineer.

5. If the utility owner fails to respond to the Contractor's request to the One Call System, or the facility owner notifies Contractor that the utility cannot be marked within the time frame and a mutually agreeable date for marking cannot be arrived at, the Contractor may proceed with excavation as scheduled, but not earlier than the lawful dig date.
6. If the Contractor has reason to believe that the facilities have been overlooked or marked incorrectly, the Contractor shall contact the One Call System and re-notify the utility owner. If, after re-notification, sufficient information to safely excavate is still not provided, Contractor shall be compensated, by the Owner, in accordance with the payment provisions of the Act and of the Contract, for all costs resulting from repairs to, or replacement of damaged, existing underground utilities or structures.

D. Contractor shall establish procedures for emergency action and repairs to utilities accidentally damaged during construction with the utility owners prior to the commencement of work. During the course of the work, if the Contractor accidentally damages an existing utility, the Contractor shall immediately follow the established procedures for emergency action and repairs. The Contractor shall immediately notify 911 and the utility owner if the damage results in the escape of any flammable, toxic, hazardous or corrosive gas or liquid, which endangers life, health, or property.

E. When the Contractor, during the progress of the excavation, shall uncover utility services, pipes, or lines which because of previous (concealed) damage or age are in poor condition, the Contractor shall immediately notify the utility owner in order that steps may be taken for replacement or repair. Locations of repairs, and the procedures of repairs that have been made by Contractor, at the direction of the utility company, shall be recorded by the Contractor. Payment for the work performed shall be made in accordance with the terms mutually agreed to by the Contractor and the utility owner, prior to commencing with the work.

F. Pipes, conduits, and other underground utilities exposed as a result of the Contractor's operations shall be adequately supported along their entire exposed length by timber or planking, installed in such a manner that the anchorage of the supporting members will not be disturbed or weakened during the backfilling operations. Backfill of selected material shall be carefully placed and compacted under and around the supports, and all supports shall be left in place as a guard against breakage of the supported facility due to trench settlement.

G. Contractor shall perform exploratory excavations when, in the opinion of the

Engineer, the utility owner, or the project owner, it is necessary to determine, or confirm the location(s) of existing underground structures and utilities.

1. Dig test pits to determine the location and elevation of existing subsurface utilities, or structure(s) at locations where indicated on the Drawings and other areas as directed by the Engineer. Dig such test pits in the presence of an authorized representative of the utility/structure owner. Contractor may not proceed with excavation work without the prior notification and approval of the owner of the subsurface utility, or structure(s). Dig such test pits only at the locations indicated on the Drawings and in other areas as directed by Engineer
2. Contractor may not proceed with excavation work in locations where new utility lines are to be connected to existing utility lines until test pits have been dug and the exact location and elevation of the existing utility has been determined.

H. Contractor shall plan the excavation to avoid damage to or minimize interference with underground utilities in the construction area. Excavation that requires temporary or permanent interruption of a utility service shall be coordinated with the affected utility owner.

I. When the Contractor damages a utility during the excavation work and the damage results in personal injury or property damage to parties other than the Contractor or the utility owner, the Contractor shall submit an incident report to the Pennsylvania Department of Labor and Industry and to any other agency required by the Act, not more than ten (10) business days after the incident. A copy of the incident report shall also be submitted to the Engineer and Owner.

PART 2 -PRODUCTS

NOT APPLICABLE TO THIS SECTION

PART 3- EXECUTION

3.1 PAYMENT FOR ADDITIONAL WORK

A. General: The cost for repair and/or support of existing underground utilities and structures damaged during construction, or found to have been damaged previously (concealed), or in poor condition due to age, will be paid as follows:

1. If the utility/structure was properly and correctly marked, in accordance with the

Act, Contractor shall be responsible for all costs, including support material left in place.

2. If the utility/structure was not shown, or was marked improperly or incorrectly, and not in accordance with the Act, Contractor will be compensated for the work performed in accordance with the payment provisions of the Contract and further specified below.

B. When information on the location of existing utilities is not provided, the information provided is inaccurate or incorrect, or uncharted or incorrectly charted utilities are encountered, the Contractor shall ascertain the location of the existing utilities by utilizing prudent techniques. The Contractor shall submit written notification to the Engineer apprising the Engineer of the conditions that have warranted the notification and request for additional compensation. In the event that written notification cannot be immediately provided, the Contractor may provide oral notification to the Engineer followed by written notification no later than three (3) business days thereafter. After submission of written notification, the Contractor will be entitled to additional compensation in accordance with the Act.

1. Except where it has been indicated, in the Contract Documents, that payment will be made as "Miscellaneous Unclassified Excavation," the extra work will be paid on a force account (time and material) basis in accordance with the latest edition of the Pennsylvania Department of Transportation Publication 408, Specifications.
2. When claiming extra work on a force account basis, the Contractor shall complete a Force Account Daily Sign-Off form (PA DOT CS-4347) on a daily basis. The Engineer or an authorized representative of the Owner shall countersign the sign-off form. Failure to complete the sign-off form on a daily basis may constitute grounds to deny additional payment.
3. Contractor shall submit a change order request for the extra force account work. The change order request shall include a Negotiated Price Cost Justification form (PA DOT CS-4347CJ) as well as copies of the daily sign-off forms for the period covered under the change order request. Fees for subcontractors, overhead and profit, and other costs, as may be allowed by the Conditions of the Contract, shall be in accordance with the Conditions of the Contract. The Engineer reserves the right to require additional documentation to substantiate the amounts claimed in the change order request.
4. The change order request will be processed in accordance with the Conditions of the Contract.

END OF SECTION 020150

SECTION 022300 - SITE CLEARING/DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Contractor shall be responsible for legally disposing of excavated materials in a licensed or government approved area. A letter of acceptance from the owner of the property where materials will be deposited releasing the Borough from all responsibility shall be submitted to the Project Engineer. Excavated material shall be disposed of in an environmentally safe manner.

1.2 SUMMARY

A. This Section includes the following:
1. Clearing and grubbing and pavement removal,
2. Topsoil stripping,
3. Removing above-grade site improvements,
4. Disconnecting, capping or sealing, and abandoning site utilities in place,
5. Saw cutting existing sidewalk as required at the limits of the proposed construction,
6. Removing unwanted materials from within the limits of construction,
7. All earthwork necessary and required to prepare the site for the installation and construction of all site improvements as shown on the plans or indicated in the specifications. The contractor shall complete all cuts and fills, furnish, install and compact fill materials; any excavation, backfilling and compaction necessary to provide a suitable subgrade satisfactory to the Engineer; dewatering, completion and maintenance of the site grading from the elevation of the deepest excavation on the site to the finished grades shown on the drawings. Also included is the disposal of unsuitable on-site material, layout and construction of work, stock pike, and temporary storage areas and other work required to grade the site as shown on the contract plans and as specified in these documents. Hauling and dumping costs for unsuitable material shall be borne by the Contractor.

   The Contractor shall be required to provide adequately sized equipment for the excavation, backfilling and grading of on-site materials in order to grade according to the proposed grading as shown on the plans.

8. Test Pits – shall be performed at existing utility crossings, including, but not limited to, sanitary sewer crossings and water main crossings, to verify depth prior to submitting storm sewer structure shop drawings. Completely backfill or

provide steel plates until storm sewer work can be accomplished.

B. Related Sections include the following:

1. Division 1 Section "Field Engineering" for verifying utility locations and for
2. Division 2 Section "Earthwork" for soil materials, excavating, backfilling, and site grading.

1.3 DEFINITIONS

A. Topsoil defined below is the raw material that may need screening and amending before meeting landscaper's definition of topsoil.

B. Topsoil: Natural or cultivated surface-soil layer 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 2 inches in diameter; and free of weeds, roots, and other deleterious materials.

C. Demolition: The complete excavation and removal of existing surface and subgrade structures, bituminous or concrete pavements, concrete aprons, driveways, curbs, gutters or sidewalks within the limits shown on the Drawings, or as directed by the Project Engineer, in preparation for new construction.

D. Unwanted materials: Those which are not designated to be salvaged and will not become an integral part of the finished work of the Project.

1.4 MATERIALS OWNERSHIP

A. Except for materials indicated to be removed and replaced, including signs, cleared materials shall become Contractor's property and shall be removed from the site.

1.5 SUBMITTALS – Contractor shall prepare:

A. Record drawings according to Division 1 Section "Contract Close-out."

1. Identify and accurately locate capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.6 QUALITY ASSURANCE

A. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1.7 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and prior notification of the homeowners. Minimize inconvenience to homeowners and businesses.

B. Notify utility locator service for area where Project is located before site clearing.

C. All residents, along with the Engineer, shall be given a minimum of forty-eight (48) hours notice prior to the intended start of demolition work and again to the residents prior to the start of work in each individual phase.

D. The Contractor shall make himself/herself fully aware of the conditions existing throughout the extent of the work, including but not limited to the types of equipment required to perform the work, and the character, quality, quantity and types of materials which might be encountered.

E. Temporary soil erosion control measures to control water and air pollution, through use of mulch, grass, straw bales, rock inlet protection, filtration dikes, rip rap or silt barrier fencing, shall be in place before any earthwork operation may begin.

F. Maintain area within the limits of construction in as clean a condition possible during progress of demolition work. Limit dust to lowest level practical.

G. Provide and maintain signs, flashing lights, barricades, markers, and other protective devices as required to conform with construction operations and provide for the safety of the general public at no additional cost to the Owner.

H. Take all necessary precautions, including barricades, barrels, flashing lights, etc., to insure against damage to existing work to remain in place, to be reused, or to remain the property of the Owner. Any damage to such work shall be repaired or replaced, whichever is approved, at no additional cost to the Owner.

I. Protect all trees, plants, grass and other landscaping from damage. Replace any trees, plants or other landscaping materials designated to remain that are damaged during the work under this contract.

J. Take all precautions and utilize all facilities required to protect existing utilities and structures. Contractor is to verify utility locations and take appropriate action to avoid damage to them. Immediately report to the Utility and the Project Engineer any break, leak or other damage to the lines or protective coatings made or discovered during the prosecution of the work and immediately alert nearby homeowners of any emergency created or discovered.

K. The Engineer is to be notified immediately if any utilities are disturbed during demolition operations. Any utilities damaged during the excavation process shall be completely repaired in kind to their original condition by the Contractor or the utility itself, at their option. Such repairs must be satisfactory to the Engineer and the utility. All costs for these repairs will be Contractor’s responsibility.

L. No concrete work shall be broken by a dropped-weight device where a possibility of damage to public or private facilities or utilities exists, or where public safety is jeopardized.

M. Any concrete not indicated to be removed, either on the Drawings or at the direction of the Engineer, which becomes chipped, cracked, shifted, undermined or disturbed in any way shall be replaced by the Contractor at his own expense when directed to do so by the Engineer.

N. Burning of materials as a means of disposal of refuse, debris or other unwanted materials shall not be permitted at the project site.

O. Contractor shall keep himself informed each day of forecasted inclement weather conditions and will not expose the subgrade when the local forecast warns of unsuitable weather conditions for exposing subsoils.

P. Comply with all State and local code and permit requirements and regulations.

Q. Any hauling and dumping fees, or fines, shall be paid by the Contractor.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Satisfactory Soil Materials: Requirements for satisfactory soil materials are specified in Division 2 Section "Earthwork."

1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.

PART 3 – EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Provide erosion-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.

D. Verify the extent of demolition to be performed prior to commencing work.

E. Contractor shall satisfy himself as to the conditions existing throughout the limits of the work, including but not limited to the type of equipment required to perform the work, and the character, quantity, quality and types of materials which may be encountered.

F. Arrange for verification of locations of all utility services within the limits of construction for the Project. Review same for any possible conflicts and schedule test pit verification with the Engineer.

G. Items designated to be salvaged or restored, as approved by the Engineer, will be clearly marked.

H. Remove items indicated to be salvaged for the Owner and place in the designated storage area, at no addition cost to the Owner.

3.2 TREE PROTECTION

A. Erect and maintain a temporary fence around drip line of individual trees or around perimeter drip line of groups of trees to remain (any trees or landscaping not scheduled to be removed). Remove fence when construction is complete.

1. Do not store construction materials, debris, or excavated material within drip line of remaining trees.
2. Do not permit vehicles, equipment, or foot traffic within drip line of remaining trees.

B. Do not excavate within drip line of trees, unless otherwise indicated.

C. Where excavation for new construction is required within drip line of trees to remain, hand clear and excavate 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.

1. Cover exposed roots with burlap and water regularly.
2. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.
3. Coat cut faces of roots more than 1-1/2 inches in diameter with emulsified asphalt or other approved coating formulated for use on damaged plant tissues.
4. Cover exposed roots with wet burlap to prevent roots from drying out. Backfill with soil as soon as possible.

D. Repair or replace trees and vegetation not indicated to be removed that are damaged by construction operations, in a manner approved by Engineer.

1. Employ a qualified arborist, licensed in jurisdiction where Project is located, to submit details of proposed repairs and to repair damage to trees and shrubs.
2. Replace trees that cannot be repaired and restored to full-growth status, as determined by the qualified arborist.

3.3 UTILITIES

A. Contractor shall arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing.

1. Verify that utilities have been disconnected and capped before proceeding with site clearing.

B. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
1. Arrange to shut off indicated utilities with utility companies.

C. Existing Utilities: Do not interrupt utilities serving facilities occupied by homeowner's or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Engineer not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Utility companies' written permission.

3.4 CLEARING AND GRUBBING

A. Remove obstructions as indicated on the contract drawings, train lot materials, existing sidewalk areas, grass, and other vegetation to permit installation of new construction.

1. Do not remove trees, shrubs, and other vegetation indicated not indicated to be removed.
2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
3. Completely remove stumps, roots, obstructions, and debris extending to a depth of 18 inches below exposed subgrade.
4. Use only hand methods for grubbing within drip line of remaining trees.

B. Fill depressions caused by clearing and grubbing operations with satisfactory compacted soil material, unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding 8-inch loose depth and compact each layer to a density equal to adjacent original ground.

3.5 APPLICATION

A. Clean saw cut existing sidwalks, etc. as required to prepare for proper blending of new work with the existing at the limits of the proposed construction.

B. Remove designated existing sidewalk, RCP etc., in order to construct the proposed improvements as indicated on the plans.

C. Undercutting or excess excavation to depths below the required subgrade limits as shown on the Drawings, where not directed by the Engineer, shall be replaced at the

Contractor’s expense with suitable granular fill material as approved by the Engineer. Reuse of existing on-site materials will not be allowed.

3.6 DISPOSAL

A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them in accordance with state, local and federal regulations off Owner's property.

END OF SECTION 022300

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 024113 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements.
3. Demolition and removal of existing building “fit-out” to include General Construction, HVAC, Plumbing, Fire Protection, electrical and low voltage systems.
4. Repair procedures for selective demolition operations.

B. Related Sections include the following:

1. Division 1 Section "Summary of Work" for use of premises, and phasing, and Owner-occupancy requirements.
2. Division 1 Section "Temporary Utilities and Facilities" for temporary construction and environmental-protection measures for selective demolition operations.
3. Division 1 Section “Cutting and Patching” for cutting and patching procedures.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Detach items from existing construction and deliver them to Owner.

C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets and other items of interest or value to Owner that may be encountered during selective demolition remain Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.

B. Existing light fixtures or other systems and furniture noted to be carefully removed and salvaged in a manner to prevent damage and deliver promptly to Owner.

1.5 SUBMITTALS

A. Qualification Data: For demolition firm and refrigerant recovery technician.

B. Proposed Dust-Control and Noise-Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.

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 other tenants' 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. Locations of proposed dust- and noise-control temporary partitions and means of egress, including for other tenants affected by selective demolition operations.
5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
6. Means of protection for items to remain and items in path of waste removal from building.
7. Selectively demolish structural components as required to construct new work. According to OSHA regulations 1926.850(a), prior to any demolition work, a survey report of the structure shall be prepared by the Contractor to describe the conditions of the framing, floors, and walls. Any adjacent structure where occupants may be exposed to construction activities shall be similarly surveyed.

D. Inventory: After selective demolition is complete, submit a list of items that have been removed and salvaged.

E. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1. Comply with submittal requirements in Division 1 Section "Construction Waste Management."

1.6 QUALITY ASSURANCE

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

B. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

C. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

D. Standards: Comply with ANSI A10.6 and NFPA 241.

E. Predemolition Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Coordination." Review methods and procedures related to selective demolition including, but not limited to, the following:

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.

1.7 PROJECT CONDITIONS

A. The building will maintain continued operations for other tenants so Contractor is to stage construction so their operations will not be disrupted. Provide not less than 72-hours' notice to Adjacent Users of activities that will affect Adjacent Users operations.

1. Comply with requirements specified in Division 1 Section "Summary of Work."

B. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.

1. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from authorities having jurisdiction.

C. Owner assumes no responsibility for condition of areas to be selectively demolished.

D. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

E. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. Hazardous materials will be removed by Owner before start of the Work under a separate contract.
2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Owner will remove hazardous materials under a separate contract.

F. Storage or sale of removed items or materials on-site is not permitted.

G. 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.

1.8 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

A. Use repair materials identical to existing materials.

1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
2. Use materials whose installed performance equals or surpasses that of existing materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

E. Engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.

1. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.

F. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.

1. Comply with requirements for existing services/systems interruptions specified in Division 1 Section "Summary."

B. Do not interrupt existing utilities serving occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to authorities having jurisdiction.

1. Provide at least 3 work days notice to Owner if shutdown of service is required during changeover.

C. Service/System Requirements: 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, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing. Where entire wall is to be removed, existing services/systems may be removed with removal of the wall.

3.3 PREPARATION

A. Dangerous Materials: Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.

B. Pest Control: Employ a certified, licensed exterminator to treat building and to control rodents and vermin before and during selective demolition operations.

C. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
   1. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
   2. Protect existing site improvements, appurtenances, and landscaping to remain.
   3. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.

D. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

   1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
   2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
   3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
   4. Cover and protect furniture, furnishings, and equipment that have not been removed.
   5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 1 Section "Temporary Facilities and Controls."

E. Temporary Enclosures: Provide temporary enclosures for protection of existing building and construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

   1. Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.

F. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.

G. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished. Strengthen or add new supports when required during progress of selective demolition.

3.4 POLLUTION CONTROLS

A. Dust Control: Use water mist, temporary enclosures, and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations.

1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
2. Wet mop floors to eliminate trackable dirt and wipe down walls and doors of demolition enclosure. Vacuum carpeted areas.

B. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

C. Cleaning: 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.

3.5 SELECTIVE DEMOLITION, GENERAL

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.
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.
5. Maintain adequate ventilation when using cutting torches.
6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
9. Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.

B. Existing Facilities: Comply with Owner’s designated project representative requirements for using and protecting existing walkways, loading docks, building entries, and other building facilities during selective demolition operations.

C. Reuse of Building Elements: Do not demolish building elements beyond what is indicated on Drawings without Architect's approval.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals, using power-driven saw, then remove concrete between saw cuts.

B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.

C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

D. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI-WP and its Addendum.

1. Remove residual adhesive and prepare substrate for new floor coverings by one of the methods recommended by RFCI.

E. Air-Conditioning Equipment: Remove equipment without releasing refrigerants, if applicable.

3.7 PATCHING AND REPAIRS

A. General: Promptly repair damage to adjacent construction caused by selective demolition operations.

B. Patching: Comply with Division 1 Section "Cutting and Patching."

C. Repairs: Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.

1. 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.

D. Finishes: Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

E. 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.

1. Patch with durable seams that are as invisible as possible – including “toothing” new masonry into existing. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
2. Where patching occurs in a painted surface, apply primer and intermediate paint coats over patch and apply final paint coat over entire unbroken surface containing patch. Provide additional coats until patch blends with adjacent surfaces.
3. Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.

F. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

3.8 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

END OF SECTION 024113

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Specification Section 033050: Cast-In-Place Concrete Slabs.

1.2 SUMMARY

A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:

1. Footings.
2. Foundation walls.
3. Piers.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 STANDARDS OF PRACTICE

A. Detailed recommendations for acceptable practices, while not necessarily a part of these specifications, are available in the following standards and recommendations of the American Concrete Institute (ACI):
1. ACI 117 – Specifications for Tolerances for Concrete Construction and Materials
2. ACI 214 – Guide to Evaluation of Strength Test Results of Concrete.
3. ACI 301 – Specifications for Structural Concrete.
4. ACI 315 – Guide to Presenting Reinforcing Steel Design Details.
5. ACI 318 – Building Code Requirements for Structural Concrete.
6. ACI 347 – Guide to Formwork for Concrete.
7. ACI 306 – Guide to Cold Weather Concreting.
8. ACI 305 – Guide to Hot Weather Concreting.
9. ACI 309 – Guide for Consolidation of Concrete.
10. ACI 211 – Proportioning Concrete Mixtures.

11. ACI 304 – Guide for Measuring, Mixing, Transporting and Placing Concrete.

B. Concrete Reinforcing Steel Institute (CRSI)

C. All standards and recommendations shall be the latest revisions of same at time of bidding, and as listed in the corresponding IBC Referenced Standards.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

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.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement, prepared according to *ACI 315 – Guide to Presenting Reinforcing Steel Design Details*. 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. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Steel reinforcement and accessories.
4. Curing materials.
5. Joint-filler strips.

1.6 QUALITY ASSURANCE

A. 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.

B. 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; certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 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.

D. Source Limitations: Obtain each type or 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.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will 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.

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. Chamfer Strips: Wood, metal, PVC, or rubber strips; size as indicated on Drawings.

D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

E. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.
2. Furnish ties that, when removed, will leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.
3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.3 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.

B. Galvanized Reinforcing Bars: ASTM A615, Grade 60, deformed bars; ASTM A767, Class II, galvanized after fabrication and bending.

C. Epoxy-Coated Reinforcing Bars: ASTM A615, Grade 60, deformed bars; ASTM A775, epoxy-coated after fabrication and bending.

2.4 REINFORCEMENT ACCESSORIES

A. 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.

B. Joint Dowel Bars: Plain-steel bars, ASTM A 615, Grade 60. Cut bars true to length with ends square and free of burrs.

2.5 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type III:

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

C. Ground Granulated Blast-Furnace Slag: ASTM C989, Grade 100 or 120.

D. Normal-Weight Aggregates: ASTM C 33, coarse aggregate or better, graded. Provide aggregates from a single source.
   1. Use largest practical aggregate size for each mix specification.
   2. Coarse and fine aggregate shall be free of materials with deleterious reactivity to alkali in cement.

E. Water: Clean and potable.

2.6 ADMIXTURES

A. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

   1. Air-Entraining Admixture: ASTM C 260.
   2. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
   3. Retarding Admixture: ASTM C 494/C 494M, Type B.
   4. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
   5. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
   6. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
   7. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

B. Crystalline Waterproofing Admixture: Product is for use in concrete at elevator pit foundation/pit slab and pit walls.

   1. Basis of Design Product: Xypex Admix C-500 / C-500NF, by Xypex Chemical Corporation
   2. Other manufacturers/products are acceptable as “equivalent” to the Basis of Design.
   3. Contractor shall submit all documentation to ensure the equivalent product meets or exceeds the performance of the Basis of Design product.

2.7 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

   1. Available Products:
      .
      a. Euclid Chemical Company (The); Eucobar.
      b. L&M Construction Chemicals, Inc.; E-Con.
      c. Meadows, W. R., Inc.; Sealtight Evapre.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film, white burlap-polyethylene sheet, or natural cellulose fabric.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

1. Available Products:
   a. The Euclid Chemical Company; Kurez DR VOX.
   b. L&M Construction Chemicals, Inc.; L&M Cure R.
   c. Meadows, W. R., Inc.; 1100 Clear.

2.8 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.

B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

2.9 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.

B. Cementitious Materials: Use fly ash, pozzolan, and ground granulated blast-furnace slag as needed to reduce the total amount of Portland cement, which would otherwise be used. Limit percentage, by weight, of cement-replacement materials to a combined total of no more than 20-percent.

C. Admixtures: Use admixtures according to manufacturer's written instructions, and as required for concrete placement and workability.

2.10 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings, foundation walls, and piers: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 4,000 psi at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.45.
3. Slump Limit: 5 inches, plus or minus 1 inch.
4. Air Content: 5-1/2 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.
5. Coarse/Fine Aggregate Ratio: Quantity of coarse aggregate (by weight) shall be in the range of 1.2- to 1.4-times the quantity of fine aggregate (by weight).
6. Include Crystalline Waterproofing Admixture in concrete mix designs for elevator pit slab and foundation wall construction.

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, and furnish batch ticket information.

PART 3 - EXECUTION

3.1 FORMWORK

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 of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
   1. Class A, 1/8”.
   2. Class B, 1/4”.
   3. Class C, 1/2”.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate 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.

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.

M. Earth-forming is permitted to construct isolated column footings and continuous wall footings:
   1. Earth-formed footing dimensions shall be no less than the footing dimensions specified on the Contract Documents.
   2. Sides of earth-formed excavations shall be sloped as dictated by soil conditions to prevent soil from sloughing into excavated area and wet concrete.
   3. Ensure tops of footings are placed in accordance with the elevations specified on the Contract Documents.

3.2 EMBEDDED ITEMS

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's "Code of Standard Practice for Steel Buildings and Bridges."

3.3 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 (10 deg C) for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.

   1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
   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 will not be 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.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would 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.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

3.5 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 (38 mm) into concrete.
3. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
4. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement and embedded items is complete and that required inspections have been performed.

B. Batch ticket for concrete shall clearly indicate mix design numbers which correlates with approved mix design.

C. Do not add water to concrete during delivery, at Project site or during placement, unless approved by concrete plant supplier.

D. Deposit concrete continuously or in layers of such thickness that no new concrete will be 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 specified. Deposit concrete to avoid segregation.

E. Deposit concrete in forms in horizontal layers no deeper than 24” (600 mm) and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints.
   1. Consolidate placed concrete with mechanical vibrating equipment.
   2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the vibrator.
   3. Place vibrators to rapidly penetrate placed layer and at least 6” into preceding layer. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix constituents to segregate.

3.7 COLD- AND HOT-WEATHER CONCRETE PLACEMENT

A. Cold-Weather Placement: in accordance with ACI 306 – Guide to Cold Weather Concreting.

B. Hot-Weather Placement: in accordance with ACI 305 – Guide to Hot Weather Concreting.

3.8 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 one part portland cement to one and one-half 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 will match 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.

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.

3.9 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. 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.

3.10 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 (1 kg/sq. m 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 the remainder of the 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-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 (300 mm), 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.

2. 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.

3. 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.

3.11 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

3.12 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Professional. Remove and replace concrete that cannot be repaired and patched to Professional's approval.

B. Materials: Provide patching materials corresponding to the type of patch required. Submit patching and repair product information for review and approval prior to application.

3.13 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Inspections:

1. Steel reinforcement placement.
2. Verification of use of required design mixture.
3. Concrete placement, including conveying and depositing.
4. Curing procedures and maintenance of curing temperature.

C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least one composite sample for each 50 cu. yd. (76 cu. m) or fraction thereof of each concrete mixture placed each day.

a. When frequency of testing will provide 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, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
6. Compression Test Specimens: ASTM C 31/C 31M.

    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.

7. 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.

8. 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.
9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
10. 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.
11. 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.
12. 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.

13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
14. Correct deficiencies in the Work that test reports and inspections indicate does not comply with the Contract Documents.

D. Where earth-forming methods are used to construct footings, it is the responsibility of the Contractor placing the concrete to ensure that the foundation elements are constructed to accurate dimensions and elevations. It is also the responsibility of the Contractor placing the concrete to correct any deficiencies or errors that affect the Work of other trades. Any corrective work shall be performed at the expense of the Contractor responsible for placing the concrete.

END OF SECTION 033000

SECTION 033050 - CAST-IN-PLACE CONCRETE SLABS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Specification Section 033000: Cast-In-Place Concrete.

1.2 WORK INCLUDED

A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mix design, concrete topping, placement procedures and finishes.
   1. On-grade concrete slabs.
   2. On-deck concrete slabs.

1.3 SUBMITTALS

A. Product Data: For each type of manufactured material and product indicated.

B. Design Mixes: For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results or other circumstances warrant adjustments.

C. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
   1. Cementitious materials and aggregates.
   2. Steel reinforcement and reinforcement accessories.
   3. Admixtures.
   4. Curing materials.
   5. Floor and slab treatments.
   6. Bonding agents.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed concrete Work similar in material, design and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment. Manufacturer must be certified according to the National Ready Mixed Concrete Association's Certification of Ready Mixed Concrete Production Facilities.

C. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from 1 source, and each admixture from the same manufacturer.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

B. Galvanized Reinforcing Bars: ASTM A615, Grade 60, deformed bars; ASTM A767, Class II, galvanized after fabrication and bending.

C. Epoxy-Coated Reinforcing Bars: ASTM A615, Grade 60, deformed bars; ASTM A775, epoxy-coated after fabrication and bending.

2.2 FIBERGLASS-REINFORCED POLYMER BAR REINFORCEMENT

A. Solid, circular cross section bars composed of glass fibers embedded in a resin matrix.

B. Basis of Reference: ICC-ES Evaluation Report ESR-5081, January 2023.

C. Fiberglass reinforcing bars may be used in non-structural, exterior applications including shrinkage-and-temperature reinforcement in on-grade slabs, nosing

bars in concrete stairs, vertical and horizontal bars in exposed frost walls (non-retaining conditions), etc. ***All proposed locations for use of fiberglass reinforcing bars shall be separately submitted for review and approval by Engineer.***

2.3 VAPOR BARRIERS

A. Plastic Vapor Barrier: ASTM E 1745, Class A. Include manufacturer's recommended adhesive, mastic, termination bars, and pressure-sensitive tape as required.
   1. Available Products:
      a. Fortifiber Corporation; Moistop Ultra 15.
      b. Raven Industries Inc.; Vapor Block 15.
      c. Reef Industries, Inc.; Griffolyn Type-105.
      d. Stego Industries, LLC: Stego Wrap Vapor Barrier, 15-mil.

2.4 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete.

B. Joint Dowel Bars: Plain-steel bars, ASTM A 615/A 615M, Grade 60 (Grade 420). Cut bars true to length with ends square and free of burrs.

C. Joint Dowel Plates: 1/4” x 4 ½” x 4 ½”, ASTM A36 plates
   1. Basis of Design Product: Diamond Dowel System by PNA Construction Technologies (www.pna-inc.com); or accepted equivalent.
   2. Install at all locations shown on Drawings.

2.5 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I:

B. Normal-Weight Aggregate: ASTM C 33, uniformly graded, and as follows:
   1. Use largest practical aggregate size for each mix specification.

C. Water: Clean and potable.

2.6 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will 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: Not permitted in concrete slabs.
   5. High-Range, Water-Reducing and Retarding Admixture: Not permitted in concrete slabs.
   6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.7 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
   1. Available Products:
      a. Euclid Chemical Company (The); Eucobar.
      b. L&M Construction Chemicals, Inc.; E-Con.
      c. Meadows, W. R., Inc.; Sealtight Evapre.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately *9 oz./sq. yd. (305 g/sq. m)* when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film, white burlap-polyethylene sheet or natural cellulose fabric.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
   1. Available Products:
      a. Euclid Chemical Company (The); Kurez DR VOX.
      b. L&M Construction Chemicals, Inc.; L&M Cure R.
      c. Meadows, W. R., Inc.; 1100 Clear.

2.8 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.

B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

2.9 CONCRETE MIXES, 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.

B. Cementitious Materials: Use fly ash, pozzolan, and ground granulated blast-furnace slag as needed to reduce the total amount of Portland cement, which would otherwise be used. Limit percentage, by weight, of cement-replacement materials concrete to a combined total of no more than 20-percent.

C. Admixtures: Use admixtures according to manufacturer's written instructions, and as required for concrete placement and workability.

2.10 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. On-Grade Interior Slabs: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4,000 psi at 28 days*;* 0.45 max w/c.
2. Maximum Cementitious Materials Content: 564 lb/cu. yd.; use Portland Cement only; cementitious replacement materials (Fly Ash, GGBFS, etc) are not permitted.
3. Slump Limit: 5 inches, plus or minus ½ inch.
4. Air Content: Limit to entrapped air. Do not use air-entraining admixtures.
5. Coarse/Fine Aggregate Ratio: Quantity of coarse aggregate (by weight) shall be in the range of 1.2- to 1.4-times the quantity of fine aggregate (by weight).

B. On-Grade Exterior Slabs: Proportion normal-weight concrete mixture as follows:
1. Minimum Compressive Strength: 4,500 psi at 28 days.
2. Maximum Cementitious Materials Content: 611 lb/cu. yd.
3. Slump Limit: 4 inches, plus or minus 1 inch.
4. Air Content: 5 percent, plus or minus 1.5 percent, for 1-inch nominal maximum aggregate size.

5. Coarse/Fine Aggregate Ratio: Quantity of coarse aggregate (by weight) shall be in the range of 1.2- to 1.4-times the quantity of fine aggregate (by weight).

C. On-Deck Interior Slabs: Proportion normal-weight concrete mixture as follows:
   1. Minimum Compressive Strength: 4,000 psi at 28 days.
   2. Maximum Cementitious Materials Content: 564 lb/cu. yd.
   3. Slump Limit: 5 inches, plus or minus ½ inch (without superplasticizer).
   4. Air Content: Limit to entrapped air. Do not use air-entraining admixtures.
   5. Coarse/Fine Aggregate Ratio: Quantity of coarse aggregate (by weight) shall be in the range of 1.2- to 1.4-times the quantity of fine aggregate (by weight).

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 and ASTM C 1116, and furnish batch ticket information.
   1. When air temperature is between 85°F and 90°F (30°C and 32°C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90°F (32°C), reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMWORK

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 concrete structure can support such loads.

B. Construct forms tight enough to prevent loss of concrete mortar.

C. 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.

D. Chamfer exterior corners and edges of permanently exposed concrete.

3.2 EMBEDDED ITEMS

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.

3.3 VAPOR BARRIERS

A. Plastic Vapor Barriers: Place, protect, and repair vapor barriers according to ASTM E 1643 and manufacturer's written instructions.
   1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.
   2. Terminate at slab edges by turning vapor barrier sheet up vertical wall surface and sealing in accordance with detail shown on Drawings.
   3. Seal around all barrier penetrations (conduit, pipes, etc) in accordance with manufacturer’s instructions.
   4. Prior to concrete placement, inspect vapor barrier surface and repair all damaged, punctured, or torn areas.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
   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.

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.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

3.5 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement and embedded items is complete and that required inspections have been performed.

B. Batch ticket for concrete shall clearly indicate mix design numbers which correlates with approved mix design.

C. Do not add water to concrete during delivery, at Project site or during placement.

D. Concrete Placement: On-Deck (elevated) Floor Slabs:
   1. The on-deck concrete slab thickness indicated on the Drawings is a minimum thickness requirement.
   2. Concrete shall be placed with a varying thickness to accommodate deflection of structural framing under the weight of wet concrete and provide a flat, level and finished concrete surface at the specified elevation.

E. 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, free of humps or hollows, before excess moisture or bleed water appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

F. Cold-Weather Placement: Comply with applicable provisions of ACI 306.

G. Hot-Weather Placement: Comply with applicable provisions of ACI 305.

3.6 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, 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 (6 mm)* in 1 direction.
   1. Apply scratch finish to surfaces to receive concrete floor toppings or to receive mortar setting beds for bonded cementitious floor finishes.

C. 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.

D. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and 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.

3.7 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete slabs from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with recommendations in ACI 305R 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 (1 kg/sq. m 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. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings and other surfaces, by 1 or a combination of the following methods:
   1. 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” (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than 7 days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
   2. 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 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

3. 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 3 hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.8 JOINT FILLING

A. Prepare, clean and install joint filler according to manufacturer's written instructions.

B. Remove dirt, debris, saw cuttings, curing compounds and sealers from joints; leave contact faces of joint clean and dry.

3.9 FIELD QUALITY CONTROL

A. General:
1. Concrete materials and operation will be tested and inspected as work progresses. Failure to detect any defective work or material shall not in any way prevent later rejection when such defect is discovered nor shall it obligate the Professional for final acceptance.
2. Comply with Division 01 Section “Quality Control Testing Services” for sampling and testing of concrete.
3. Testing of field curing test cylinders or testing required because of changes in materials or proportions of the mix requested by the Contractor, as well as any extra testing of concrete or materials occasioned by their failure to meet specification requirements, shall be at the Contractor's expense.

END OF SECTION 033050

SECTION 033100 – SITE CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section. Contractor shall construct the sidewalk to the dimensions and materials noted on the contract plans.

1.2 SUMMARY

A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mix design, placement procedures, and finishes. The applicable application for this specification section includes sidewalks. Sidewalk poured with excessive honeycombing or uneven surfaces shall be subject to rejection, removal and replacement at the Contractor’s expense. Sidewalk not poured to the design elevations and grades and approved with the required final field adjustment at the direction of the Engineer or his inspector shall be subject to rejection, removal and replacement by the Contractor at the Contractor’s expense.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume.

1.4 SUBMITTALS

A. Product Data: For each type of manufactured material and product indicated.

B. Design Mixes: For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

1. Indicate amounts of mix water to be withheld for later addition at Project site.

C. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork. Design and engineering of formwork are Contractor's responsibility.

D. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:

E. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:

1. Cementitious materials and aggregates,
2. Form materials and form-release agents,
3. Fiber reinforcement,
4. Admixtures,
5. Waterstops,
6. Curing materials,
7. Bonding agents,
8. Adhesives,
9. Vapor retarders,
10. Epoxy joint filler,
11. Joint-filler strips,
12. Repair materials.

F. Minutes of preinstallation conference.

G. Colorized Concrete Mockup: Color shall be selected by the owner. Contractor shall provide color sample mockups, minimum 5'x5' size.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed concrete Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for formwork and shoring and reshoring installations that are similar to those indicated for this Project in material, design, and extent.

C. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.

1. Manufacturer must be certified according to the National Ready Mixed Concrete Association's Certification of Ready Mixed Concrete Production Facilities.

D. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.

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.

E. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each

admixture from the same manufacturer.

F. ACI Publications: Comply with the following, unless more stringent provisions are indicated:

1. ACI 301, "Specification for Structural Concrete."
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle steel reinforcement to prevent bending and damage.

1. Avoid damaging coatings on steel reinforcement.
2. Repair damaged epoxy coatings on steel reinforcement according to ASTM D 3963/D 3963M.

PART 2 - PRODUCTS

2.1 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete 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 or CRSI Class 2 stainless-steel bar supports.
2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
3. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

B. Joint Dowel Bars: Plain-steel bars, ASTM A 615/A 615M, Grade 60. Cut bars true to length with ends square and free of burrs.

C. Epoxy-Coated Joint Dowel Bars: ASTM A 775/A 775M; with ASTM A 615/A 615M, Grade 60, plain-steel bars.

D. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775/A 755M.

E. Zinc Repair Material: ASTM A 780, zinc-based solder, paint containing zinc dust, or sprayed zinc.

2.2 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I, Type I/II, Type II, Type III.

B. Blended Hydraulic Cement: ASTM C 595M, Type IS, Portland blast-furnace slag cement.

C. Blended Hydraulic Cement: ASTM C 595M, Type IP, Portland-pozzolan cement.

D. Blended Hydraulic Cement: ASTM C 595M, Type I (PM), pozzolan-modified Portland cement.

E. Silica Fume: ASTM C 1240, amorphous silica.

F. Normal-Weight Aggregate: ASTM C 33, uniformly graded, and as follows:

1. Class: Severe weathering region, but not less than 3S.
2. Class: Moderate weathering region, but not less than 3M.
3. Class: Negligible weathering region, but not less than 1N.
4. Nominal Maximum Aggregate Size: 1-1/2 inches
5. Nominal Maximum Aggregate Size: 1 inch
6. Nominal Maximum Aggregate Size: 3/4 inch
7. Combined Aggregate Gradation: Well graded from coarsest to finest with not more than 18 percent and not less than 8 percent retained on an individual sieve, except that less than 8 percent may be retained on coarsest sieve and on No. 50 sieve, and less than 8 percent may be retained on sieves finer than No. 50

G. Water: Potable and complying with ASTM C 94.

2.3 ADMIXTURES

A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.

B. Air-Entraining Admixture: ASTM C 260.

C. Water-Reducing Admixture: ASTM C 494, Type A.

D. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.

E. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.

F. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

G. 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.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

    a. Catexol 1000CL; Axim Concrete Technologies.
    b. MCI 2000 or MCI 2005; Cortec Corporation.
    c. DCI or DCI-S; W. R. Grace & Co., Construction Products Div.
    d. Rheocrete 222+; Master Builders, Inc.
    e. FerroGard-901; Sika Corporation.

2.4 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./SY dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Solvent-Borne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

F. Aquron CPT-2000: See section 03370.

2.5 RELATED MATERIALS

A. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

B. Epoxy-Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements, and as follows:

1. Type II, non-load bearing, for bonding freshly mixed concrete to hardened concrete.
2. Types I and II, non-load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
3. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.6 REPAIR MATERIALS

A. Repair Topping: Traffic-bearing, cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch.

1. Cement Binder: ASTM C 150, 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 5700 psi at 28 days when tested according to ASTM C 109/C 109M.

2.7 CONCRETE MIXES

A. Prepare design mixes for each type and strength of concrete determined by either laboratory trial mix or field test data bases, as follows:

1. Proportion normal-weight concrete according to ACI 211.1 and ACI 301.
2. Proportion lightweight structural concrete according to ACI 211.2 and ACI 301.

B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the laboratory trial mix basis.

C. Slab-on-Grade: Proportion normal-weight concrete mix as follows:

1. Compressive Strength (28 Days): 4000 psi
2. Maximum Slump: 5 inches

D. Cementitious Materials: For concrete exposed to deicers, limit percentage, by weight, of cementitious materials other than Portland cement according to ACI 301 requirements.

E. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than Portland cement in concrete as follows:

1. Fly Ash: 25 percent.
2. Combined Fly Ash and Pozzolan: 25 percent.
3. Ground Granulated Blast-Furnace Slag: 50 percent.
4. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 50 percent Portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.
5. Silica Fume: 10 percent.
6. Combined Fly Ash, Pozzolans, and Silica Fume: 35 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.
7. Combined Fly Ash or Pozzolans, Ground Granulated Blast-Furnace Slag, and Silica Fume: 50 percent Portland cement minimum, with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.

F. Maximum Water-Cementitious Materials Ratio: 0.40 for corrosion protection of steel reinforcement in concrete exposed to chlorides from deicing chemicals, salt, saltwater, brackish water, seawater, or spray from these sources.

G. Air Content: Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content of 2 to 4 percent, unless otherwise indicated.

H. Air Content: Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content as follows within a tolerance of plus 1 or minus 1.5 percent, unless otherwise indicated:

1. Air Content: 6 percent for 1-inch- nominal maximum aggregate size.

I. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) 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 water-cementitious materials ratio below 0.50.
4. Use corrosion-inhibiting admixture in concrete mixes where indicated.

2.8 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.9 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94, and furnish batch ticket information.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least one and one-half minutes, but not more than five minutes after ingredients are in mixer, before any part of batch is released.
2. For mixer capacity larger than 1 CY., increase mixing time by 15 seconds for each additional 1 CY
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 FORMWORK

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 concrete 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 of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:

1. Class A, 1/8 inch

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Set edge forms 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.

F. Chamfer exterior corners and edges of permanently exposed concrete.

G. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

H. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

I. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

J. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

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 bolts, accurately located, to elevations required.
2. Install reglets to receive top edge of foundation sheet 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.

3.3 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 for 24 hours after placing concrete provided concrete is hard enough to not be damaged by form-removal operations and provided curing and protection operations are maintained.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be 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 Engineer.

3.4 SHORES AND RESHORES

A. Comply with ACI 318, ACI 301, and recommendations in ACI 347R for design, installation, and removal of shoring and reshoring.

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.

3.5 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 the Engineer.

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 from preformed galvanized steel, plastic keyway-section forms, or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1.5 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. 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.
7. Use epoxy-bonding adhesive 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 will 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 Division 7 Section "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.

E. Dowel Joints: Install dowel sleeves and dowels or dowel bar and support assemblies at joints where indicated.

1. Use dowel sleeves or lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement, unless approved by Architect.

C. Before 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 mix.

D. Deposit concrete continuously or in layers of such thickness that no new concrete will be 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 specified. Deposit concrete to avoid segregation.

E. Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints.

1. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.
2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the vibrator. Place vibrators 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 mix constituents to segregate.

F. 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 air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
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 mix designs.

G. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows, when hot-weather conditions exist:

1. Cool ingredients before mixing to 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. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.11 FINISHING FLOORS AND SLABS

A. General: Comply with recommendations in ACI 302.1R for screeding, restraightening, 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.

1. Apply scratch finish to surfaces indicated and to surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, Portland cement terrazzo, and other bonded cementitious floor finishes.

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 restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

D. Trowel Finish: After applying float finish, apply first trowel finish 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 indicated and to floor and slab 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, measured within 24 hours according to ASTM E 1155/E 1155M for a randomly trafficked floor surface:

    a. Specified overall values of flatness, F(F) 25; and levelness, F(L) 20; with minimum local values of flatness, F(F) 17; and levelness, F(L) 15.
    b. Specified overall values of flatness, F(F) 35; and levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and levelness, F(L) 17; for slabs-on-grade.
    c. Specified overall values of flatness, F(F) 30; and levelness, F(L) 20; with minimum local values of flatness, F(F) 24; and levelness, F(L) 15; for suspended slabs.
    d. Specified overall values of flatness, F(F) 45; and levelness, F(L) 35; with minimum local values of flatness, F(F) 30; and levelness, F(L) 24.

3. Finish and measure surface so gap at any point between concrete surface and an unleveled freestanding 10-foot long straightedge, resting on two high spots and placed anywhere on the surface, does not exceed the following:

    a. 1/4 inch

E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and 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.

3.12 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete Work.

3.13 CONCRETE PROTECTION 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 with recommendations in ACI 305R 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 by one or a combination of the following methods:

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces, by one or a combination of the following methods:

1. 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 recommends for use with floor coverings.

2. 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.

3.14 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Remove and replace concrete that is damaged or is pitted or has a non-uniform surface prior to paving or final restoration.

B. Patching Mortar: May only be used with prior permission of the Engineer. Mix dry-pack patching mortar, consisting of one part Portland cement to two and one-half 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 shall be removed and replaced at the Contractor’s expense

If repair is allowed by the Engineer, perform the repair as follows:

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete but not less than 1 inch in depth. 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 will match 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 Engineer.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template. Finishes that fail the test shall be removed and replaced at the Contractor’s expense. If repair is allowed by the Engineer, perform the repair as follows:

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.
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. 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 Engineer’s approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Engineer’s approval.

3.15 FIELD QUALITY CONTROL

A. Testing Agency: Contractor shall engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement according to requirements specified in this Article.

B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mix exceeding 5 CY but less than 25 CY, plus one set for each additional 50 CY or fraction thereof.

2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.

3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173, 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 mix.

4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.

5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.

6. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of four standard cylinder specimens for each composite sample.

    a. Cast and field cure one set of four standard cylinder specimens for each composite sample.

7. Compressive-Strength Tests: ASTM C 39; test two laboratory-cured specimens at 7 days and two at 28 days.
    a. Test two field-cured specimens at 7 days and two at 28 days.
    b. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at age indicated.

C. 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.

D. Strength of each concrete mix 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.

E. Test results shall be reported in writing to Engineer, 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 mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.

F. 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 the Engineer. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by the Engineer.

END OF SECTION 033000

SECTION 033700 – CONCRETE CURING AND SEALING MATERIAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Furnish all labor, materials, equipment and incidentals required to waterproof and seal concrete where shown on the drawings and/or as specified herein, and as needed for a complete and proper installation.

B. Provide temporary electric service and potable water required to apply the product.

C. Product shall be Aquron CPT-2000 solution manufactured by Aquron Products of Rowlett, Texas.

1.3 SUBMITTALS

A. Submit the following product data:

1. Materials list of items proposed to be provided under this Section.

2. Manufacturer’s current specifications and other data needed to prove compliance with the specified requirements.

3. Manufacturer’s recommended installation procedures which, when approved by the Engineer, will become the basis for accepting or rejecting actual installation procedures used on the work.

B. Any test data or reports required under this section.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.

B. Use a Certified Applicator currently approved in writing by the product Manufacturer, Aquron Corporation.

C. Cooperate as required in performance of the specified testing and inspecting.

D. Application of the product shall conform to Manufacturer's written specifications.

E. The Engineer may select an area for testing product application and observing applicator procedures for conformance with this section and the Manufacturer's specifications.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in the original manufacturer's sealed containers to location, on site, approved by Owner.

B. Store materials in such a way as to prevent damage to containers or product and protect from freezing temperatures.

C. Containers shall be kept tightly sealed until product is applied.

1.6 WARRANTY REQUIREMENTS

A. Aquron Corporation (Manufacturer) shall guarantee that if any goods supplied prove defective in workmanship or material that Manufacturer shall replace them or refund their purchase price. Aquron Corporation shall submit a performance warranty for its Aquron CPT-2000 solution treatment.

PART 2 - PRODUCTS

2.1 CONCRETE WATERPROOFING SOLUTION TREATMENT

A. For all newly installed concrete sidewalk, handicap ramps and driveway aprons, provide the following product manufactured by Aquron Corporation, Rockwell TX (no substitute):

1. The Aquron CPT-2000 sub-surface molecular bonding and waterproofing densifier (cures clear) water-borne, environmentally neutral solution to provide superior waterproofing.

2. Water shall be potable water only.

2.2 OTHER MATERIALS

A. Provide other materials, not specifically described in this Section, but required for completing the work, where specified by the Engineer.

PART 3-EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

B. Surface, air and material shall not be lower than 40°F during application. **DO NOT** apply when temperature is expected to fall below 40°F *within* 6 hours.

C. Weather should be *clear*, with moderate breeze acceptable. There shall be no precipitation during application or expected for 4 hours following.

D. The Contractor/Applicator shall provide protection for any glass or aluminum to avoid over spray. In the event over spraying occurs, remove spill promptly with water to guard against potential etching glass and/or dulling of aluminum.

E. The Contractor/Applicator shall examine the areas and conditions under which work of this Section will be performed for conformance with Manufacturer Specifications. Correct conditions detrimental to timely and proper completion of the Work. **DO NOT** proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. BASIC RULES FOR APPLYING AQURON CPT-2000 FOR PRIMING AND SEALING CONCRETE PRIOR TO COATINGS AND COVERINGS

B. In order to perform, Aquron CPT-2000 must be able to penetrate the concrete. The concrete surface must be clean and free of all adhesives, sealers, curing compounds, and any other foreign materials that would obstruct penetration. Where over-machine troweling has taken place, reducing absorption, surface tension must be broken. The porosity of the surface must allow Aquron CPT-2000 to easily and freely penetrate the concrete. If Aquron CPT-2000 is not absorbed into the concrete, it will simply evaporate into the air, causing it to be ineffective. To test porosity, pour a small droplet of water onto the floor in various areas. The water should be completely absorbed into the concrete within 30-60 seconds. If this does not occur, the concrete surface is too dense or contains a coating and must be bead-blasted to clean exposed concrete as a corrective measure prior to application of Aquron CPT-2000. Any method other than bead-blasting must have prior written approval from the Aquron Corporation.

C. A maximum coverage rate of 150 sq. feet per gallon (or 750 square feet per 5 gallon container) is absolutely critical in order for Aquron CPT-2000 to work properly. You can

over-apply Aquron CPT-2000, and, it can be under-applied. It is extremely easy and almost natural to apply the product too thin. *Caution:* If recommended coverage rate is exceeded, the system may result in failure. We have found the best method for applying Aquron CPT-2000 is to grid the sub floor into 150 square foot sections for smaller jobs, or 600 square ft. sections for larger jobs, then measure and evenly spray at a rate of 1 gallon per 150 sq. ft. section or 5 gallons for each 750 sq. ft. section.

D. INSTALLATION

1. Job Conditions
   (1) Do not proceed with application of Aquron CPT-2000 when ambient temperature and/or substrate temperatures are less than 40°F or forecasted to drop below 40°F during the next 6 hours.
   (2) Should temperatures be extremely hot, cool surface with sufficient water to decrease temperatures.
   (3) Caution should be taken in windy conditions as Aquron CPT-2000 if allowed to dry on, can etch glass or dull shiny aluminum. If contact is made with glass or aluminum rinse surface immediately with water before Aquron dries on surface.
   (4) As a water-borne product, Aquron CPT-2000 must have access to the surface, any previous coatings or heavy build ups of oil or grease must be removed.
   (5) Do not dilute. Use as supplied.
   (6) Once Aquron CPT-2000 is applied, wait 24 to 48 hours on existing concrete before conducting an ASTMF 1869 Calcium Chloride Test.
   (7) Aquron CPT-2000 only seals the concrete itself; it does not seal cracks or fractures.
   (8) Do not proceed with coatings application is ASTMF 1869 shows moisture level higher than acceptable limits established by coatings manufacturer.

2. Application Procedure (for established cured concrete)
   (1) Spray tip size: (a) Aquron CPT-2000 must be applied to exterior weathered concrete by utilizing an airless sprayer with a tip size no larger than .019 with 25□ fan spray pattern. (b) Aquron CPT-2000 must be applied to interior steel trowelled concrete with a fine hard surface by utilizing an airless spray- er with a tip size no larger than 0.013 with a 25□ spray pattern. (A test area should be designated within the area of concrete to be treated in order to test for proper tip size. The proper size tip should allow for penetration in a single pass without pooling or puddling.)
   (2) Pre-wet with water area of application to dampen, all pooled and puddle areas must be dispersed, continue to keep area damp until Aquron CPT- 2000 has been applied.
   (3) Apply Aquron CPT-2000 at a rate of 150-sq. ft. per gallon. Normally to achieve this rate of application of Aquron CPT-2000, 2 applications, at least, will be needed. Apply first application covering area in one direction, then apply second application once first has penetrated surface (normally 10-60 minutes, do not allow to dry). Achieve an even coverage by applying second application at 90□ perpendicular to the first i.e., a crisscross pattern.

(4) Start application holding spray tip approximately 8”-10” from concrete sur- face. Make application using overlapping spray pattern with a fanning mo- tion at the end of each pass.
(5) Entire area being treated is to be saturated, but do not allow Aquron CPT-2000 to puddle, if so disperse puddle area with broom 15-30 minutes after application is completed (do not allow puddles of Aquron CPT-2000 to dry).
(6) Always start application at lowest possible area first and proceed to high- er elevations. On vertical application (walls) start at the bottom and proceed up the vertical surface with horizontal strokes.
(7) Check whether Aquron CPT-2000 has purged to the surface of the con- crete any oil, gas, greases and salts etc., these must be thoroughly washed or abraded away before adhesives or coatings can be applied.
(8) When application is to weeping hydrostatic walls or floors, at least two applications, each at a rate of 150 sq. ft. per gallon, are necessary with sec- ond applied immediately following the first.

3. Application Procedure (for fresh concrete).
(1) On freshly finished concrete surfaces, no additional surface prepara- tion is required. Apply as soon as surface is walkable or has reached ini- tial set. Installation requires using a low pressure non-atomizing sprayer equipped with a fan spray tip. Aquron 2000 Cure and Seal is applied to the point of saturation (the point where runoff is about to occur), but at a rate not to exceed 150 square feet per U.S. gallon. While Aquron 2000 Cure and Seal is being continually agitated to maintain pigment in solu- tion, start application holding spray tip approximately 12” from concrete surface. Make application using overlapping spray pattern with fanning motion at the end of each horizontal pass. Entire area being treated must be saturated with no “holidays”. When forms are removed, treat exposed concrete.

NOTE: *Two applications, each at no less than 150 sq. ft. per gallon, are required when a calcium chloride test shows moisture vapor emission levels of greater than 10 to 12 pounds.*

1. Clean equipment with potable water and mild soap.

2. Topicals shall be installed in conformance with specific manufacturer’s requirements.

3. Upon completion of the work, remove from the site containers, trash, and debris caused by Work under this section.

END OF SECTION 033700

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 035416 – SELF-LEVELING UNDERLAYMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes self-leveling underlayment.

B. Related Sections include the following:

1. Division 9 Sections for patching and leveling compounds applied with floor coverings.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Plans indicating substrates, locations, and average depths of underlayment based on survey of substrate conditions.

C. Manufacturer Certificates: Signed by manufacturers of both underlayment and floor covering system certifying that products are compatible.

D. Qualification Data: For Installer.

E. Minutes of pre-installation conference.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Installer who is approved by manufacturer for application of underlayment products required for this Project.

B. Product Compatibility: Manufacturers of both underlayment and floor covering system certify in writing that products are compatible.

C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials to comply with manufacturer's written instructions to prevent deterioration from moisture or other detrimental effects.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature and humidity, ventilation, and other conditions affecting underlayment performance.

1. Place self-leveling underlayment only when ambient temperature and temperature of substrates are between 50 and 80 deg F (10 and 27 deg C).

1.7 COORDINATION

A. Coordinate application of underlayment with requirements of floor covering products, including adhesives, specified in Division 9 Sections, to ensure compatibility of products.

PART 2 - PRODUCTS

2.1 SELF-LEVELING UNDERLAYMENTS

A. Underlayment: Self-leveling product that can be applied in minimum uniform thicknesses of 1/8” up to 1” and that can be feathered at edges to match adjacent floor elevations.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Basis of design: Ardex; K-15 Self-Leveling Underlayment Concrete

a. Uzin, A Division of UFLOOR Systems, Inc.
b. Bonsal, W. R. Company.
c. ChemRex.
d. L&M Construction Chemicals, Inc.
e. Sika Corporation.

3. Cement Binder: ASTM C 150, portland cement, or hydraulic or blended hydraulic cement as defined by ASTM C 219.
4. Compressive Strength: Not less than 4100 psi (28 MPa) at 28 days when tested according to ASTM C 109/C 109M.
5. Underlayment Additive: Resilient-emulsion product of underlayment manufacturer formulated for use with underlayment when applied to substrate and conditions indicated.

B. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm); or coarse sand

as recommended by underlayment manufacturer.

1. Provide aggregate when recommended in writing by underlayment manufacturer for underlayment thickness required.

C. Water: Potable and at a temperature of not more than 70 deg F (21 deg C).

D. Primer: Product of underlayment manufacturer recommended in writing for substrate, conditions, and application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for conditions affecting performance.

1. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Prepare and clean substrate according to manufacturers written instructions.

1. Treat nonmoving substrate cracks according to manufacturers written instructions to prevent cracks from telegraphing (reflecting) through underlayment.
2. Fill substrate voids to prevent underlayment from leaking.

B. Concrete Substrates: Mechanically remove, according to manufacturer's written instructions, laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants that might impair underlayment bond.

1. Moisture Testing: Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates do not exceed a maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/100 sq. m) in 24 hours.

C. Adhesion Tests: After substrate preparation, test substrate for adhesion with underlayment according to manufacturer's written instructions.

3.3 APPLICATION

A. General: Mix and apply underlayment components according to manufacturer's written instructions.

1. Close areas to traffic during underlayment application and for time period after application recommended in writing by manufacturer.
2. Coordinate application of components to provide optimum underlayment-to-substrate and intercoat adhesion.
3. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.

B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.

C. Apply underlayment to produce uniform, level surface.

1. Apply a final layer without aggregate to produce surface.
2. Feather edges to match adjacent floor elevations.

D. Cure underlayment according to manufacturer's written instructions. Prevent contamination during application and curing processes.

E. Do not install floor coverings over underlayment until after time period recommended in writing by underlayment manufacturer.

F. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

3.4 PROTECTION

A. Protect underlayment from concentrated and rolling loads for remainder of construction period.

END OF SECTION 035416

SECTION 042000 - UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Mortar and grout.
3. Steel reinforcing bars.
4. Masonry joint reinforcement.
5. Ties and anchors.
6. Embedded flashing.
7. Miscellaneous masonry accessories.

1.3 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For the following:

1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
2. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement." Show information on elevation drawings of all reinforced masonry walls including locations of openings, lintels, vertical reinforcing, bond beams, etc.
3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

C. Samples for Initial Selection:

1. Weep holes/vents.

1.5 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each type and size of the following:

1. Masonry units.
2. Cementitious materials. Include brand, type, and name of manufacturer.
3. Grout mixes. Include description of type and proportions of ingredients.
4. Reinforcing bars.
5. Joint reinforcement.
6. Anchors, ties, and metal accessories.

B. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

C. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.6 QUALITY ASSURANCE

A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

C. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination."

1.7 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.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.9 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.
2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in 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 seven days after completing cleaning.

E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

2.2 CONCRETE MASONRY UNITS

A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
2. Provide bullnose units for outside corners unless otherwise indicated.

B. CMUs: ASTM C 90.

1. Density Classification: Normal weight.
    1) Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions of 4, 6, 8, 12, 14, and 16 inches.

2.3 CONCRETE AND MASONRY LINTELS

A. General: Provide one of the following:

1. Concrete Lintels: ASTM C 1623, matching CMUs in color, texture, and density classification; and with reinforcing bars indicated.
2. Concrete Lintels: Precast or formed-in-place concrete lintels complying with requirements in Section 033000 "Cast-in-Place Concrete," and with reinforcing bars indicated.
3. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.4 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of Portland cement and hydrated lime containing no other ingredients.

D. Masonry Cement: Not permitted.

E. Aggregate for Mortar: ASTM C 144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
3. White-Mortar Aggregates: Natural white sand or crushed white stone.
4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
5. Color as selected for Decorative CMU.

F. Aggregate for Grout: ASTM C 404.

G. Admixtures: Not permitted.

H. Water: Potable.

2.5 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.

B. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.

1. Interior Walls: Hot-dip galvanized, carbon steel.
2. Exterior Walls: Hot-dip galvanized, carbon steel.
3. Wire Size for Side Rods: 0.148-inch diameter.
4. Wire Size for Cross Rods: 0.148-inch diameter.
5. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
6. Provide in lengths of not less than 10 feet.

C. Masonry Joint Reinforcement for Single-Wythe Masonry: Either ladder or truss type with single pair of side rods.

2.6 TIES AND ANCHORS

A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.

1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 153/A 153M, Class B-2 coating.
2. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- diameter, hot-dip galvanized steel wire.
2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from hot-dip galvanized steel wire.

C. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 0.060-inch- thick, steel sheet, galvanized after fabrication.

   a. 0.064-inch thick, galvanized sheet may be used at interior walls unless otherwise indicated.

2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.25-inch diameter, hot-dip galvanized steel wire. Mill-galvanized wire may be used at interior walls unless otherwise indicated.

D. Dovetail Slot for Embedment in Concrete Walls: Provide pre-fabricated dovetail slots, embedded in cast-in-place concrete walls, for use with corresponding adjustable veneer anchors:

1. Material: 20-gauge steel.
2. Finish: Hot-dipped galvanized.

2.7 EMBEDDED FLASHING MATERIALS

A. Metal Flashing:

1. Provide 26 gauge stainless steel flashing. When thru-wall flashing at roof rising wall is exposed to building occupants from building windows or at grade, it shall be Follonbee's TCS II.
2. Copings: Provide Cheney Dovetail design flashing with 3/8 inches long, 45 degree toe drips along each side.
3. Rising Wall and Parapet: Provide Keystone combination receiver and insert flashing receiver shall extend full width of masonry wall and have an up-turned seam at inside.
4. Thru-Wall at Grade: Cheney 3-way Sawtooth design or Keystone 3-way Bond Interlocking Thru-Wall flashing. Top flange shall extend through masonry back-up wall and have an up-turned seam inside. Bottom edge shall project through mortar face 3/16 inch. Round the corners of the bottom edge at outside building corners. Turn down the bottom edge of flashing to be flush with the face of veneer below to prevent sharp edges at building corners.
5. Flexible flashing shall be installed at all relief angles and masonry cavity wall openings.

2.8 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, urethane or PVC.

B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

D. Weep/Vent Products:

1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer wythe, in color selected from manufacturer's standard.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) Advanced Building Products Inc.; Mortar Maze weep vent.
2) Blok-Lok Limited; Cell-Vent.
3) Heckmann Building Products Inc.; No. 85 Cell Vent.
4) Hohmann & Barnard, Inc.; Quadro-Vent.
5) Wire-Bond; Cell Vent.

2.9 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Diedrich Technologies, Inc.
b. EaCo Chem, Inc.
c. ProSoCo, Inc.

2.10 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Use portland cement-lime mortar unless otherwise indicated.

B. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.

1. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls, interior load-bearing walls, and for other applications where another type is not indicated, use Type S.
2. For exterior veneers and interior non-load-bearing partitions use Type N.
3. Admixtures in mortar are not permitted.

C. Grout for Unit Masonry: Comply with ASTM C 476.

1. Use either fine or coarse grout that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
2. Proportion grout in accordance with ASTM C 476, Proportion Specification.
3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.
4. Admixtures in grout are not permitted.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
2. Verify that foundations are within tolerances specified.
3. Verify that reinforcing dowels are properly placed.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.

D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch.
2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.
3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in bond pattern to match existing; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4-inches Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

F. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.

G. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

H. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.

1. Install compressible filler in joint between top of partition and underside of structure above.
2. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 078446 "Fire-Resistive Joint Systems."

3.5 MORTAR BEDDING AND JOINTING

A. Lay CMUs as follows:

1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

C. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.6 MASONRY JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.

1. Space reinforcement not more than 16 inches o.c.
2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

E. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.7 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. Anchor masonry to structural steel and concrete where masonry abuts or faces structural steel or concrete to comply with the following:

1. Provide an open space not less than 1 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.8 CONTROL AND EXPANSION JOINTS

A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

B. Form control joints in concrete masonry using one of the following methods:

1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.
2. Install preformed control-joint gaskets designed to fit standard sash block.
3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake out joint for application of sealant.
4. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.

C. Form expansion joints in brick as follows:

1. Build flanges of metal expansion strips into masonry. Lap each joint 4 inches in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.
2. Build flanges of factory-fabricated, expansion-joint units into masonry.
3. Build in compressible joint fillers where indicated.
4. Form open joint full depth of brick wythe and of width indicated, but not less than 1/2 inch for installation of sealant and backer rod specified in Section 079200 "Joint Sealants."

D. Provide horizontal, pressure-relieving joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 079200 "Joint Sealants," but not less than 3/8 inch.

3.9 LINTELS

A. Install lintels where indicated.

B. Provide concrete or masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.

C. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.10 FLASHING, WEEP HOLES, AND VENTS

A. General: Install embedded flashing in masonry at lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.

B. Install flashing as follows unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
2. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of 8 inches, and through inner wythe to within 1/2 inch of the interior face of wall in exposed masonry. Where interior face of wall is to receive furring or framing, carry flashing completely through inner wythe and turn flashing up approximately 2 inches on interior face.
3. At stud back-up walls, extend flashing from exterior face of veneer, through veneer, across air space behind veneer, and up face of sheathing at least 8 inches; with upper edge tucked under building paper or building wrap, lapping at least 8 inches.
4. At lintels and shelf angles, extend flashing a minimum of 4 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 4 inches to form end dams.
5. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 4 inches or as recommended by flashing manufacturer, and seal lap with two beads of elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated. Provide factory soldered corners with 18-inches minimum legs.

a. Extend sheet metal flashing 1/2 inch beyond face of masonry at exterior and turn flashing down to form a drip.
b. Solder corners and level changes to be watertight.

C. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

D. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:

1. Use specified weep/vent products to form weep holes.
2. Space weep holes 32 inches o.c. unless otherwise indicated.

E. Place cavity drainage material immediately above flashing in cavities.

3.11 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than 60 inches.

3.12 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
6. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

END OF SECTION 042000

SECTION 042113 - BRICK MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Face brick.
2. Mortar and grout.
3. Ties and anchors.
4. Embedded flashing.
5. Miscellaneous masonry accessories.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For the following:

1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
2. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

C. Samples: For each type and color of the following:

1. Face brick.
2. Special brick shapes.
3. Mortar: Make Samples using same sand and mortar ingredients to be used on Project.
4. Weep holes.
5. Accessories embedded in masonry.

1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each type and size of the following:

1. Masonry units.

a. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.

b. For exposed brick, include test report for efflorescence according to ASTM C 67.

2. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
3. Grout mixes. Include description of type and proportions of ingredients.
4. Anchors, ties, and metal accessories.

B. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.5 QUALITY ASSURANCE

A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

C. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

D. Mock-Up Sample Panels: Before installing face brick, build sample panels, using materials indicated for the complete Work, to verify selections made under sample Submittals and to demonstrate aesthetic effects. Build sample panels (Reference architectural series drawings for exterior finish materials layout and arrangement) by full thickness. Include, cavity, ties, weeps, window jamb/sill, and insulation in sample.
   1. Locate panels as directed by Architect.
   2. Clean exposed faces of panels with masonry cleaner indicated.
   3. Protect approved sample panels from the elements with weather resistant membrane.
   4. Maintain sample panels during construction in an undisturbed condition as a standard for judging the completed Work.
   5. 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 Architect in writing.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on

elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.

C. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 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 (600 mm) down both sides of walls and hold cover securely in place.
2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches (600 mm) down face next to unconstructed wythe and hold cover in place.

B. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect 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.

C. 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 (4 deg C) and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 BRICK

A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units.

1. For ends of sills and caps, corbels, and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
2. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.

B. Face Brick: Facing brick complying with ASTM C 216. Provide the following:

1. New brick to match existing building
   a. Basis of design: Continental Brick Company
   b. Color: Std. 490 (match existing)
   c. Size: Norman (match existing)
   d. *Brick & mortar must be approved during the mock-up panel process to ensure it matches the existing building.*

2.2 MORTAR MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of Portland cement and hydrated lime containing no other ingredients.

D. Masonry Cement: Not permitted.

E. Admixtures: Not permitted.

F. Aggregate for Mortar: ASTM C 144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch (6 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
3. White-Mortar Aggregates: Natural white sand or crushed white stone.
4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

2.3 REINFORCEMENT

A. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.

B. Adjustable Masonry-Veneer Anchors:

1. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) Dayton Superior Corporation, Dur-O-Wal Division; D/A 210 with D/A 700-708.
2) Heckmann Building Products, Inc; 315-D with 316.
3) Hohmann & Barnard, Inc; DW-10.
4) Wire-Bond; 1004, Type III.

b. Anchor Section: Sheet metal plate, 1-1/4 inches (32 mm) wide by 9 inches (229 mm) long, with screw holes top and bottom and with raised rib-stiffened strap, 5/8 inch (16 mm) wide by 5-1/2 inches (140 mm) long, stamped into center to provide a slot between strap and plate for inserting wire tie.

2. Stainless-Steel Drill Screws for Steel Studs: Proprietary fastener consisting of carbon-steel drill point and 300 Series stainless-steel shank, complying with ASTM C 954 except manufactured with hex washer head and neoprene or EPDM washer, No. 10 (4.83-mm) diameter by length required to penetrate steel stud flange with not less than three exposed threads.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) Dayton Superior Corporation, Dur-O-Wal Division; Stainless Steel SX Fastener.
2) ITW Buildex; Illinois Tool Works, Inc; Scots long life Teks.

2.4 EMBEDDED FLASHING MATERIALS

A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:

1. Stainless Steel: ASTM A 240/A 240M, Type 304, 0.016 inch (0.40 mm) thick.
2. Fabricate continuous flashings in sections 96 inches (2400 mm) long minimum, but not exceeding 12 feet (3.7 m). Provide splice plates at joints of formed, smooth metal flashing.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) Cheney Flashing Company; Cheney 3-Way Flashing (Sawtooth).
2) Keystone Flashing Company, Inc; Keystone 3-Way Interlocking Thruwall Flashing.
3) Sandell Manufacturing Co., Inc; Mechanically Keyed Flashing.

3. Fabricate through-wall flashing with drip edge unless otherwise indicated. Fabricate by extending flashing 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees.

B. Solder and Sealants for Sheet Metal Flashings:

1. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
2. Elastomeric Sealant: ASTM C 920, chemically curing urethane sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

2.5 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, urethane or PVC.

B. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

C. Weep/Vent Products: Use the following unless otherwise indicated:

1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer wythe, in color selected from manufacturer's standard.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) Advanced Building Products Inc.; Mortar Maze weep vent.
2) Blok-Lok Limited; Cell-Vent.
3) Heckmann Building Products Inc.; No. 85 Cell Vent.
4) Hohmann & Barnard, Inc.; Quadro-Vent.
5) Wire-Bond; Cell Vent.

D. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Advanced Building Products Inc; Mortar Break.
b. CavClear/Archovations, Inc; Stone Mat.
c. Dayton Superior Corporation, Dur-O-Wal Division; Polytite MortarStop.
d. Mortar Net USA, Ltd; Mortar Net.

2. Provide one of the following configurations:

a. Strips, full-depth of cavity and 10 inches (250 mm) high, with dovetail shaped notches 7 inches (175 mm) deep that prevent clogging with mortar droppings.

2.6 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Diedrich Technologies, Inc.
b. EaCo Chem, Inc.
c. PROSOCO, Inc.

2.7 MORTAR MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar.
2. Use Portland cement-lime mortar unless otherwise indicated.

B. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.

1. For brick-masonry veneer use Type N.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.

B. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

C. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

D. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

E. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

3.3 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Running Bond with 33 percent offset.

C. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

3.4 MORTAR BEDDING AND JOINTING

A. Lay hollow brick as follows:

1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
2. With entire units, including areas under cells, fully bedded in mortar at starting course on footings.

B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

3.5 ANCHORING MASONRY VENEERS

A. Anchor masonry veneers to wall framing with masonry-veneer anchors to comply with the following requirements:

1. Fasten screw-attached anchors through sheathing to wall framing with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
2. Provide not less than 2 inches (50 mm) of air space between back of masonry veneer and face of sheathing.
3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
4. Space anchors as indicated, but not more than 18 inches (458 mm) o.c. vertically and 24 inches (610 mm) o.c. horizontally, with not less than 1 anchor for each 2 sq. ft. (0.2 sq. m) of wall area. Install additional anchors within 12 inches (305 mm) of openings and at intervals, not exceeding 8 inches (203 mm), around perimeter.

3.6 EXPANSION JOINTS

A. General: Install expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span expansion joints without provision to allow for in-plane wall or partition movement.

B. Form expansion joints in brick as follows:

1. Build flanges of metal expansion strips into masonry. Lap each joint 4 inches (100 mm) in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.
2. Build flanges of factory-fabricated, expansion-joint units into masonry.
3. Build in compressible joint fillers where indicated.
4. Form open joint full depth of brick wythe and of width indicated, but not less than 3/8 inch (10 mm) for installation of sealant and backer rod specified in Section 079200 "Joint Sealants."

C. Provide horizontal, pressure-relieving joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 079200 "Joint Sealants," but not less than 3/8 inch (10 mm).

1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.7 LINTELS

A. Install lintels where indicated.

B. Provide minimum bearing of 8 inches (200 mm) at each jamb unless otherwise indicated.

3.8 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.

B. Install flashing as follows unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
2. At masonry-veneer walls, extend flashing through veneer, across air space behind veneer, and up face of sheathing at least 8 inches (200 mm); with upper edge tucked under building paper or building wrap, lapping at least 4 inches (100 mm).
3. At lintels and shelf angles, extend flashing a minimum of 6 inches (150 mm) into masonry at each end. At heads and sills, extend flashing 6 inches (150 mm) at ends and turn up not less than 2 inches (50 mm) to form end dams.
4. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches (38 mm) or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.

C. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:

1. Use specified weep/vent products to form weep holes.
2. Use wicking material to form weep holes above flashing under brick sills. Turn wicking down at lip of sill to be as inconspicuous as possible.
3. Space weep holes 24 inches (600 mm) o.c. unless otherwise indicated.

D. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

E. Install vents in head joints in exterior wythes at spacing indicated. Use specified weep/vent products to form vents.

3.9 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
   Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

3.10 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. Masonry Waste: Remove excess clean masonry waste and legally dispose of off Owner's property.

END OF SECTION 042113

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 051200 - STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 WORK INCLUDED

A. This Section includes the following:
   1. Structural steel.
   2. Grout.

B. Related Sections include the following:
   1. Division 01 Section “Quality Assurance Testing and Inspection Services.”
   2. Division 05 Section "Metal Fabrications" for steel lintels or shelf angles not attached to structural-steel frame, miscellaneous steel fabrications and other metal items not defined as structural steel.
   3. Division 09 painting Sections for surface preparation and priming requirements.

1.3 REFERENCED STANDARDS

A. American Society for Testing and Materials (ASTM):
   1. ASTM A6 – Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, Sheet Piling.
   2. A29 – Standard Specification for Steel Bars, Carbon and Alloy, Hot-Wrought, General Requirements for Grades 1010 through 1020.
   3. ASTM A36 - Structural Steel.
   4. ASTM A53 - Pipe Steel, Black and Hot-Dipped, Zinc-coated Welded and Seamless Steel Pipe.
   5. ASTM A108 - Steel Bars, Carbon, Cold Finished, Standard Quality.
   6. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
   7. ASTM A307 - Carbon Steel Bolts and Studs.
   8. ASTM A325 - High Strength Bolts for Structural Steel Joints.
   9. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.
   10. ASTM A572 - High-Strength Low-Alloy Columbium-Vanadium Steels of Structural Quality.

11. ASTM A992 - Standard Specification for Steel for Structural Shapes for Use in Building Framing.
12. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink).
13. ASTM F436 - Standard Specification for Hardened Steel Washers.
14. ASTM F 959 - Standard Specification for Compressible Washer-Type Direct Tension Indicators for use with Structural Fasteners.
15. ASTM F 1554 - Standard Specification for Anchor Bolts, Steel, 36, 55 and 105 ksi Yield Strength.
16. ASTM F 1852 - Standard Specification for “Twist-Off” Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

B. AWS D1.1 - Structural Welding Code.

C. American Institute of Steel Construction (AISC):
1. AISC - Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.
2. AISC - Code of Standard Practice for Steel Buildings and Bridges.
3. AISC - Specification for Structural Joints using ASTM A325 or A490 Bolts.

D. SSPC - Steel Structures Painting Council - Painting Manual.

1.4 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.

1.5 PERFORMANCE REQUIREMENTS

A. Connections: Provide details of connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand loads indicated on Drawings and comply with other information and restrictions indicated.
1. Engineering Responsibility: Fabricator's responsibilities include using a qualified professional engineer to prepare structural analysis data for structural-steel connections.

1.6 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication of structural-steel components.
1. Include details of cuts, connections, splices, camber, holes and other pertinent data.

2. Use of Contract Drawings for Shop Drawings is not permitted.
3. Include embedment drawings.
4. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length and type of each weld.
5. Indicate type, size and length of bolts, distinguishing between shop and field bolts.

1.7 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator with not less than ten (10) years of experience with structures of complexity like that indicated for this Project.

B. Erector Qualifications: A qualified steel erector with not less than ten (10) years of experience who has completed structural steel work similar in material, design, and extent to that indicated for this project, and is acceptable to the steel fabricator.

C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."

D. Comply with applicable provisions of the following specifications and documents:
1. AISC's "Code of Standard Practice for Steel Buildings and Bridges."
2. AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
3. AISC's "Specification for Allowable Stress Design of Single-Angle Members."
4. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1.8 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 erosion and deterioration.
1. Store fasteners in a protected place. Clean and re-lubricate bolts and nuts that become dry or rusty before use.

B. 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.

1.9 COORDINATION

A. Furnish 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.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: ASTM A 992 or ASTM A 572, Grade 50.

B. Channels, Angles, M, S-Shapes: ASTM A 36.

C. Plate and Bar: ASTM A 36, except where indicated to be A572, Grade 50.

D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B structural tubing.

E. Steel Pipe: ASTM A 53, Type E or S, Grade B.

F. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS AND ANCHORS

A. High-Strength Bolts, Nuts and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.
   1. Finish: Plain, unless otherwise noted.

B. Threaded Rods: ASTM A 36.
   1. Nuts: ASTM A 563 heavy hex carbon steel.
   2. Washers: ASTM F 436 hardened carbon steel.
   3. Finish: Plain, unless noted otherwise on drawings.

2.3 PRIMER

A. Primer for Concealed Elements: Shop primer is not required for structural steel elements that will be enclosed within the building envelope and concealed in the final Work of the Project.

B. Primer for Exposed Elements: Coordinate with Division 9 requirements of finish painting and top coating for all structural steel framing components that will remain outside the building envelope or will remain exposed to view in final Work of the Project.

2.4 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
   1. Mark and match-mark materials for field assembly.
   2. Milled surfaces of built-up sections shall be completely assembled or welded before milling.
   3. Fitted stiffeners shall be fabricated neatly between flanges and the ends of stiffeners shall be milled or ground to secure an even bearing against abutting surfaces. Inside corners of stiffeners may be clipped at a 45 degree angle at wide flange fillets. All milled or ground joints shall bear throughout their contact length.
   4. Compression Joints: Compression joints which depend on contact bearing as part of the splice capacity shall have the bearing surfaces of individual fabricated pieces prepared to a common plane by milling, sawing or other suitable means.
   5. Cutting: Manual oxygen cutting shall be done only with a mechanically guided torch. An unguided torch may be used provided the cut is not within 1/8” of the finished dimension and final removal is completed by means such as chipping or grinding to produce a smooth surface quality free of notches or jagged edges. All corners shall be smooth and rounded to a minimum 1/2" radius.
   6. Holes for Other Work: Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members as shown on the contract documents and/or the final shop drawings.
   7. Lifting and Erection Devices: The fabricator shall be responsible for designing, detailing and furnishing all lifting devices and erection aids required for erection. Such devices shall be removed after erection if they interfere with architectural finish requirements.
   8. 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.

C. Bolt Holes: Cut, drill, mechanically thermal cut or punch standard bolt holes perpendicular to metal surfaces.

2.6 CONNECTIONS (SHOP AND FIELD)

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A325 or A490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened unless noted otherwise on Drawings.

2. High-strength bolts shall not be used in combination with welds to share load transmission in the same connection, except as indicated in Chapter J of AISC's Specification for Structural Steel Buildings.

3. All bolts shall be new and well-lubricated at the time of installation.

B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

1. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.
3. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances.

2.7 SHOP PRIMING

A. Shop prime steel surfaces as required for top coating products that will be exposed in final Work of the Project. Otherwise, shop priming is not required for structural steel surfaces that will be concealed and within the building envelope in the final Work of the Project. Additionally, do not shop prime the following:
1. Surfaces to be field welded.
2. Surfaces to be galvanized.

B. Surface Preparation: Clean surfaces to be primed and coated. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with coating manufacturer's recommendations for surfaces that will receive finish coating and remain exposed to view in final Work.

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

2.8 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123.
   1. Fill vent holes and grind smooth after galvanizing.
   2. Galvanize lintels, shelf angles and all steel having an exterior exposure.

2.9 FIELD-APPLIED RUST-INHIBITIVE COATING

A. Apply coatings as indicated on Drawings.

B. Prepare surfaces to be field-coated by SSPC SP2 Hand Tool Cleaning to remove all loose rust, scale, dirt, etc.

C. Apply two (2) coats of rust-inhibitive coating by brush or spray.

D. Minimum dry-film thickness (DFT): 1.5 mil/coat.

E. Products that may be incorporated into the Work include, but are not limited to:
   1. Heavy-Duty Rust Inhibitive Primer, 7400 System, by Rust-Oleum Corporation.
   2. Steel Spec Rust Inhibitive Primer, by The Sherwin-Williams Company.
   3. 99-Series Heavy Duty Inhibitive Primer, by Sumter Coatings, Inc.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates and other embedments, with steel erector present, for compliance with requirements.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 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.
   1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.3 FABRICATION

A. To the greatest extent practicable, structural material shall be fabricated and assembled in the shop.

B. Connections shall be detailed to develop forces shown on the drawing or as noted in these specifications.

C. Milled Surfaces shall comply with the AISC Specifications and the Drawings.

D. After assembly, the various members forming parts of a completed frame or structure shall be aligned and adjusted before being fastened. Tolerances shall conform to AISC. Fastening of splices of compression members shall be done after the abutting surfaces have been brought completely into contact.

E. The use of a gas-cutting torch in the field for correcting fabrication errors is prohibited unless the Professional has specifically approved such procedure for each use individually in writing.

3.4 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."

B. Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.
   1. Set bearing plates for structural members on wedges, shims or setting nuts as required.
   2. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.

3. Promptly pack grout solidly between bearing surfaces and base or bearing 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. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be 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.

D. Do not use thermal cutting during erection.

E. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

F. Field Modifications to Structural Steel: Errors in shop fabrication or deformation resulting from handling and transportation that prevent the proper assembly and structural fitting of parts shall be reported immediately to the Professional and approval of the method of correction shall be obtained. Approved corrections shall be made at no additional cost to the Department. Do not use cutting torches, reamers or other devices in the field for unauthorized correction of fabrication errors.

G. Miscellaneous Framing: Provide supplemental structural steel support framing for metal deck where normal deck bearing is interrupted by columns, or other framing members or floor openings whether shown or not on the architectural, mechanical or structural drawings.

H. Erect structural steel in accordance with AISC Specification.

I. Do not field cut or alter structural members without approval of Engineer.

J. Gas Cutting: Do not use gas-cutting torches in field for correcting fabrication errors in structural framing. Cutting will be permitted only on secondary members that are not under stress, as acceptable to Professional. Finish gas-cut sections equal to a sheared appearance when permitted.

K. Perform welding according to standards and specifications of the American Welding Society (AWS) and American Institute of Steel Construction (AISC) by certified welders.

3.5 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A325 or A490 Bolts" for type of bolt and type of joint specified.

B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

1. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high strength bolted connections.

B. Bolted Connections: Bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A325 or A490 Bolts."

C. Welded Connections: Field welds will be visually inspected according to AWS D1.1.

1. In addition to visual inspection, all partial- and complete-joint-penetration (PJP and CJP) field welds will be tested according to AWS D1.1 and one of the following inspection procedures, at testing agency's option:

    a. Liquid Penetrant Inspection: ASTM E165.
    b. Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
    c. Ultrasonic Inspection: ASTM E164.
    d. Radiographic Inspection: ASTM E94.

D. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.7 REPAIRS AND PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Touch-up Painting: After installation, promptly clean, prepare, and prime or re-prime field connections, rust spots and abraded surfaces of prime-painted joists and accessories, bearing plates and abutting structural steel.
   1. Clean and prepare surfaces by SSPC-SP 3 power-tool cleaning.
   2. For Exposed Steel, clean and prepare surfaces by SSPC-SP 6 commercial blast cleaning.
   3. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

C. Touch-up Painting: Cleaning and touch-up painting are specified in Division 09 painting Sections.

END OF SECTION 051200

THIS PAGE LEFT INTENTIONALLY BLANK

SECTION 053100 - STEEL DECK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 WORK INCLUDED

A. This Section includes the following:
   1. Roof deck.
   2. Composite Floor Deck.
   3. Deck Accessories.

B. Related Sections include the following:
   1. Division 01 Section “Quality Assurance Testing and Inspection Services.”
   2. Division 03 Section "Cast-in-Place Concrete Slabs" for concrete fill.
   3. Division 05 Section "Metal Fabrications" for framing deck openings with miscellaneous steel shapes.

1.3 SUBMITTALS

A. Product Data: For each type of deck, accessory and product indicated.

B. Shop Drawings: Show layout and types of deck panels, anchorage details, reinforcing channels, pans, deck openings, special jointing, accessories and attachments to other construction. The use of Contract Drawings for use as Shop Drawings is not permitted.

   1. Clearly indicate method of deck attachment/fastening.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed steel deck similar in material, design and extent to that indicated for this Project and whose

work has resulted in construction with a record of successful in-service performance.

B. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel" and AWS D1.3, "Structural Welding Code--Sheet Steel."

C. AISI Specifications: Calculate structural characteristics of steel deck according to AISI's "Specification for the Design of Cold-Formed Steel Structural Members."

D. Comply with applicable articles of Division 01 Section “Quality Assurance Testing and Inspection Services.”

1.5 DELIVERY, STORAGE AND HANDLING

A. Protect steel deck from corrosion, deformation and other damage during delivery, storage and handling.

B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Canam Steel Corporation; Canam Group, Inc.
   2. New Millenium Building Systems, LLC
   3. Nucor Corporation, Vulcraft Division
   4. Roof Deck, Inc.

2.2 ROOF DECK

A. Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 29 and the following:

1. Galvanized Steel Sheet: ASTM A 653, Structural Steel, Grade 40, G60 zinc coating.
2. Deck Profile: As indicated on Drawings.
3. Profile Depth: As indicated on Drawings
4. Design Uncoated-Steel Thickness: As indicated on Drawings.
5. Span Condition: Two-span continuous (minimum); unless indicated otherwise on Drawings.

2.3 COMPOSITE STEEL FLOOR DECK

A. Composite Steel 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 Floor Deck," in SDI Publication No. 29, the minimum section properties indicated and the following:
   1. Galvanized Steel Sheet: ASTM A 653, Structural Steel, Grade 40, G60 zinc coating.
   2. Deck Profile: As indicated on Drawings
   3. Design Uncoated-Steel Thickness: As indicated on Drawings.
   4. Span Condition: Two-span continuous (minimum); unless indicated otherwise on Drawings.

2.4 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 (4.8 mm) 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 (230 MPa), not less than 0.0359” (0.91-mm) design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.

F. Steel Sheet Accessories: Steel sheet, of same material, finish and thickness as deck, unless otherwise indicated.

G. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), of same material and finish as deck, and of thickness and profile.

H. Column Closures, End Closures, Z-Closures and Cover Plates: Steel sheet, of same material, finish and thickness as deck, unless otherwise indicated.

I. Exposed end closures: 1/8” steel with hairline joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.

3.2 INSTALLATION, GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 29, manufacturer's written instructions and requirements in this Section.

B. Locate decking bundles to prevent overloading of supporting members.

C. 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.

D. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

E. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to decking.

F. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of decking and support of other work.

G. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds and methods used for correcting welding work.

3.3 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, but not less than 1-1/2” long and as follows:
   1. Weld Diameter: 3/4”, nominal.

B. Weld Spacing: Fasten metal roof deck to supporting structural elements in a 36/5 pattern.

C. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of 1/2 of the span or 18” and as follows:
   1. Mechanically fasten with self-drilling No. 10 diameter or larger carbon-steel screws.
   2. Where no structural support framing is indicated beneath perimeter edges (parallel to deck span), these requirements for intermittent fastening are not applicable.

D. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1 1/2”, with abutting end joints.

3.4 FLOOR DECK INSTALLATION

A. Fasten floor deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter, but not less than 1-1/2” long and as follows:
   1. Weld Diameter: 3/4”, nominal.

B. Weld Spacing: Fasten metal floor deck to supporting structural elements in a 24/4 pattern.

C. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of 1/2 of the span or 18” and as follows:

1. Mechanically fasten with self-drilling No. 10 diameter or larger carbon-steel screws.
2. Where no structural support framing is indicated beneath perimeter edges (parallel to deck span), these requirements for intermittent fastening are not applicable.

3.5 FIELD QUALITY CONTROL

A. Field welds will be subject to inspection by Quality Assurance Testing Agency.

B. Testing agency will report test results promptly and in writing to Contractor and Professional.

C. Remove and replace work that does not comply with specified requirements.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.6 REPAIRS AND 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. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION 053100

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Miscellaneous steel framing and supports.
2. Loose steel lintels.
3. Elevator machine beams, hoist beams, and divider beams.
4. Support angles for elevator door sills.
5. Metal ladders.

1.3 ACTION SUBMITTALS

A. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

B. Delegated-Design Submittal: For ladders, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate wall and other contiguous

construction to ensure that actual dimensions correspond to established dimensions.

2. Provide allowance for trimming and fitting at site.

1.6 COORDINATION

A. Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.

2.2 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

C. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.

2.3 FASTENERS

A. General: Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, at exterior walls. Provide stainless-steel fasteners for fastening aluminum. Select fasteners for type, grade, and class required.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.

C. Anchor Bolts: ASTM F 1554, Grade 36.

1. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts where item being fastened is indicated to be galvanized.

D. Post-Installed Anchors: Torque-controlled expansion anchors.

1. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.

2. Material for Exterior Locations: Alloy Group 1 stainless-steel bolts complying with ASTM F 593 and nuts complying with ASTM F 594.

2.4 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Zinc-Rich Primer: Complying with SSPC-Paint 20 or SSPC-Paint 29 and compatible with topcoat.

C. Galvanizing Repair Paint: SSPC-Paint 20, high-zinc-dust-content paint for regalvanizing welds in steel.

D. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107.

E. Concrete Materials and Properties: Comply with requirements in Division 3 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi, unless otherwise indicated.

2.5 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges. Remove sharp or rough areas on exposed surfaces.

C. Weld corners and seams continuously. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals. Obtain fusion without undercut or overlap. Remove welding flux immediately. Finish exposed welds smooth and blended.

D. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Locate joints where least conspicuous.

E. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

F. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, not less than 24 inches o.c.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

C. Fabricate supports for operable partitions from continuous steel beams of sizes indicated with attached bearing plates, anchors, and braces as indicated. Drill bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.

2.7 LOOSE STEEL LINTELS

A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Weld adjoining members together to form a single unit where indicated.

B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span but not less than 8 inches, unless otherwise indicated.

C. Galvanize loose steel lintels located in exterior walls.

D. Prime loose steel lintels located in exterior walls with zinc-rich primer.

2.8 ELEVATOR SILL ANGLES AND HOIST BEAMS

A. Sill Angles: Steel sections as detailed for support of elevator sills. Shop prime, one coat.

B. Hoist Beams: Steel wide flange sections, shape and size required to support applied loads with maximum deflection of 1/240 of the span. Shop prime, one coat.

2.9 METAL LADDERS

A. General:

1. Comply with ANSI A14.3, unless otherwise indicated.
2. Space siderails 16 inches apart, unless otherwise indicated for elevator ladders.
3. Support each ladder at top and bottom and not more than 60 inches o.c. with welded or bolted brackets, made from same metal as ladder.

B. Steel Ladders:

1. Siderails: Continuous, 3/8-by-2-1/2-inch steel flat bars, with eased edges, unless otherwise indicated.

2. Rungs: 3/4-inch- diameter steel bars, unless otherwise indicated.
3. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
4. Provide nonslip surfaces on top of each rung by coating with abrasive material metallically bonded to rung by a proprietary process.
5. Galvanize ladders including brackets and fasteners.

2.10 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Finish metal fabrications after assembly.

2.11 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:

1. ASTM A 123/A 123M, for galvanizing steel and iron products.
2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.

B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:

1. Exteriors (SSPC Zone 1B) and Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."

C. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

2.12 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. As-Fabricated Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

3.3 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 055000

SECTION 061053 – MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Wood blocking and nailers.
2. Plywood backing panels.
3. Wood treatment.
4. Project identification sign (temporary).
5. Roof blocking.

1.3 DEFINITIONS

A. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.

B. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. NLGA: National Lumber Grades Authority.
2. SPIB: The Southern Pine Inspection Bureau.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

B. Fastener Patterns: Full-size templates for fasteners in exposed framing.

C. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

D. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated wood.

2. Fire-retardant-treated wood.
3. Power-driven fasteners.
4. Powder-actuated fasteners.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

B. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.

D. Application: Treat items indicated on Drawings, and the following:

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Use treatment that does not promote corrosion of metal fasteners.
2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D2898. Use for exterior locations and where indicated.
3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201 at 92 percent relative humidity. Use where exterior type is not indicated.
4. Design Value Adjustment Factors: Treated lumber shall be tested according ASTM D5664 and design value adjustment factors shall be calculated according to ASTM D6841.

C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

E. Application: Treat items indicated on Drawings, and the following:

1. Concealed blocking.
2. Plywood backing panels.

2.4 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Rooftop equipment bases and support curbs.
4. Cants.
5. Furring.
6. Grounds.

B. For items of dimension lumber size, provide Standard, Stud, or No.3 grade lumber of any species.

2.5 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: DOC PS1, Exterior, C-D plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2-inch nominal thickness.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.
2. Provide stainless steel type fasteners at all wood preservative treated materials including all roofing and exterior blocking.

B. Nails, Brads, and Staples: ASTM F1667.

C. Power-Driven Fasteners: NESNER-272.

D. Wood Screws: ASME B18.6.1.

E. Lag Bolts: ASME B18.2.1.

F. Bolts: Steel bolts complying with ASTM A307, Grade A; with ASTM A563 hex nuts and, where indicated, flat washers.

G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry assemblies and equal to four times the load imposed when installed in concrete as determined by testing per ASTM E488 conducted by a qualified independent testing and inspecting agency.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B633, ClassFe/Zn5.
2. Material: Stainless steel with bolts and nuts complying with ASTM F593 and ASTM F594, Alloy Group1 or 2.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

B. Framing Standard: Comply with AF&PA's WCD1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.

D. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

E. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated.

F. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

G. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. NESNER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

H. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 WOOD BLOCKING AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

C. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

3.3 WOOD FURRING INSTALLATION

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
B. Furring to Receive Plywood or Hardboard Paneling: Install 1-by-3-inch nominal- size furring vertically at 24 inches o.c.
C. Furring to Receive Gypsum Board or Plaster Lath: Install 1-by-2-inch nominal- size furring vertically at 16 inches o.c.

3.4 PROJECT IDENTIFICATION SIGNS

A. Sign shall be by General Contractor at location directed by Owner.

1. Provide three full height 2-inch by 6-inch posts buried 3-1/2 feet in the ground with tamped earth around posts.
2. Provide 4 ft. by 8 ft. sheet of 3/4-inch MDO exterior grade plywood for signage.
3. Provide pine trim (two step) mitered at corners.
4. All wood shall be pressure treated.
5. Paint entire sign with primer and two coats of exterior gloss acrylic paint.
6. Remove sign from site at completion of project and fill posts holes.

3.5 ROOF BLOCKING

A. Stacked “Two-By” Blocking: Provide stacked fire-rated treated pine “two-by’s” bolted to structure. Provide two glued and screwed plies of 3/4-inch thick fire-rated treated plugged C-D plywood in areas “two-by” material is not readily available in needed widths. Screw plies together 12-inches on center at staggered edge locations using #8 stainless steel bugle head screws, 1.5 inches long. Provide continuous ribbons of construction adhesive at both edges and in criss-cross fashion at 18-inch intervals. Stagger and overlap butt end (Ship lap) joints.

B. Option: Contractor may use 3/4-inch thick fire-rated treated plywood boxes for blocking in lieu of stacked “two-by” blocking. Reinforce four inside corners using 2 by 4 inch continuous wood framing. Extend framing 12-inches minimum through box butt joints. Adhere plywood butt joints. Box in ends of blocking runs. Screw plywood sides, tops, and bottoms to framing 18-inches on center at staggered edge locations using #8 stainless steel bugle head screws, 1.5 inches long. Provide continuous ribbons of construction adhesive at all plywood and framing joints/ and mating surfaces.

C. Fasten blocking and box bottoms to structure below using 3/8 inch diameter bolts 18 inches on center. Bolt heads shall have fender washers between head and wood. Countersink bolt heads at stacked “two-by’s”. Bolts shall extend through structural roof edge framing.

END OF SECTION 061053

SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Wall sheathing.
2. Sheathing joint and penetration treatment.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire

resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory.

2.2 WALL SHEATHING

A. Glass-Mat Gypsum Wall Sheathing: ASTM C 1177/1177M.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. CertainTeed Corporation; GlasRoc.
   b. G-P Gypsum Corporation; Dens-Glass Gold.
   c. National Gypsum Company; Gold Bond e(2)XP.
   d. United States Gypsum Co.; Securock.

2. Type and Thickness: Refer to Drawings.
3. Size: 48 by 96 inches.

2.3 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. For wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Power-Driven Fasteners: NES NER-272.

C. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.

1. For steel framing less than 0.0329 inch thick, use screws that comply with ASTM C 1002.
2. For steel framing from 0.033 to 0.112 inch thick, use screws that comply with ASTM C 954.

2.4 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

A. Sealant for Glass-Mat Gypsum Sheathing: Silicone emulsion sealant complying with ASTM C 834, compatible with sheathing tape and sheathing and recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.

1. Sheathing Tape: Self-adhering glass-fiber tape, minimum 2 inches wide, 10 by 10 or 10 by 20 threads/inch, of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing and with a history of successful in-service use.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."

D. Coordinate sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 GYPSUM SHEATHING INSTALLATION

A. Comply with GA-253 and with manufacturer's written instructions.

1. Fasten gypsum sheathing to wood framing with nails or screws.
2. Install boards with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
3. Install boards with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.

C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent boards without forcing. Abut ends of boards over centers of studs, and stagger end

joints of adjacent boards not less than one stud spacing. Attach boards at perimeter and within field of board to each steel stud.

1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of boards.

D. Vertical Installation: Install board vertical edges centered over studs. Abut ends and edges of each board with those of adjacent boards. Attach boards at perimeter and within field of board to each stud.

1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of boards.

E. Seal sheathing joints according to sheathing manufacturer's written instructions.

1. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel silicone emulsion sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

END OF SECTION 061600

SECTION 071113 - BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Cold-applied, emulsified-asphalt dampproofing applied to the following surfaces:

a. Exterior, below grade surfaces.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 FIELD CONDITIONS

A. Weather Limitations: Proceed with application only when existing and forecasted weather conditions permit dampproofing to be performed according to manufacturers' written instructions.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Source Limitations: Obtain primary dampproofing materials and primers from single source from single manufacturer. Provide molded-sheet drainage panels and auxiliary materials recommended in writing by manufacturer of primary materials.

2.2 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Henry Company.

2. Karnak Corporation.
3. Meadows, W. R., Inc.

B. Fibered Brush and Spray Coats: ASTM D 1227, Type II, Class 1.

2.3 AUXILIARY MATERIALS

A. General: Furnish auxiliary materials recommended in writing by dampproofing manufacturer for intended use and compatible with bituminous dampproofing.

B. Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class 1, except diluted with water as recommended in writing by manufacturer.

C. Asphalt-Coated Glass Fabric: ASTM D 1668, Type I.

D. Patching Compound: Type recommended in writing by dampproofing manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions with Applicator present, for compliance with requirements for surface smoothness, surface moisture, and other conditions affecting performance of bituminous dampproofing work.

B. Proceed with application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.

B. Clean substrates of projections and substances detrimental to the dampproofing work; fill voids, seal joints, and remove bond breakers if any, as recommended in writing by prime material manufacturer.

C. Apply patching compound to patch and fill tie holes, honeycombs, reveals, and other imperfections.

3.3 APPLICATION, GENERAL

A. Comply with manufacturer's written instructions for dampproofing application, cure time between coats, and drying time before backfilling unless more stringent requirements are indicated.

1. Apply dampproofing to provide continuous plane of protection.
2. Apply additional coats if recommended in writing by manufacturer or to achieve a smooth surface and uninterrupted coverage.

B. Where dampproofing footings and foundation walls, apply from finished-grade line to top of footing; extend over top of footing and down a minimum of 6 inches over outside face of footing.

1. Extend dampproofing 12 inches onto intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.
2. Install flashings and corner protection stripping at internal and external corners, changes in plane, construction joints, cracks, and where shown as "reinforced," by embedding an 8-inch- wide strip of asphalt-coated glass fabric in a heavy coat of dampproofing. Dampproofing coat for embedding fabric is in addition to other coats required.

3.4 CLEANING

A. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION 071113

THIS PAGE LEFT INTENTIONALLY BLANK

SECTION 071326 - SELF-ADHERING SHEET WATERPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Modified bituminous sheet waterproofing.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review waterproofing requirements including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, and tested physical and performance properties of waterproofing.
2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.

B. Shop Drawings: Show locations and extent of waterproofing and details of substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.

C. Samples: For each exposed product and for each color and texture specified, including the following products:

1. 8-by-8-inch (200-by-200-mm) square of waterproofing and flashing sheet.
2. 8-by-8-inch (200-by-200-mm) square of insulation.
3. 4-by-4-inch (100-by-100-mm) square of drainage panel.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by waterproofing manufacturer.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.

1. Do not apply waterproofing in snow, rain, fog, or mist.

B. Maintain adequate ventilation during preparation and application of waterproofing materials.

1.8 WARRANTY

A. Manufacturer's Warranty: Manufacturer's standard materials-only warranty in which manufacturer agrees to furnish replacement waterproofing material for waterproofing that does not comply with requirements or that fails to remain watertight within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Source Limitations for Waterproofing System: Obtain waterproofing materials, protection course, and molded-sheet drainage panels from single source from single manufacturer.

2.2 MODIFIED BITUMINOUS SHEET WATERPROOFING

A. Modified Bituminous Sheet: Minimum 60-mil (1.5-mm) nominal thickness, self-adhering sheet consisting of 56 mils (1.4 mm) of rubberized asphalt laminated on one side to a 4-mil- (0.10-mm-) thick, polyethylene-film reinforcement, and with release liner on adhesive side.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Carlisle Coatings & Waterproofing Inc; CCW MiraDRI 860/861.
    b. CETCO Building Materials Group, a subsidiary of AMCOL International Corp; Envirosheet.
    c. Grace Construction Products; W.R. Grace & Co. -- Conn; Bituthene 4000.
    d. Henry Company; Blueskin WP 200.
    e. Meadows, W.R.,Inc; SealTight Mel-Rol.
    f. Protecto Wrap Company; PW 100/60.

2. Physical Properties:

    a. Tensile Strength, Membrane: 250 psi (1.7 MPa) minimum; ASTM D 412, Die C, modified.
    b. Ultimate Elongation: 300 percent minimum; ASTM D 412, Die C, modified.
    c. Low-Temperature Flexibility: Pass at minus 20 deg F (minus 29 deg C); ASTM D 1970.
    d. Crack Cycling: Unaffected after 100 cycles of 1/8-inch (3-mm) movement; ASTM C 836.
    e. Puncture Resistance: 40 lbf (180 N) minimum; ASTM E 154.
    f. Water Absorption: 0.2 percent weight-gain maximum after 48-hour immersion at 70 deg F (21 deg C); ASTM D 570.
    g. Water Vapor Permeance: 0.05 perms (2.9 ng/Pa x s x sq. m) maximum; ASTM E 96/E 96M, Water Method.
    h. Hydrostatic-Head Resistance: 200 feet (60 m) minimum; ASTM D 5385.

3. Sheet Strips: Self-adhering, rubberized-asphalt strips of same material and thickness as sheet waterproofing.

2.3 AUXILIARY MATERIALS

A. General: Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.

B. Primer: Liquid waterborne primer recommended for substrate by sheet-waterproofing material manufacturer.

C. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by sheet-waterproofing material manufacturer.

D. Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, of trowel grade or low viscosity.

E. Substrate Patching Membrane: Low-viscosity, two-component, modified asphalt coating.

F. Metal Termination Bars: Aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick, predrilled at 9-inch (229-mm) centers.

2.4 MOLDED-SHEET DRAINAGE PANELS

A. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel: Composite subsurface drainage panel consisting of a studded, nonbiodegradable, molded-plastic-sheet drainage core; with a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 (0.21-mm) sieve laminated to one side of the core; and with a vertical flow rate of 9 to 15 gpm per ft. (112 to 188 L/min. per m).

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. American Hydrotech, Inc; Hydrodrain 400.
    b. Carlisle Coatings & Waterproofing Inc; CCW MiraDRAIN 6000.
    c. Grace Construction Products; W.R. Grace & Co. -- Conn; Hydroduct 220.
    d. Henry Company; Henry Drain Board (DB) 220
    e. Protecto Wrap Company; Protecto Drain 2000-V.
    f. W.R. Meadows; MEL-DRAIN

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the waterproofing.

1. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.
2. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method according to ASTM D 4263.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.

B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids.

E. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D 4258.

F. Bridge and cover isolation joints or expansion joints discontinuous deck-to-wall and deck-to-deck joints with overlapping sheet strips of widths according to manufacturer's written instructions.

G. Corners: Prepare, prime, and treat inside and outside corners according to ASTM D 6135.

H. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions according to ASTM D 6135.

3.3 MODIFIED BITUMINOUS SHEET-WATERPROOFING APPLICATION

A. Install modified bituminous sheets according to waterproofing manufacturer's written instructions and recommendations in ASTM D 6135.

B. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by sheet waterproofing in same day. Reprime areas exposed for more than 24 hours.

C. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform 2-1/2-inch- (64-mm-) minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure watertight installation.

1. When ambient and substrate temperatures range between 25 and 40 deg F (minus 4 and plus 5 deg C), install self-adhering, modified bituminous sheets produced for low-temperature application. Do not use low-temperature sheets if ambient or substrate temperature is higher than 60 deg F (16 deg C).

D. Apply continuous sheets over already-installed sheet strips, bridging substrate cracks, construction, and contraction joints.

E. Seal edges of sheet-waterproofing terminations with mastic.

F. Install sheet-waterproofing and auxiliary materials to tie into adjacent waterproofing.

G. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fishmouths and blisters. Patch with sheet waterproofing extending 6 inches (150 mm) beyond repaired areas in all directions.

3.4 MOLDED-SHEET DRAINAGE-PANEL INSTALLATION

A. Place and secure molded-sheet drainage panels, with geotextile facing away from wall or deck substrate, according to manufacturer's written instructions. Use adhesives or other methods that do not penetrate waterproofing. Lap edges and ends of geotextile

to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.

1. For vertical applications, install board insulation before installing drainage panels.

3.5 FIELD QUALITY CONTROL

A. Owner will engage a site representative qualified by waterproofing membrane manufacturer to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components, and to furnish daily reports to Architect.

3.6 PROTECTION, REPAIR, AND CLEANING

A. Protect waterproofing from damage and wear during remainder of construction period.

B. Protect installed board insulation from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

C. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

D. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 071326

SECTION 071616 - CRYSTALLINE WATERPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Crystalline waterproofing admixture for negative-side application to elevator pit foundation walls and slab.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include material descriptions and installation instructions for crystalline waterproofing.

B. Qualification Data: For Applicator.

C. Product Certificates: For waterproofing, patching, and plugging materials, from manufacturer.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for crystalline waterproofing.

1.4 QUALITY ASSURANCE

A. Applicator Qualifications: A firm experienced in applying crystalline waterproofing similar in material, design, and extent to that indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

1.5 PROJECT CONDITIONS

A. Weather Limitations: Proceed with application only when existing and forecasted weather conditions permit crystalline waterproofing to be performed according to manufacturer's written instructions.

B. Ambient Conditions: Proceed with waterproofing work only if temperature is maintained at 40 deg F or above during work and cure period, and space is well ventilated and kept free of water.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Basis-of-Design Product: Subject to compliance with requirements, provide a AQUAFIN, Inc.; AQUAFIN-IC ADMIX or a comparable product by one of the following:

1. American PERMAQUIK Inc.
2. Conproco Corporation.
3. Vandex USA LLC.
4. Xypex Chemical Corporation.
5. W.R. Meadows; CEM-KOTE CW Plus

B. Water/cement ratio (w/c): 0.55 maximum of concrete mix

C. Compressive Strength: (ASTM C-39) Up to 25% increase over untreated concrete

D. Flexural Strength: (ASTM C-293) Does not detrimentally alter concrete mix

E. Permeability: (COE CRD-C 48) No measurable leakage through waterproofed concrete, when tested at 460 feet (140 m) water head, or 200 psi (14 bar) water pressure.

2.2 ACCESSORY MATERIALS

A. Water: Potable.

PART 3 - EXECUTION

3.1 PREPARATION

A. Mix concrete and waterproofing in accordance with manufacturer’s instructions.

3.2 APPLICATION

A. Stir liquid crystalline waterproofing admixture in container provided prior to use, to assure that the mixture is homogeneous.

B. Assure that the water/cement ratio (w/c) does not exceed 0.55 before liquid crystalline waterproofing admixture is added.

C. At batching plant, if transportation of concrete mix to place of usage is no longer than 45 minutes:

1. Mix concrete mix in batch mixer and add specified dosage of liquid crystalline waterproofing admixture to the batching water, or add last to the wet mix.

D. Ready-mix truck at job site:

1. Deliver mix with specified water content.
2. Add specified dosage of liquid crystalline waterproofing admixture.
3. Mix for 3 - 5 minutes.

E. Waterproofing Treatment Extensions: Extend waterproofing treatment as follows:

1. Onto every substrate in areas indicated for treatment, including sump pits and similar offsets and features.

3.3 FIELD QUALITY CONTROL

A. Inspection: Engage manufacturer's representative to inspect completed application and provide a written report that application complies with manufacturer's written instructions.

END OF SECTION 071616

THIS PAGE LEFT INTENTIONALLY BLANK

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Foam-plastic board insulation.
2. Rigid mineral wool board insulation.
3. Batt insulation.
4. Roof Insulation
5. Spray polyethylene foam insulation.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.

B. Research/Evaluation Reports: For foam-plastic insulation, from ICC-ES.

1.5 QUALITY ASSURANCE

A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect plastic insulation as follows:

1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 FOAM-PLASTIC BOARD INSULATION

A. Extruded-Polystyrene Board Insulation: ASTM C 578, of type and minimum compressive strength indicated below, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. DiversiFoam Products.
b. Dow Chemical Company.
c. Owens Corning.
d. Pactiv Building Products.

2. Type IV, 25 psi. at perimeter foundation walls.
3. Type V, 100 psi. under slab.
4. White-faced exterior layer at curtain wall spandrel locations.

2.2 RIGID MINERAL WOOL INSULATION SHEATHING BOARD

A. Rigid Mineral Wool Insulation Sheathing Board: ASTM C423, ASTM C165, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following: Rockwool CAVITYROCK or equivalent product from: Owens Corning, Johns Manville.
2. Refer to Drawings for insulation thicknesses and thermal resistance rating.

2.3 BATT INSULATION

A. Semi-Rigid batt insulation: ASTM C167, ASTM C518, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following: Rockwool COMFORT BATT or equivalent product from: Owens Corning, Johns Manville.
2. Refer to Drawings for insulation thicknesses and thermal resistance rating.

2.4 ROOF INSULATION

A. General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated. Insulation shall be minimum two, 3” staggered layers providing R-30 total minimum aged insulating value.

B. Provide ½” Thick SECUROCK gypsum fiber roof board, or approved equivalent, mechanically fastened through to metal deck.

C. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class I, Grade 3, felt or glass-fiber mat facer on both major surfaces.

D. Tapered Insulation: Provide factory-tapered polyisocyanurate insulation boards fabricated to slope of 1/4 inch per 12 inches, unless otherwise indicated from same manufacturer. Tapered boards shall be faced both sides.

E. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated to prevent ponded water.

F. Refer to drawings for insulation thicknesses.

2.5 INSULATION ACCESSORIES

A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with roofing system.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer. Fastener length projections through underside of exposed metal deck locations (Gymnasium, Cafeteria, LGI, Entry Lobby, Bus Drop-off Entry Lobby) must be minimized or cutting of fasteners will be required. Exposed fasteners will NOT be accepted.

2.6 ACOUSTIC BATT INSULATION

A. Semi-Rigid batt insulation: ASTM C423, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following: Rockwool AFB or equivalent product from: Owens Corning, Johns Manville.
2. Refer to Drawings for insulation thicknesses and thermal resistance rating.

2.7 SPRAY POLYURETHANE FOAM INSULATION

A. Closed-Cell Polyurethane Foam Insulation: ASTM C 1029, Type II, with maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.

1. Basis of Design Product: Subject to compliance with requirements, provide CertainTeed Corp.; CertaSpray Closed Cell Foam, or comparable product by one of the following:

    a. BASF Corporation.
    b. BaySystems NorthAmerica, LLC.
    c. Dow Chemical Company (The).
    d. ERSystems, Inc.
    e. Gaco Western Inc.
    f. Henry Company.
    g. NCFI; Division of Barnhardt Mfg. Co.
    h. SWD Urethane Company.
    i. Volatile Free, Inc.

2. Physical and Mechanical Properties:

    a. Core Density: 1.9-2.4 pcf when tested in accordance with ASTM D 1622.
    b. Thermal Resistance (aged): 5.8 less than or equal to 2-1/2 inches / 6.4 when greater than 2-1/2 inches when tested in accordance with ASTM C 518 at 75 degrees F, (h-ft2- degrees F)/Btu.
    c. Thermal Resistance (initial): 6.4 when tested in accordance with ASTM C 518 at 75 degrees F, (h-ft2- degrees F)/Btu.
    d. Closed Cell Content: 88-95 percent when tested in accordance with ASTM D 2842.
    e. Compressive Strength: Greater than 25 psi when tested in accordance with ASTM D 1621.
    f. Tensile Strength: 23 psi when tested in accordance with ASTM D 1623.
    g. Water Absorption: Less than 2 percent by volume when tested in accordance with ASTM D 2842.
    h. Dimensional Stability: Less than 9 percent by volume when tested in accordance with ASTM D 2126 at 75 degrees F/95 percent RH, 28 Day.
    i. Water Vapor Transmission: 1.3 perm/inch when tested in accordance with ASTM E 96.
    j. Air Permeability: 0.013 when tested in accordance with ASTM E 283 at 1 inch thickness, L/s/m2.
    k. Fungi Resistance: Pass, with no growth when tested in accordance with ASTM C 1338.

2.8 INSULATION FASTENERS

A. Type recommended by insulation manufacturer for insulation types, and applications specified.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.3 INSTALLATION OF BELOW-GRADE INSULATION

A. On vertical surfaces, set insulation units using manufacturer’s recommended adhesive applied according to manufacturer's written instructions.

1. If not otherwise indicated, extend insulation a minimum of 24 inches below exterior grade line.

B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

1. If not otherwise indicated, extend insulation a minimum of 24 inches below exterior grade line.

3.4 INSTALLATION OF CAVITY-WALL INSULATION

A. Semi-rigid mineral wool insulation sheathing board: Install as recommended by manufacturer. Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions. Press units firmly against inside substrates.

1. Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed for this purpose and specified in Division 4 Section "Unit Masonry Assemblies."

3.5 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

B. Semi-rigid batt insulation: Install in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
4. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.

C. Spray-Applied Insulation: Apply spray-applied insulation according to manufacturer's written instructions. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked. After insulation is applied, make flush with face of studs by using method recommended by insulation manufacturer.

3.6 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

SECTION 072726 - LIQUID MEMBRANE VAPOR PERMEABLE AIR BARRIER

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Fluid-applied air barrier to be used at concrete masonry unit walls where air barrier is required.

B. Surface preparation.

C. Application of liquid-applied vapor permeable air barrier.

D. Application of materials to provide bridge and seal air leakage pathways in

1. Wall and roof connections and penetrations.
2. Connections to foundation walls.
3. Walls, windows, curtain walls, storefronts, louvers, or doors
4. Expansion and control joints.
5. Masonry ties.
6. All other penetrations through the wall assembly.

1.02 RELATED SECTIONS

A. Section 04 20 00 - Unit Masonry.

B. Section 07 21 00 - Thermal Insulation.

C. Section 07 54 16 – KEE Roofing.

D. Section 07 62 00 – Sheet Metal Flashing and Trim.

G. Section 07 92 00 - Joint Sealants.

H. Section 08 10 00 - Doors and Frames.

J. Section 09 29 00 - Gypsum Board.

1.03 REFERENCES

A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

C. ASTM E96 (Method B) - Standard Test Methods for Water Vapor Transmission of Materials.

D. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

E. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.

F. 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.

G. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials.

H. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.

1.04 SUBMITTALS

A. Comply with Section 01 33 00 - Submittal Procedures.

B. Submit manufacturer's product data and application instructions.

1.05 QUALITY ASSURANCE

A. Installer Qualifications:

1. Air Barrier Installer shall be currently accredited under the Air Barrier Association of America and ensure applicators are certified in accordance with the ABAA Quality Assurance Program.

2. Use an experienced installer and adequate number of skilled personnel who are thoroughly trained and experienced in the application of the air barrier.

a. Air Barrier Installer performing Work shall be approved by air barrier membrane manufacturer.

B. Obtain air barrier materials from a single manufacturer regularly engaged in manufacturing the product.

C. Provide products which comply with all state and local regulations controlling use of volatile organic compounds (VOCs).

1.06 PRECONSTRUCTION MEETING

A. Preconstruction Meeting: Conduct meeting prior to commencing Work of this section.

1.07 MOCK-UPS

A. Prior to installation of air barrier, apply air barrier as follows to verify details under shop drawing submittals and to demonstrate tie-ins with adjoining construction, and other termination conditions, as well as qualities of materials and execution.

B. Apply air barrier in field-constructed mock-ups of assemblies as shown in drawings. Reference drawings for mock-up detail.

C. Test mock-up in accordance with ASTM E783 and ASTM E1105 for air and water infiltration.

D. Cooperate and coordinate with the Owner's inspection and testing agency. Do not cover any installed air barrier membrane unless it has been inspected, tested, and approved.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Store materials in a clean dry area in accordance with manufacturer's instructions.

C. Store at temperatures at or above 40º F (4º C), free from contact with cold or frozen surfaces.

D. Protect materials during handling and application to prevent damage or contamination.

1.09 ENVIRONMENTAL REQUIREMENTS

A. Product not intended for uses subject to abuse or permanent exposure to the elements.

B. Do not proceed with product application if rainfall is forecast or imminent within 12 hours.

C. Do not apply membrane when air or surface temperatures are below 20º F (-6.7º C).

D. Do not apply when air, material and surface temperatures are expected to fall below 20º F (-6.7º C) within 24 hours of completed application.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Source Limitations: Obtain primary air-barrier materials and air-barrier accessories from single source from single manufacturer.

B. Basis of Design Product: Subject to compliance with requirements, provide WR Meadows, Air Shield LMP or approved equivalent.

1. Henry Company
2. GCP

2.02 MATERIALS

A. Liquid Air Barrier System: One component, polymer modified, cold applied liquid vapor permeable air barrier membrane.

1. Performance Based Specification: Air barrier membrane shall be water-based, that cures to form a tough, seamless, elastomeric membrane having the following characteristics:

a. Air Leakage ASTM E2357: < 0.04 cfm / ft.^{2} @ 75 Pa (1.57 lb./ft.^{2}).
b. Air Permeability ASTM E2178: < 0.004 cfm/ft.^{2} @ 75 Pa (1.57 lb./ft.^{2}).
c. Water Vapor Permeance ASTM E96 Method B: > 10 perms.
d. Elongation ASTM D412: 1300%.
e. Flexibility at -20° C ASTM C836 2" mandrel: Pass.
f. Flame Spread and Smoke Development, ASTM E84: Class A.

2.03 ACCESSORIES

A. Flashing and Transition Membrane: Self-adhesive polymeric sheet membrane having a thickness of 40 mils (1 mm).

1. AIR-SHIELD THRU-WALL FLASHING by W. R. MEADOWS, or approved equal.

B. Joint Sealant: Single component, polyurethane joint sealant for exterior sheathing panels.

1. POURTHANE® NS by W. R. MEADOWS, or approved equal.

C. Liquid Flashing: Fluid applied, single component, flashing membrane for rough openings and detailing.

1. AIR-SHIELD LIQUID FLASHING by W. R. MEADOWS, or approved equal.

D. Joint Tape: Self-adhesive polymeric membrane for joints of plywood and oriented strand board (OSB).

1. AIR-SHIELD by W. R. MEADOWS, or approved equal.

E. Membrane Adhesive:

1. Temperatures above 40° F (4° C): Water-Based Adhesive

a. MEL-PRIME™ W/B Water-Based Adhesive by W. R. MEADOWS, or approved equal.

2. Temperatures below 30° F (-1° C): Solvent-Based Primer.

a. MEL-PRIME VOC Compliant Solvent-Base Adhesive or Standard Solvent-Base Adhesive by W. R. MEADOWS, or approved equal.

F. Pointing Mastic: mastic for sealing penetrations and terminations of membrane.

1. POINTING MASTIC by W. R. MEADOWS, or approved equal.

G. Detailing Membrane: non-slump waterproofing material for joint detailing.

1. BEM by W. R. MEADOWS, or approved equal.

H. Concrete Repair Materials: general purpose patching materials.

1. MEADOW-PATCH™ 5 and MEADOW-PATCH 20 Concrete Repair Mortars by W. R. MEADOWS, or approved equal.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine surfaces to receive membrane. Notify Architect if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.

3.02 SURFACE PREPARATION

A. Protect adjacent surfaces not designated to receive air barrier.

B. Clean and prepare surfaces to receive air barrier membrane in accordance with manufacturer's instructions.

C. Do not apply membrane to surfaces unacceptable to manufacturer.

D. Concrete surfaces must be clean, free of standing water, ice, snow, frost, dust, dirt, oil, curing compounds, or any other foreign material that could prevent proper adhesion of the membrane.

E. Patch all holes and voids and smooth out any surface misalignments.

F. Patch all cracks, protrusions, small voids, offsets, details, irregularities, and small deformities with cementitious patching mortar at least two hours before application.

G. Ensure joints between dissimilar building materials are sealed with a strip of self-adhesive membrane 6" (150 mm) wide, centered over the joint.

3.03 APPLICATION OF AIR BARRIER SYSTEM

A. Transition Membrane

1. Prime surfaces to be covered in one working day with applicable primer.
2. Apply transition membrane with a minimum overlap of 3” (75 mm) onto primed surface at all joints, columns, beams, and dissimilar materials.
3. Roll membrane firmly into place.
4. Ensure membrane is fully adhered and remove all wrinkles and fish mouths.
5. Overlap subsequent courses of membrane a minimum of 2” (50 mm) and ensure joints are fully adhered.

6. Seal top edge of transition membrane with pointing mastic.

B. Rough Opening Transition Membrane

1. Self-adhesive Transition Membrane.
    a. Prime the area to be detailed using adhesive recommended by the membrane manufacturer according to the substrate.
    b. Pre-cut the self-adhesive membrane for each area of the rough opening to ensure ease of handling.
    c. Apply the first pre-cut strip at the base of the rough opening by removing the release paper and rolling firmly into place, ensuring that there is a minimum of 3” (75 mm) of membrane extending onto the wall and a minimum of 3” (75 mm) of membrane extending into the rough opening.
    d. Repeat this procedure for the vertical areas of the rough opening and the header portion of the opening.
    e. Ensure all edge overlaps are a minimum of 2” (50 mm) and end to end overlaps are 4” (100 mm).
    f. Seal all terminations with mastic recommended by membrane manufacturer.
2. Fluid Applied Transition Membrane using vapor permeable membrane
    a. Apply a coat of primer on the raw edges of exterior gypsum board.
    b. Apply a minimum of 30 wet mil coat of the air barrier membrane extending a minimum of 3” (75 mm) onto the wall.
    c. Apply a minimum of 30 wet mil coat of the air barrier membrane extending into the rough opening a minimum of 3” (75 mm).
    d. Embed a layer of 6” (150 mm) reinforcing fabric into this first coat.
    e. Completely cover the glass mesh with a second coat of the air barrier membrane at 30 wet mils while the first coat is still wet, again extending 3” (75 mm) onto the wall and 3” (75 mm) into the rough opening.
    f. Follow this same procedure for concrete or concrete masonry without using the mesh tape ensuring a 60 wet mil thickness is achieved.
3. Fluid Applied Transition Membrane using liquid flashing membrane
    a. Apply a coat of primer on the raw edges of exterior gypsum board.
    b. Treatment of joints or cracks larger than ¼” (6.35 mm) and less than ½” (12.7 mm).
        i. Prefill any joints or cracks with the liquid flashing material.
        ii. Apply a generous bead of material over the joint.
        iii. Press and spread liquid flashing into the joint.
        iv. Allow material to skin over prior to full application of liquid flashing the rough opening.
    c. Treatment of joints or cracks larger than ½” (12.7 mm)

i. Install backer rod into the joint to control depth of liquid flashing material.
ii. Apply a generous bead of material over and into the joint.
iii. Press and spread liquid flashing into the joint.
iv. Smooth out using a spreader tool or putty knife
v. Allow material to cure prior to full application of liquid flashing into the rough opening.

d. Apply a bead of liquid flashing in the rough opening starting at the top and continuing around the rough opening.

e. Spread the material using a spreader tool or putty knife across the rough opening surface.

f. Test the material thickness using a wet mil gauge to ensure that it has a thickness of 12 - 15 mils.

g. Apply a generous bead of liquid flashing material to the vertical surface around the rough opening and spread this material 4” - 6” (100 - 152 mm) onto the vertical surface with a spreader tool or putty knife.

h. Test the thickness to ensure the material has a thickness of 12 – 15 mils.

i. Allow liquid flashing material to dry before installing any windows, doors, wall assembly, and full air barrier material.

C. Through Wall Flashing

1. Prime surfaces to be covered in one working day with applicable adhesive.
2. Remove release paper prior to application.
3. Apply though wall flashing at based of masonry walls as indicated on drawings.
4. Recess through wall flashing 1/2” (13 mm) from the face of the masonry.
5. Apply a bead of pointing mastic if through wall flashing is not embedded into masonry.

D. Air Barrier Membrane

1. Apply air barrier membrane in accordance with manufacturer's instructions.
2. Thoroughly mechanically mix membrane prior to application.
3. Apply membrane by spray or roller at a minimum coverage rate of 25 $ft.^2$/U.S. gal (0.61 m^2/L) providing a thickness of 60 wet mils in two coats.
4. Frequently inspect surface area with a wet mil gauge to ensure consistent thickness.
5. Work material into any fluted rib forming indentations.
6. Cured thickness of membrane should be 30 mils dry.
7. Allow 48 hours for full cure of the membrane.

3.04 PROTECTION

A. Cover air barrier membrane as soon as possible, since it is not designed for permanent exposure.

B. Protect air barrier system from construction damage during application and remainder of construction period, according to manufacturer's written instructions.

C. For exposure exceeding 4 months, protect air barrier from exposure to UV light with UV stable tarp and harmful weather exposure as required by manufacturer. Remove, replace or repair main air barrier material exposed for more than 4 months.

END OF SECTION 072726

SECTION 075310 - EPDM MEMBRANE ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Adhered membrane roofing system.
2. Vapor retarder.

B. Related Sections include the following:

1. Division 6 Section “Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.
2. Division 7 Section “Thermal Insulation” for roof insulation fastening requirements.
3. Division 7 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counterflashings.
4. Division 7 Section "Joint Sealants."

1.3 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

B. Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," before multiplication by a safety factor.

C. Factored Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," after multiplication by a safety factor.

1.4 PERFORMANCE REQUIREMENTS

A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.

C. Roofing System Design: Provide a membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE 7.

D. FMG Listing: Provide roofing membrane, base flashings, and component materials that comply with requirements in FMG 4450 and FMG 4470 as part of a membrane roofing system and that are listed in FMG's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FMG markings.

1. Fire/Windstorm Classification: Class 1A-90.
2. Hail Resistance: SH.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other Work.

1. Base flashings and membrane terminations.
2. Tapered insulation, including slopes.
3. Insulation fastening patterns.

C. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.

D. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

1. Submit evidence of meeting performance requirements.

E. Qualification Data: For Installer and manufacturer.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing system.

G. Research/Evaluation Reports: For components of membrane roofing system.

H. Maintenance Data: For roofing system to include in maintenance manuals.

I. Warranties: Special warranties specified in this Section.

J. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty. Installer must be approved with the manufacturer for at least 5 years and have completed 5 jobs similar in nature/scope.

B. Manufacturer Qualifications: A qualified manufacturer that has FMG approval for membrane roofing system identical to that used for this Project.

C. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.

D. Source Limitations: Obtain components for membrane roofing system approved by roofing membrane manufacturer.

E. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.

1. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.
2. Fire-Resistance Ratings: ASTM E 119, for fire-resistance-rated roof assemblies of which roofing system is a part.

F. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site. Comply with requirements for preinstallation conferences in Division 1 Section "Project Meetings." Review methods and procedures related to roof deck construction and roofing system including, but not limited to, the following:

1. Meet with Owner; A/E; Owner's insurer if applicable; testing and inspecting agency representative; roofing Installer; roofing system manufacturer's representative; deck Installer; and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.

9. Review roof observation and repair procedures after roofing installation.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.

1. Special NDL warranty includes roofing membrane, base flashings, roofing accessories roof insulation fasteners cover boards substrate board vapor retarder, walkway products and other components of membrane roofing system.
2. Warranty Period: 20 years from date of Substantial Completion.

B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering Work of this Section, including all components of membrane roofing system such as roofing membrane, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, roof pavers, and walkway products, for the following warranty period:

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 EPDM ROOFING MEMBRANE

A. EPDM Roofing Membrane: ASTM D 4637-96, Type III, fabric-backed membrane, and as follows:

1. Manufacturers:

a. BASIS OF DESIGN: Carlisle Sure-Seal FleeceBACK 115 or approved equivalent manufacturer.
b. Versico's Versigard EPDM Roofing Membrane.
c. Tremco Manufacturing EPDM Roofing Membrane.

2. Thickness: 60-mil non-reinforced EPDM laminated to a 55-mil non-woven polyester fleece-backing resulting in a total finished sheet thickness of 115-mil.
3. Exposed Face Color: Black.

2.2 AUXILIARY MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.

1. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.

B. Sheet Flashing: Provide manufacturer recommended flashing products, according to application. Products include but are not limited to: Sure-Seal Pressure-Sensitive Cured Cover Strip, Sure-Seal Pressure-Sensitive Overlayment Strip, Sure-Seal Uncured EPDM Elastoform Flashing, Sure-Seal Inside/Outside Corner or approved equivalent products.

C. Epichlorohydrin (Grease Resistant) Sheet: 60-mil-thick, unreinforced flexible sheet with the following typical properties as determined per ASTM test method indicated:

1. Breaking Strength: 210 lbf; ASTM D 751.
2. Ultimate Elongation: 480 percent; ASTM D 412.
3. Tearing Strength: 45 lbf.; ASTM D 751.
4. Brittleness Temperature: Minus 67 deg F; ASTM D 2137.
5. Resistance to Ozone Aging: No cracks after 168 hours' exposure of 50 percent elongated sample at 104 deg F and 100-pphm ozone; ASTM D 1149.
6. Resistance to Outdoor (Ultraviolet) Weathering: No cracks, no crazing @ 41580 kJ/m^2; ASTM G 155.

D. Bonding Adhesive: Manufacturer's standard bonding adhesive. Low VOC

E. Seaming Material: Manufacturer's standard synthetic-rubber polymer primer and 6-inch- wide minimum, butyl splice tape with release film.

F. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.

G. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.

H. Metal Battens: Manufacturer's standard aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick, pre-punched.

I. Fasteners: Factory powder-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

J. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

K. Cover Boards: Provide manufacturer recommended cover board composed of fiber-reinforced gypsum, without a facer.

a. Thickness: ¼”

2.3 VAPOR RETARDER

A. Polyethylene Vapor Retarder (use over cover board on metal deck locations): ASTM D 4397, 6 mils thick, minimum, with maximum permeance rating of 0.13 perm.

1. Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:

1. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Division 5 Section "Steel Deck."
4. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.
5. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.

6. Verify that concrete curing compounds that will impair adhesion of roofing components to roof deck have been removed.
7. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

D. Install acoustical roof deck rib insulation strips, specified in Division 5 Section "Steel Deck," according to acoustical roof deck manufacturer's written instructions.

3.3 VAPOR-RETARDER INSTALLATION

A. Loosely lay polyethylene-film vapor retarder in a single layer over area to receive vapor retarder, side and end lapping each sheet a minimum of 2-inches and 6-inches, respectively.

1. Seal side and end laps with tape or adhesive.

B. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into membrane roofing system.

3.4 INSULATION INSTALLATION

A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with membrane roofing system manufacturer's written instructions for installing roof insulation.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Install two staggered layers of insulation under area of roofing to achieve required thickness. Joints of each succeeding layer staggered from joints of previous layer a minimum of 6-inches in each direction.

E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4-inch with insulation.

1. Cut and fit insulation within 1/4-inch of nailers, projections, and penetrations.

G. Mechanically Fastened Insulation: Install each base layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

1. Fasten insulation according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.
2. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.
3. Follow fastening instructions indicated in Section “Thermal Insulation” in locations to receive exposed acoustic decking.

H. Adhered Insulation: Fully adhere top layer of insulation to base layer using manufacturer recommended adhesive.

1. Basis of design: Carlisle Flexible Fast Adhesive or approved equivalent.

3.5 ADHERED ROOFING MEMBRANE INSTALLATION

A. Install roofing membrane over area to receive roofing according to membrane roofing system manufacturer's written instructions. Contractor MUST follow all manufacturer guidelines for roofing installation. Unroll roofing membrane and allow to relax before installing.

B. Start installation of roofing membrane in presence of membrane roofing system manufacturer's technical personnel.

C. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

D. Bonding Adhesive: Apply bonding adhesive to substrate and underside of roofing membrane at rate required by manufacturer and allow to partially dry before installing roofing membrane. Do not apply bonding adhesive to splice area of roofing membrane.

E. Mechanically or adhesively fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.

F. Apply roofing membrane with side laps shingled with slope of roof deck where possible.

G. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape, and firmly roll side and end laps of overlapping roofing membranes according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing membrane terminations.

H. Repair tears, voids, and lapped seams in roofing that does not meet requirements.

I. Spread sealant or mastic bed over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.

J. Install roofing membrane and auxiliary materials to tie in to existing roofing.

K. Apply epichlorohydrin sheet over roofing membrane 50-ft. beyond rooftop kitchen exhaust on all sides.

3.6 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars concealed under counterflashing.

3.7 FIELD QUALITY CONTROL

A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.

1. Notify Architect or Owner 48 hours in advance of date and time of inspection.

B. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.

C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

D. Contractor must provide a warranted, leak-free connection to the existing PVC (Sika Sarnafil) roof adjacent to the new work. Existing roof consists of fully adhered PVC membrane over insulation on metal deck.

3.8 PROTECTING AND CLEANING

A. Protect membrane-roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075310

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Low-slope roof sheet metal fabrications.

2. Miscellaneous sheet metal flashing and trim.

B. Related Requirements:

1. Division 07 low slope membrane roofing section for installing sheet metal flashing and trim integral with roofing and for related warranty requirements.

2. Division 07 Section "Roof Specialties" for manufactured copings and roof edge flashings incorporated in roof system.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Shop Drawings: For sheet metal flashing and trim.

1. Include plans, elevations, sections, and attachment details.

2. Include identification of material, thickness, weight, and finish for each item and location in Project.

3. Indicate details meet requirements of SMACNA and NRCA required by this Section.

4. Detail formed flashing and trim at scale of not less than 1-1/2 inches per 12 inches (1:10).

C. Samples for Verification: For each type of exposed finish.

1.3 INFORMATIONAL SUBMITTALS

A. Contractor's Product Certificates: For each type of coping and roof edge flashing that is ANSI/SPRI ES-1 tested.

1.4 CLOSEOUT SUBMITTALS

A. Warranties: Manufacturer's executed warranty documents. Submit prior to acceptance of Work.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1. For copings and roof edge flashings that are ANSI/SPRI ES-1 tested; fabrication shop shall be listed as able to fabricate required details as tested and approved.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.7 WARRANTY

A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. Flashings and Fastening: Comply with requirements of Division 07 roofing sections. Provide base flashings, perimeter flashings, detail flashings and component materials and installation techniques that comply with requirements and recommendations of the following:

1. FM Global 1-49: "Property Loss Prevention Data Sheet for Perimeter Flashings."

2. FM Global 1-29: "Property Loss Prevention Data Sheet for Above Deck Roof Components."

3. NRCA: "The NRCA Roofing Manual" for construction details and recommendations.

D. SPRI Wind Design Standard: Manufacture and install copings and roof edge flashings tested in accordance with ANSI/SPRI/FM 4435/ES-1.

E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects.

2.2 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

B. Aluminum Sheet: ASTM B209/B209M, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface., alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with

1. Basis of Design Product: Tremco, Inc., TremLock Sheet.

2. Exposed Coil-Coated Finish:

a. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
b. Color: As selected from manufacturer's full range.

3. As-Milled Finish: Mill.

C. Lead Sheet: ASTM B749 lead sheet.

2.3 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Sheet: Minimum 30 mils (0.76 mm) thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer.

1. Low-Temperature Flexibility: ASTM D1970; passes after testing at minus 20 deg F (29 deg C) or lower.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.

2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.

C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.

D. Elastomeric Sealant: ASTM C920, elastomeric polyurethane at concealed joints and silicone at exposed joints; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

E. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

F. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D1187.

G. Asphalt Roofing Cement: ASTM D4586, asbestos free, of consistency required for application.

2.5 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.

1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.

2. Obtain field measurements for accurate fit before shop fabrication.

3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.

4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.

2. Use lapped expansion joints only where indicated on Drawings.

D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.

E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.

G. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

H. Seams for Uncoated Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.

I. Do not use graphite pencils to mark metal surfaces.

2.6 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

A. Expansion Joint Cover: Fabricate from the following materials:

1. Aluminum: 0.050 inch (1.27 mm) thick.

B. Base Flashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:

1. Aluminum: 0.040 inch (1.02 mm) thick.

C. Counterflashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:

1. Aluminum: 0.032 inch (0.81 mm) thick.

D. Flashing Receivers: Fabricate from the following materials:

1. Aluminum: 0.032 inch (0.81 mm) thick.

E. Roof-Penetration Flashing: Fabricate from the following materials:

1. Lead: (19.53 kg/m2) 4 lb/sq. ft.; (1.6 mm) 0.0625 inch thick.

PART 3 - EXECUTION

3.1 UNDERLAYMENT INSTALLATION

A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps and edges with roller. Cover underlayment within 14 days.

B. Install slip sheet, wrinkle free, over underlayment before installing sheet metal flashing and trim.

3.2 INSTALLATION, GENERAL

A. Install sheet metal flashing and trim to comply with details indicated and recommendations of cited sheet metal standard that apply to installation characteristics required unless otherwise indicated on Drawings.

1. Space cleats not more than 12 inches (300 mm) apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.

2. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Coat concealed side of uncoated-aluminum and stainless steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.

2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet (3 m) with no joints within 24 inches (600 mm) of corner or intersection.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.

2. Use lapped expansion joints only where indicated on Drawings.

D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.

E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

F. Seal joints as required for watertight construction.

1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).

2. Prepare joints and apply sealants to comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions.

3.3 ROOF FLASHING INSTALLATION

A. Install sheet metal flashing and trim to comply with performance requirements and cited sheet metal standard.

1. Provide concealed fasteners where possible, and set units true to line, levels, and slopes.

2. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.

C. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing.

1. Insert counterflashing in reglets or receivers and fit tightly to base flashing.

2. Extend counterflashing 4 inches (100 mm) over base flashing.

3. Lap counterflashing joints minimum of 4 inches (100 mm).

D. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with sealant and clamp flashing to pipes that penetrate roof.

3.4 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.5 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean off excess sealants.

C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.

D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 076200

SECTION 077100 - ROOF SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Manufactured copings.
2. Manufactured roof-edge specialties (fasciae, drip edges and gravel stops).

B. Related Information:

1. Division 06 Section "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.
2. Division 07 Section "Sheet Metal Flashing and Trim" for custom- and site-fabricated sheet metal flashing and trim.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site, in conjunction with roofing preinstallation conference specified in Division 07 roofing section.

1. Meet with Owner, Owner's insurer if applicable, Installer, and installers whose work interfaces with or affects roof specialties including installers of roofing materials and accessories.
2. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
3. Review special roof details, roof drainage, and condition of other construction that will affect roof specialties.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Samples for Initial Selection: For each type of roof specialty indicated with factory-applied color finishes.

C. Samples for Verification: For each roof specialty product made from 12-inch (300-mm) lengths of full-size components including fasteners, cover joints, accessories, and attachments.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for copings and roof-edge flashings.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer.

B. Sample Warranty: For manufacturer's special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing specialties to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer offering products meeting requirements that are ANSI/SPRI ES-1 tested to specified design pressure.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Do not store roof specialties in contact with other materials that might cause staining, denting, or other surface damage. Store roof specialties away from uncured concrete and masonry.

B. Protect strippable protective covering on roof specialties from exposure to sunlight and high humidity, except to extent necessary for the period of roof specialties installation.

1.8 PROJECT / FIELD CONDITIONS

A. Field Measurements: Verify profiles and tolerances of roof-specialty substrates by field measurements before fabrication, and indicate measurements on Shop Drawings.

B. Coordination: Coordinate roof specialties with flashing, trim, and construction of parapets, roof deck, roof and wall panels, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.9 WARRANTY

A. Roofing-System Warranty: Roof specialties are included in warranty provisions in Division 07 roofing Section.

B. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Roof specialties shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components,

failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 MANUFACTURERS

A. Basis of Design: The roof system specified in this Section is based upon products of Tremco, Inc., that are named in other Part 2 articles, or approved equivalent.

B. Source Limitations: Obtain roof specialties approved by manufacturer providing roofing-system warranty specified in Division 07 roofing Section.

2.3 EXPOSED METALS

A. Aluminum Sheet: ASTM B209/B209M, alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.

1. Surface: Smooth, flat finish as indicated.

B. Aluminum Extrusions: ASTM B221/B221M, alloy and temper recommended by manufacturer for type of use and finish indicated, finished as follows:

2.4 CONCEALED METALS

A. Aluminum Extrusions: ASTM B221/B221M, alloy and temper recommended by manufacturer for type of use and structural performance indicated, mill finished.

B. Zinc-Coated (Galvanized) Steel Sheet: ASTM A653/A653M, G90 (Z275) coating designation.

2.5 UNDERLAYMENT MATERIALS

A. Felt: ASTM D226/D226M, Type II (No. 30), asphalt-saturated organic felt, nonperforated.

B. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils (0.76 to 1.0 mm) thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.

1. Thermal Stability: ASTM D1970/D1970M; stable after testing at 240 deg F (116 deg C).

2. Low-Temperature Flexibility: ASTM D1970/D1970M; passes after testing at minus 20 deg F (29 deg C).

2.6 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.

B. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:

1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.

2. Fasteners for Aluminum: Aluminum or Series 300 stainless steel.

3. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A153/A153M or ASTM F2329.

C. Elastomeric Sealant: ASTM C920, elastomeric silicone polymer sealant of type, grade, class, and use classifications required by roofing-specialty manufacturer for each application.

D. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

E. Asphalt Roofing Cement: ASTM D4586/D4586M, asbestos free, of consistency required for application.

2.7 MANUFACTURED COPINGS

A. Copings: Manufactured coping system consisting of formed-metal coping cap in section lengths not exceeding 12 feet (3.6 m), concealed anchorage; corner units, end cap units, and concealed splice plates with same finish as coping caps.

1. Coping Profile:

a. Unit Face Height: Accommodate existing height plus additional insulation and blocking indicated.

2. Basis-of-Design Product: Subject to compliance with requirements, provide Tremco, TremLock Infinity Gold Coping.

3. Coping-Cap Material: Formed aluminum sheet, nominal 0.040-inch (1.02-mm) thick.

a. Finish: High-performance organic (PVDF) coating.
b. Color: As selected by Owner from manufacturer's full range.

4. Corners: Factory mitered and continuously welded.

5. Coping-Cap Attachment Method: Snap-on, fabricated from coping-cap material.

6. Snap-on-Coping Anchor Plates: Concealed, galvanized-steel sheet, 12 inches (300 mm) wide, with integral cleats.

2.8 MANUFACTURED ROOF-EDGE SPECIALTIES

A. Roof-Edge Fascia: Snap-on type fascia with vertical profile.

1. Description: Manufactured two-piece roof-edge fasciae systems consisting of formed-metal fascia covers in section lengths not exceeding 12 feet (3.6 m), with an extruded anchor bar to engage and secure fascia cover, and concealed splice plates. Provide matching prefabricated continuously welded corner units.

a. Roof-Edge Fasciae Profile:

1) Unit Face Height: Accommodate existing height plus additional insulation and blocking indicated.

b. Splice Plates: Of same material and finish as roof edge flashing units, 8 inches (203 mm) long with factory-installed dual non-curling butyl sealant strips.

2. Basis-of-Design Product: Tremco, TremLock 215 HD Fascia.

3. Fascia Cover Securement: Snap-on, over continuous extruded aluminum anchor bar.

4. Roofing System: Modified bitumen.

5. Fascia Cover Material: Formed aluminum sheet, nominal 0.040-inch (1.02-mm) thick.

a. Finish: High-performance organic (PVDF) coating.
b. Color: As selected by Owner from manufacturer's full range.

B. Fascia Accessories: Provide accessories fabricated from the same materials and for compatibility with roof edge system; provide the following accessories:

1. Fascia extenders.

2.9 MANUFACTURED REGLETS AND COUNTERFLASHINGS

2.10 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. High-Performance Organic (PVDF) Coating: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with ASTM A755/A755M and coating and resin manufacturers' written instructions.

1. Aluminum Coil Coating Finishes: Two-Coat or Three-Coat Fluoropolymer: AAMA 2605 and as additionally required to meet specified finish performance and warranty requirements. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

E. Concealed Surface Finish: Apply pretreatment and manufacturer's standard acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

F. Mill Finish: As manufactured.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.

B. Examine walls, roof edges, and parapets for suitable conditions for roof specialties.

C. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF UNDERLAYMENT

A. Felt Underlayment: Install with adhesive for temporary anchorage to minimize use of mechanical fasteners under roof specialties. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches (50 mm).

B. Self-Adhering Sheet Underlayment: Install wrinkle free. Apply primer if required by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply in shingle fashion to shed water. Overlap edges not less than 3-1/2 inches (90 mm). Roll laps with roller. Cover underlayment within 14 days.

C. Slip Sheet: Install with tape or adhesive for temporary anchorage to minimize use of mechanical fasteners under roof specialties. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches (50 mm).

3.3 INSTALLATION, GENERAL

A. General: Install roof specialties according to manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete roof-specialty systems.

1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.

2. Provide uniform, neat seams with minimum exposure of solder and sealant.

3. Install roof specialties to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.

4. Torch cutting of roof specialties is not permitted.

5. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

1. Coat concealed side of uncoated aluminum roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.

2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of self-adhering, high-temperature sheet underlayment.

3. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.

C. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.

1. Space movement joints at a maximum of 12 feet (3.6 m) with no joints within 18 inches (450 mm) of corners or intersections unless otherwise shown on Drawings.

2. When ambient temperature at time of installation is between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.

D. Fastener Sizes:

1. Wood Blocking or Sheathing: Use fasteners of sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.

2. Other Substrates: Use fasteners of sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

E. Seal joints with elastomeric sealant as required by roofing-specialty manufacturer.

F. Seal joints as required for watertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F (4 deg C).

3.4 INSTALLATION OF COPINGS

A. Install clips, cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.

B. Anchor copings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.

1. Interlock face and back leg drip edges of snap-on coping cap into cleated anchor plates anchored to substrate at manufacturer's required spacing that meets performance requirements.

3.5 INSTALLATION OF ROOF-EDGE SPECIALTIES

A. Install clips, cleats, cants, and other anchoring and attachment accessories and devices with concealed fasteners.

B. Anchor roof edgings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.

3.6 CLEANING AND PROTECTION

A. Clean exposed metal surfaces.

B. Clean off excess sealants.

C. Clean and neutralize flux materials. Clean off excess solder.

D. Remove temporary protective coverings and strippable films as roof specialties are installed. On completion of installation, clean finished surfaces including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain roof specialties in a clean condition during construction.

E. Replace roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077100

SECTION 077129 – MANUFACTURED ROOF EXPANSION JOINTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Metal-flanged, bellows-type roof expansion assemblies.
   2. Aluminum roof expansion assemblies.

B. Related Sections include the following:

   1. Division 6 Section "Rough Carpentry" for wooden curbs for mounting roof expansion assemblies.
   2. Division 7 Section “Thermoplastic Polyolefin (TPO) Roofing."
   3. Division 7 Section "Sheet Metal Flashing and Trim" for shop- and field-fabricated sheet metal expansion-joint systems, flashing, and other sheet metal items.
   4. Division 7 Section "Roof Specialties" for other manufactured roof items.
   5. Division 7 Section "Fire-Resistive Joint Systems" for fire-resistive joint systems in construction other than roofs.

1.3 PERFORMANCE REQUIREMENTS

A. General: Provide roof expansion assemblies that, when installed, remain watertight within movement limitations specified by manufacturer.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Include plans, elevations, sections, details, joints, splices, locations of joints and splices, intersections, transitions, fittings, and attachments to other work. Where joint assemblies change planes, provide isometric drawings depicting how components interconnect to achieve continuity.

C. Samples: For each type of exposed factory-applied finish required, prepared on Samples of size to adequately show color.

   1. Include similar Samples of material for assemblies and accessories involving color selection.

D. Research/Evaluation Reports: For roof expansion assemblies.

E. Warranties: Special warranties specified in this Section.

F. Qualification Data: For Installer.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Installer of roof membrane.

B. Source Limitations: Obtain metal-flanged, bellows-type roof expansion assemblies approved by roofing membrane manufacturer and that are part of roofing membrane warranty.

C. Product Options: Drawings indicate size, profiles, and dimensional requirements of roof expansion assemblies and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

D. Fire-Test-Response Characteristics: Provide fire-barrier assemblies with fire-test-response characteristics not less than that of adjacent construction, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Assemblies shall be capable of anticipated movement while maintaining fire rating. Identify assemblies with appropriate markings of applicable testing and inspecting agency.

1. Fire-Resistance Ratings: UL 2079.
2. Fire-Resistance Ratings: ASTM E 119.

1.6 SCHEDULING

A. Coordinate delivery and installation of roof expansion assemblies to prevent damage and provide timely integration of units with roofing membranes and flashing.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer and Installer agree to repair or replace roof expansion assemblies that leak, deteriorate in excess of rates specified in manufacturer's published product literature, or otherwise fail to perform within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair or replace components that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
   a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
   b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
   c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
2. Products: Subject to compliance with requirements, provide one of the products specified.

2.2 METALS

A. Galvanized Steel Sheet: ASTM A 653/A 653M, hot-dip zinc-coating designation G90 (Z275), stretcher-leveled standard of flatness and either commercial or forming steel, minimum 0.019 inch thick.

B. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness, minimum 0.015 inch thick.

C. Copper Sheet: ASTM B 370, Temper H00 (cold rolled) unless Temper 060 is required for forming, minimum 16 oz./sq. ft.

D. Sheet Aluminum: ASTM B 209 (ASTM B 209M); Alloy 3003-H14, 5052-H32, or 6061-T6; minimum 0.032 inch thick.

E. Extruded Aluminum: ASTM B 221 (ASTM B 221M), Alloy 6063-T5 or 6063-T52, minimum 0.040 inch thick.

F. Aluminum Finishes:

1. Mill Finish: AA-M10 (Mechanical Finish: as fabricated; no other applied finish unless buffing is required to removed scratches, welding, or grinding produced in fabrication process).

2. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 611.
3. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.
4. Class II, Color Anodic Finish: AA-M12C22A32/A34 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, integrally colored or electrolytically deposited color coating 0.010 mm or thicker).
5. Class I, Color Anodic Finish: AA-M12C22A42/A44 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 611.

    a. Color: As selected by Architect from manufacturer's full range.

6. High-Performance Organic Finish (2-Coat Fluoropolymer): AA-C12C40R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: conversion coating; Organic Coating: manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA 2604 and with coating and resin manufacturers' written instructions.

    a. Color and Gloss: As selected by Architect from manufacturer's full range.

2.3 MISCELLANEOUS MATERIALS

A. Roof Cement: ASTM D 4586, Type II.

B. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and to remain watertight.

C. Mineral-Fiber Blanket: ASTM C 665.

D. Flexible Cellular Sponge or Expanded Rubber: ASTM D 1056.

E. Silicone Extrusions: Classified according to ASTM D 2000, UV stabilized, and do not propagate flame.

F. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to withstand design loads.

1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.

2.4 FIRE BARRIERS

A. Fire Barriers: Devices complying with requirements specified in Part 1 "Quality Assurance" Article for fire-test-response characteristics and designed for dynamic structural movement without material degradation or fatigue when tested according to ASTM E 1399. Provide roof expansion assemblies with manufacturer's continuous, standard, flexible fire-barrier seals in back of joint system at locations indicated to provide fire-resistance rating not less than rating of adjacent construction.

2.5 BELLOWS-TYPE ROOF EXPANSION ASSEMBLIES

A. Metal-Flanged, Bellows-Type Roof Expansion Assemblies: Provide manufacturer's standard assemblies of sizes and types indicated, with prefabricated units for corner and joint intersections and horizontal and vertical transitions including those to other building expansion joints, splicing units, adhesives, coatings, and other components as recommended by roof expansion assembly manufacturer for complete installation. Fabricate assemblies specifically for roof-to-roof and roof-to-wall applications.

B. Provide assemblies consisting of exposed polymeric sheet over foam bellows, securely anchored at both edges to 4-inch wide sheet metal nailing flanges, either flat or angle formed to fit cant or curbs as required. Insulate bellows with closed-cell, flexible rubber or plastic foam not less than 5/16 inch thick; adhere bellows to underside of polymeric sheet.

1. Products:

    a. Architectural Art Mfg., Inc.; T Series Roof Expansion Cover.
    b. Balco Metalines, a division of Balco, Inc.; Roof Bellows.
    c. BMCA Insulation Products, Inc., GAF Materials Corporation; Metalastic.
    d. C/S Group.
    e. Johns Manville.
    f. JointMaster, a division of InPro Corporation.
    g. MM Systems Corporation; Series.
    h. Watson Bowman Acme Corp.

2. Polymeric Sheet: Coordinate with roofing membrane.
3. Metal Flanges: Zinc-coated (galvanized) steel, minimum 0.019 inch thick.

    a. Mortar Flanges: Where flanges will be embedded in concrete or mortar, provide manufacturer's standard perforated-metal mortar flanges.

4. Moisture Barrier: Manufacturer's standard, flexible, continuous, polymeric moisture barrier looped under roof expansion assemblies at locations indicated. Fill space with blanket-type, mineral-fiber insulation.
5. Fire Barrier: Provide manufacturer's standard fire barrier.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with manufacturer's written instructions for handling and installing roof expansion assemblies and materials unless more stringent requirements are indicated.

B. Coordinate installation of roof expansion assembly materials and associated work so complete assemblies comply with assembly performance requirements.

C. Install fire barriers to provide continuous, uninterrupted fire resistance throughout length of roof expansion assembly, including transitions and end joints.

D. Extend roof expansion assemblies over curbs, parapets, cornices, gutters, valleys, fasciae, and other elements in the construction profile, with factory-fabricated intersections and transitions to provide continuous, uninterrupted, waterproof roof expansion assemblies.

1. Install factory-fabricated transitions between roof expansion assemblies and building architectural joint systems, specified in Division 5 Section "Architectural Joint Systems," to provide continuous, uninterrupted, watertight construction.

E. Splice roof expansion assemblies with materials provided by roof expansion assembly manufacturer for this purpose, according to manufacturer's written instructions, to provide continuous, uninterrupted, waterproof roof expansion assemblies.

F. Provide uniform profile of roof expansion assembly throughout length of each installation; do not stretch polymeric sheets.

G. Install mineral-fiber blanket insulation to fill joint space within joint and moisture barrier.

H. Bed anchorage flanges in cement or sealant recommended by manufacturer and securely nail to curbs and cant strips as recommended by manufacturer but not less than 6 inches o.c.

I. Anchor roof expansion assemblies complying with manufacturer's written instructions.

J. On single-ply roofing, install roof expansion assemblies complying with manufacturer's written instructions. Anchor to cants or curbs and seal to membrane with sealant compatible with roofing membrane and roof expansion assembly. Cover flanges with stripping or flashing and install according to requirements in Division 7 Section " Polyvinyl-Chloride (PVC) roofing."

3.2 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensures that roof expansion assemblies are without damage or deterioration at time of Substantial Completion.

END OF SECTION 077129

SECTION 078100 - APPLIED FIREPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes sprayed fire-resistive materials (SFRM).

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review products, design ratings, restrained and unrestrained conditions, densities, thicknesses, bond strengths, and other performance requirements.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Framing plans, schedules, or both, indicating the following:

1. Extent of fireproofing for each construction and fire-resistance rating.
2. Applicable fire-resistance design designations of a qualified testing and inspecting agency acceptable to authorities having jurisdiction.
3. Minimum fireproofing thicknesses needed to achieve required fire-resistance rating of each structural component and assembly.
4. Treatment of fireproofing after application.

C. Samples: For each exposed product and for each color and texture specified, in manufacturer's standard dimensions in size.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and testing agency.

B. Product Certificates: For each type of fireproofing.

C. Evaluation Reports: For fireproofing, from ICC-ES.

D. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A firm or individual certified, licensed, or otherwise qualified by fireproofing manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements.

B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects.

1. Build mockup of each type of fireproofing and different substrate and each required finish as shown on Drawings.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.7 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on field mockups of fireproofing.

1. Provide test specimens and assemblies representative of proposed materials and construction.

B. Preconstruction Adhesion and Compatibility Testing: Test for compliance with requirements for specified performance and test methods.

1. Bond Strength: Test for cohesive and adhesive strength according to ASTM E 736. Provide bond strength indicated in referenced fire-resistance design, but not less than minimum specified in Part 2.
2. Density: Test for density according to ASTM E 605. Provide density indicated in referenced fire-resistance design, but not less than minimum specified in Part 2.
3. Verify that manufacturer, through its own laboratory testing or field experience, attests that primers or coatings are compatible with fireproofing.
4. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
5. For materials failing tests, obtain applied-fireproofing manufacturer's written instructions for corrective measures including the use of specially formulated bonding agents or primers.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not apply fireproofing when ambient or substrate temperature is 44 deg F or lower unless temporary protection and heat are provided to maintain temperature at or above this level for 24 hours before, during, and for 24 hours after product application.

B. Ventilation: Ventilate building spaces during and after application of fireproofing, providing complete air exchanges according to manufacturer's written instructions. Use natural means or, if they are inadequate, forced-air circulation until fireproofing dries thoroughly.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Assemblies: Provide fireproofing, including auxiliary materials, according to requirements of each fire-resistance design and manufacturer's written instructions.

B. Fire-Resistance Design: Indicated on Drawings, tested according to ASTM E 119 or UL 263 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Steel members are to be considered unrestrained unless specifically noted otherwise.

C. Asbestos: Provide products containing no detectable asbestos.

2.2 SPRAYED FIRE-RESISTIVE MATERIALS

A. SFRM: Manufacturer's standard, factory-mixed, lightweight, dry formulation, complying with indicated fire-resistance design.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Carboline Company; AD Southwest Fireproofing Type 5GP.
b. Grace Construction Products; Monokote MK-6 Series.
c. Isolatek International; Cafco 300.
d. Pyrok, Inc.; Pyrok-HD.
e. Schundler Company (The); Classic 5 LD.
f. Southwest Fireproofing Products Co.; Type 5EF.

2. Application: Designated for exterior use by a qualified testing agency acceptable to authorities having jurisdiction.
3. Bond Strength: Minimum 150-lbf/sq. ft. cohesive and adhesive strength based on field testing according to ASTM E 736.
4. Density: Not less than 15 lb/cu. ft. and as specified in the approved fire-resistance design, according to ASTM E 605.
5. Thickness: As required for fire-resistance design indicated, measured according to requirements of fire-resistance design or ASTM E 605, whichever is thicker, but not less than 0.375 inch.
6. Combustion Characteristics: ASTM E 136.

7. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

    a. Flame-Spread Index: 10 or less.
    b. Smoke-Developed Index: 10 or less.

8. Compressive Strength: Minimum 10 lbf/sq. in. according to ASTM E 761.
9. Corrosion Resistance: No evidence of corrosion according to ASTM E 937.
10. Deflection: No cracking, spalling, or delamination according to ASTM E 759.
11. Effect of Impact on Bonding: No cracking, spalling, or delamination according to ASTM E 760.
12. Air Erosion: Maximum weight loss of 0.025 g/sq. ft. in 24 hours according to ASTM E 859.
13. Fungal Resistance: Treat products with manufacturer's standard antimicrobial formulation to result in no growth on specimens per ASTM G 21.
14. Finish: As selected by Architect from manufacturer's standard finishes.

    a. Color of Topcoat: As selected by Architect from manufacturer's full range.

2.3 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. 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 E 736.

C. 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.

D. 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.

E. 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.

F. 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.

G. Topcoat: Suitable for application over applied fireproofing; of type recommended in writing by fireproofing manufacturer for each fire-resistance design.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrates and other conditions affecting performance of the Work and according to each fire-resistance design.

1. 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.
2. Objects penetrating fireproofing, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.
3. Substrates receiving fireproofing are not obstructed by ducts, piping, equipment, or other suspended construction that will interfere with fireproofing application.

B. Conduct tests according to fireproofing manufacturer's written recommendations to verify that substrates are free of substances capable of interfering with bond.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Cover other work subject to damage from fallout or overspray of fireproofing materials during application.

B. Clean substrates of substances that could impair bond of fireproofing.

C. Prime substrates where included in fire-resistance design and where recommended in writing by fireproofing manufacturer unless compatible shop primer has been applied and is in satisfactory condition to receive fireproofing.

D. 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.

3.3 APPLICATION

A. Construct fireproofing assemblies that are identical to fire-resistance design indicated and products as specified, tested, and substantiated by test reports; for thickness, primers, sealers, topcoats, finishing, and other materials and procedures affecting fireproofing work.

B. Comply with fireproofing manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to mix, convey, and apply fireproofing; as applicable to particular conditions of installation and as required to achieve fire-resistance ratings indicated.

C. Spray apply fireproofing to maximum extent possible. Following the spraying operation in each area, complete the coverage by trowel application or other placement method recommended in writing by fireproofing manufacturer.

D. Coordinate application of fireproofing with other construction to minimize need to cut or remove fireproofing.

1. Do not begin applying fireproofing until clips, hangers, supports, sleeves, and other items penetrating fireproofing are in place.
2. Defer installing ducts, piping, and other items that would interfere with applying fireproofing until application of fireproofing is completed.

E. Metal Decks:

1. Do not apply fireproofing to underside of metal deck substrates until concrete topping, if any, has been completed.
2. Do not apply fireproofing to underside of metal roof deck until roofing has been completed; prohibit roof traffic during application and drying of fireproofing.

F. Install auxiliary materials as required, as detailed, and according to fire-resistance design and fireproofing manufacturer's written recommendations for conditions of exposure and intended use. For auxiliary materials, use attachment and anchorage devices of type recommended in writing by fireproofing manufacturer.

G. Spray apply fireproofing to maximum extent possible. Following the spraying operation in each area, complete the coverage by trowel application or other placement method recommended in writing by fireproofing manufacturer.

H. Extend fireproofing in full thickness over entire area of each substrate to be protected.

I. Install body of fireproofing in a single course unless otherwise recommended in writing by fireproofing manufacturer.

J. Where sealers are used, apply products that are tinted to differentiate them from fireproofing over which they are applied.

K. Provide a uniform finish complying with description indicated for each type of fireproofing material and matching finish approved for required mockups.

L. Cure fireproofing according to fireproofing manufacturer's written recommendations.

M. Do not install enclosing or concealing construction until after fireproofing has been applied, inspected, and tested and corrections have been made to deficient applications.

N. Finishes: Where indicated, apply fireproofing to produce the following finishes:

1. Spray-Textured Finish: Finish left as spray applied with no further treatment.

3.4 FIELD QUALITY CONTROL

A. Special Inspections: Engage a qualified special inspector to perform the following special inspections:

1. Test and inspect as required by the IBC, 1704.10.

B. Perform the tests and inspections of completed Work in successive stages. Do not proceed with application of fireproofing for the next area until test results for previously completed applications of fireproofing show compliance with requirements. Tested values must equal or exceed values as specified and as indicated and required for approved fire-resistance design.

C. Fireproofing will be considered defective if it does not pass tests and inspections.

1. Remove and replace fireproofing that does not pass tests and inspections, and retest.
2. Apply additional fireproofing, per manufacturer's written instructions, where test results indicate insufficient thickness, and retest.

D. Prepare test and inspection reports.

3.5 CLEANING, PROTECTING, AND REPAIRING

A. Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.

B. 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.

C. As installation of other construction proceeds, inspect fireproofing and repair damaged areas and fireproofing removed due to work of other trades.

D. Repair fireproofing damaged by other work before concealing it with other construction.

E. Repair fireproofing by reapplying it using same method as original installation or using manufacturer's recommended trowel-applied product.

END OF SECTION 078100

SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Penetrations in fire-resistance-rated walls.
2. Penetrations in horizontal assemblies.
3. Penetrations in smoke barriers.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Product Schedule: For each penetration firestopping system. Include location and design designation of qualified testing and inspecting agency.

1. Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping condition, submit illustration, with modifications marked, approved by penetration firestopping manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

C. Shop Drawings: For each through-penetration firestop system, show each type of construction condition, relationships to adjoining construction, and type of penetrating item. Include firestop design designation of qualified testing and inspecting agency that evidences compliance with requirements for each condition indicated.

1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system and configuration for construction and penetrating items.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Installer Certificates: From Installer indicating penetration firestopping has been installed in compliance with requirements and manufacturer's written recommendations.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for penetration firestopping.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm experienced in installing penetration firestopping similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its penetration firestopping products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer. Installer qualifications to comply with one of the options listed below:

1. Firm must be approved by FMG according to FMG 4991 “Approval of Firestop Contractors, or
2. A firm that has been qualified under UL’s Qualified Contractor Program, or
3. A firestop specialty contractor qualified under a Firestop manufacturer’s training program.

B. Fire-Test-Response Characteristics: Penetration firestopping shall comply with the following requirements:

1. Penetration firestopping tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.
2. Penetration firestopping is identical to those tested per testing standard referenced in "Penetration Firestopping" Article. Provide rated systems complying with the following requirements:

    a. Penetration firestopping products bear classification marking of qualified testing and inspecting agency.
    b. Classification markings on penetration firestopping correspond to designations listed by the following:
        1) UL in its "Fire Resistance Directory."
        2) Intertek ETL SEMKO in its "Directory of Listed Building Products."
        3) FM Global in its "Building Materials Approval Guide."

C. Preinstallation Conference: Conduct conference at Project site.

D. 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.

E. Installation Responsibility: Assign installation of firestop systems in project to a single, qualified installer.

F. Source limitations: Obtain firestop systems, for each kind of construction indicated, through one source from a single manufacturer.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.

B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.

C. Notify Owner's testing agency at least seven days in advance of penetration firestopping installations; confirm dates and times on day preceding each series of installations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of design product: Subject to compliance with requirements, provide Hilti Construction Chemicals Inc., or comparable product by one of the following:

1. Nelson Firestop Products.
2. 3M Fire Protection Products.

B. All firestopping, for each kind of construction condition indicated, shall be from the same manufacturer.

2.2 PENETRATION FIRESTOPPING

A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.

B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.

1. Fire-resistance-rated walls include fire walls, fire-barrier walls, smoke-barrier walls, and fire partitions.
2. F-Rating: Not less than the fire-resistance rating of constructions penetrated.

C. Penetrations in Horizontal Assemblies: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.

1. Horizontal assemblies include floors, floor/ceiling assemblies, and ceiling membranes of roof/ceiling assemblies.
2. F-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated.
3. T-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.

D. Penetrations in Smoke Barriers: Provide penetration firestopping with ratings determined per UL 1479.

1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at 0.30-inch wg at both ambient and elevated temperatures.

E. W-Rating: Provide penetration firestopping showing no evidence of water leakage when tested according to UL 1479.

F. Mold Resistance: Provide penetration firestopping with mold and mildew resistance rating of 0 as determined by ASTM G21.

G. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

H. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.

1. Permanent forming/damming/backing materials, including the following:
   a. Slag-wool-fiber or rock-wool-fiber insulation.
   b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
   c. Fire-rated form board.
   d. Fillers for sealants.

2. Temporary forming materials.
3. Substrate primers.
4. Collars.
5. Steel sleeves.

2.3 FILL MATERIALS

A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve or plastic sleeve lined with an intumescent strip, an extended rectangular flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket. Cast-in place devices for use with only noncombustible penetrants shall be black in color. Cast-in devices for use with combustible or noncombustible penetrants shall be red in color.

B. Drop-in Firestop Devices: Factory-assembled devices for use with combustible or noncombustible penetrants on cored holes within concrete floors. Device shall consist of galvanized steel sleeve lined with an intumescent strip, an extended rectangular flange attached to one end of the sleeve for fastening to concrete floor and neoprene gasket.

C. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.

D. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

E. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized-steel sheet.

F. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

G. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

H. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.

I. Blocks/Plugs: Intumescent flexible block/plug suitable for reuse in re-penetration of openings. Blocks shall allow up to 12” of unreinforced annular space.

J. Fire-rated Cable Management Devices: Factory-assembled round metallic sleeve device for use with cable penetrations, containing an integrated smoke seal fabric membrane that can be opened and closed for re-penetration.

K. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

L. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
   1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of nonsag grade for both opening conditions.

2.4 MIXING

A. For those products requiring mixing before application, comply with penetration firestopping manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Clean out openings immediately before installing penetration firestopping to comply with manufacturer's written instructions and with the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping.
2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Priming: Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

3.3 INSTALLATION

A. General: Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.

C. Install fill materials for firestopping by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing and inspecting agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

3.5 FIELD QUALITY CONTROL

A. Owner will engage a qualified testing agency to perform tests and inspections.

B. Where deficiencies are found or penetration firestopping is damaged or removed because of testing, repair or replace penetration firestopping to comply with requirements.

C. Proceed with enclosing penetration firestopping with other construction only after inspection reports are issued and installations comply with requirements.

D. Manufacturer’s Field Services: During installation, provide periodic walk-through inspections to ensure proper installation/application. After installation is complete, submit findings in writing documenting the visual walk-through.

3.6 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping is without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping and install new materials to produce systems complying with specified requirements.

END OF SECTION 078413

SECTION 078446 - FIRE-RESISTIVE JOINT SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Joints in or between fire-resistance-rated constructions.
2. Joints in smoke barriers.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Product Schedule: For each fire-resistive joint system. Include location and design designation of qualified testing agency.

1. Where Project conditions require modification to a qualified testing agency's illustration for a particular fire-resistive joint system condition, submit illustration, with modifications marked, approved by fire-resistive joint system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Installer Certificates: From Installer indicating fire-resistive joint systems have been installed in compliance with requirements and manufacturer's written recommendations.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for fire-resistive joint systems.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm experienced in installing fire-resistive joint systems similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its fire-resistive joint system products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

B. Fire-Test-Response Characteristics: Fire-resistive joint systems shall comply with the following requirements:

1. Fire-resistive joint system tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.
2. Fire-resistive joint systems are identical to those tested per testing standard referenced in "Fire-Resistive Joint Systems" Article. Provide rated systems complying with the following requirements:

a. Fire-resistive joint system products bear classification marking of qualified testing agency.
b. Fire-resistive joint systems correspond to those indicated by reference to designations listed by the following:
1) UL in its "Fire Resistance Directory."

C. Preinstallation Conference: Conduct conference at Project site.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install fire-resistive joint systems when ambient or substrate temperatures are outside limits permitted by fire-resistive joint system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Install and cure fire-resistive joint systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

A. Coordinate construction of joints to ensure that fire-resistive joint systems are installed according to specified requirements.

B. Coordinate sizing of joints to accommodate fire-resistive joint systems.

C. Notify Owner's testing agency at least seven days in advance of fire-resistive joint system installations; confirm dates and times on day preceding each series of installations.

PART 2 - PRODUCTS

2.1 FIRE-RESISTIVE JOINT SYSTEMS

A. Where required, provide fire-resistive joint systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which fire-resistive joint systems are installed. Fire-resistive joint systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.

B. Joints in or between Fire-Resistance-Rated Construction: Provide fire-resistive joint systems with ratings determined per ASTM E 1966 or UL 2079:

1. Joints include those installed in or between fire-resistance-rated walls, floor or floor/ceiling assemblies, and roofs or roof/ceiling assemblies.
2. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of construction they will join.
3. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. EMSEAL
    b. Fibrex Insulations, Inc.
    c. Passive Fire Protection Partners.
    d. 3M Fire Protection Products.
    e. Thermafiber Corp.
    f. Roxul Inc.
    g. USG Corporation.

C. Joints in Smoke Barriers: Provide fire-resistive joint systems with ratings determined per UL 2079.

1. L-Rating: Not exceeding 5.0 cfm/ft of joint at 0.30 inch wg at both ambient and elevated temperatures.
2. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. EMSEAL
    b. A/D Fire Protection Systems Inc.
    c. Grace Construction Products.
    d. Hilti, Inc.
    e. Johns Manville.
    f. Nelson Firestop Products.
    g. NUCO Inc.
    h. Passive Fire Protection Partners.
    i. RectorSeal Corporation.
    j. Specified Technologies Inc.

k. 3M Fire Protection Products.
l. Tremco, Inc.; Tremco Fire Protection Systems Group.
m. USG Corporation.

D. Exposed Fire-Resistive Joint Systems: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

E. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install fill materials and to maintain ratings required. Use only components specified by fire-resistive joint system manufacturer and approved by the qualified testing agency for systems indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Clean joints immediately before installing fire-resistive joint systems to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:

1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of fill materials.
2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with fill materials. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Priming: Prime substrates where recommended in writing by fire-resistive joint system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent fill materials of fire-resistive joint system from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing fire-resistive joint system's seal with substrates.

3.3 INSTALLATION

A. General: Install fire-resistive joint systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming materials and other accessories of types required to support fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.

C. Install fill materials for fire-resistive joint systems by proven techniques to produce the following results:

1. Fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
2. Apply fill materials so they contact and adhere to substrates formed by joints.
3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Identify fire-resistive joint systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of joint edge so labels will be visible to anyone seeking to remove or penetrate joint system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words "Warning - Fire-Resistive Joint System - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

3.5 FIELD QUALITY CONTROL

A. Inspecting Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Where deficiencies are found or fire-resistive joint systems are damaged or removed due to testing, repair or replace fire-resistive joint systems so they comply with requirements.

C. Proceed with enclosing fire-resistive joint systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTING

A. Clean off excess fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by fire-resistive joint system manufacturers and that do not damage materials in which joints occur.

B. Provide final protection and maintain conditions during and after installation that ensure fire-resistive joint systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated fire-resistive joint systems immediately and install new materials to produce fire-resistive joint systems complying with specified requirements.

3.7 FIRE-RESISTIVE JOINT SYSTEM SCHEDULE

A. Where UL-classified systems are indicated, they refer to system numbers in UL's "Fire Resistance Directory" under product Category XHBN.

END OF SECTION 078446

SECTION 080671 – DOOR HARDWARE SCHEDULE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section references specification sections relating to commercial door hardware for the following:

1. Swinging doors.

B. Commercial door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Electromechanical and access control door hardware.
3. Electromechanical and access control door hardware power supplies, back-ups and surge protection.

C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. NFPA 105 - Installation of Smoke Door Assemblies.
7. State Building Codes, Local Amendments.

D. Standards: Reference Related Sections for requirements regarding compliance with applicable industry standards.

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."

2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.

3. Content: Include the following information:

   a. Type, style, function, size, label, hand, and finish of each door hardware item.
   b. Manufacturer of each item.
   c. Fastenings and other pertinent information.
   d. Explanation of abbreviations, symbols, and codes contained in schedule.
   e. Mounting locations for door hardware.
   f. Door and frame sizes and materials.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Keying Schedule: Prepared under the supervision of the Owner, separate schedule detailing final keying instructions for locksets and cylinders in writing. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner to approve submitted keying schedule prior to the ordering of permanent cylinders.

D. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals.

F. Warranties and Maintenance: Special warranties and maintenance agreements specified in the Related Sections.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.5 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

1.6 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. Refer to “PART 3 – EXECUTION” for required specification sections.

PART 3 - EXECUTION

3.1 DOOR HARDWARE SETS

A. The door hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.

2. The supplier is responsible for handing and sizing all products.

3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.

B. Manufacturer's Abbreviations:

1. MK - McKinney
2. PE - Pemko
3. SU - Securitron
4. RO - Rockwood
5. SA - SARGENT
6. MC - Medeco
7. HS - HES
8. RF - Rixson
9. OT - Other
10. OM - Omnia Industries Inc

Hardware Sets

Set: 1.0

Doors: 100

2 Continuous Hinge	CFM_SLF-HD1 PT x Length Required		PE	
2 Electric Power Transfer	EL-CEPT	630	SU	⚡
1 Removable Mullion	[12] L980S / L980A (As Required) x Length Required	PC	SA	
1 Rim Exit Device, Storeroom	LD 55 56 64 8804 Less Pull	US32D	SA	⚡
1 Rim Exit Device, Exit Only	LD 55 56 8810 EO	US32D	SA	⚡
2 Core	As Required To Match Facility Standard	US15	SA	
1 Cylinder	64 980C1	US26D	SA	
1 Pull	RM3411-36 Mtg-Type 12XHD	US32-316	RO	
1 Conc Overhead Stop	6-X36	630	RF	
2 Surface Closer	PR7500 / 7500 (As Condition Requires)	689	NO	
1 Threshold	273x224AFGT x Length Required x MSES25SS		PE	
1 Gasketing	Provided By Door/Frame Supplier			
1 Mullion Gasketing	5110BL x Length Required		PE	
2 Sweep	3452CNB x Length Required		PE	
1 Astragal	29324CNB x Door Height		PE	
1 Card Reader	Provided By Security Supplier			

2 ElectroLynx Harness	QC-C**** x Length Required	MK
3 ElectroLynx Harness	QC-C1500P	MK
2 Position Switch	DPS2 - M / W-BK	SU
1 Wiring Diagram	Elevation and Point to Point as Specified	

Notes:
SYSTEM OPERATIONAL NARRATIVE
Doors normally closed and secured.
Presenting valid credential to door face mounted card reader temporarily retracts latches allowing manual entry.
Entry also possible via key override.
Free egress at all times.
Request to exit switches, incorporated in exit device push pads, temporarily shunt the door position switches allowing egress without indicating alarm at monitoring station.
Door position switches monitor the doors open/closed status.
Latches remain projected during power loss. (Fail Secure).

END OF SECTION 080671

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Access doors and frames for walls and ceilings.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, fire ratings, materials, individual components and profiles, and finishes.

B. Shop Drawings:

1. Include plans, elevations, sections, details, and attachments to other work.
2. Detail fabrication and installation of access doors and frames for each type of substrate.

C. Samples: For each door face material, at least 3 by 5 inches in size, in specified finish.

D. Product Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

PART 2 - PRODUCTS

2.1 STEEL MATERIALS

A. Steel Plates, Shapes, and Bars: ASTMA36/A36M.

1. ASTMA123/A123M, for galvanizing steel and iron products.
2. ASTMA153/A153M, for galvanizing steel and iron hardware.

B. Steel Sheet: Uncoated or electrolytic zinc-coated, ASTMA591/A591M with cold-rolled steel sheet substrate complying with ASTMA1008/A1008M, Commercial Steel (CS), exposed.

C. Drywall Beads: Edge trim formed from 0.0299-inch zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum board.

2.2 ACCESS DOORS AND FRAMES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Babcock-Davis.
2. J. L. Industries, Inc.
3. Karp Associates, Inc.
4. Larsen's Manufacturing Company.
5. Milcor Inc.
6. Nystrom, Inc.

B. Flush Access Doors with Exposed Flanges:

1. Assembly Description: Fabricate door to fit flush to frame. Provide manufacturer's standard-width exposed flange, proportional to door size.
2. Locations: Wall and ceiling.
3. Door Size: As indicated.
4. Uncoated Steel Sheet for Door: Nominal 0.060 inch, 16 gage.
   a. Finish: Factory prime.
5. Frame Material: Same material, thickness, and finish as door.
6. Hinges: Manufacturer's standard.
7. Hardware: Lock.

C. Flush Access Doors with Concealed Flanges:

1. Assembly Description: Fabricate door to fit flush to frame. Provide frame with gypsum board beads for concealed flange installation.
2. Locations: Wall and ceiling.
3. Door Size: As indicated.
4. Uncoated Steel Sheet for Door: Nominal 0.060 inch, 16 gage.
   a. Finish: Factory prime.
5. Frame Material: Same material and thickness as door.
6. Hinges: Manufacturer's standard.
7. Hardware: Lock.

D. Hardware:

1. Latch: Cam latch operated by screwdriver.
2. Lock: Cylinder.

   a. Lock Preparation: Prepare door panel to accept cylinder specified in Section087100 "Door Hardware."

E. Hardware: Stainless steel hinges with removable pin, screw driver slot with quarter turn cam lock, except for fire rated access doors.

2.3 MATERIALS

A. Steel Plates, Shapes, and Bars: ASTMA36/A36M.

B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTMA879/A879M, with cold-rolled steel sheet substrate complying with ASTMA1008/A1008M, Commercial Steel (CS), exposed.

C. Frame Anchors: Same type as door face.

D. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTMA153/A153M or ASTMF2329.

2.4 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.

1. For trimless frames with drywall bead, provide edge trim for gypsum board and gypsum base securely attached to perimeter of frames.
2. Provide mounting holes in frames for attachment of units to metal or wood framing.
3. Provide mounting holes in frame for attachment of masonry anchors. Furnish adjustable metal masonry anchors.

D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.

1. For cylinder lock, furnish two keys per lock and key all locks alike.

2.5 ACCESS DOOR SIZE

A. Minimum Size: 24-inch by 32-inch for any items to be accessed requiring shoulders to fit through access door opening.

B. Provide 32-inch by 40-inch doors in 6-inch thick or thicker block or stud walls.

C. Provide 16-inch by 16-inch doors at locations where item to be accessed is entirely accessible and convenient to work on within 8-inches of access door face of wall or ceiling.

D. Where access doors are required to accommodate filters or similar replacement/maintenance equipment, doors shall be of size to pass 1.25 percent of the least equipment dimension.

2.6 FINISHES

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: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Steel and Metallic-Coated-Steel Finishes:

1. Factory Prime: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

B. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.3 ADJUSTING AND CLEANING

A. Adjust doors and hardware after installation for proper operation.

B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 083113

SECTION 084113 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Exterior and interior storefront framing.
2. Storefront framing for punched openings.
3. Exterior and interior manual-swing entrance doors and door-frame units.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For aluminum-framed storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.

1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
2. Include full-size isometric details of each vertical-to-horizontal intersection of aluminum-framed entrances and storefronts, showing the following:

a. Joinery, including concealed welds.
b. Anchorage.
c. Expansion provisions.
d. Glazing.
e. Flashing and drainage.

3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
4. Show connection details of sun control shades and entrance framing.

C. Samples: For each type of exposed finish required, in manufacturer's standard sizes.

D. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch 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.

E. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

F. Delegated-Design Submittal: For aluminum-framed storefronts indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Energy Performance Certificates: For aluminum-framed storefronts, accessories, and components, from manufacturer.

1. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed storefront.

C. Product Test Reports: For aluminum-framed entrances and storefronts, for tests performed by manufacturer and witnessed by a qualified testing agency.

D. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.

C. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

D. Accessible Entrances: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including, but not limited to, excessive deflection.
b. Noise or vibration caused by thermal movements.
c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
d. Failure of operating components.

2. Warranty Period: Five years from date of Substantial Completion.

B. Finish Warranty: Include coverage for aluminum finishes degradation.

1. Clear Anodized Finish: Provide a five year manufacturer’s warranty.

C. Glass Warranty: As specified in Section 088000.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer registered in the state where the project is located, as defined in Section 014000 "Quality Requirements," to design aluminum-framed entrances and storefronts.

B. General Performance: Aluminum-framed systems shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction:

1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
2. Failure also includes the following:
    a. Thermal stresses transferring to building structure.
    b. Glass breakage.
    c. Noise or vibration created by wind and thermal and structural movements.
    d. Loosening or weakening of fasteners, attachments, and other components.
    e. Failure of operating units.

C. Structural Loads:

1. Wind Loads: As indicated on Drawings
2. Seismic Loads: As indicated on Drawings.

D. Deflection of Framing Members: At design wind pressure, as follows:

1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch, whichever is smaller.
    a. Operable Units: Provide a minimum 1/16-inch clearance between framing members and operable units.

E. Structural-Test Performance: Provide aluminum-framed systems tested according to ASTM E 330 as follows:

1. When tested at positive and negative wind-load design pressures, systems do not evidence deflection exceeding specified limits.
2. When tested at 150 percent of positive and negative wind-load design pressures, systems, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.

3. Test Durations: As required by design wind velocity, but not fewer than 10 seconds.Air Infiltration: Test according to ASTM E 283 for infiltration as follows:
4. Fixed Framing and Glass Area:
   a. Maximum air leakage of 0.06 cfm/sq. ft. at a static-air-pressure differential of 6.24 lbf/sq. ft.

G. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:

1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 10 lbf/sq. ft.

H. Energy Performance: Certify and label energy performance according to NFRC as follows:

1. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than 0.40 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
2. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified condensation resistance rating of no less than 68 as determined according to NFRC 500.

I. Noise Reduction: Test according to ASTM E 90, with ratings determined by ASTM E 1332, as follows.

1. Outdoor-Indoor Transmission Class: Minimum 27.

J. Thermal Movements: Provide aluminum-framed systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
2. Test Performance: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.
   a. High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of 180 deg F.
   b. Low Exterior Ambient-Air Temperature: 0 deg F.
3. Interior Ambient-Air Temperature: 75 deg F

2.2 MANUFACTURERS

A. Basis-of-Design Products: Subject to compliance with requirements, provide YKK YES 45 TU series storefront framing system, or comparable product by one of the following:

1. Oldcastle Building Envelope.
2. Kawneer North America.

B. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing and accessories, from single manufacturer.

2.3 EXTERIOR FRAMING SYSTEM

A. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Construction: Thermally broken.
2. Glazing System: Retained mechanically with gaskets on four sides.
3. Glazing Plane: As indicated.

B. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.

C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

1. Reinforce aluminum framing, internally, as required to support sun control shades.

D. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts, complying with ASTM A 123/A 123M or ASTM A 153/A 153M.

E. Framing System Gaskets and Sealants: Manufacturer's standard, recommended by manufacturer for joint type.

F. Storefront Framing System:

1. Description: Center set, flush glazed; head and sill members continuous; jambs and vertical mullions attached by screw spline joinery.
2. Components: Manufacturer’s standard extruded aluminum mullions, hinged mullions, 90 degree corner posts, and indicated shapes.
3. Thermal Barrier: Manufacturer’s standard.
4. Finish: High-performance organic finish. (Coordinate with Curtain Wall System)

2.4 INTERIOR FRAMING SYSTEM

A. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Construction: Non-Thermal.
2. Glazing System: Retained mechanically with gaskets.
3. Glazing Plane: Center rabbet, exterior flush glazed.

B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

C. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts, complying with ASTM A 123/A 123M or ASTM A 153/A 153M.

D. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

E. Framing System Gaskets and Sealants: Manufacturer's standard, recommended by manufacturer for joint type.

2.5 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

1. Sheet and Plate: ASTM B 209.
2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
3. Extruded Structural Pipe and Tubes: ASTM B 429.
4. Structural Profiles: ASTM B 308/B 308M.
5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.

B. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer, complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.6 VENTING WINDOWS

A. Aluminum Windows: Manufacturer's standard units, complying with AAMA/WDMA/CSA 101/I.S.2/A440, with self-flashing mounting fins, and as follows:

1. Window Type: Casement.
2. Minimum Performance Class: AW.
3. Minimum Performance Grade: As indicated on Drawings.
4. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by manufacturer for strength, corrosion resistance, and application of required finish, but not less than 0.064-inch thickness at any location for main frame and sash members.
    a. Thermally Improved Construction: Fabricate window units with an integral, concealed, low-conductance thermal barrier; located between exterior materials and window members exposed on interior side; in a manner that eliminates direct metal-to-metal contact.

5. Mullions: Between adjacent windows, fabricated of extruded aluminum matching finish of window units.
6. Fasteners, Anchors, and Clips: Nonmagnetic stainless steel, aluminum, or other noncorrosive material, compatible with aluminum window members, trim, hardware, anchors, and other components of window units. Fasteners shall not be exposed, except for attaching hardware.
   a. Reinforcement: Where fasteners screw-anchor into aluminum less than 0.128 inch thick, reinforce interior with aluminum or nonmagnetic stainless steel to receive screw threads, or provide standard, noncorrosive, pressed-in, spline grommet nuts.

7. Hardware: Manufacturer's standard; of aluminum, stainless steel, die-cast steel, malleable iron, or bronze; including the following:
   a. Cam-action sweep sash lock and keeper at meeting rails.

8. Limit Stops: Provide limit stops at all window openings. Manufacturer’s standard opening height.

9. Insect Screens: Provide removable insect screen on each operable exterior sash, with screen frame finished to match window unit, complying with SMA 1004 or SMA 1201, and as follows:
   a. Fabric: Manufacturer's standard aluminum wire fabric or glass-fiber mesh fabric.
   b. Coordinate operation of insect screen at operable window with roller shade prior to fabrication.

B. Glazing: Same as adjacent aluminum-framed entrances and storefront glazing.

C. Finish: Match adjacent aluminum-framed entrances and storefront finish.

2.7 ENTRANCE DOOR SYSTEMS

A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.

1. Door Construction: minimum 0.125-inch- thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
   a. Exterior doors: 2-inch overall thickness.
   b. Interior doors: 1 3/4-inch overall thickness.

2. Door Design: Wide stile; 5-inch nominal width door stiles with 10 inch bottom rail.
   a. Accessible Doors: Smooth surfaced for width of door in area within 10 inches above floor or ground plane.

3. Glazing Stops and Gaskets: Snap-on, extruded-aluminum stops and preformed gaskets to match adjacent storefront construction.
   a. Provide nonremovable glazing stops on outside of door.

2.8 ENTRANCE DOOR HARDWARE

A. Entrance Door Hardware: As specified in Division 08 Section "Door Hardware."

2.9 GLAZING

A. Glazing: As specified in Division 08 Section "Glazing."

B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, molded or extruded, of profile and hardness required to maintain watertight seal.

C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.

D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.

2.10 INSULATION

A. Basis-of-Design Product: Subject to compliance with requirements, provide Thermax White Finish Insulation, or comparable product by one of the following:

1. Rmax, Inc.
2. Dow Chemical Co.
3. Hunter Panels.

B. Aluminum-Faced, Polyisocyanurate Board Insulation: ASTM C 1289, Type I, Class 2, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.

1. Thickness: Two inches.

2.11 ACCESSORIES

A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
2. Reinforce members as required to receive fastener threads.
3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.

B. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 07 Section "Joint Sealants."

C. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30-mil thickness per coat.

2.12 FABRICATION

A. Form or extruded aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
4. Physical and thermal isolation of glazing from framing members.
5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
6. Provisions for field replacement of glazing from exterior.
7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

E. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

1. At exterior doors, provide compression weather stripping at fixed stops.
2. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.

F. Entrance Doors: Reinforce doors as required for installing entrance door hardware.

G. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

H. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.13 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
6. Seal joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or applying sealant or tape, or by installing nonconductive spacers as recommended by manufacturer for this purpose.
2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Set continuous sill members and flashing in full sealant bed as specified in Division 07 Section "Joint Sealants" to produce weathertight installation.

D. Install components plumb and true in alignment with established lines and grades, and without warp or rack.

E. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.

F. Install glazing as specified in Division 08 Section "Glazing."

G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

H. Install weatherseal sealant as specified in Division 07 Section "Joint Sealants" to produce weathertight installation.

I. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.

3.3 ERECTION TOLERANCES

A. Erection Tolerances: Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:

1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
3. Alignment:
   a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
   b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
   c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.
4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

3.4 ADJUSTING

A. Adjust operating entrance door hardware to function smoothly as recommended by manufacturer.

1. For entrance doors accessible to people with disabilities, adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3 inches from the latch, measured to the leading door edge.

END OF SECTION 084113

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Doors.
2. Storefront framing.
3. Glazed entrances.

1.3 DEFINITIONS

A. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

B. Interspace: Space between lites of an insulating-glass unit.

1.4 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

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. Review temporary protection requirements for glazing during and after installation.

1.6 ACTION SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Glazing Accessory Samples: For gaskets, sealants, and colored spacers, in 12-inch lengths. Fire rated sealants.

C. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

D. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installers and manufacturers of insulating-glass units.

B. Product Certificates: For glass and glazing products, from manufacturer.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for insulating glass and glazing sealants.

1. For glazing sealants, including fire rated glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.

D. Preconstruction adhesion and compatibility test report.

E. Warranties: Special warranties specified in this Section.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.

B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

E. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating-glass manufacturer's written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.10 FIELD CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or below 40 deg F.

1.11 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

1. Warranty Period: 10 years from date of Substantial Completion.

B. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Substantial Completion.

C. Manufacturer's Special Warranty on Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to

manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1. Warranty Period: 10 years from date of Substantial Completion

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Products: Subject to compliance with requirements, provide Guardian Industries glazing units, or comparable product by one of the following companies that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications:

1. Glass Enterprises, Inc.
2. Viracon.
3. Vitro (formerly PPG Industries).

B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.

1. Obtain tinted glass from single source from single manufacturer.
2. Obtain reflective-coated glass from single source from single manufacturer.

C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

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 the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Delegated Design: Design glass, including comprehensive engineering analysis according to ASTM E 1300 by a qualified professional engineer, using the following design criteria:

1. Design Wind Pressures: As indicated on Drawings.
   a. Wind Design Data: As indicated on Drawings.

2. Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical, design glass to resist design wind pressure based on glass type factors for short-duration load.

3. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

D. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

E. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

1. For monolithic-glass lites, properties are based on units with lites of thickness indicated.
2. For laminated-glass lites, properties are based on products of construction indicated.
3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).
5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC

D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.

1. Minimum Glass Thickness for Exterior Lites: Not less than 6.0 mm.

E. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.

2.4 GLASS PRODUCTS

A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.

B. Heat-Treated Float Glass: ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.

1. For uncoated glass, comply with requirements for Condition A.
2. For coated vision glass, comply with requirements for Condition C (other uncoated glass).

C. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated

D. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

1. Construction: Laminate glass with polyvinyl butyral interlayer unless fire-protection or fire-resistance rating is based on another product.
2. Interlayer Thickness: Provide thickness as needed to comply with requirements.
3. Interlayer Color: Clear unless otherwise indicated

2.5 INSULATING-GLASS UNITS

A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190, and complying with other requirements specified.

1. Sealing System: Dual seal, with manufacturer’s standard primary and secondary.

2. Spacer Specifications: Manufacturer's standard spacer material and construction.

B. Glass: Comply with applicable requirements in "Glass Products" Article as indicated by designations in "Insulating-Glass Types" Article.

2.6 GLAZING SEALANTS

A. General:

1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Dow Corning Corporation; 790.
b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
c. May National Associates, Inc.; Bondaflex Sil 290.
d. Pecora Corporation; 890.
e. Sika Corporation, Construction Products Division; SikaSil-C990.
f. Tremco Incorporated; Spectrem 1.

2.7 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

2.8 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.9 GLAZING GASKETS

A. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned EPDM, silicone, or thermoplastic polyolefin rubber gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.

1. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.

2.10 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches as follows:

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to

maintain required face clearances and to comply with system performance requirements.

2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

J. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

K. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

L. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until just before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 CLEANING AND PROTECTION

A. Immediately after installation remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass

manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.8 MONOLITHIC-GLASS TYPES - SCHEDULE

A. Clear fully tempered float glass.

1. Thickness: 1/4 inch.
2. Provide safety glazing labeling.

B. Laminated Glass:

1. Thickness: Minimum 1 inch.

3.9 INSULATING-GLASS TYPES - SCHEDULE

A. Glass Type 1: Guardian Industries SN 68:

1. Overall Unit Thickness: 1 1/16 inch.
2. Thickness of Each Glass Lite: 1/4 inch.
3. Outdoor Lite: Guardian SunGuard, SuperNeutral 68 on Clear.
4. Interspace Content: 3/8 inch air space.
5. Indoor Lite: 7/16 inch Clear Heat Strengthened Laminated glass.
    a. Outer Ply: 3/16” Clear Heat Strengthened
    b. Interlayer: .060 PVB
    c. Inner Ply: 3/16” Clear Heat Strengthened
6. Winter Nighttime U-Factor: 0.29 percent maximum.
7. Summer Daytime U-Factor: 0.28 maximum.
8. Visible Light Transmittance: 68 percent minimum.
9. Solar Heat Gain Coefficient: 0.38 maximum.

END OF SECTION 088000

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior gypsum board assemblies.
2. Suspension systems for interior gypsum ceilings, soffits, and grid systems.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: Submit evaluation reports certified under an independent third party inspection program administered by an agency accredited by IAS to ICC-ES AC98, IAS Accreditation Criteria for Inspection Agencies.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 FRAMING SYSTEMS

A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.

1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
2. Protective Coating: Comply with ASTM C 645; ASTM A 653/A 653M G40 (Z120), Coating with equivalent corrosion resistance of ASTM A 653/A 653M, G40 (Z120) or DiamondPlus® coating; roll-formed from steel meeting mechanical and chemical requirements of ASTM A 1003 with a zinc-based coating. Galvannealed products are not acceptable.

B. Studs and Runners: ASTM C 645. Use either steel studs and runners or equivalent gauge steel studs and runners.

1. Steel Studs and Runners:

a. Minimum Base-Metal Thickness: Per UL Design Standards, or indicated on Drawings.
b. Depth: As indicated on Drawings.

2. Equivalent Gauge Steel Studs and Runners:

a. Minimum Base-Metal Thickness: Per UL Design Standards, or indicated on Drawings.
b. Depth: As indicated on Drawings.
c. Product: ClarkDietrich ProSTUD or equivalent.

C. Slip-Type Head Joints: Where indicated, provide one of the following:

1. Single Long-Leg Runner System: ASTM C 645 top runner with 2-inch- deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.
2. Double-Runner System: ASTM C 645 top runners, inside runner with 2-inch-deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
3. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) ClarkDietrich Building Systems; BlazeFrame or MaxTrak Slotted Deflection Track.
2) MBA Building Supplies; FlatSteel Deflection Track or Slotted Deflecto Track.
3) Steel Network Inc. (The); VertiClip SLD or VertiTrack VTD Series.

4) Telling Industries; Vertical Slip Track or Vertical Slip Track II.

D. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. ClarkDietrich Building Systems; BlazeFrame or MaxTrak.
b. Fire Trak Corp.; Fire Trak System.
c. Metal-Lite, Inc.; The System.

E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.

1. Minimum Base-Metal Thickness: Per UL Design Standards, or indicated on Drawings.

F. Cold-Rolled Channel Bridging: Steel, 0.053-inch minimum base-metal thickness, with minimum 1/2-inch- wide flanges.

1. Depth: As indicated on Drawings.
2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch- thick, galvanized steel.

G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

1. Minimum Base-Metal Thickness: Per UL Design Standards, or indicated on Drawings.
2. Depth: As indicated on Drawings.

H. Resilient Furring Channels: 1/2-inch- deep, steel sheet members designed to reduce sound transmission.

1. Configuration: Asymmetrical or hat shaped.

2. Product: Subject to compliance with requirements, provide ClarkDietrich Building Systems; RC Deluxe (RCSD) Resilient Channel or equivalent.

I. Cold-Rolled Furring Channels: 0.053-inch base-steel thickness, with minimum 1/2-inch- wide flanges.

1. Depth: As indicated on Drawings.
2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum base-steel thickness of 0.0296 inch.
3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch- diameter wire.

J. Z-Shaped Furring: nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 3/4 inch, minimum base-metal thickness of 0.018 inch, and depth required to fit insulation thickness indicated.

K. Headers and Jambs: Manufacturer's proprietary shape used to form header beams and jambs, columns or posts, of web depths indicated, unpunched, with stiffened flanges and as follows:

1. Product: Subject to compliance with requirements, provide ClarkDietrich Building Systems; Heavy Duty Studs – HDS and Header Bracket - HDSC, or a comparable product.
2. Minimum Base-Steel Thickness: As indicated on Drawings.

2.3 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch- diameter wire.

B. Hanger Attachments to Concrete:

1. Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E 488 by an independent testing agency.

a. Type: Cast-in-place anchor, designed for attachment to concrete forms Postinstalled, chemical anchor, or Postinstalled, expansion anchor.

2. Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by an independent testing agency.

C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.

D. Flat Hangers: Steel sheet, in size indicated on Drawings.

E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.053 inch and minimum 1/2-inch- wide flanges.

1. Depth: As indicated on Drawings.

F. Furring Channels (Furring Members):

1. Cold-Rolled Channels: 0.053-inch base-steel thickness, with minimum 1/2-inch-wide flanges, 3/4 inch deep.
2. Steel Studs and Runners: ASTM C 645.

a. Minimum Base-Metal Thickness: Per UL Design Standards, or indicated on Drawings.
b. Depth: As indicated on Drawings.

3. Equivalent Gauge Steel Studs and Runners: ASTM C 645.

a. Minimum Base-Metal Thickness: Per UL Design Standards, or indicated on Drawings.
b. Depth: As indicated on Drawings.

4. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.

a. Minimum Base-Metal Thickness: Per UL Design Standards, or indicated on Drawings.

5. Resilient Furring Channels: 1/2-inch- deep members designed to reduce sound transmission.

a. Configuration: Asymmetrical or hat shaped.

G. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Armstrong World Industries, Inc.; Drywall Grid Systems.
b. Chicago Metallic Corporation; Drywall Grid System.
c. USG Corporation; Drywall Suspension System.

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.

1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Isolation Strip at Exterior Walls: Provide one of the following:

1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.
2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

C. Drywall accessories or noise control components:

1. Manufacturer: Mullion Mate extruded aluminum partition closure shall be manufactured by Gordon Interior Specialties Division, Gordon Inc., or equivalent approved by the Architect.
2. System: Mullion Mate extruded aluminum partition closures are pre-assembled and spring loaded to provide a tight fit for vertical junctures of partitions and window walls. Mullion Mate is finished to match mullions in a spray applied water-borne cross-linked baked acrylic finish or Acrylic-Polyester hybrid powder coat paint finish or custom paints or anodized finish. They are sound tested to a 38 STC rating with optional acoustical batts for sound attenuation.
3. Materials: Aluminum extrusions: 6063-T5 temper, tensile strength 31 KSI (ASTM B 221, ASTM B 221M).
4. Include acoustic batts for sound attenuation.
5. Accessories: Mullion Mate end caps to match size of Mullion Mate.
6. General: Provide metals free from surface blemishes where exposed to view in finished unit. Surfaces that exhibit pitting, seam marks, roller marks, stains, and discolorations, or other imperfections on finished units are not acceptable. All metal shall be of the highest-grade commercial type.
7. Finishes: All material shall be factory anodized in color as approved by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

B. Coordination with Sprayed Fire-Resistive Materials:

1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.
2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce

thickness of fire-resistive materials below that required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754.

1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Install bracing at terminations in assemblies.

D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

    a. Install two studs at each jamb unless otherwise indicated.
    b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
    c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

    a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
6. Curved Partitions:

    a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
    b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches o.c.

E. Direct Furring:

1. Screw to wood framing.
2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.

F. Z-Furring Members:

1. Erect insulation, specified in Section 072100 "Thermal Insulation," vertically and hold in place with Z-furring members spaced 24 inches o.c.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.

G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.5 INSTALLING SUSPENSION SYSTEMS

A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.

    a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.

    a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.

3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
5. Do not attach hangers to steel roof deck.
6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
8. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.

F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

G. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 092216

THIS PAGE LEFT INTENTIONALLY BLANK

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Interior gypsum board.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For the following products:

1. Trim Accessories: 12-inch long samples of each trim accessory indicated.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack panels flat to prevent sagging.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

B. Do not install interior products until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

A. Basis of Design Product: Subject to compliance with requirements, provide products as manufactured by USG Corporation, or comparable product by one of the following:

1. CertainTeed Corp.
2. Georgia-Pacific Gypsum LLC.
3. Lafarge/Continental Building products.
4. National Gypsum Company.
5. PABCO Gypsum.

B. Gypsum Wallboard: ASTM C 1396/C 1396M.

1. Thickness: As indicated
2. Long Edges: Tapered.

2.4 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc.
2. Shapes:

    a. Cornerbead.

2.5 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Wallboard: Paper.
2. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.

   a. Use setting-type compound for installing paper-faced metal trim accessories.

3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.

2.6 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

1. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Isolation Strip at Exterior Walls: Provide one of the following:

1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.
2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames and framing, for compliance with requirements and other conditions affecting performance.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

    a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
    b. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.

3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

B. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

3.4 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:
    1. Cornerbead: Use at outside corners, unless otherwise indicated.

D. Aluminum Trim: Install in locations indicated on Drawings.

3.5 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2&3: Not Used.
3. Level 4: Typical at panel surfaces that will be exposed to view, unless otherwise indicated.
4. Level 5: Where indicated on Drawings.
    a. Primer and its application to surfaces are specified in other Division 09 Painting Sections.

E. Maximum variation of finished gypsum board surface from true flatness: 1/8 inch in 10 feet in any direction.

3.6 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 092940 - GYPSUM TRIM AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section, as do the following:

1. Section 061053 – Miscellaneous Rough Carpentry

1.2 SUMMARY

A. Section Includes:

1. Vinyl trims for gypsum board, including accessories and joint treatment.

1.3 REFERENCES

A. ASTM International (ASTM):

1. ASTM C 754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products
2. ASTM C 840 - Standard Specification for Application and Finishing of Gypsum Board
3. ASTM C 1002 - Standard Specification for Steel Self Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
4. ASTM C 1047 - Standard Specification for Accessories for Gypsum Wallboard
5. ASTM C 1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing
6. ASTM D 1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPCV) Compounds
7. ASTM D 3678 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Interior-Profile Extrusions

1.4 SUBMITTALS

A. Submit under provisions of Division 01 - Administrative Requirements.

B. Product Data: Submit data on vinyl trim and accessories.

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Cleaning methods.

C. Selection Samples: Two sets of full size samples, 9 inches in length, representing manufacturer's full range of available trim products and accessories.

D. Verification Samples: For each product and accessory specified, two samples, 9 inches in length, representing actual trim products and accessories specified.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle materials and products in strict compliance with manufacturer's instructions and recommendations and industry standards.

1. Store in covered area away from direct sunlight.
2. Stack boxes containing trim members flat to prevent sagging.

B. Store materials in manufacturer's original sealed, labeled packaging until ready for installation and in accordance with manufacturer's instructions. Protect from damage.

1.6 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design Manufacturer for vinyl trim: Trim-Tex Inc, or equal products provided by one of the following manufacturers:

1. Clark Deitrich
2. Phillips

2.2 TRIM MEMBERS

A. Basis of Design: Vinyl trim for gypsum board as manufactured by Trim-Tex Inc.; including accessories, joint treatment for trim.

B. Performance Requirements:

1. Self-Extinguishing: Shall not continue to support combustion once flame source is removed.
2. Meet or exceed following ASTM Standards:
   a. ASTM E84-10 – Achieve Class A rating for Smoke and Flame Spread
   b. ASTM C 1047 - Standard Specification for Accessories for Gypsum Wallboard

c. ASTM D 1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPCV) Compounds
d. ASTM D 3678 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Interior-Profile Extrusions
e. GA-216-10 – Gypsum Association
f. Impervious to rust, galvanic corrosion, electrolysis and resistant to most chemicals

2.3 COMMERCIAL BEADS

A. Tear Away Beads

1. Tear Away L Bead. Available in Flat, Extra Tall Masking, and Arch.
2. Tear Away Expansion Joint; 'V' Shape

2.4 ACCESSORIES

A. 847 Spray Adhesive or manufacturer's equivalent.

B. ½" Divergent Staples or manufacturer's equivalent.

C. Mud Max. Drywall compound adhesion additive or manufacturer's equivalent.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Prepare substrates using the methods recommended by the manufacturer for achieving best result for the substrates under project conditions. Verify site conditions are ready to receive work.

B. Do not proceed with installation until substrates have been prepared using the methods recommended by the manufacturer and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.

C. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.

3.2 INSTALLATION

A. Install vinyl trim members in accordance with manufacturer's written installation instructions.

1. Compliance: Perform Work in accordance with ASTM C 754.

2. Compliance: Perform Work in accordance with ASTM C 840.
3. Compliance: Perform Work in accordance with GA-214.
4. Compliance: Perform Work in accordance with GA-216.
5. Compliance: Perform Work in accordance with GA-600.
6. Compliance: As scheduled and indicated on drawings.
7. When manufacturer's installation instructions do not specifically cover applicable installation; comply with ASTM C 754, GA-216 and GA-600.

B. Secure trim members to substrate with staples and spray adhesive in accordance with trim manufacturer's written instructions.

1. Install factory fabricated accessories at joints in trim members with durable:

a. Straight edges.
b. Straight corners.

2. Apply specified mud to flanges of trim members.

C. Control Joints: Place control joints consistent with lines of building spaces as indicated on Drawings.

D. Interior Trim: Install in the following locations:

1. Corner Bead: Use at outside corners; type as indicated on drawings.
2. Deflection Bead: Use at head of wall or as indicated on drawings.
3. L Bead. Use at exposed panel edges, where gypsum abuts different finish material or as indicated on drawings.
4. Other trims. Use as indicated on drawings.

3.3 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 092940

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes acoustical panels and exposed suspension systems for ceilings.

B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified, 6 inches in size.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Suspended ceiling components.
2. Structural members to which suspension systems will be attached.
3. Size and location of initial access modules for acoustical panels.
4. Items penetrating finished ceiling including the following:

    a. Lighting fixtures.
    b. Air outlets and inlets.
    c. Speakers.
    d. Sprinklers.
    e. Access panels.

5. Perimeter moldings.

B. Qualification Data: For testing agency.

C. Product Test Reports: For each acoustical panel ceiling, for tests performed by a qualified testing agency.

D. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.

E. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Panels: Full-size panels equal to 2 percent of quantity installed.
2. Acoustical Baffles: Full-size panels equal to 2 percent of quantity of each installed color.
3. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.
4. Hold-Down Clips: Equal to 2 percent of quantity installed.
5. Impact Clips: Equal to 2 percent of quantity installed.

1.8 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to NVLAP for testing indicated.

B. 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 mockup of typical ceiling area as shown on Drawings.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension-system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.10 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials.

C. 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.

2.2 ACOUSTICAL PANELS, GENERAL

A. Source Limitations: Obtain each type of acoustical ceiling panel and supporting suspension system from single source from single manufacturer.

B. Glass-Fiber-Based Panels: Made with binder containing no urea formaldehyde.

C. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances unless otherwise indicated.

1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches away from test surface according to ASTM E 795.

D. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.

1. Where appearance characteristics of acoustical panels are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

2.3 ACOUSTICAL PANELS

A. Refer to Finish Schedule on Drawings for manufacturers and products.

B. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

2.4 METAL SUSPENSION SYSTEMS, GENERAL

A. Metal Suspension-System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635/C 635M.

B. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.

2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190, conducted by a qualified testing and inspecting agency.

C. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.

2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch- diameter wire.

D. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch-thick, galvanized-steel sheet complying with ASTM A 653/A 653M, G90 coating designation; with bolted connections and 5/16-inch- diameter bolts.

E. Stabilizer Bars: Manufacturer's standard perimeter stabilizers.

2.5 METAL SUSPENSION SYSTEM

A. Refer to Finish Schedule on Drawings for manufacturers and products:

2.6 METAL EDGE MOLDINGS AND TRIM

1. Manufacturers: Provide moldings and trim by manufacturers indicated as Basis of Design in this specification.

A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners unless otherwise indicated.
2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.

B. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements and the following:

1. Baked-Enamel or Powder-Coat Finish: Minimum dry film thickness of 1.5 mils. Comply with ASTM C 635/C 635M and coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with

requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

A. General: Install acoustical panel ceilings to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

1. Fire-Rated Assembly: Install fire-rated ceiling systems according to tested fire-rated design.

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or

adhesive anchors, or power-actuated fasteners that extend through forms into concrete.

7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
8. Do not attach hangers to steel deck tabs.
9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

1. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
2. Do not use exposed fasteners, including pop rivets, on moldings and trim unless approved by Architect.

D. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

E. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

1. Arrange directionally patterned acoustical panels as follows:

    a. As indicated on reflected ceiling plans.

2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
3. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
4. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
5. Install hold-down or impact clips in areas indicated, in areas required by authorities having jurisdiction, and for fire-resistance ratings; space as recommended by panel manufacturer's written instructions unless otherwise indicated.
6. Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance-rated assembly.

3.4 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Resilient base.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 12 inches long.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.5 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Coordinate mockups in this Section with mockups specified in other Sections.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.7 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 RESILIENT BASE

A. Refer to Finish Schedule on Drawings for manufacturers, products, colors, and finishes.

B. Lengths: Coils in manufacturer's standard length.

C. Corners: Job formed.

2.2 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

C. Stair-Tread Nose Filler: Two-part epoxy compound recommended by resilient stair-tread manufacturer to fill nosing substrates that do not conform to tread contours.

EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates for Resilient Stair Accessories: Prepare horizontal surfaces according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
4. Moisture Testing: Proceed with installation only after substrates pass testing according to manufacturer's written recommendations, but not less stringent than the following:

    a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
    b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have maximum 75 percent relative humidity level.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install resilient products until they are the same temperature as the space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Job-Formed Corners:

1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
   a. Form without producing discoloration (whitening) at bends.

2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
   a. Cope corners to minimize open joints.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.

B. Perform the following operations immediately after completing resilient-product installation:

1. Remove adhesive and other blemishes from exposed surfaces.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513

SECTION 096813 - TILE CARPETING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes modular carpet tile.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to carpet tile installation including, but not limited to, the following:

    a. Review delivery, storage, and handling procedures.
    b. Review ambient conditions and ventilation procedures.
    c. Review subfloor preparation procedures.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
2. Include installation recommendations for each type of substrate.

B. Shop Drawings: Show the following:

1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
2. Carpet tile type, color, and dye lot.
3. Type of subfloor.
4. Type of installation.
5. Pattern of installation.
6. Pattern type, location, and direction.
7. Pile direction.
8. Type, color, and location of insets and borders.
9. Type, color, and location of edge, transition, and other accessory strips.

10. Transition details to other flooring materials.

C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet Tile: Full-size Sample.
2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch-long Samples.

D. Product Schedule: For carpet tile. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.

C. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:

1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.

B. Fire-Test-Response Ratings: Where indicated, provide carpet tile identical to those of assemblies tested for fire response according to NFPA 253 by a qualified testing agency.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI 104.

1.10 FIELD CONDITIONS

A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.

B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at occupancy levels during the remainder of the construction period.

C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.11 WARRANTY

A. Special Warranty for Carpet Tiles: 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. Failures include, but are not limited to, more than 10 percent edge raveling, snags, runs, dimensional stability, excess static discharge, loss of tuft bind strength, loss of face fiber, and delamination.
3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE

A. Refer to Finish Schedule on Drawings for manufacturers, products, styles and colors.

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.

B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:

1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet tile manufacturer.
2. Subfloor finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" for slabs receiving carpet tile.
3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.

C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet tile manufacturer.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

A. General: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.

B. Installation Method: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive.

C. Maintain dye lot integrity. Do not mix dye lots in same area.

D. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.

E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.

G. Install pattern parallel to walls and borders.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet tile:

1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
2. Remove yarns that protrude from carpet tile surface.
3. Vacuum carpet tile using commercial machine with face-beater element.

B. Protect installed carpet tile to comply with CRI 104, Section 16, and “Protecting Indoor Installations."

C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 099113 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on exterior substrates.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Samples for Initial Selection: For each type of topcoat product.

C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

D. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. VOC content.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.
2. Coating Maintenance Manual: Upon conclusion of the project, the Contractor or paint manufacturer/supplier shall furnish a coating maintenance manual, such as Sherwin-Williams “Custodian Project Color and Product Information” report or

equal. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.5 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.

a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.
b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on mockups.

a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance of requirements, products by Sherwin-Williams Company (The) are the basis of design and set the standard of quality required. Other acceptable manufacturers, include but are not limited to:

1. Benjamin Moore
2. The Pittsburgh Paints Company

2.2 PAINT, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

B. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.

C. Total VOC content will not be increased by tints and colorants required.

D. Colors: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Masonry (Clay and CMU): 12 percent.
3. Wood: 15 percent.
4. Gypsum Board: 12 percent.

C. Exterior Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers. Provide ASTM D3359 Cross Cut Adhesion Test at (1) location where existing paint is to receive new paint.

E. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

B. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

C. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

D. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.

E. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer.

F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

H. Aluminum Substrates: Remove loose surface oxidation.

I. Wood Substrates:

1. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

J. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions.

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed to view:

a. Equipment, including panelboards.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.
f. Plastic conduit.
g. Tanks that do not have factory-applied final finishes.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 SCHEDULE - EXTERIOR SURFACES – LATEX

A. Total VOC content will not be increased by tints and colorants required.

B. Shop Primed Ferrous Metal: Semi-Gloss Acrylic Enamel:

1. Sherwin-Williams:

a. Primer: Pro Industrial Pro-Cryl Universal Primer.
b. Finish coats: Two coats Pro Industrial DTM Acrylic semi-gloss, B66 series.

2. PPG Paints:

a. Primer: Pitt Tech Plus Waterborne Acrylic Primer/Finish 4020PF
b. Finish Coats: Two coats Pitt Tech Plus Waterborne Acrylic, Semi-Gloss 4216HP

C. Ferrous Metal: Semi-Gloss Acrylic Enamel:

1. Sherwin-Williams:

a. Primer: Pro Industrial Pro-Cryl Universal Primer.

b. Finish: Two coats Pro Industrial DTM Acrylic semi-gloss, B66 series.

2. PPG Paints:

a. Primer: Pitt Tech Plus Waterborne Acrylic Primer/Finish 4020PF
b. Finish Coats: Two coats Pitt Tech Plus Waterborne Acrylic, Semi-Gloss 4216HP

D. Galvanized Metals: Semi-gloss Acrylic Enamel: Pretreat as required by manufacturer.

1. Sherwin-Williams:

a. Primer: Pro Industrial Pro-Cryl Universal Primer.
b. Finish: Two coats Pro Industrial DTM Acrylic semi-gloss, B66 series.

2. PPG Paints:

a. Primer: Pitt Tech Plus Waterborne Acrylic Primer/Finish 4020PF
b. Finish Coats: Two coats Pitt Tech Plus Waterborne Acrylic, Semi-Gloss 4216HP

E. Concrete and Concrete Masonry Units: Semi-Gloss Acrylic:
1. Sherwin-Williams:
a. Filler: One coat Prep Rite Interior/Exterior Block Filler B25 W25.
b. Finish: Two coats A-100 semi-gloss, A8.

2. PPG Paints:

a. Filler: Speedhide Int/Ext Latex Masonry Block Filler 6-15XI.
Finish: Two coats PPG Speedhide Exterior 100% Acrylic Latex Semi-Gloss 6-900XI Series.

3.7 SCHEDULE - EXTERIOR SURFACES - HIGH PERFORMANCE

A. Shop Primed Ferrous Metal: Gloss Urethane:

1. Sherwin-Williams:
a. Primer: One coat Kem Bond HS Primer B50.
b. Finish: Two coats Hi-Solids Polyurethane B65.

2. PPG Paints:

a. Primer: One coat MultiPrime Low VOC Universal Primer 4360.
b. Finish: Two coats Pitthane Ultra Gloss Urethane Enamel 95-812

B. Ferrous and Non-Ferrous Metals: Gloss Urethane:

1. Sherwin-Williams:
a. Primer: One coat Macropoxy HS primer B58.
b. Finish: Two coats Hi-Solids Polyurethane B65.

2. PPG Paints:

   a. Primer: One coat Amerlock 2 Fast Dry High Solids Epoxy
   b. Finish: Two coats Pitthane Ultra Gloss Urethane Enamel 95-812

END OF SECTION 099113

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on interior substrates.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Samples for Initial Selection: For each type of topcoat product.

C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

D. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. VOC content.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.
2. Coating Maintenance Manual: Upon conclusion of the project, the Contractor or paint manufacturer/supplier shall furnish a coating maintenance manual, such as Sherwin-Williams “Custodian Project Color and Product Information” report or

equal from PPG Paints. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.5 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.

a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.
b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on mockups.

a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance of requirements, products by Sherwin-Williams Company (The) are the basis of design and set the standard of quality required. Other acceptable manufacturers, include but are not limited to:

1. Benjamin Moore
2. The Pittsburgh Paints Company

2.2 PAINT, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

B. Colors: As selected by Architect from manufacturer's full range.

C. Total VOC content will not be increased by tints and colorants required.

D. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Masonry (Clay and CMU): 12 percent.
3. Wood: 15 percent.
4. Gypsum Board: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Spray-Textured Ceiling Substrates: Verify that surfaces are dry.

E. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers. Provide ASTM D3359 Cross Cut Adhesion Test at (1) typical location where existing paint is to receive new paint.

F. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.

F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.

G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

I. Aluminum Substrates: Remove loose surface oxidation.

J. Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions.

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed in equipment rooms:

a. Equipment, including panelboards.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.
f. Plastic conduit.
g. Tanks that do not have factory-applied final finishes.

h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.

2. Paint the following work where exposed in occupied spaces:

a. Equipment, including panelboards.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.
f. Plastic conduit.
g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
h. Other items as directed by Architect.

3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 SCHEDULE - INTERIOR SURFACES - LATEX

A. Total VOC content will not be increased by tints and colorants required.

B. Shop Primed Ferrous Metal: Semi-Gloss Finish:

1. Sherwin-Williams:

a. Primer: Pro Industrial Pro-Cryl Universal primer.
b. Finish: Two coats Pro Industrial Waterbased Alkyd Urethane, semi-gloss.

2. PPG PAINTS:

a. Primer: Pitt Tech Plus Waterborne Acrylic Primer/Finish 4020 PF
b. Finish: Two Coats Pitt Tech Plus Waterborne Acrylic Semi-Gloss 4216HP

C. Ferrous Metal and Galvanized Metals: Semi-Gloss Finish:

1. Sherwin-Williams:

a. Primer: Pro Industrial Pro-Cryl Universal primer.
b. Finish: Two coats Pro Industrial Waterbased Alkyd Urethane, semi-gloss.

2. PPG PAINTS:

a. Primer: Pitt Tech Plus Waterborne Acrylic Primer/Finish 4020 PF
b. Finish: Two Coats Pitt Tech Plus Waterborne Acrylic Semi-Gloss 4216HP

D. Concrete Masonry Units (CMU): Semi-Gloss Finish:

1. Sherwin-Williams:

a. Filler: One coat PrepRite Interior/Exterior Block Filler B25W25.
b. Finish (typical): Two coats ProMar 200 Zero VOC, semi-gloss.
c. Finish (toilet rooms, locker rooms, receiving area): Two coats Pro Industrial Precatalyed Waterbased Epoxy, semi-gloss.

2. PPG PAINTS

a. Primer: One Coat SPEEDHIDE® Int/Ext Masonry Hi Fill Latex Block Filler 6-15XI
b. Finish: Two Coats SPEEDHIDE® zero Int Zero-VOC Latex Semi-Gloss 6-4510XI

E. Exposed Metal Deck & Joists: Flat Acrylic:

1. Sherwin-Williams:
a. Primer: (Ferrous and Non-Ferrous Metal): ProIndustrial Pro-Cryl Primer.
b. Finish: ProIndustrial Waterborne Acrylic Dryfall, Flat.

2. PPG PAINTS

   a. Primer: spot prime with Pitt-Tech® Plus Int/Ext DTM Industrial Primer 4020 PF
   b. Finish: SPEEDHIDE® SUPER TECH® WB Interior Dry-Fog Flat Latex, 6-725XI.

F. Gypsum Board: Flat Finish:

1. Sherwin-Williams:

   a. Primer: One coat. ProMar 200 Zero VOC Primer.
   b. Finish: Two coats. ProMar 200 Zero VOC, Flat.

2. PPG PAINTS

   a. Primer: One Coat SPEEDHIDE® Zero Int Latex Sealer 6-4900XI
   b. Finish: Two Coats SPEEDHIDE® Zero Int Zero-VOC Latex Flat 6-4110XI

G. Gypsum Board: Eggshell Finish:

1. Sherwin-Williams:

   a. Primer: One coat ProMar 200 Zero VOC Primer.
   b. Finish: Two coats ProIndustrial Pre-Catalyzed WaterBased Epoxy, eg-shell

2. PPG PAINTS

   a. Primer: One Coat SPEEDHIDE® Zero Int Latex Sealer 6-4900XI
      Finish: Two Coats SPEEDHIDE® Zero Int Latex Eggshell 6-4310XI

H. Gypsum Board: Semi-Gloss Finish:

1. Sherwin-Williams:

   a. Primer: One coat ProMar 200 Zero VOC Primer.
   b. Finish: Two coats ProMar 200 Zero VOC, semi-gloss.

2. PPG PAINTS

   a. Primer: One Coat SPEEDHIDE® Zero Int Latex Sealer 6-4900XI
      Finish: Two Coats SPEEDHIDE® Zero Int Latex Semi-Gloss 6-4510XI

END OF SECTION 099123

SECTION 099733 - CONCRETE FLOOR SEALER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Concrete sealer for:

a. Uncured concrete floors.
b. Cured concrete floors.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Provide data on specified products, describing physical and performance characteristics.

B. Manufacturer's Installation Instructions:

1. Submit surface preparation and application instructions.

1.4 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Accept concrete sealer on site in manufacturer's original unopened containers. Inspect for damage.

B. Protect concrete sealer from freezing.

1.6 PROJECT CONDITIONS

A. Do not install concrete sealer when air temperature or concrete surface temperature is less than 40 degrees F.

B. Maintain concrete floor surface temperature above freezing during and after installation of concrete sealer until sealer is cured.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Manufacturers:

1. Curecrete Chemical Company; Ashford Formula.
2. The Euclid Chemical Company; Euco Diamond Hard.
3. L&M Construction Chemicals, Inc.; Seal Hard.
4. W.R. Meadows; Liqui-hard.

B. Concrete Sealer: Clear, penetrating, reactive VOC compliant, waterborne siliconate compound designed to densify and seal concrete surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION - UNCURED CONCRETE FLOORS

A. Verify final troweling is complete.

B. Verify concrete is set sufficiently so application of concrete sealer will not mar concrete surface.

3.2 EXAMINATION - CURED CONCRETE FLOORS

A. Verify floor surfaces are free of substances that may impair penetration of concrete sealer.

3.3 PREPARATION - CURED CONCRETE FLOORS

A. Remove membrane forming curing compounds and other surface contaminates capable of impairing concrete sealer penetration into concrete.

B. Remove contaminates by chemical or mechanical means as recommended by concrete sealer manufacturer.

C. Allow floor to dry. Broom clean floor surface to remove loose dust and dirt.

3.4 INSTALLATION - UNCURED CONCRETE FLOORS

A. Apply concrete sealer in accordance with manufacturer's instructions immediately after final troweling.

B. Keep floor surface wet with concrete sealer for minimum 30 minutes.

C. Broom concrete sealer as required for uniform coverage on floor surface.

D. Remove excess liquid material from floor surface.

E. Saw Cut Floor Joints: Treat joints after cutting as specified in Section 033000 “Cast-In-Place Concrete.”

1. Remove cement dust from joints and floor surface.
2. Treat saw cut joints by flooding with concrete sealer.
3. When curing is complete, clean joints in preparation for sealant application as specified in Section 079200 “Joint Sealants.”

3.5 INSTALLATION - CURED CONCRETE FLOORS

A. Apply concrete sealer in accordance with manufacturer's instructions.

B. Keep floor surface wet with concrete sealer for minimum 30 minutes.

C. Scrub concrete sealer into concrete surface with mechanical scrubbers.

D. Remove excess liquid material from floor surface.

E. Rinse floor when required to remove excess concrete sealer.

3.6 PROTECTION OF FINISHED WORK

A. Prohibit traffic on floor finish for 8 hours after installation.

3.7 CLEANING

A. Remove concrete sealer residue from floor surface.

END OF SECTION 099733

THIS PAGE LEFT INTENTIONALLY BLANK

SECTION 101423 – PANEL SIGNAGE

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Elevator Lobby.

B. Signage for ADA and Life Safety Code Compliance.

1.1 REFERENCES

A. ANSI 117.1 – For Buildings and Facilities

B. ASTM International (ASTM) D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.

C. ASTM International (ASTM) E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

D. ASTM International (ASTM) D1929 - Standard Test Method for Determining Ignition Temperature of Plastics.

E. Underwriters Laboratories (UL) 94 - Tests for Flammability of Plastic Materials for Parts in Devices and Appliances.

F. Underwriters Laboratories (UL) 723 - Standard for Test for Surface Burning Characteristics of Building Materials.

G. ASTM E2072-04 - (American Society for Testing and Material) and DIN 67510.

H. ASTM E2073-02 - (Standard Test Method for Photopic Luminance of Photo luminescent (Phosphorescent) Markings).

I. ADAAG – Americans with Disabilities Act Accessibility Guidelines; US Architectural and Transportation Barriers Compliance Board.

J. National Fire Protection Association - 101 Life Safety Code

1.2 PERFORMANCE REQUIREMENTS

A. Provide photopolymer signage that conforms to the requirements of all regulatory agencies holding jurisdiction and the quality control of selected signage manufacturer.

B. Requirements:
1. Comply with all applicable provisions of the ADA and ANSI A117.1-2017.
2. Character Proportion: Letters and numbers on signs must have a width-to-height ratio between 3:5 and 1:1 and a stroke width-to-height ratio between 1:5 and 1:10.

3. Color Contrast: Characters and symbols must contrast with their background - either light characters on a dark background or dark characters on a light background.
4. Raised Characters or Symbols: Letters and numbers on signs must be raised 1/32 in (0.8 mm) minimum and be sans serif characters. Raised characters or symbols must be at least 5/8 in (16 mm) high, but no higher than 2 in (50 mm). Symbols or pictograms on signs must be raised 1/32 in (0.8 mm) minimum.
5. Symbols of Accessibility: Accessible facilities required to be identified must use the international symbol of accessibility.
6. Braille: Grade II with accompanying text.

C. Fire Performance Characteristics:
1. Provide photopolymer signage with surface burning characteristics that consist of a flame spread of 75 and a smoke development of 120 when tested in accordance to UL 723 (ASTM E 84).
2. Self Extinguishing: Provide photopolymer signage with a CC1 classification for .060-inch thick material when tested in accordance with the procedures in ASTM D 635, Standard Test Method for Rate of Burning and/or Extent and Time of Burning Plastics in a Horizontal Position.
3. Vertical Burn: Provide photopolymer material that is classified as 94V-2 for material .118 inches thick or greater and 94HB for material .118 inches thick or less when tested in accordance with UL 94, Tests for Flammability of Plastic Materials for Parts in Devices and Appliances.
4. Self-Ignition Temperature: Provide photopolymer material that has a self-ignition temperature of 800 F (427C) when tested in accordance with ASTM D 1929.

1.3 SUBMITTALS

A. Submit under provisions of Division 01.

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

C. Shop Drawings: Detail drawings showing materials, lay-out, sizes, lettering and graphics, construction details of each type of sign and mounting details.

D. Selection Samples: For each finish product specified, two sets of color sheets representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each sign type and color specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, patterns, overall quality, and adherence to drawings and references indicated.

F. Manufacturer's Installation Instructions: Printed installation instructions for each signage system.

G. Message List: Signage report indicating signage location, text and sign type.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in unopened factory packaging.

B. Inspect materials at delivery to verify there are no defects or damage.

C. Store and dispose of solvent-based materials, and materials used with solvent-based materials in accordance with requirements of local authorities having jurisdiction.

1.5 PROJECT CONDITIONS

A. Install products in an interior climate-controlled environment.

B. Maintain environmental conditions (temperature, humidity and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.6 WARRANTY

A. At project closeout, provide to the Owner or Owner’s representative a copy of the manufacturer's standard limited warranty against manufacturing defect outlining the terms, conditions and exclusions from coverage.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 – PRODUCTS

2.0 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide signs manufactured by one of the following, but not limited to:

1. ASE, Inc.
2. ASI Sign Systems, Inc.
3. Berry & Homer, Inc.
4. Fast Signs, Inc.
5. InPro Corporation; SignScape Signage and Wayfinding.
6. iSign, Inc.
7. Mohawk Sign Systems.
8. Alpine Sign and Lighting.
9. Michener’s Engraving Inc.

B. Provide all signage from one manufacturer.

2.1 SIGNAGE – GENERAL

A. The signage contractor shall design and submit approval drawings for all sign types relevant to the project.

B. Comply with all applicable provisions of the ADAAG and ANSI A117.1 codes that apply to the State and Local jurisdiction of the project.

C. Typography: Copy shall be a true, clean and accurate reproduction of typeface(s) specified. Upper and lower case and all caps as indicated in Sign Type drawings and Signage Schedule. Letter spacing to be normal and interline spacing set by manufacturer.

D. Arrows, symbols and pictograms will be provided in style, sizes, colors and spacing as indicated in drawings for each sign system.

E. Braille

1. Grade 2 Braille utilizing perfectly round, clear insertion beads.

F. Design

1. Colors, patterns, and artwork: Selected from Manufacturer's full range of colors and options.
2. Design: Signage to match existing style, color, and font. Manufacturer shall visit the site to review existing signage to match.
3. Finishes are to meet current federal ADA and all state and local requirements.

2.2 IDENTIFICATION SIGNAGE

A. Signage System:
1. The signage shall incorporate a 2-ply decorative acrylic sheet to match existing, including all tactile requirements in adherence to ADA specifications.
2. Coordinate verbiage and locations with owner/architect. Provide room numbers and room names at each entrance to each room as shown on the schedule.

B. Materials:
1. Sign face shall be 1/16" (nominal) standard grade, acrylic as indicated on drawings. A painted sign face shall not be acceptable.
2. Tactile lettering shall be precision machined, raised 1/32", matte PETG and subsurface colored for scratch resistance.

C. Standard Colors:
1. Face/background color shall be standard grade acrylic all colors and finishes. Match existing.
2. Standard tactile colors shall match manufacturer's ADA standard color selection. Match existing.

D. Construction:
1. The acrylic sheets shall be precision machined together to a 90-degree angle. Edges shall be smooth, void of chips, burrs, sharp edges and marks.
2. The signage shall utilize an acrylic sphere for Grade II Braille inserted directly into a scratch resistant, high pressure laminate sign face. Braille dots

are to be pressure fit in high tolerance drilled holes.

3. Braille dots shall be half hemispherical domed and protruding a minimum 0.025".
4. The signage shall utilize a pressure activated adhesive. The adhesive shall be nonhazardous and shall allow for flexing and deflection of the adhered components due to changes in temperature and moisture without bond failure.
5. All signs shall be provided with appropriate mounting hardware. Hardware shall be finished and architectural in appearance and suitable for the mounting surface.
6. Some signs may be installed on glass. A blank backer is required to be placed on the opposite side of the glass to cover tape and adhesive. The backer shall match the sign in size and shape and color.

PART 3 – EXECUTION

3.1 SITE VISITS

A. Site Visits – 2 site visits shall be required by the sign contractor:
   1. Post award for the purposes of meeting with Owners and project manager.
   2. Final walk-through and punch list.

3.2 EXAMINATION

A. Verify that wall surface is dry and free from dirt, grease and loose paint.

B. Complete all finishing operations, including painting, before beginning installation of signage systems.

C. Do not begin installation until substrates have been properly prepared. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

D. Examine signage for defects, damage and compliance with specifications prior to installation. Do not install damaged signage.

3.3 CODE COMPLIANCE

A. It shall be the responsibility of the successful bidder to meet any and all local, state, and federal code requirements in fabricating and installing signs.

3.4 PREPARATION

A. Verify mounting heights and locations comply with referenced standards.

B. Clean surfaces thoroughly prior to installation to remove dust, debris and loose particles.

C. Prepare surfaces using the methods recommended by the manufacturer for

achieving the best results for the substrate under the project conditions.

3.5 INSTALLATION

A. General: Installation locations shall be in accordance with ADA specifications. Locate signs where indicated using mounting methods in compliance with manufacturer's written instructions:

1. The signage contractor shall coordinate installation schedules with the Owner and/or Construction Manager.
2. Installation shall be performed by manufacturer's personnel trained and certified in manufacturer's methods and procedures.
3. The signage contractor shall submit a CAD generated location plan noting the location of all signage and cross referenced to message schedule or plots for architect's approval.
4. Installer to conduct a pre-installation survey prior to manufacturing to verify copy and sign location. Each location shall be noted using a low tack vinyl reproduction of actual sign. Full scale renderings of directories and directional shall also be provided. Any location discrepancy or message issues shall be submitted to architect for review.
5. Signs shall be plumb, level, and at heights indicated with sign surfaces free from defects.
6. Upon completion of the work, signage contractor shall remove unused or discarded materials, containers and debris from site.

3.6 CLEANING

A. At completion of installation, clean surfaces in accordance with manufacturer's instructions.

3.7 DELIVERY, STORAGE, PROTECTION

A. Protect installed products until completion of project.

B. Package to prevent damage or deterioration during shipment, handling, storage and installation. Products should remain in original packaging until removal is necessary. Store products in a dry, indoor location.

C. Touch-up, repair or replace damaged products before substantial completion.

3.8 SIGNAGE SCHEDULE

A. Room signs: Provide additional blank sign for any room signs mounted on glass. Provide required elevator signage and exit signage required by code.

B. Provide "In Case of Fire Use Stairs" sign at elevator.

END OF SECTION 101423

SECTION 104413 - FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Fire-protection cabinets for the following:

a. Portable fire extinguishers.

1.3 PREINSTALLATION CONFERENCE

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to fire-protection cabinets including, but not limited to, the following:

a. Schedules and coordination requirements.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing recessed-, semirecessed-, or surface-mounting method and relationships of box and trim to surrounding construction.

B. Shop Drawings: For fire-protection cabinets. Include plans, elevations, sections, details, and attachments to other work.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For fire-protection cabinets to include in maintenance manuals.

1.6 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.

1.7 SEQUENCING

A. Apply decals or vinyl lettering on field-painted fire-protection cabinets after painting is complete.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

2.2 FIRE PROTECTION CABINET

A. Cabinet Type: Suitable for fire extinguisher.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. J. L. Industries, Inc.;
b. Larsen's Manufacturing Company;
c. Potter Roemer LLC;

B. Cabinet Construction: Nonrated.

1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.0428-inch- thick, cold-rolled steel sheet lined with minimum 5/8-inch-thick, fire-barrier material. Provide factory-drilled mounting holes.

C. Cabinet Material: Cold-rolled steel sheet.

1. Shelf: Same metal and finish as cabinet.

D. Semi-recessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).

1. Square-Edge Trim: 1-1/4- to 1-1/2-inch backbend depth.

E. Cabinet Trim Material: Same material and finish as door.

F. Door Material: Steel sheet.

G. Door Style: Full acrylic bubble with frame.

H. Door Glazing: Molded acrylic bubble.

1. Acrylic Bubble Color: Clear transparent.

I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

1. Provide projecting door pull and friction latch.
2. Provide continuous hinge, of same material and finish as trim, permitting door to open 180 degrees.

J. Accessories:

1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated.

a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."

1) Location: Applied to location indicated on Drawings.
2) Application Process: Silk-screened.
3) Lettering Color: As indicated.
4) Orientation: As indicated on Drawings.

K. Materials:

1. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.

a. Finish: Baked enamel or powder coat.
b. Color: As selected by Architect from full range of industry colors and color densities.

2.3 FABRICATION

A. Fire Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

1. Weld joints and grind smooth.
2. Provide factory-drilled mounting holes.
3. Prepare doors and frames to receive locks.
4. Install door locks at factory.

B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.

1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch thick.
2. Miter and weld perimeter door frames.

C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.4 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.

C. Finish fire-protection cabinets after assembly.

D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls and partitions for suitable framing depth and blocking where semirecessed cabinets will be installed.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare recesses for semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

A. General: Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.

B. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.

C. Identification: Apply decals or vinyl lettering at locations indicated.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.

E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 104413

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.

B. Product Schedule: For fire extinguishers. Coordinate final fire-extinguisher schedule with fire-protection cabinet schedule to ensure proper fit and function.

1.4 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.6 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure of hydrostatic test according to NFPA 10.
b. Faulty operation of valves or release levers.

2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire protection cabinet and mounting bracket indicated.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Amerex Corporation.
b. Ansul Incorporated; Tyco International Ltd.
c. Badger Fire Protection; a Kidde company.
d. Buckeye Fire Equipment Company.
e. Fire End & Croker Corporation.
f. J. L. Industries, Inc.; a division of Activar Construction Products Group.
g. Larsen's Manufacturing Company.

2. Valves: Manufacturer's standard.
3. Handles and Levers: Manufacturer's standard.
4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.

B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 4-A:60-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.3 MOUNTING BRACKETS

A. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Amerex Corporation.
b. Ansul Incorporated; Tyco International Ltd.
c. Badger Fire Protection; a Kidde company.
d. Buckeye Fire Equipment Company.
e. Fire End & Croker Corporation.
f. J. L. Industries, Inc.; a division of Activar Construction Products Group.
g. Larsen's Manufacturing Company.

B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

a. Orientation: As indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.

1. Mounting Brackets: 54 inches above finished floor to top of fire extinguisher.

B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 104416

SECTION 142400 - HYDRAULIC ELEVATORS (REFERENCE ALTERNATES)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes hydraulic passenger elevators.

1.3 DEFINITIONS

A. Definitions in ASME A17.1/CSA B44 apply to work of this Section.

1.4 ACTION SUBMITTALS

A. Product Data: Include capacities, sizes, performances, operations, safety features, finishes, and similar information. Include product data for car enclosures, hoistway entrances, and operation, control, and signal systems.

B. Shop Drawings:

1. Include plans, elevations, sections, and large-scale details indicating service at each landing, machine room layout, coordination with building structure, relationships with other construction, and locations of equipment.
2. Include large-scale layout of car-control station.
3. Indicate maximum dynamic and static loads imposed on building structure at points of support, and maximum and average power demands.

C. Samples for Initial Selection: For finishes involving color selection.

D. Samples for Verification: For exposed car, hoistway door and frame, and signal equipment finishes; 3-inch square Samples of sheet materials; and 4-inch lengths of running trim members.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Manufacturer Certificates: Signed by elevator manufacturer certifying that hoistway, pit, and machine room layout and dimensions, as shown on Drawings, and electrical service, as shown and specified, are adequate for elevator system being provided.

C. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For elevators to include in emergency, operation, and maintenance manuals.

B. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.

C. Continuing Maintenance Proposal: Submit a continuing maintenance proposal from Installer to Owner, in the form of a standard two-year maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Elevator manufacturer or an authorized representative who is trained and approved by manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle materials, components and equipment in manufacturer's protective packaging. Store materials, components, and equipment off of ground, under cover, and in a dry location.

1.9 COORDINATION

A. Coordinate installation of sleeves, block outs, elevator equipment with integral anchors, and other items that are embedded in concrete or masonry for elevator equipment. Furnish templates, sleeves, elevator equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.

B. Furnish well casing and coordinate delivery with related excavation work.

C. Coordinate locations and dimensions of other work relating to hydraulic elevators including pit ladders; sumps and floor drains in pits; entrance subsills; electrical service; and electrical outlets, lights, and switches in hoistways, pits, and machine rooms.

1.10 WARRANTY

A. Manufacturer's Special Warranty: Manufacturer agrees to repair, restore, or replace elevator work that fails in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, operation or control system failure, including excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.
2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide ThyssenKrupp Elevator; Endura machine-roomless hydraulic elevator. **Reference ALTERNATES for alternate manufacturers listed below.**

1. Schindler Elevator Corp. (REFERENCE ALTERNATES)
2. Otis (REFERENCE ALTERNATES)

2.2 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with ASME A17.1/CSA B44.

B. Accessibility Requirements: Comply with Section 407 in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and with ICC A117.1.

C. Seismic Performance: Elevator system shall withstand the effects of earthquake motions determined according to ASCE/SEI 7 and shall comply with elevator safety requirements for seismic risk Zone 1 or greater in ASME A17.1/CSA B44.

1. The term "withstand" means "the system will remain in place without separation of any parts when subjected to the seismic forces specified and the system will be fully operational after the seismic event."
2. Provide earthquake equipment required by ASME A17.1/CSA B44.
3. Project's Seismic Design Category: As indicated on Drawings.
4. Elevator Component Importance Factor: 1.0.

2.3 ELEVATORS

A. Elevator System, General: Manufacturer's standard elevator systems. Unless otherwise indicated, manufacturers' standard components shall be used, as included in standard elevator systems and as required for complete system.

B. Elevator Description (TKE Endura MRL):

1. Type: (2 Stage) Hydraulic Machine Room-less, Passenger
2. Rated Load: 4000 lb.
3. Rated Speed: 110 fpm.
4. Operation System: Single automatic.
5. Auxiliary Operations:
    a. Automatic lowering.
    b. Priority service.
6. Car Enclosures:
    a. Inside Width: 7'-8".
    b. Inside Depth: 5'-5".
    c. Inside Height: 7'-4" (ceiling height)
    d. Front Walls (Return Panels): Satin stainless steel, No. 4 finish with integral car door frames.
    e. Car Fixtures: Satin stainless steel, No. 4 finish.
    f. Side and Rear Wall Panels: Plastic laminate.
    g. Reveals: Satin stainless steel, No. 4 finish.
    h. Door Faces (Interior): Satin stainless steel, No. 4 finish.
    i. Door Sills: Aluminum, mill finish.
    j. Ceiling: Metallic-finish, plastic laminate.
    k. Handrails: Satin stainless steel, No. 4 finish at sides and rear of car. Profile as selected by Architect.
    l. Floor prepared to receive resilient flooring specified in Section 096500 "Resilient Flooring".
7. Hoistway Entrances:
    a. Width: 48 inches.
    b. Height: 84 inches.
    c. Type: Two speed.
    d. Frames: Stainless steel.
    e. Doors: Stainless steel.
    f. Sills: Aluminum, mill finish.
8. Hall Fixtures: Satin stainless steel, No. 4 finish.
9. Additional Requirements:
    a. Provide inspection certificate in each car, mounted under acrylic cover with frame made from satin stainless steel, No. 4 finish.
    b. Controller must fit into the door jamb. No control closet or access door will be provided.

C. Elevator Description (Schindler Model 3100):

1. Type: (2 Stage) Hydraulic Machine Room-less, Passenger
2. Rated Load: 3500 lb.
3. Rated Speed: 100 fpm.

4. **Operation System: Single automatic.**
5. **Auxiliary Operations:**
    a. **Automatic lowering.**
    b. **Priority service.**
6. **Car Enclosures:**
    a. **Inside Width: 6'-9 5/16".**
    b. **Inside Depth: 5'-6 7/8".**
    c. **Inside Height: 7'-9"**
    d. **Front Walls (Return Panels): Satin stainless steel, No. 4 finish with integral car door frames.**
    e. **Car Fixtures: Satin stainless steel, No. 4 finish.**
    f. **Side and Rear Wall Panels: Plastic laminate.**
    g. **Reveals: Aluminum, anodized.**
    h. **Door Faces (Interior): Satin stainless steel, No. 4 finish.**
    i. **Door Sills: Aluminum, mill finish.**
    j. **Ceiling: Metallic-finish, plastic laminate.**
    k. **Handrails: Satin stainless steel, No. 4 finish at sides and rear of car. Profile as selected by Architect.**
    l. **Floor prepared to receive resilient flooring specified in Section 096500 "Resilient Flooring".**
7. **Hoistway Entrances:**
    a. **Width: 42 inches.**
    b. **Height: 84 inches.**
    c. **Type: Two speed.**
    d. **Frames: Stainless steel.**
    e. **Doors: Stainless steel.**
    f. **Sills: Aluminum, mill finish.**
8. **Hall Fixtures: Satin stainless steel, No. 4 finish.**
9. **Additional Requirements:**
    a. **Provide inspection certificate in each car, mounted under acrylic cover with frame made from satin stainless steel, No. 4 finish.**
    b. **Controller must fit into the door jamb. No control closet or access door will be provided.**

D. Elevator Description (Otis Gen3 Core):

1. **Type: (2 Stage) Hydraulic Machine Room-less, Passenger**
2. **Rated Load: 3500 lb.**
3. **Rated Speed: 150 fpm.**
4. **Operation System: Single automatic.**
5. **Auxiliary Operations:**
    a. **Automatic lowering.**
    b. **Priority service.**

6. Car Enclosures:

a. Inside Width: 6'-5 9/16".
b. Inside Depth: 5'-5 9/16".
c. Inside Height: 7'-9".
d. Front Walls (Return Panels): Satin stainless steel, No. 4 finish with integral car door frames.
e. Car Fixtures: Satin stainless steel, No. 4 finish.
f. Side and Rear Wall Panels: Plastic laminate.
g. Reveals: Satin stainless steel, No. 4 finish.
h. Door Faces (Interior): Satin stainless steel, No. 4 finish.
i. Door Sills: Aluminum, mill finish.
j. Ceiling: Metallic-finish, plastic laminate.
k. Handrails: Satin stainless steel, No. 4 finish at sides and rear of car. Profile as selected by Architect.
l. Floor prepared to receive resilient flooring specified in Section 096500 "Resilient Flooring".

7. Hoistway Entrances:

a. Width: 42 inches.
b. Height: 84 inches.
c. Type: Two speed.
d. Frames: Stainless steel.
e. Doors: Stainless steel.
f. Sills: Aluminum, mill finish.

8. Hall Fixtures: Satin stainless steel, No. 4 finish.
9. Additional Requirements:

a. Provide inspection certificate in each car, mounted under acrylic cover with frame made from satin stainless steel, No. 4 finish.
b. Controller must fit into the door jamb. No control closet or access door will be provided.

2.4 SYSTEMS AND COMPONENTS

A. Pump Units: Positive-displacement type with a maximum of 10 percent variation between no load and full load and with minimum pulsations.

1. Pump shall be submersible type with submersible squirrel-cage induction motor, and shall be suspended inside oil tank from vibration isolation mounts or shall be tank-top-mounted type with fan-cooled, squirrel-cage induction motor, and shall be mounted on oil tank with vibration isolation mounts and enclosed in prime-painted steel enclosure lined with 1-inch thick, glass-fiber insulation board.
2. Motor shall have wye-delta or solid-state starting.
3. Motor shall have variable-voltage, variable-frequency control.

B. Hydraulic Silencers: System shall have hydraulic silencer containing pulsation-absorbing material in blowout-proof housing at pump unit.

C. Piping: Size, type, and weight of piping as recommended by elevator manufacturer, with flexible connectors to minimize sound and vibration transmissions from power unit.

1. Cylinder units shall be connected with dielectric couplings.
2. Casing for Underground Piping: Schedule 40 PVC pipe complying with ASTM D 1785, joined with PVC fittings complying with ASTM D 2466 and solvent cement complying with ASTM D 2564.

D. Hydraulic Fluid: Nontoxic, biodegradable fluid made from vegetable oil with antioxidant, anticorrosive, antifoaming, and metal-passivating additives and approved by elevator manufacturer for use with elevator equipment.

1. Product: Subject to compliance with requirements, provide "Hydro Safe" by Hydro Safe Oil Division, Inc.

E. Inserts: Furnish required concrete and masonry inserts and similar anchorage devices for installing guide rails, machinery, and other components of elevator work. Device installation is specified in another Section.

F. Protective Cylinder Casing: PVC or HDPE pipe casing complying with ASME A17.1/CSA B44, of sufficient size to provide not less than 1-inch clearance from cylinder and extending above pit floor. Casing shall have means of monitoring effectiveness to comply with ASME A17.1/CSA B44.

G. Car Frame and Platform: Welded or bolted steel units.

H. Guides: Roller guides; polymer-coated, nonlubricated sliding guides; or sliding guides with guide-rail lubricators. Provide guides at top and bottom of car and counterweight frames.

2.5 OPERATION SYSTEMS

A. General: Provide manufacturer's standard microprocessor operation system as required to provide type of operation indicated.

B. Auxiliary Operations: In addition to primary operation system features, provide the following operational features for elevators where indicated:

1. Single-Car Battery-Powered Lowering: When power fails, car is lowered to the lowest floor, opens its doors, and shuts down. System includes rechargeable battery and automatic recharging system.
2. Automatic Dispatching of Loaded Car: When car load exceeds 80 percent of rated capacity, doors start closing.

C. Security Features: Provide the following security features, where indicated. Security features shall not affect emergency firefighters' service.

1. Card-Reader Operation: System uses card readers at car-control stations to authorize calls. Security system determines which landings and at what times calls require authorization by card reader. Provide required conductors in

traveling cable and panel in machine room for interconnecting card readers, other security access system equipment, and elevator controllers.

2.6 DOOR REOPENING DEVICES

A. Infrared Array: Provide door reopening device with uniform array of 36 or more microprocessor-controlled, infrared light beams projecting across car entrance. Interruption of one or more light beams shall cause doors to stop and reopen.

2.7 CAR ENCLOSURES

A. General: Provide steel-framed car enclosures with nonremovable wall panels, with access doors, power door operators, and ventilation.

1. Provide standard railings complying with ASME A17.1/CSA B44 on car tops where required by ASME A17.1/CSA B44.

B. Materials and Finishes: Manufacturer's standards, but not less than the following:

1. Subfloor: Exterior, underlayment grade plywood, not less than 5/8 nominal thickness.
2. Floor Finish: As selected by Architect.
3. Fabricate car with recesses and cutouts for signal equipment.
4. Fabricate car door frame integrally with front wall of car.
5. Stainless-Steel Doors: Flush, hollow-metal construction; fabricated from stainless-steel sheet or by laminating stainless-steel sheet to exposed faces and edges of enameled cold-rolled steel doors using adhesive that fully bonds metal to metal without telegraphing or oil-canning.
6. Sills: Extruded metal, with grooved surface, 1/4 inch thick.
7. Luminous Ceiling: Fluorescent light fixtures and ceiling panels of translucent acrylic or other permanent rigid plastic.
8. Handrails: Manufacturer's standard handrails, of shape, metal, and finish indicated.

2.8 HOISTWAY ENTRANCES

A. Hoistway Entrance Assemblies: Manufacturer's standard horizontal-sliding, door-and-frame hoistway entrances complete with track systems, hardware, sills, and accessories. Frame size and profile shall accommodate hoistway wall construction.

1. Where gypsum board wall construction is indicated, frames shall be self-supporting with reinforced head sections.

B. Fire-Rated Hoistway Entrance Assemblies: Door and frame assemblies shall comply with NFPA 80 and be listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction based on testing at as close-to-neutral pressure as possible according to NFPA 252.

1. Fire-Protection Rating: As indicated on Drawings

C. Materials and Fabrication: Manufacturer's standards, but not less than the following:

1. Enameled-Steel Frames: Formed from cold- or hot-rolled steel sheet. Provide with factory-applied enamel finish; colors as selected by Architect from manufacturer's full range.
2. Enameled-Steel Doors: Flush, hollow-metal construction; fabricated from cold-rolled steel sheet. Provide with factory-applied enamel finish; colors as selected by Architect from manufacturer's full range.
3. Sills: Extruded metal, with grooved surface, 1/4 inch thick.
4. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M.

2.9 SIGNAL EQUIPMENT

A. General: Provide hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled. Fabricate lighted elements with long-life lamps and acrylic or other permanent, non-yellowing translucent plastic diffusers or LEDs.

B. Car-Control Stations: Provide manufacturer's standard recessed or semirecessed car-control stations. Mount in return panel adjacent to car door unless otherwise indicated.

1. Mark buttons and switches for required use or function. Use both tactile symbols and Braille.
2. Provide "No Smoking" sign matching car-control station, either integral with car-control station or mounted adjacent to it, with text and graphics as required by authorities having jurisdiction.

C. Emergency Communication System: Two-way voice communication system, with visible signal, which dials preprogrammed number of monitoring station and does not require handset use. System is contained in flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.

D. Car-Top Alarm: Switches on top emergency exits that will cause alarm to sound when cover is opened.

E. Car Position Indicator: Provide illuminated, digital-type car position indicator, located above car door or above car-control station. Also, provide audible signal to indicate to passengers that car is either stopping at or passing each of the floors served. Include travel direction arrows if not provided in car-control station.

F. Hall Push-Button Stations: Provide one hall push-button station at each landing.

1. Provide units with flat faceplate for mounting with body of unit recessed in wall.
2. Equip units with buttons for calling elevator and for indicating applicable direction of travel.

G. Hall Lanterns: Units with illuminated arrows; but provide single arrow at terminal landings. Provide the following:

1. Manufacturer's standard wall-mounted units, for mounting above entrance frames.

H. Hall Position Indicators: Provide digital-display-type position indicators, located above hoistway entrance at ground floor. Provide units with flat faceplate for mounting and with body of unit recessed in wall.

2.10 FINISH MATERIALS

A. General: Provide the following materials for exposed parts of elevator car enclosures, car doors, hoistway entrance doors and frames, and signal equipment as indicated.

B. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, commercial steel, Type B, exposed, matte finish.

C. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, commercial steel, Type B, pickled.

D. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine elevator areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work. Verify critical dimensions and examine supporting structure and other conditions under which elevator work is to be installed.

B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Excavation for Cylinder: Drill well hole in elevator pit to accommodate installation of cylinder; comply with applicable requirements in Division 31 Section "Earth Moving."

B. Provide well casing to retain well-hole walls.

C. Install cylinder in protective casing within well hole. Before installing protective casing, remove water and debris from well hole and provide permanent waterproof seal at bottom of well casing.

1. Fill void space between protective casing and cylinder with corrosion-protective filler.

D. Install cylinder plumb and accurately centered for elevator car position and travel. Anchor securely in place, supported at pit floor. Seal between casing and pit floor with 4 inches of nonshrink, nonmetallic grout.

E. Welded Construction: Provide welded connections for installing elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts. Comply with AWS workmanship and welding operator qualification standards.

F. Sound Isolation: Mount rotating and vibrating equipment on vibration-isolating mounts to minimize vibration transmission to structure and structure-borne noise due to elevator system.

G. Install piping above the floor, where possible. Install underground piping in casing.

H. Lubricate operating parts of systems as recommended by manufacturers.

I. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with car. Where possible, delay installation of sills and frames until car is operable in shaft. Reduce clearances to minimum, safe, workable dimension at each landing.

J. Leveling Tolerance: 1/4 inch, up or down, regardless of load and travel direction.

K. Set sills flush with finished floor surface at landing. Fill space under sill solidly with nonshrink, nonmetallic grout.

L. Once car can travel, coordinate with all trades to finish their work. Provide access to top and bottom of shaft for installation of plumbing, electrical, sprinkler, and HVAC. Provide operator as needed for this work at no cost to the Owner (minimum 3 full days).

3.3 FIELD QUALITY CONTROL

A. Acceptance Testing: On completion of elevator installation and before permitting elevator use (either temporary or permanent), perform acceptance tests as required and recommended by ASME A17.1/CSA B44 and by governing regulations and agencies.

B. Advise Owner, Architect, and authorities having jurisdiction in advance of dates and times that tests are to be performed on elevators.

3.4 PROTECTION

A. Temporary Use: Use of elevator for construction purposes is not permitted.

B. At time of Substantial Completion of elevator work, or portion thereof, provide suitable protective coverings, barriers, devices, signs, or other such methods or procedures to

protect elevator work from damage or deterioration. Maintain protective measures throughout remainder of construction period.

3.5 CLEANING

A. Before final acceptance, remove protection from finished surfaces and clean and polish surfaces in accordance with manufacturer's recommendations for type of material and finish provided. Stainless steel shall be cleaned with soap and water and dried with a non-abrasive surface; it shall not be cleaned with bleach-based cleansers.

B. At completion of elevator work, remove tools, equipment, and surplus materials from site. Clean equipment rooms and hoistway. Remove trash and debris.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to operate, adjust, and maintain elevator(s).

B. Check operation of elevator with Owner's personnel present before date of Substantial Completion and again not more than one month before end of warranty period. Determine that operation systems and devices are functioning properly.

3.7 MAINTENANCE

A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall 24 months' full maintenance by skilled employees of elevator Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper elevator operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

1. Perform maintenance during normal working hours.

END OF SECTION 142400

SECTION 220100 - GENERAL PROVISIONS

PART 1 - GENERAL

1.1 FIRE UNDERWRITER SEAL:

A. Where applicable, all material shall bear the National Board of Fire Underwriters' Seal of Approval. Certificates to this effect to be furnished to Architect upon request.

1.2 DEFINITION OF WORK RESPONSIBILITY:

A. All electrical control components including starters required for operation of Plumbing equipment whether integral or remote shall be furnished and installed under this Contract. Control wiring, conduits and accessories for control devices shall be furnished and installed by the Contractor who provides the equipment. See Division 26 specifications for starters, combination starters, and switches.

B. Power wiring from panel boards or similar source through all equipment disconnects to motors or plumbing equipment shall be furnished and installed by the Electrical Contractor.

C. Equipment disconnect switches, unless otherwise specified or supplied by the equipment supplier as an integral part of the equipment shall be furnished and installed by the Electrical Contractor.

D. All electrical equipment, components, and wiring furnished and installed under this portion of the specifications shall conform to all requirements of the applicable portions of the Division 26 electrical specifications.

E. All base flashing, where required, shall be by the General Contractor, with necessary counter-flashing by this contractor. Flashing shall comply with the requirements of Division 07.

F. All structural work needed for support of plumbing equipment, piping, specialties, or components shall be provided by this contractor unless shown on structural plans.

1.3 RULES AND REGULATIONS:

A. Contractor shall be licensed by the Municipality/Township in which the work is performed. Contractor is responsible for meeting all licensing requirements of the Municipality and securing all necessary certifications prior to beginning work. Copies of these licenses must be posted within the respective job trailers during construction.

B. All work shall be performed in accordance with the rules and regulations of the ICC Codes, local plumbing codes, the utilities having jurisdiction, and the NFPA Codes.

C. All work shall be performed in accordance with the rules and regulations or Pennsylvania Department of Labor and Industry, Federal Department of Labor (Occupational Safety and Health Administration), the Department of Education (where applicable), and all codes and agencies having jurisdiction.

D. All construction, design fabrication, tests, rating and installation shall comply with the rules and regulations of all local, state or national codes and agencies having jurisdiction over this project. Any costs involved in complying to these rules and regulations shall be included in original bid of this Contractor.

E. Refer to Div.01 specifications for Permit application and cost responsibilities for work of this Contract.

1.4 ANCHOR BOLTS:

A. This Contractor shall provide and set in place at the time the foundations, bases, or curbs are poured, all necessary anchor bolts as required for the various equipment specified herein, to be furnished under Div. 22 specifications. Anchor bolts must be of the hook type and of the proper sizes and length to suit the apparatus. The bolts shall be set in pipe sleeves of approximately twice the bolt diameter and as long as the imbedded length of the bolt.

B. When the equipment is set in its proper position, the bolt sleeves and the space between the rough foundations, bases or curbs of the equipment shall be completely filled with one inch of non-shrinking cement grout.

C. This contractor shall assume all responsibility for the location of all anchor bolts for the equipment furnished under Div. 22 specifications, and must have a man present at the time the foundation, bases, or curbs are poured.

1.5 DRAWINGS:

A. The accompanying drawings are a part of these specifications and are intended to show approximate and relative locations of services and equipment. They shall not be scaled to determine exact positions, locations and clearances.

B. Due to the diagrammatic layout and small scale of the drawings, certain piping and duct rises, drops, offsets, valves, and related specialties are not shown. The Contractor shall provide all piping, fittings, valves, and specialties required to insure a complete installation without additional cost to the Owner.

C. All drawings and specifications pertaining to General Construction, Plumbing, HVAC, Electrical and other work shall be carefully examined. All work shall be coordinated prior to installation. Where physical interferences with installed work occur because of failure of this Contractor to coordinate with other trades, this Contractor shall remove and reinstall the work at his own expense.

1.6 SUBMISSION OF SHOP DRAWINGS, EQUIPMENT AND MATERIALS

A. Refer to Division 1 for additional submittal requirements.

B. Contractors shall include with each submittal / shop drawing, a matrix outlining all items that do not match the specified items. If an item is not listed on the matrix, the submitted unit will be assumed to meet all parts of the specification. Contractors will be responsible to ensure that the specifications are met in full. Items in matrix shall include scheduled performance data vs. submitted performance data, specified components vs. submitted unit components, specified construction weight, warranty, etc. vs. submitted construction, weight, warranty, etc.

C. All material submittals shall be submitted in individual submittal packages corresponding to the specification Section and Paragraph of the "Part 2 - Products" section within the applicable Div. 22 specifications for the submitted material. Submittal packages with multiple types of materials from multiple spec sections and combined into a bulk submittal package delays review time and may be rejected without review.

1.7 VISIT TO THE SITE:

A. Prior to submission of his bid, the Contractor shall visit the site to acquaint himself with the existing conditions. Bids as submitted will be interpreted to include all costs and change made necessary by such conditions.

1.8 COORDINATION OF WORK:

A. Contractor shall coordinate his work with that of other trades. In case of interference or problems the Architect shall decide which work is to be relocated, regardless of which is installed first.

B. The Prime Contractor shall prepare coordination/arrangement CAD drawings for coordination with all other trades. The contractor shall furnish these coordination drawings to the contractor responsible for project BIM coordination.

C. This Contractor shall obtain approval of all arrangement drawings before continuing with installation of his work.

1.9 LOCATION OF EQUIPMENT:

A. All locations of plumbing, HVAC and fire protection equipment and pipe connections there to shall be verified by the Owner and Architect. The contractor shall verify locations sufficiently in advance of the installation to allow uninterrupted progress of the work of all trades.

1.10 MATERIALS AND EQUIPMENT:

A. All materials and equipment, unless otherwise specified, shall be new and of the best quality, approved for their specific application.

B. This Contractor shall provide, when required by the Architect, labeled samples of materials to be used on the project. Samples shall be submitted for approval by the Architect prior to their installation.

C. All materials and equipment installed by the Contractor shall be securely and rigidly supported from or attached to the building structure.

1.11 WORKMANSHIP:

A. All workmanship shall be done according to the best practices of the trade by qualified and competent tradesmen.

1.12 PROTECTION OF EQUIPMENT:

A. The Contractor shall protect all material and equipment from damage until final acceptance as installed. He shall close all openings during construction with temporary plugs and replace all damaged items with ones of exact sameness at his expense.

B. He shall schedule material and systems for deliver in such a pattern that critical pieces of equipment may be stored within the building, protected from weather. Where materials are stored outside, they must be protected from the elements and damage.

C. This Contractor shall be responsible for coordinating the procurement of specified materials and equipment being supplied by his sub-contractors and suppliers.

1.13 SCAFFOLDING AND HOISTING:

A. The Contractor shall furnish and erect all scaffolding, hoists, shoring, platforms, railings, ladders, and other devices required by local, state, and federal laws to install his systems and equipment. Scaffolding and all other equipment shall be removed at completion of the work.

B. Contractor shall hoist or rig his own material and equipment into place, or arrange for the rigging of it by others at his expense.

1.14 FOREMAN:

A. Contractor must provide a competent foreman, subject to approval of the Owner. The foreman shall be deemed the agent of the Contractor and must be on duty at the building during all working hours.

B. Any instructions or notices given to the foreman shall be considered equivalent to the instruction or notices being given to the Contractor in person.

1.15 SLEEVES:

A. Each Contractor shall furnish and set all sleeves required for the installation of his work and shall be responsible for their final and permanent locations.

B. All pipes passing through masonry construction shall be fitted with sleeves. Each sleeve shall extend through its respective floor or wall and shall finish flush with each surface unless otherwise required. Unless otherwise specified or shown, sleeves shall be two pipe size larger than the overall outside diameter of the pipe when insulated. Sleeves in bearing and masonry walls shall be made of standard weight galvanized steel pipe. Sleeves through concrete floor slabs and other partitions shall be 18 ga. galvanized steel or galvanized steel pipe.

C. Where sleeves pass through foundation walls, the space between such sleeves and passing pipes shall be caulked with graphite packing and an approved plastic and waterproof caulking compound as approved by the Architect. In lieu of caulking materials, Contractor has option of using preassembled "Link-Seals" as manufactured by Thunderline Corporation, 5495 Treadwell, Wayne, Michigan 48184.

D. All sleeves shall be properly installed and securely cemented in place. Where pipes pass through waterproofed floor or walls, design of sleeves shall be such that the waterproofing can be properly flashed around the sleeves, and of such height that the water will be restrained from entering sleeves and dripping to any finished areas below.

E. Contractor shall seal all piping penetrations through all walls and floors. Where pipes pass through fire resisting portions of the structure, the annular space between the sleeve and the pipe shall be filled with an approved fireproof material. Refer to Division 1 specifications for fireproofing requirements.

1.16 CONCRETE AND MASONRY WORK:

A. The General Contractor shall furnish and install all concrete bases, reinforcing, etc. required to install the Mechanical Work, unless otherwise noted.

B. The Contractor, prior to installing any forms, reinforcing or concrete, shall notify all other Contractors or subcontractors, in ample time for them to install any portion of their work which is to be concealed in the concrete. No such work shall be placed in a manner to interfere with the proper placing of the reinforcement unless so authorized by the Architect.

1.17 ESCUTCHEONS:

A. All exposed pipes, except as otherwise described, passing through walls, floors, ceilings, etc. in finished spaces, shall be provided with solid pattern heavy ceiling, floor or wall escutcheons with set screw. Escutcheons and plates shall be of steel or malleable iron with prime coat ready for painting. Escutcheons will not be provided where sleeves intentionally extend above finished floor.

B. All exposed plumbing short branch connections to fixtures and/or equipment passing through wall or floors shall be equipped with pressed brass, chromium plated, solid-type escutcheons.

C. Provide angle collars at ducts where they pass through finished walls, floors and ceilings.

1.18 ACCESS DOORS AND PANELS:

A. All ceiling access panels not shown on the Architectural Reflected Ceiling plans and all additional wall or ceiling access panels required for access for the work of this section shall be furnished by this Contractor and set by the General Contractor. The location of these access panels must be approved by the Architect prior to their installation. The Contractor shall furnish an access panels where valves, specialties, junction boxes, and other serviceable items are installed behind plaster, tile, or similar type non-removable surfaces.

B. Refer to Section 08 3113 - "Access Doors and Frames" for specific requirements.

1.19 CUTTING AND PATCHING:

A. This Contractor shall give the General Contractor complete information as to size of openings to be provided by the General Contractor in new floors, and walls, etc., so that such openings may be provided as the project progresses.

B. If openings are omitted or are incorrect through failure of this Contractor to coordinate the required openings, this Contractor shall, at his own expense, engage the trade which originally installed the work, to cut and patch to the satisfaction of the Architect.

C. This Contractor shall be responsible for the cutting of existing floor slabs for the installation/demolition of any underground piping systems required by the plumbing drawings and Div. 22 specifications. This Contractor is responsible for proper bedding, backfill materials and compaction (as outlined in the specifications and on the drawings) to an elevation that is level with the bottom of the existing concrete floor slab.

D. This Contractor shall be responsible for the cutting and patching of exposed surfaces (other than the floor) as required for the installation/demolition of any work of the plumbing drawings and Div. 22 specifications. All holes cut shall be in a manner approved by the Architect. Patching of existing construction and finishes must be equivalent to adjacent finishes and materials.

E. Where it becomes necessary to cut out any portions of walls, floors, ceilings, roof or other portions of the building for the installation of work, and as may be required to perform and complete the work under this Contract, the Contractor shall do all necessary cutting and fitting, shall remove all excess material, and shall replace all work damaged so as to leave the entire premises in a finished condition.

F. No cutting shall be done which may in any way affect the building structurally or architecturally. Any damage incident to cutting or other causes in the performance of this Contract shall be made good by replacement or repairs. Cutting shall be done only with the prior approval of the Architect.

G. Contractor shall seal all piping penetrations through all walls and floors. Penetrations through fire rated walls or floors shall be sealed with an approved UL Listed fire sealant.

1.20 GUARANTEE:

A. Refer to Div.01 specifications for Warranty requirements. Where warranty requirements are not specified in Div.01, this Contractor shall unconditionally guarantee in writing all materials, equipment, and workmanship for a period of one years from date of acceptance by Owner. The Contractor shall provide free service for all equipment involved in his Contract during this guarantee period.

B. The guarantee shall include restoration to its original condition of all adjacent work that must be disturbed in fulfilling this guarantee.

C. All such repairs and/or replacements shall be made without delay and at the convenience of the Owner.

1.21 CLEANING OF SYSTEMS:

A. The Contractor shall thoroughly clean all pipe systems to remove all grease, oil scale, core, sand and other foreign material after tests have been made and before the building is turned over to the Owner.

B. All strainers shall be opened and cleaned thoroughly.

C. Should the Contractor put any substance into any system to aid in the cleaning of it, all trace of such material shall be removed before the system is considered clean. All such substances, if used, shall be free from any acid that will set or injure valve seats in any way.

1.22 INSTRUCTION TO EMPLOYEES:

A. At the completion of the work, and before final acceptance of the building by the Owner, each Contractor, together with the representatives of the manufacturers of the equipment installed by the Contractor, shall instruct the designated employees of the Owner in the care, adjustment, maintenance and operation of equipment installed by him.

B. Three copies of factory maintenance schedules shall be furnished for each piece of equipment. Acceptance of materials and equipment is conditional upon receipts of maintenance manuals.

C. A representative of the manufacturer of each piece of equipment shall inspect his respective pieces of equipment, make final adjustments, and put them in a satisfactory working condition.

1.23 SUBSTITUTIONS:

A. Substitutions, if permitted, must comply with the requirements of the Instruction to Bidders for pre-bid substitutions and with Division 01 Section "Product Requirements" for post-bid substitutions.

B. Various items of equipment and materials that have been used as the basis for plumbing system design have been specified by a manufacturer's name and model number. Another manufacturer's product may be submitted for consideration as a substitute in accordance with Div. 01 requirements. The Architect/Engineer shall be the sole judge as to the comparability of an item of equipment that is submitted for approval as a substitute for that which is specified. Each substitute proposals shall include all labor and materials that will be required to install the equipment and make it operate satisfactorily in accordance with the original design concept. Changes required in piping, valves, supports, fittings, ductwork, motors, controls, electrical wiring, and thermal insulation, etc. shall be included. It shall be the responsibility of the Contractor to make

certain that substitute equipment, which has been accepted by the Architect will fit into the designated spaces. Contractor shall make the necessary field measurements in order to determine that there is adequate space for the equipment, taking into consideration the clearances that are required for connections and servicing.

C. If any changes are required in the installation of mechanical or electrical services to any plumbing equipment accepted as a substitution to the basis of design, the Plumbing Contractor shall be responsible for any additional costs incurred to the Owner, Engineer, other prime contractors and costs incurred for changes to the coordination drawings

1.24 ALTERNATES:

A. Various items of equipment and materials that have been used as a basis for plumbing system design have been specified by a manufacturer's name and model number. Where another manufacturer's product has been specified as an alternate to this equipment the proposed cost for this alternate shall include all labor and materials that will be required to install the equipment and make it operate satisfactorily in accordance with the original design concept. He shall include such things as changes in piping, valves, supports and supporting structure, fittings, ductwork, motors, controls, electrical wiring and thermal insulation. It shall be the responsibility of the contractor to make certain the alternate equipment will fit into the designated spaces. He shall make the necessary field measurements in order to determine that there is adequate space for the equipment, taking into consideration the clearances that are required for connections and servicing.

1.25 ALIGNMENT:

A. Where several receptacles, devices, bells, alarms, thermostats, switches, handles, etc., are to be installed in a common location, this equipment shall be lined up in a vertical plane. It is the Contractor's responsibility to confer with the Architect on this alignment.

B. This Contractor shall carefully check all the Drawings and coordinate their work with all trades to provide for a symmetrical and coordinated ceiling. Ceiling T-bars, lights, registers, and other equipment shall all be symmetrically installed with provisions made for integrating the T-bars and this equipment. Failure to coordinate will result in relocation of ceiling components as directed by the Architect at the Contractor's expense.

1.26 OPERATION AND MAINTENANCE INSTRUCTIONS:

A. Refer to Division 01 "Close-out Procedures" as well as the following.

B. The Contractor shall prepare closeout documents in accordance with Div.01 specifications. Where not specified in Div.01 specifications, the Contractor shall prepare for the Owner, 3 hard bound volumes, each containing all operating instructions and information necessary for the care and maintenance of the system. These volumes shall be complete in every respect, and shall include detailed operating instructions for each piece of equipment and diagrams for control wiring and piping so arranged and detailed that the maintenance staff may trace the control in the event of operational malfunctioning.

C. The Contractor shall submit 1 of the hard-bound volumes (or electronic copy) to the Architect/Engineer for approval prior to submitting same to Owner.

D. The purpose of this manual is to assist the Owner in routine operation, maintenance, servicing, troubleshooting and procurement of replacement parts. All information in the manual shall be as-built and only material pertinent to the project shall be included.

E. The operating manual shall be considered a part of the final inspection and shall be submitted for approval at least 30 days in advance of a request for final inspection. The manual shall include:

1. A copy of all final corrected equipment submittals, control diagrams, descriptive brochures, and a list of all parts of each piece of mechanical and electrical equipment which has been furnished and installed.
2. Complete and detailed typewritten operating and maintenance instructions for all major operating equipment. The operating and start-up instructions shall be written in a concise, step by step manner. Maintenance instructions shall include such things as periodic checks, adjustments and troubleshooting techniques.
3. A listing of all items of mechanical and electrical equipment, a compilation of the nameplate data for this same equipment, the name, address and telephone number of the nearest service organization.
4. Copies of all A.S.M.E. pressure vessel certifications, state police approved tank permits, complete additional valve tag schedules, all electrical inspection permits and all additional mechanical and electrical permits required for occupancy by the Owner.
5. All of the materials shall be indexed, arranged categorically and be bound in a rigid, plastic covered, three ring binder.

F. The Contractor shall provide Project Record (As-Builts) documents in accordance with requirements of Div. 01 specifications.

G. O & M manuals must be provided prior to equipment being turned over to the Owner.

H. Warranty period shall begin starts when Owner begins occupancy the building or related phase/area of construction.

1.27 PAINTING:

A. Refer to Division 09 Section "Paintings and Coatings" for painting requirements as well as the following.

B. Provide corrosion inhibiting prime coating on all ferrous materials.

C. Paint all metal laid underground with one heavy coat of corrosion protective materials.

D. All exposed piping, iron work, and equipment installed in the mechanical equipment rooms under this contract shall be painted 1 prime coat and 2 coats of best quality oil paint of color as selected by the Architect.

E. All exposed gas piping within boiler rooms and mechanical rooms shall be painted yellow and identified as required in Division 22 specifications.

F. Unless specifically noted, insulation and galvanized piping in ceiling cavity area shall not be painted.

G. Painting of piping within exposed finished areas within the building interior shall be by the G.C. Installation of piping by the prime contractor shall include cleaning and prep of the piping for final painting by G.C.

1.28 EARTHWORK:

A. Refer to Division 31 as well as the following.

B. Provide all excavating, backfilling, shoring, sheeting, pumping, bailing, etc., required for the installation of the work of this Section.

C. Trench depths shall allow adequate cover over piping, walls shall be vertical and bottoms shall be instrument graded. Earth shall be scooped out under pipe hubs to provide a solid bearing for the barrel of the pipe on undisturbed earth. Concrete or other approved supports shall be provided for all pipes installed in fill.

D. Carry pipe trenches in rock below the pipe invert at least 1/4 the nominal diameter of the pipe or a minimum of 4" below the bottom of the pipe whichever is the greater. Backfill space below pipe with crushed stone or gravel ranging in size from 1/4" to 3/4".

E. Excavation under footings or foundations and deeper than the angle of repose from footings or foundations as determined by the Architect shall be backfilled solidly with 3,000-pound concrete, to such angle of repose and bottom of such footing or foundation. Where excavation damages existing lawns, sidewalks, roadways etc., such surfaces shall be restored to their original condition by the Contractor performing the excavation.

F. All excavated material remaining after the backfilling operation shall be removed from the site by this Contractor.

G. Any settlement in trench backfill shall be brought to grade, and damage to pavement or slabs caused by such settlement shall be repaired at the Contractor's expense.

H. All repair of macadam or concrete paving made necessary by work done under this contract shall be performed by General Contractor at the expense of this contractor. All such repairs shall match surrounding paving in materials and workmanship.

END OF SECTION 220100

SECTION 220101 - REMOVALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-l Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK:

A. This Contractor shall be responsible for the removal of existing piping, fixtures, or equipment in the existing building which is shown on the Drawings and any additional piping which is in conflict with the new construction or new Plumbing systems. Existing piping and supplies for equipment and fixtures which are removed shall be disconnected at their source and capped. Furnish all labor, equipment hauling, rigging, scaffolding, etc. necessary for the removal phase of the project. Coordinate requirements with Architectural drawings.

1.3 GENERAL:

A. Modification or removal of existing piping, fixtures, equipment, and related accessories which require systems to be shut-down shall be coordinated with the Owner. Periods of shut-down shall be minimal and all new work shall be planned and scheduled to accomplish as few shut-downs as possible.

B. All construction and removal work shall be performed in a manner as to keep the existing systems in operation as the work progresses. Prior to commencing construction, the contractor shall review the construction schedule with the Owner and Architect to assure a well coordinated schedule.

C. This contractor shall provide temporary connections where required to keep existing systems operational where required by phasing.

D. Remove as indicated on the drawings and as required for renovated areas, existing waste, vent, water, gas, and storm water piping. Cap ends of piping which remain active. Piping which will not remain active shall be removed in its entirety(within accessible areas) or capped and abandoned in place(in inaccessible construction and below slab) unless specifically noted otherwise on the Demolition Drawings.

E. Cutting and patching shall be by this Contractor unless otherwise indicated.

F. Asbestos abatement will be performed by the owner's abatement contractor where required. Should the Contractor find any material that is suspect, he shall report this to

the owner's representative immediately. The abatement contractor will schedule the material to be removed.

G. Remove or disconnect and cap existing piping (as indicated on the drawings) serving plumbing fixtures which are being removed.

H. Carefully disconnect all plumbing fixtures which are to be replaced with new like in kind fixtures such that the original rough in can be reused. Contractor shall replace damaged connections or rough in supplies where necessary to reconnect new fixtures. Contractor shall provide all required new hardware for mounting and reconnection of new fixtures.

END OF SECTION 220101

SECTION 220553 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Nameplates.

B. Tags.

C. Stencils.

D. Pipe Markers.

1.2 REFERENCE STANDARDS

A. ASME A13.1 - Scheme for the Identification of Piping Systems; The American Society of Mechanical Engineers; 2007.

1.3 SUBMITTALS

A. Labelling List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.

B. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.

C. Product Data: Provide manufacturers catalog literature for each product required.

D. Manufacturer's Installation Instructions: Indicate special procedures, and installation.

E. Project Record Documents: Record actual locations of tagged valves.

PART 2 - PRODUCTS

2.1 GENERAL

A. Coordinate names, abbreviations and other designations used in mechanical identification work, with corresponding designations shown, specified or

schedule. Provide numbers, lettering and working as indicated or, if not otherwise indicated, as recommended by manufacturers or as required for proper identification and operation/maintenance of mechanical systems and equipment.

B. Multiple Systems: Where multiple systems of same generic name are shown and specified, provide identification which indicates individual system number as well as service (as examples: (Standpipe F12)

C. Manufacturers

1. Advanced Graphic Engraving: www.advancedgraphicengraving.com.
2. Brady Corporation: www.bradycorp.com.
3. Brimar Industries: www.brimar.com
4. Champion America, Inc: www.Champion-America.com.
5. Kolbi Pipe Markers: www.kolbipipemarkers.com
6. Seton Identification Products: www.seton.com/aec.

2.2 NAMEPLATES

A. Description: Laminated three-layer plastic with engraved letters.

1. Letter Color: White.
2. Letter Height: 1/2 inch.
3. Background Color: Black.

2.3 VALVE TAGS

A. Plastic Tags: Laminated three-layer plastic with engraved black piping system abbreviation (1/4" high lettering) and sequenced valve numbers (1/2" high lettering), light contrasting background color and with 5/32" hole for fastener. Tag size minimum 1-1/2 inch diameter.

B. Valve Tag Fasteners: Manufacturer's standard solid brass chain (wire link or beaded type), or solid brass S hooks of the sizes required for proper attachment of tags to valves, and manufactured specifically for that purpose.

C. Valve Schedule: Provide valve schedule for each piping system, typewritten and reproduced on 8-1/2" x 11" bond paper. Tabulate valve number, piping system, system abbreviation (as shown on tag), location of valve (room or space), and variations for identification (if any). Mark valves which are intended for emergency shut-off and similar

special uses, by special "flags" in margin of schedule. In addition to mounted copies, furnish extra copies for Maintenance Manuals as specified in Division 1.

1. Frame: For each page of the valve schedule, provide a glazed display frame, with screws for removable mounting on masonry walls. Provide frames of finished hardwood or extruded aluminum, with SSB grade sheet glass.

2.4 PIPE MARKERS

A. Comply with ASME A13.1.

B. Plastic Pipe Markers: Provide manufacturer's standard preprinted, flexible or semi rigid, permanent, color coded, plastic sheet pipe markers, complying with ANSI A13.1. Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.

1. All Piping: Provide snap-on application of pre-tensioned semi-rigid plastic full-bank pipe markers, extending 360 degrees around pipe at each location.
2. Lettering: Manufacturer's standard pre-printed nomenclature which best describes piping system in each instance, as selected by Architect/Engineer in cases of variance with names as shown or specified.
3. Arrows: Print each pipe marker with arrows indicating direction of flow, either integrally with piping system service lettering (to accommodate both directions), or as separate unit of plastics.

2.5 UNDERGROUND PLASTIC PIPE MARKERS:

A. Description: Manufacturer's standard 2" wide warning tape color coded and labeled to match pipe identification labels. Material shall be detectable polyester complying with ASTM B-721.

2.6 CEILING TACKS

A. Description: Self-adhesive plastic coded dots. Color coded to match color of pipe marker.

PART 3 - EXECUTION

3.1 PREPARATION

A. Where identification is to be applied to surfaces which require insulation, painting or other covering or finish, including valve tags in finished mechanical spaces, install identification after completion of coverings and painting. Install identification prior to installation of acoustical ceilings and similar removable concealment. Degrease and clean all surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

A. Piping System Identification:

1. Install pipe markers on each system indicated to receive identification, and include arrows to show normal direction of flow:
2. Plastic pipe markers, with application system as indicated under "Products" in this section.
3. Locate pipe markers and color bands on all piping within mechanical rooms, accessible maintenance spaces, and above acoustic tile ceilings. Where piping is exposed to view in occupied/finished spaces, verify identification requirements with Architect in field prior to installation. Locate additional pipe markers in each of the following locations.

    a. Near each valve and control device.
    b. Near each branch, excluding short take-offs for fixtures and terminal units; mark each pipe at branch, where there could be question of flow pattern.
    c. Near locations where pipes pass through walls or floors/ceilings, or enter non-accessible enclosures.
    d. At access doors, manholes and similar access points which permit view of concealed piping.
    e. Near major equipment items and other points of origination and termination.
    f. Spaced intermediately at maximum spacing of 50' along each piping run, except reduce spacing to 25' in congested areas of piping and equipment. On piping above removable acoustical ceilings, omit intermediately spaced markers.

4. Provide underground warning tape for all underground piping outside the building approximately 6-8 inches below finish grade.

B. Valve Identification:

1. Provide valve tag on every valve, cock and control device in each piping system; exclude check valves, valves within factory-fabricated equipment units, plumbing fixture faucets, convenience and lawn-watering hose bibs, and shut-off valves at plumbing fixtures, HVAC terminal devices and similar rough-in connections of end-use fixtures and units. List each tagged valve in valve schedule for each piping system.
2. Mount valve schedule frames and schedules in machine rooms where indicated or, of not otherwise indicated, where directed by Architect/Engineer.
3. Provide valve finder ceiling dots at all concealed valve locations. Locate on ceiling grid not on ceiling tile.

C. Mechanical Equipment Identification:

1. General: Install engraved plastic laminate nameplate on or near each major item of mechanical equipment and each operational device, as specified herein if not otherwise specified for each item or device. Provide signs for the following general categories of equipment and operational devices:

   a. Main control and operating valves, including safety devices and hazardous units such as gas pressure regulators.
   b. Tanks and pressure vessels.
   c. Domestic water heaters
   d. Domestic water pressure booster pumps
   e. Recirculation pumps
   f. Water Softeners
   g. Sewage and Stormwater ejectors

END OF SECTION 220553

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 221005 - PLUMBING PIPING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Pipe, Pipe Fittings, Pipe Hangers and Supports, Valves, and Miscellaneous connections for piping systems.

1. Pumped/Forced Waste and Rainwater

a. Contractor shall provide complete Forced Main piping systems as shown on plumbing drawings and specified herein including but not limited to all: piping, pipe fittings, pipe supports, pipe anchors, drains, including final coordination and connection to Water/Sanitary or Storm piping system as indicated on drawings.

1.2 RELATED REQUIREMENTS

A. Section 07 8413 - Penetration Fireproofing

B. Section 08 3100 - Access Doors and Panels.

C. Section 22 0100 - General Provisions

D. Section 22 0553 - Identification for Plumbing Piping and Equipment.

1.3 REFERENCE STANDARDS

A. Work and products provided in conformance to referenced standards listed below shall be in conformance with the latest editions of the referenced standards where the standards have a revision more current than the edition noted below.

B. ASME B16.3 - Malleable Iron Threaded Fittings; The American Society of Mechanical Engineers; 1998 (R2006).

C. ASME B16.4 - Gray Iron Threaded Fittings; The American Society of Mechanical Engineers; 1998 (R2006).

D. ASME B31.9 - Building Services Piping; The American Society of Mechanical Engineers; 2008 (ANSI/ASME B31.9).

E. ASTM A 53/A 53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2007.

F. IBC - ICC - International Building Code

G. IPC - ICC - International Plumbing Code

H. MSS SP-58 - Pipe Hangers and Supports - Materials, Design and Manufacture; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.; 2009.

I. MSS SP-69 - Pipe Hangers and Supports - Selection and Application; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.; 2003.

J. MSS SP-80 - Bronze Gate, Globe, Angle and Check Valves; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.; 2008.

K. MSS SP-89 - Pipe Hangers and Supports - Fabrication and Installation Practices; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.; 2003.

L. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.; 1996.

1.4 SUBMITTALS

A. In addition to the requirements of Division 01 specifications, plumbing product submittals shall be in accordance with the following:

1. Piping & Pipe fitting Product Data: Provide manufacturer's data on pipe materials and pipe fittings specified herein. Submittals shall clearly indicate exact materials to be provided and applications where the submitted product is to be installed and associated specification section. Manufacturer data shall indicate, material of construction, applicable standards and listings, design pressure and ratings, etc.
2. Hangers & Supports, Valve, & Misc. Product Data: Provide manufacturer's data for Hangers & supports, valve, & miscellaneous piping products specified herein. Clearly indicate exact models/model number, options, and accessories to be provided for each product. Submittals shall clearly indicate applications where the submitted product is to be used. Manufacturer data shall indicate, material of construction, applicable standards and listings, design pressure and ratings, etc.
3. Project Record Documents: Record actual locations of valves. Provide valve schedule as required in Section 22 0553 "Identification for Plumbing Piping and Equipment".
4. Maintenance Data: Submit maintenance data and spare parts lists for each type of valve. Include this data in Maintenance Manual.
5. Maintenance Materials: Furnish the following for Owners use in maintenance of project.

    a. See Section 01 6000 - Product Requirements, for additional provisions.
    b. Valve Repacking Kits: One for each type and size of valve.

B. Review of submittals which do not clearly indicate the information noted below may be delayed or Rejected due to lack of clarity or information. Generic catalog sheets with no indication of options, accessories, or model to be provided will be Rejected without further review. P.C. is responsible to review plumbing product submittals provided by suppliers and coordinate and verify all submittal information prior to submission to Architect/Engineer.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with State of Pennsylvania, UCC standards.

1. Maintain one copy on project site.

B. Valves: Manufacturer's name and pressure rating marked on valve body.

C. Piping

1. Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.
2. Manufacturers: Firms regularly engaged in the manufacture of piping products of types and sizes required, and which have been in satisfactory use for not less than five years in similar service.

D. Valves: Manufacturer's name and pressure rating marked on valve body.

1. Manufacturers: Firms regularly engaged in the manufacture of valves, of types and sizes required, whose products have been in satisfactory use in similar service for not less than five years.
2. Marking of Valves: Comply with MSS SP-25.
3. Valve Dimensions; For face-to-face and end-to-end dimensions of flanged or welding-end valve bodies, comply with ANSI B16.10. Grooved end valves shall comply with manufacturer's published dimensional data, with grooved ends complying with ANSI/AWWA C606.
4. Valve Types: Provide valves of same type by same manufacturer.

1.6 REGULATORY REQUIREMENTS

A. Perform Work and inspections/testing in accordance with State of Pennsylvania UCC building codes including but not limited to IPC, IFGC, IBC, and IFC (Locally adopted editions).

B. Conform to International Plumbing Code and all requirements of the local authority having jurisdiction/local Water Authority for installation of backflow prevention devices, service valving, and metering.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Provide factory applied plastic end caps on each length of pipe and tube. Maintain end caps through shipping, storage and handling as required to prevent pipe end damage and eliminate dirt and moisture from outside of pipe and tube..

E. Where possible, store pipe and tube inside and protected from weather. Where necessary to store outside, elevate well above grade and enclose with durable waterproof wrapping.

F. Protect steel flanges and fittings from moisture and dirt by inside storage and enclosure or packaging with durable, waterproof wrapping.

1.8 FIELD CONDITIONS

A. Do not install underground piping when bedding is wet or frozen.

1.9 EXTRA MATERIALS

A. See Section 01 6000 - Project Requirements, for additional provisions.

B. Provide two repacking kits for each size valve.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Except as otherwise indicated, provide factory fabricated products of the size, joint type, or class (thickness) indicated for each service. Where size, joint type, or class (thickness) is not indicated, provide products as determined by the installer for installation requirements and comply with the standards of the International Plumbing Code, International Fuel Gas Code, NFPA, Cast Iron Soil Pipe Institute (CISPI),and EPA as appropriate for each service.

2.2 PUMPED WASTE/RAINWATER PIPING, ABOVE SLAB/GRADE

A. Steel Pipe: ASTM A 53/A 53M Schedule 40, galvanized, using one of the following joint types:

1. Flanged Joints: ASME B16.1 cast iron fittings.
2. Threaded Joints: ASME B16.3 malleable iron fittings.

2.3 FLANGES, UNIONS, AND COUPLINGS

A. Unions (Pipe Sizes 2" and Under):

1. Ferrous pipe: Class 150 malleable iron threaded unions.
2. Copper tube and pipe: Class 150 bronze unions with soldered joints.

B. Flanges (Pipe Size Over 1 Inch):

1. Ferrous pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.
2. Copper tube and pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.

C. Dielectric Unions/Connections: Provide standard products recommended by manufacturer for use in service indicated which effectively isolate ferrous from non-ferrous piping (electrical conductance), prevent galvanic action, and stop corrosion.

1. Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier
2. Manufacturer: Subject to compliance with requirements, provide dielectric unions of one of the following:

a. Atlas Products Co.
b. Capital Mfg. Co., Div. of Harsco Corp.
c. Eclipse, Inc.
d. Epco Sales, Inc.
e. PSI Industries.
f. Stockham Valves and Fittings.

2.4 MISCELLANEOUS PIPING FABRICATION MATERIALS:

A. Forged Branch Connection Fittings: Except as otherwise indicated, provide the type as determined by the installer to comply with installation requirements.

B. Pipe Nipples: Fabricate from same pipe as used for connected pipe; except do not use less than schedule 80 pipe where length remaining Unthreaded is less than 1 1/2", and where pipe size is less than 1 1/4", and do not thread nipples full length (no close nipples.)

C. Gaskets for Flanged Joints: ANSI B16.21 full faced for cast iron flanges; raised face for steel flanges, unless otherwise indicated.

2.5 PIPE HANGERS AND SUPPORTS

A. HORIZONTAL PIPING HANGERS AND SUPPORTS:

1. General: Except as otherwise indicated, provide factory fabricated horizontal piping hangers and supports of the MSS type and size indicated, bolts (if any) and washers; comply with MSS SP-58 and the manufacturer's published product information. Where the MSS type or size is not indicated, provide proper selection determined by installer for installation requirements, and comply with MSS SP-69 and the manufacturer's published product information: size hangers and supports properly for piping including insulation, for insulated piping systems..

   a. Adjustable Clevis Hangers: MSS-SP-69 Type 1, fabricated from steel. (Insulated or Non-insulated - Stationary piping systems)
   b. Adjustable Swivel Band Hangers: MSS-SP-69 Type 10 fabricated from steel. (Non-insulated - Stationary piping systems)
   c. Adjustable Roller Hangers: MSS-SP-69 Type 43, including axle roller and clevis.(Insulated or Non-insulated - Non-Stationary piping systems)
   d. Steel Brackets: Welded structural steel shapes complying with one of the following:

      1) Light Duty: MSS Type 31.
      2) Medium Duty: MSS Type 32.
      3) Heavy Duty: MSS Type 33.

B. VERTICAL PIPING CLAMPS:

1. General: Except as otherwise indicated, provide factory fabricated vertical piping clamps of the MSS type and size indicated; comply with MSS SP-58 and the manufacturer's published product information. Where the MSS type or size is not indicated, provide proper selection as determined by the installer for installation requirements, and comply with MSS SP-69 and the manufacturer's published product information. Size clamps properly for piping, including insulation (if any).

   a. Two Bolt Riser Clamp: MSS-SP-69 Type 8.
   b. Four Bolt Riser Clamp: MSS-SP-69 Type 42, including pipe spacers at inner bolt holes.

C. HANGER ROD ATTACHMENTS:

1. General: Except as otherwise indicated, provide factory fabricated hanger rod attachments of the MSS type and size indicated; comply with MSS SP-58 and the manufacturer's published product information. Where MSS type or size is not indicated, provide proper selection as determined by installer for installation requirements, and comply with MSS AP-69 and the manufacturer's published product information. Size attachments properly for piping, including insulation (if any).

    a. Turnbuckles: MSS-SP-69 Type 13.
    b. Weldless Eye Nut: MSS-SP-69 Type 17.
    c. Malleable Eye Socket: MSS-SP-69 Type 16.
    d. Clevises: MSS-SP-69 Type 14.

D. BUILDING ATTACHMENTS:

1. General: Except as otherwise indicated, provide factory fabricated building attachments of the MSS type and load rating indicated; comply with MSS SP-58 and the manufacturer's published product information. Where the MSS type or load rating is not indicated, provide proper selection determined by installer for installation requirements, and comply with MSS SP-69 and the manufacturer's published information. Size units properly for piping loading.

    a. Concrete Inserts: MSS-SP-69 Type l8, steel.
    b. Top Beam C-Clamps: MSS-SP-69 Type l9.
    c. C-Clamps: MSS-SP-69 Type 23, steel
    d. Top I-Beam Clamp: MSS-SP-69 Type 25.
    e. Side Beam Clamp: MSS-SP-69 Type 20.
    f. Beam Clamp/Eye Nut: MSS-SP-69 Type 28.
    g. Wide Flange Beam Clamp/Eye Nut: MSS-SP-69 Type 29.
    h. Beam Clamp/Extension Piece: MSS-SP-69 Type 30.

E. SADDLES AND SHIELDS:

1. General: Except as otherwise indicated, provide factory fabricated saddles and shields of the MSS type and size indicated; comply with MSS SP-58 and the manufacturer's published product information. Where the MSS type or size is not indicated, provide proper selection determined by installer for installation requirements, and comply with MSS SP-69 and the manufacturer's published product information. Size saddles and shields properly for insulation and vapor barriers (if any).

    a. Protection Saddles: MSS-SP-69 Type 39.
    b. Protection Shields: MSS-SP-69 Type 40.
    c. Wood Insulation Saddle: Provide products manufactured by Elcen Metal Products Company.

F. RESTRAINTS

1. General: Provide No-Hub Cast Iron Joint restraints as required by local Plumbing Codes, CISPI Designation 310-11, and the 2006 CISPI Installation Handbook. 24 ga. CRS, galvanized straps, stainless steel bands and worm gear drive clamps.

   a. HoldRite Series #117

G. MISCELLANEOUS HANGER AND SUPPORT MATERIALS:

1. Metal Framing: Provide products complying with NEMA STD ML 1. Contractor shall provide all miscellaneous steel required for support of work within his contract.
2. Steel Plates, Shapes and Bars: Provide products complying with ASTM A 36.
3. Cement Grout: Portland cement (ASTM C l50, Type I or Type III,) and cleaned uniformly graded, natural sand (ASTM C 404, Size No. 2). Mix at a ratio of l.0 part cement to 3.0 parts sand, by volume, with only the minimum amount of water required for placement and hydration.
4. Heavy Duty Steel trapezes: Fabricate from steel shapes selected for the loads required, weld steel in accordance with AWS Standards.
5. Pipe Guides: Provide factory fabricated guides of cast semi-steel or heavy fabricated steel, consisting of a bolted two-section outer cylinder and base with a two sections guiding spider bolted tightly to the pipe. Size guide and spiders to clear pipe and insulation (if any), and cylinder. Provide guides of the length recommended by the manufacturer to allow indicated travel.

2.6 VALVES:

A. General: Provide factory fabricated valves recommended by manufacturer for use in service indicated. Provide valves of types and pressure ratings indicated; provide proper selection as determined by installer to comply with installation requirements. Provide sizes as indicated, and connections which properly mate with pipe, tube, and equipment connections.

B. All valves and specialties within the domestic potable water piping shall meet the Lead Free requirements of the Safe Drinking Water Act (Sec. 1417) amended 1-4-2011 (weighted average lead content = 0.25%), NSF/ANSI-61-8 Commercial Hot 180°F (including Annex F and G) and NSF/ANSI-372, and other equivalent state regulations.

C. All shutoff valves 4" and smaller within the domestic potable water piping shall be full port ball valve type unless noted otherwise.

D. General Valve Features:

1. General: Provide valves with features indicated and where not otherwise indicated, provide proper valve features as determined by installer for installation requirements. Comply with ANSI B31.1

2. Flanged: Valve flanges complying with ANSI B16,1 (cast iron), ANSI B16.5 (steel), or ANSI P16.24 (bronze).
3. Threaded; Valve ends complying with ANSI P2.1.
4. Trim: Fabricate pressure-containing components of valve, including stems (shafts) and seats from bronze materials, of standard alloy recognized in the valve manufacturing industry that resists dezincification and meets the Lead free requirements
5. Non-Metallic Discs: Non-metallic material selected for service indicated in accordance with the manufacturer's published literature.
6. Renewable Seat: Design seat of valve with removable disc, and assemble valve so disc can be replaced when worn,
7. Extended Stem: Increase stem length by 2" minimum, to accommodate insulation applied over valve.
8. Check Valve: Check valve designed with hinged disc which seals against seat machined in bridge wall of valve body and manufactured for automatic closure by flow reversal.

E. BALL VALVES:

1. Acceptable Manufacturers: Subject to compliance with requirements, provide valves of one of the following:

   a. Conbraco Industries, Inc.
   b. Milwaukee Valve Co., Inc.
   c. NIBCO, Inc.

2. General: Valves shall be rated 600 PSI non-shock CWP, valve ends shall have full depth ANSI threads or extended solder connections.
3. Comply with the following standards: MSS SP-110

F. SWING CHECK VALVES:

1. Acceptable Manufacturers: Subject to compliance with requirements, provide valves of one of the following:

   a. Conbraco Industries, Inc.
   b. Milwaukee Valve Co., Inc.
   c. NIBCO, Inc.

2. Comply with MSS SP-71 and MSS SP-SO for design, workmanship, material and testing.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.3 INSTALLATION

A. PIPING INSTALLATION:

1. General: Install pipe, tube and fittings in accordance with recognized industry practices which will achieve permanently leakproof piping systems, capable of performing each indicated service without piping failure. Install each run with a minimum of joints and couplings, but with adequate and accessible unions for disassembly and maintenance/ replacement of valves and equipment. Reduce sizes (where indicated) by use of reducing fittings. Align piping accurately at connection, within 1/16" misalignment tolerance.
2. Install all piping in accordance with International Plumbing Code (IPC), International Fuel Gas Code(IFGC), and ANSI B31 Code for Pressure Piping requirements as applicable to each system.
3. Locate piping runs, except as otherwise indicated, vertically and horizontally (pitched to drain) and avoid diagonal runs wherever possible. Orient horizontal runs parallel with walls and column lines. Locate runs as shown or described by diagrams, details and notations or, if not otherwise indicated, run piping in the shortest route which does not obstruct usable space or block access for servicing the building and its equipment. Hold piping close to walls, overhead construction, columns and other structural and permanently enclosed elements of the building; limit clearance to 0.5" where furring is shown for enclosure or concealment of piping, but allow for insulation thickness, if any. Where possible, locate insulated piping for 1.0" clearance outside of insulation. Wherever possible in finished and occupied spaces, conceal piping from view by locating in column enclosures, in hollow wall construction or above suspended ceilings; do not encase horizontal runs in solid partitions, except as indicated.
4. Electrical Equipment Spaces: Do not run piping through transformer vaults and other electrical equipment spaces and enclosures including elevator machine rooms.
5. Piping System Joints: Provide joints of the type indicated in each piping system.
6. Thread pipe in accordance with ANSI B2.1; cut threads full and clean using sharp dies. Read threaded ends to remove burrs and restore full inside diameter. Apply pipe joint compound/tape on male threads at each joint and tighten joint to leave not more than 3 threads exposed.
7. Flanged Joints: Match flanged within piping systems, and at connections with valves and equipment. Clean flange faces and install gaskets. Tighten bolts to provide uniform compression of gaskets.
8. Insulating Unions: Comply with manufacturer's instructions for installing unions. Install unions in a manner which will prevent galvanic action and stop corrosion when joining ferrous and non-ferrous piping.

9. Provide penetration firestopping for all work of Div. 22 in accordance with Div. 07 specifications.

B. PIPING INSPECTION:

1. General: Clean exterior surfaces of installed piping systems of superfluous materials and prepare for application of specified coatings if any. Flush out piping systems with clean water before proceeding with required tests. Inspect each run of each system for completion of joints, supports and accessory items.

C. PIPING TESTS:

1. General: Provide temporary equipment for testing, including pumps and gages. Test piping system before insulation is installed wherever feasible and remove control devices before testing.
2. Test each natural section of each piping system independently, but do not use piping system valves to isolate sections where test pressure exceeds valve pressure rating. Fill each section with water and pressurize for the indicated pressure and time.
3. Test piping installations and backflow preventers in accordance with IPC Section 312. Coordinate testing with local AHJ.
4. Repair piping systems sections which fail the required piping tests by disassembly and reinstallation, using new materials to the extent required to overcome leakage. Do not use chemicals, stop-leak compounds, mastics or other temporary repair methods.

D. HANGERS AND SUPPORTS:

1. Proceed with the installation of hangers, supports and anchors only after the required building structural work has been completed in areas where work is to be installed. Correct inadequacies including (but not limited to) the proper placement of inserts, anchors and other building attachments.

E. BUILDING ATTACHMENTS INSTALLATION:

1. Install building attachments at the required locations within concrete or onto structural steel for proper piping support. Space attachments within the maximum piping span length indicated in MSS SP-69 and IPC. Install additional building attachments where support is required for additional concentrated loads, including valves, flanges, guides, strainers, expansion joints, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten insert securely to forms. Where concrete with compressive strength less than 2500 psi is indicated, install reinforcing bars through the openings at the top of inserts. Prior to placing concrete, install nut in insert and screw threaded rod thru nut until rod is firmly against top of the insert body.

F. HANGERS AND SUPPORTS INSTALLATION:

1. General: Install hangers, supports, clamps and attachments to support piping properly from the building structure; comply with MSS SP-69. Arrange for grouping of parallel runs of horizontal piping to be supported together on trapeze type hangers where possible. Install supports with the maximum spacing complying with MSS SP-69. Where piping of various sizes is to be supported together with trapeze hangers, space hangers for smallest pipe size or install intermediate supports for smaller diameter pipe. Do not use wire of perforated metal to support piping, and do not support piping from other piping.
2. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers and other accessories. Except as otherwise indicated for exposed continuous pipe runs, install hangers and supports of the same type and style as installed for adjacent similar piping.
3. Provide additional steel as required to span structural members for intermediate support of piping required between structural framing members. ALL piping shall be supported from structural framing members only. Coordinate all work with other trades.

    a. Do not fasten or anchor work to concrete floor deck except where individually approved by Structural Engineer and Architect.
    b. Do not fasten or anchor any work directly to metal roof deck.
    c. Prevent electrolysis in support of copper tubing by the use of hangers and supports which are copper plated, or by other recognized industry methods.
    d. Provisions for movement:

        1) Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement between pipe anchors, and to facilitate the action of expansion joints, expansion loops, expansion bends and similar units.
        2) Load Distribution: Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.
        3) Pipe Slopes: Install hangers and supports to provide the indicated pipe slopes, and so that maximum pipe deflections allowed by ANSI B3l are not exceeded.

    e. Insulated Piping: Comply with the following installation requirements:

        1) Saddles/Shields: Where low compressive strength insulation of vapor barriers are indicated on piping, install coated protective shields at all hanger locations.

G. PIPE GUIDE INSTALLATION:

1. Install pipe guides complying with the manufacturer's published product literature. Where not otherwise indicated, install pipe guides on each side of expansion loops.

H. PIPING ANCHORS INSTALLATION:

1. Install anchors at the proper location to prevent stresses from exceeding those permitted by ANSI B3l, and to prevent the transfer of loading and stresses to connection equipment.

    a. Fabricate and install anchor by welding steel shapes, plates and bars to the piping and to the structure. Comply with ANSI B3l and with AWS standards.
    b. Anchor Spacings: Where not otherwise indicated, install anchors at the ends of principal pipe runs, at intermediate points in pipe runs between expansion loops and bends. Make provisions for preset of anchors as required to accommodate both expansion and contraction of piping.

I. ADJUSTMENT OF HANGERS AND SUPPORTS:

1. Adjust hangers and supports and place grout as required under floor mounted supports to bring piping to proper levels and elevations.

J. VALVE INSTALLATION:

1. General: Except as otherwise indicated, comply with the following requirements:

    a. Install valves where required for proper operation of piping and equipment, including valves in branch lines where necessary to isolate sections of piping. Locate valves so as to be accessible and so that separate support can be provided when necessary.
    b. Install valves with stems pointed up, in the vertical position, where possible, but in no case with stems pointed downward from a horizontal plane unless unavoidable. Install valve drains with hose-end adapter for each valve that must be installed with stem below horizontal plane.
    c. Insulation: Where insulation is indicated, install extended stem valves, arranged in the proper manner co receive insulation.
    d. Applications Subject to Shock; Install valves with bodies of metal other than cast iron where thermal or mechanical shock is indicated or can be expected to occur.
    e. Applications Subject to Corrosion: Do not install bronze valves and valve components in direct contact with steel, unless the bronze and steel are separated by a dielectric insulator. Install bronze valves in steam and condensate service and in other services where corrosion is indicated or can be expected to occur.
    f. Non-Metallic Disc: Limit the selection and installation of valves with non-metallic discs to locations indicated and where foreign material in the piping system can be expected to prevent tight shut off of metal seated valves.
    g. Renewable Seats: Select and install valves with renewable seats, except where frequent usage of the valves is indicated.

K. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

L. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

M. Install piping to maintain headroom, conserve space, and not interfere with use of space.

N. Group piping whenever practical at common elevations.

O. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

P. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 22 0719.

Q. Provide access where valves and fittings are not exposed. Coordinate size and location of access doors with Section 08 3100.

R. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

S. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting. Refer to Section 09 9000.

T. Install bell and spigot pipe with bell end upstream.

U. Install valves with stems upright or horizontal, not inverted.

V. Sleeve pipes passing through partitions, walls and floors.

3.4 APPLICATION

A. Install unions downstream of valves and at equipment or apparatus connections.

B. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

C. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

END OF SECTION 221005

SECTION 223000 - PLUMBING EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Elevator Sump Pumps

1.2 SUBMITTALS

A. Product Data:

1. Indicate pump type, capacity, power requirements.
2. Provide certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable.
3. Provide electrical characteristics and connection requirements.

B. Operation and Maintenance Data: Include operation, maintenance, and inspection data, replacement part numbers and availability, and service depot location and telephone number.

C. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Identification: Provide pumps with manufacturer's name, model number, and rating/capacity identified by permanently attached label.

C. Performance: Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, operate within 25 percent of midpoint of published maximum efficiency curve.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

1.5 EXTRA MATERIALS

A. See Div. 01 specifications, for additional provisions.

B. Provide all required maintenance parts for up to 1 yr. for all required regular maintenance

1.6 OWNER INSTRUCTION/DEMONSTRATION

A. Provide owner instruction and demonstration for all pieces of installed equipment. Demonstration shall include: regular operating instructions, required regular maintenance, regular required maintenance schedule for each piece of equipment. P.C. shall employ the service of a manufacturers representative where necessary or where otherwise noted in these specifications.

PART 2 PRODUCTS

2.1 ELEVATOR SUMP PUMP

A. Manufacturers:

1. Stancor Inc: www.stancorpumps.com
2. Liberty Pumps: www.libertypumps.com
3. Zoeller: www.zoeller.com
4. Other acceptable manufacturers offering equivalent products as approved by Architect/Engineer/Owner. Refer to Division 01 specifications for additional information.

B. Oil Minder Pump and Controller System

1. Pump

    a. 1/2 hp, 115v/1ph., 2" discharge, 50gpm@20ft head
    b. cast iron body with powder coated epoxy finish, stainless steel fittings

2. Stainless Steel Probes with oil detection shutdown
3. NEMA 4X simplex control panel, w/audible and visual alarm and dry alarm contacts including the following:

    a. Oil Smart ® liquid alarm switch
    b. Oil Smart ® pump switch (10-2282)
    c. 115 volts, single phase
    d. NEMA 4X watertight enclosure with lockable latch
    e. 30 amp motor start relay
    f. Pump HOA switch
    g. Top-mounted red alarm beacon light
    h. 81 - 84 decibel rated alarm horn
    i. Horn silence and alarm test switches
    j. Alarm automatically resets
    k. Dry auxiliary alarm contacts

l. Separate circuit protection for alarm
m. Circuit breaker protection
n. Pump “Run” indicator light
o. Dry pump run contact option "DPR"

4. Basis of Design: Zoeller model 153 pump and 10-2149 simplex control panel with DPR option

PART 3 EXECUTION

3.1 INSTALLATION

A. Install plumbing equipment in accordance with manufacturer's instructions, as required by code, and complying with conditions of certification, if any.

B. Coordinate with plumbing piping and related electrical work/fuel piping for each piece of equipment to achieve operating system

C. Elevator Sump Pump

1. Install elevator sump pump in accordance with all PA L&I regulations and in accordance with all requirements of the local Authority Having Jurisdiction.
2. Provide conduit from elevator sump to control panel to contain wiring from sump pump to control panel. Verify required conduit size per manufacture's installation instructions prior to beginning work.

D. Pumps:

1. Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.
2. Provide vibration isolation/flexible connectors on inlet and outlet piping

END OF SECTION 223000

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 230501 – HVAC GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work specified in this section. These General Provisions are in addition to all requirements of Division 01 specifications. Where requirements of this section conflict with the requirements of Division 01 specification requirements, the requirements of Division 01 take precedence.

1.2 CONTRACTOR:

A. The term Contractor as used in the Specifications shall be understood to mean the people or firm awarded the Contract for the respective phases of work - Heating, Ventilating and/or Air Conditioning.

1.3 DRAWINGS:

A. Drawings are part of the bid documents and are intended to show approximate and relative locations of services and equipment. They shall not be scaled to determine exact positions, locations, and clearances.

B. Due to the diagrammatic layout and small scale of the drawings, certain piping and duct rises, drops, offsets, valves, and related specialties are not shown. The contractor shall provide all ductwork, piping, fittings, valves, and specialties required to insure a complete installation without additional cost to the owner.

C. All drawings and specifications pertaining to general construction, plumbing, HVAC, electrical, and other work shall be carefully examined. Where physical interferences with his work occur because of his failure to consult other trades, this Contractor shall rearrange his work at his own expense.

1.4 TRUE INTENT:

A. The Drawings and Specifications are intended to provide a complete and perfectly operating system. Therefore, it is specifically agreed and understood by the Contractor that anything, be it labor, material or equipment, which is not described in the Specifications or specifically shown on the Drawings, but is necessary for the operation and completion of a perfectly operating system, according to the true intent of the Specifications and Drawings and as interpreted by the Architect, shall be furnished by the Contractor as a part of his Contract, at no extra charge, as though it were specifically detailed and described.

1.5 DEFINITIONS:

A. Where the word "provide" is used in connection with a system, equipment, or an item it shall be understood to mean the furnishing and installing of the system, equipment or item on this project.

B. Where the phrase "as directed" is used, it shall be understood to mean as directed or instructed by the Architect or his authorized representative.

C. Where the word "shall" appears in these Specifications, it shall be understood to mean that the labor, material or performance which it describes, or is associated, is mandatory.

D. Where the words "to be" appear in these Specifications, it shall be understood to have the same interpretation as if the word "shall be" were inserted in their place.

E. Where the word "comparable" appears in these Specifications, it shall be understood to mean that any item of equipment or material which is specified with an absolute minimum of differences.

1.6 SCOPE:

A. Provide a complete and operating HVAC system in accordance with these specifications and accompanying contract drawings. This shall include all required labor, materials, equipment, and supervision.

B. Work shall include but is not limited to the following systems, equipment, materials, and labor for a complete system including the following:

1. Ductwork
2. Diffusers, grilles, and registers
3. Hot water piping systems
4. Terminal heating equipment
5. Automatic temperature control system

1.7 PHASING:

A. All work shall be undertaken to accomplish the work in phases as indicated on the phasing drawings and descriptions.

B. All work required to accomplish the work in the phases shall be included.

1.8 RULES AND REGULATIONS

A. All work shall be performed in accordance with the rules and regulations of Pennsylvania Department of Labor and Industry, Federal Department of Labor (Occupational Safety and Health Administration), the Department of Education, the Department of Environmental Protection, and all codes and agencies having jurisdiction.

B. All construction, design fabrication, tests, rating and installation shall comply with the rules and regulations of all local, state or national codes and agencies having jurisdiction over this project. Any costs involved in complying to these rules and regulations shall be included in original bid of this Contractor.

C. The Owner will obtain the building permit. Any other fees relative to the contractors work shall be paid by the contractor as part of his Bid.

1.9 FOREMAN

A. Each contractor must provide a competent foreman, subject to approval of the Construction Manager and Architect. The foreman shall be deemed the agent of the Contractor and must be on duty at the building during all working hours. If work is occurring in more than one shift, provide a foreman for each shift.

B. Any instructions or notices given to the foreman shall have the same force as if given to the Contractor in person.

1.10 WORKMANSHIP

A. All workmanship shall be done according to the best practices of the trade by qualified and competent tradesmen.

1.11 WORK RESPONSIBILITY:

A. All base flashing shall be provided by the General Contractor, with all counterflashing by this contractor.

B. All structural supports required for the installation of equipment and materials shall be furnished by this contractor unless specifically shown on the structural drawings.

C. All concrete work and pads for the installation of equipment and materials shall be furnished by this contractor unless specifically shown on the general construction drawings.

1.12 COORDINATION OF WORK

A. Contractor shall coordinate his work with the other trades. In case of interference or problems the Architect shall decide which work is to be relocated, regardless of which is installed first.

1.13 ALIGNMENT:

A. Where several receptacles, devices, bells, alarms, thermostats, switches, handles, etc., are to be installed in a common location, this equipment shall be lined up in a vertical plane. It is the Contractor's responsibility to confer with the Architect on this alignment.

B. The Mechanical and Electrical Contractors shall carefully check all the Drawings and coordinate their work with all trades to provide for a symmetrical and coordinated ceiling. Ceiling T-bars, lights, registers, and other equipment shall all be symmetrically installed with provisions made for integrating the T-bars and this equipment. Failure to coordinate will result in relocation of ceiling components as directed by the Architect at the Contractor's expense.

1.14 LOCATION OF EQUIPMENT

A. All locations of plumbing, HVAC and fire protection equipment and pipe connections there to shall be verified by the Engineer and Architect. The contractor shall verify locations sufficiently in advance of the installation to allow uninterrupted progress of the work of all trades.

B. The Mechanical Contractor shall prepare dimensioned coordination/arrangement drawings at a scale of (1/4” = 1'0”). Layouts represented by these drawings shall be coordinated with all other trades. Refer to Division 1 requirements for project coordination.

C. This Contractor shall obtain Architect approval of all arrangement drawings before continuing his work.

1.15 MATERIALS AND EQUIPMENT

A. All materials and equipment, unless otherwise specified, shall be new and of the best quality, approved for their specific application.

B. This Contractor shall provide, when required by the Architect, labeled samples of materials to be used on this project. Samples shall be submitted for approval to the Architect prior to their installation.

C. All materials and equipment installed by the Contractor shall be securely and rigidly supported from or attached to the building structure.

1.16 FIRE UNDERWRITER SEAL:

A. Where applicable, all material shall bear the National Board of Fire Underwriters' Seal of Approval. Certificates to this effect to be furnished to Architect upon request.

1.17 SUBMISSION OF SHOP DRAWINGS, EQUIPMENT, AND MATERIALS

A. The Contractor shall submit, with a letter of transmittal to the Architect, 6 sets of shop drawings containing all capacities, performances, features, options, accessories and technical data of all materials and equipment listed herein. All submittals shall be made within 45 days after awarding of the contract.

B. Refer to Division 1.

C. All disapproved submittals shall be corrected as directed by the Architect and resubmitted in 6 sets until approved within 30 days after the original submittal was disapproved. No work involving any materials or equipment covered by shop drawings shall be started until the respective shop drawings are approved.

D. Submit electric copies of all submittals to the Construction Manager.

E. No equipment or materials shall be installed until final approval has been given by the Architect.

F. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number and specification section number, as appropriate on shop drawings.

G. On shop drawings, 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 Contractor Documents.

H. On shop drawings, provide space for Contractor and Architect/Engineer review stamps.

I. Contractors shall include with each submittal/shop drawing, a matrix outlining all items that do not match the specified unit. If an item is not listed on the matrix, the submitted unit will be assumed to meet all parts of the specification. Contractors will be responsible to ensure that the specifications are met in full. Items in matrix shall include schedule performance data vs submitted performance data, specified components vs submitted unit components, specified construction weight, warranty, etc. vs submitted construction, weight, warranty, etc.

1.18 APPROVED SUBSTITUTIONS:

A. Various items of equipment and materials that have been used as the basis for mechanical system design have been specified by a manufacturer's name and model number. Another manufacturer's product may listed within the specifications as an approved substitution. The Architect shall be the sole judge as to the comparability of an item of equipment that is submitted for approval as a substitute for that which is specified. Each of the Contractor's substitute proposals shall include all labor and materials that will be required to install the equipment and make it operate satisfactorily in accordance with the original design concept. He shall include such things as changes in piping, valves, supports, fittings, ductwork, motors, controls, electrical wiring, and thermal insulation. It shall be the responsibility of the Contractor to make certain that substitute equipment, which has been accepted by the Architect will fit into the designated spaces. He shall make the necessary field measurements in order to determine that there is adequate space for the equipment, taking into consideration the clearances that are required for connections and servicing. All equipment other than the basis of design shall be considered a substitution.

1.19 PROTECTION OF EQUIPMENT

A. The Contractor shall protect all material and equipment from damage until final acceptance as installed. He shall close all openings during construction with temporary plugs and replace all damaged items with ones of exact sameness at his expense.

B. The Contractor shall schedule material and systems for delivery in such a pattern that critical pieces of equipment may be stored within the building, protected from weather. Where materials are stored outside, they must be protected from the elements and damage.

C. This Contractor shall be responsible for coordinating the procurement of specified materials and equipment being supplied by his sub-contractors and suppliers.

1.20 SCAFFOLDING AND HOISTING

A. The Contractor shall furnish and erect all scaffolding, hoists, shoring, platforms, railings, ladders, and other devices required by local, state, and federal laws to install his systems and equipment. Scaffolding and all other equipment shall be removed at completion of the work.

B. The Contractor shall hoist or rig his own material and equipment into place, or arrange for the rigging of it by others at his expense.

1.21 CONCRETE AND MASONRY WORK:

A. The Contractor shall furnish and install all concrete bases, reinforcing, etc. required to install the Mechanical Work, unless otherwise noted.

B. The Contractor, prior to installing any forms, reinforcing or concrete, shall notify all other Contractors or subcontractors, in ample time for them to install any portion of their work which is to be concealed in the concrete. No such work shall be placed in a manner to interfere with the proper placing of the reinforcement unless so authorized by the Architect.

1.22 ANCHOR BOLTS:

A. Each Contractor shall provide and set in place at the time the foundations, bases, or curbs are poured, all necessary anchor bolts as required for the various equipment specified herein, to be furnished by him under these Specifications. Anchor bolts must be of the hook type and of the proper sizes and length to suit the apparatus. The bolts shall be set in pipe sleeves of approximately twice the bolt diameter and as long as the imbedded length of the bolt.

B. When the equipment is set in its proper position, the bolt sleeves and the space between the rough foundations, bases or curbs of the equipment shall be completely filled with one inch of non- shrinking cement grout.

C. Each Contractor shall assume all responsibility for the location of all anchor bolts for the equipment furnished by him under these Specifications, and must have a man present at the time the foundation, bases, or curbs are poured.

1.23 SLEEVES:

A. Each Contractor shall furnish and set all sleeves required for the installation of his work and shall be responsible for their final and permanent locations.

B. All pipes passing through masonry construction shall be fitted with sleeves. Each sleeve shall extend through its respective floor or wall and shall finish flush with each surface unless otherwise required. Unless otherwise specified or shown, sleeves shall be one pipe size larger than the overall outside diameter of the pipe when insulated. Sleeves in bearing and masonry walls shall be made of standard weight steel pipe.

C. Sleeves for pipes passing through non-fire rated floors: 18 gage galvanized steel.

D. Sleeves for pipes passing through non-fire rated beams, walls, footings, and potentially wet floors: Steel pipe or 18 gage galvanized steel.

E. Sleeves for rectangular ductwork: Galvanized steel and framing as shown on details.

F. Firestopping for non-plastic piping, ductwork shall be 3M, Dow, Corning fire caulk/packing or accepted equivalent. Install steel angles around duct penetrations. Refer to Section 07 8400. All fire stopping furnished by all contractors on the project shall have the same manufacturer.

G. All sleeves shall be properly installed and securely cemented in place. Where pipes pass through waterproofed floor or walls, design of sleeves shall be such that the waterproofing can be properly flashed around the sleeves, and of such height that the water will be restrained from entering sleeves and dripping to any finished areas below.

H. Where pipes pass through fire resisting portions of the structure, the annular space between the sleeve and the pipe shall be filled with an approved fireproof material.

1.24 ESCUTCHEONS:

A. All exposed pipes, except as otherwise described, passing through walls, floors, ceilings, etc. in finished spaces, shall be provided with solid pattern heavy ceiling, floor or wall escutcheons with set screw. Escutcheons and plates shall be of steel or malleable iron with prime coat ready for painting. Escutcheons will not be provided where sleeves intentionally extend above finished floor.

1.25 ACCESS DOORS AND PANELS:

A. All ceiling and wall access panels required shall be furnished by this Contractor and set by the General Contractor. The location of these access panels must be approved by the Architect prior to their installation. The Contractor shall furnish an access panel where fire dampers, valves, specialties, junction boxes, and other serviceable items are installed behind plaster, tile, or similar type non-removable surfaces.

B. Panels shall be of suitable size and construction for each specific location. Doors shall be flush and shall open 175 degrees on concealed hinges. All assemblies shall be rustproof and exposed finished edges and surfaces shall be prime-coated with rust inhibitive paint. Doors to be installed in ceilings shall be with screw driver operated cam locks. Doors for wall installation shall have master-keyed cylinder locks. Doors shall be Milcor, or equal, as follows:

1. Construction Milcor Model

    a. Masonry Style M
    b. Plaster Style K

1.26 CUTTING AND PATCHING:

A. Each Contractor shall give the General Contractor complete information as to size of openings to be provided by the General Contractor in new floors, and walls, etc., so that such openings may be provided as the project progresses.

B. If openings are omitted or are incorrect through failure of Mechanical Contractors to follow these instructions, the respective Contractors shall, at their own expense, engage the trade which originally installed the work, to cut and patch to the satisfaction of the Architect.

C. All cutting and patching of every nature required in connection with these Contracts shall be done by each Contractor with mechanics experience in their respective lines of work. All patching shall match adjacent finishes.

D. All cutting in the building shall be done with great care so as not to leave an unsightly surface which may not be concealed by plates, escutcheons, or other normal concealing construction. If such unsightly conditions occur through the fault of the Contractor, he shall be required at his own expense, to engage the General Contractor to replace the damaged materials with new materials.

E. Cutting and patching of the existing building shall be done by this Contractor. All holes cut shall be in a manner approved by the Architect and all patching shall be done so as to match the existing construction and finish. The Contractor shall patch all openings left in present walls, floors and ceilings when ductwork, piping and other materials are removed.

F. Where it becomes necessary to cut out any portions of walls, floors, ceilings, roof or other portions of the building for the installation of work as may be required to perform and complete the work under this Contract, the Contractor shall do all necessary cutting and fitting, shall remove all excess material, and shall replace all work damaged so as to leave the entire premises in a finished condition.

G. No cutting shall be done which may in any way affect the building structurally or architecturally. Any damage incident to cutting or other causes in the performance of this Contract shall be made good by replacement or repairs to the Owner's satisfaction. Cutting shall be done only with the prior approval of the Architect.

H. Patches in fire rated walls, ceilings and floors shall maintain the fire rating of these barriers by the use of approved materials including special fire rated sealing compounds or material identical to the barrier materials. Refer to the Architectural Specifications for approved methods and materials.

I. Contractor shall seal all ductwork and piping penetrations through walls and floors even if not fire rated.

1.27 PAINTING:

A. Provide corrosion inhibiting prime coating on all ferrous materials. Comply with Division 9 of the specifications

B. All exposed piping, iron work, and equipment installed in the mechanical equipment rooms under this contract shall be painted 1 prime coat and 2 coats of best quality oil paint of color as selected by the Architect.

C. Unless specifically noted, insulation and galvanized piping in ceiling cavity area shall not be painted.

D. All grilles, louvers, etc. unless otherwise indicated shall be either furnished in or painted in a color selected by the Architect. When requested by the Architect, the equipment shall be finished with a prime coat and then professionally painted in the field in a color selected by the Owner. The Contractor shall assume responsibility for all costs involved.

E. Note that all exposed ductwork and exposed piping systems shall be painted by the G.C. See Division 9 of the specifications for requirements. Ductwork or piping in rooms without continuous ceilings shall be considered exposed.

1.28 TEMPORARY HEAT:

A. Requirements for providing temporary heat are stated in the General Conditions of the Specifications. New HVAC equipment furnished under this Contract may be used for temporary heat provided all of the following conditions are met:

1. The HVAC equipment is installed as part of the permanent HVAC systems as indicated on the Drawings.
2. The Contractor unconditionally extends the manufacturer's warranty one year from the date of final acceptance by the Owner.
3. Air Handling systems, including air handlers, fan-powered boxes, etc. and duct distribution systems are not to be utilized for temporary heat until interior construction is substantially complete as determined by the Engineer. Obtain approval in writing.

1.29 CLEANING OF SYSTEMS:

A. The Contractors shall thoroughly clean all pipe and ductwork systems to remove all grease, oil scale, core, sand and other foreign material after tests have been made and before the building is turned over to the Owner. Flush and treat all systems in each phase as required to meet phasing requirements. See Section 23 2500.

B. All strainers shall be opened and cleaned thoroughly.

C. The interior of all air handling equipment, ductwork and all filters shall be cleaned thoroughly before the building is accepted by the Owner. Refer to Section 23 3100.

D. Should the Contractor put any substance into any system to aid in the cleaning of it, all trace of such material shall be removed before the system is considered clean. All such substances, if used, shall be free from any acid that will set or injure valve seats in any way.

E. Wash all fixtures with soap and water, remove labels and protective covering and clean all grease and cutting from plates or polished piping and trim.

F. Where damage to finish, furnishing or parts of the building results from pipe stoppage or from failure to clear and flush piping systems properly, the Contractor shall at his own expense, employ qualified skilled labor to make repairs.

G. After all tests have been made and the system proven satisfactory to the Architect, the Contractor shall go over the entire project, clean all equipment and material installed by him, and leave in a clean and working condition.

1.30 INSTRUCTION TO EMPLOYEES:

A. At the completion of the work, and before final acceptance of the building by the Owner, each Contractor, together with the representatives of the manufacturers of the equipment installed by the Contractor, shall instruct the designated employees of the Owner in the care, adjustment, maintenance and operation of equipment installed by him.

B. Three copies of factory installation and maintenance schedules shall be furnished for each piece of equipment. Acceptance of materials and equipment is conditional upon receipts of maintenance manuals.

C. A representative of the manufacturer of each piece of equipment shall inspect his respective pieces of equipment, make final adjustments, and put them in a satisfactory working condition.

1.31 OPERATION AND MAINTENANCE INSTRUCTIONS:

A. Upon the completion of this project, the Contractor shall deliver to the Architect for approval, three copies of an operating and maintenance manual consisting of the items outlined hereinafter.

B. The purpose of this manual is to assist the Owner in routine operation, maintenance, servicing, troubleshooting and procurement of replacement parts. All information in the manual shall be as-built and only material pertinent to the project shall be included.

C. The operating manual shall be considered a part of the final inspection and shall be submitted for review and approval at least 30 days in advance of a request for final inspection. The manual shall include:

1. A copy of all final corrected equipment submittals, control diagrams, descriptive brochures, and a list of all parts of each piece of mechanical and electrical equipment which has been furnished and installed.

D. Complete and detailed typewritten operating and maintenance instructions for all major operating equipment. The operating and start-up instructions shall be written in a concise, step by step manner. Maintenance instructions shall include such things as periodic checks, adjustments and troubleshooting techniques. Specifications for lubricants and other required fluids shall be included.

E. A listing of all items of mechanical and electrical equipment, a compilation of the nameplate data for this same equipment, the name, address and telephone number of the nearest service organization.

1. Copies of all A.S.M.E. pressure vessel certifications, state approved tank permits, complete additional valve tag schedules, all electrical inspection permits and all additional mechanical and electrical permits required for occupancy by the Owner.
2. All of the materials shall be indexed by specification section, arranged categorically and be bound in a rigid, plastic covered, three ring binder.

1.32 GUARANTEE:

A. Each Contractor shall unconditionally guarantee in writing all materials, equipment, and workmanship for a period of one year from date of final acceptance. The Contractor shall provide free service including parts replacement for all equipment involved in his Contract during this guarantee period.

B. The guarantee shall include restoration to its original condition of all adjacent work that must be disturbed in fulfilling this guarantee.

C. All such repairs and/or replacements shall be made without delay and at the convenience of the Owner.

D. Refrigeration compressors and heat exchanger circuits shall have a five year guarantee.

E. All warranties shall include parts and labor. Durations of equipment warranties shall begin when the building has been accepted by the Owner.

PART 2 – PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install equipment to permit removal of components and parts which require periodic replacement or maintenance. Arrange pipes, ducts, and equipment to permit access to valves, gauges, starters, motors, doors and access panels.

B. Provide access panels in equipment, ducts, etc. as required for inspection and maintenance.

3.2 PIPING INSTALLATION

A. In general, piping shall be exposed in equipment rooms, and concealed in all finished rooms. Where piping is exposed, it shall be run so as to allow maximum headroom consistent with proper pitch. No piping or ductwork shall cross below the head of any window or door.

B. Exposed piping, ducts, conduits, and/or appurtenances indicated on the inside of buildings, shall be installed parallel to the building lines. All piping shall be kept as close as possible to the ceilings, walls, and columns, to take up the minimum amount of space.

C. All work shall be arranged and installed as high as possible to prevent obstruction of window areas, and to give adequate clearance and access for operation and maintenance.

3.3 SLEEVES

A. Where pipes pass through concrete or masonry walls or concrete floors, they shall be protected through the full depth of the construction with galvanized sleeves; same to be at least one size larger than the pipe plus insulation.

B. Where sleeves occur in concrete floors, the top of sleeve shall be 2" above the finished floor line, and the end shall be filed to a smooth round finish.

C. This Contractor shall supply all pipe sleeves and shall inform general contractor of exact sleeve locations in time for their incorporation onto the concrete forms or masonry work.

D. Any cutting and patching in masonry or concrete made necessary by failure to adequate coordinate with the general contractor shall be done by the general contractor at the expense of this contractor.

E. The space between pipes and sleeves shall be caulked air tight with a non-combustible inorganic material.

3.4 UNIONS

A. Unions shall be provided at all connections to each piece of equipment and on both sides of all automatic valves, and devices which requires removal for maintenance. No unions are to be placed in a location which will be inaccessible after the completion of the project.

B. Unions of copper tubing shall be 200 lbs. SWP brass ground joint.

C. Unions for steel pipe shall be 250 lbs. SWP, malleable iron with brass to iron seat.

3.5 CLEARANCE

A. All piping, including valves and fittings shall be installed to provide the following minimum clearances between the finish coverings, adjacent pipe and/or conduits: 4" between for piping services and 6" between piping services and electrical conduits.

3.6 ESCUTCHEON PLATES

A. All piping passing through walls, ceilings, and floors shall be provided with escutcheon plates securely fastened in place. Where installed on piping in finished areas they shall be chrome plated.

3.7 ACCESS PANELS

A. Removable panels shall be located so as to provide easy access to all concealed plumbing accessories that may require adjustments or maintenance, such as valves, water hammer arresters, traps, strainers, cleanouts or others.

B. Access panels in finished wall or ceiling surfaces shall be furnished by this Contractor for installation by the General Contractor.

C. This Contractor shall pay for any work made necessary by his failure to inform other trades of access panel locations.

3.8 APPLICATIONS OF INSULATION AND COVERING

A. No covering shall be installed by the Contractor until the piping and ducts have been approved by the Architect/Engineer/Construction/Owner.

3.9 INSERTS

A. Except as noted, provide box type inserts for all hangers and supports intended to suspend piping or light weight equipment from new concrete construction. Fasten all inserts of the form work before concrete is poured. Inserts to be Grinnell Figure No. 282 or Figure No. 279 depending upon the maximum load to be carried.

B. No toggle bolts, expansion screw anchors or similar imbedded hanger supports shall be used in new construction.

3.10 CHASES AND OPENINGS IN FLOORS AND WALLS

A. It shall be the duty of the Contractor requiring chases, openings or the placement of any sleeves, anchors, and supports required for his work, whether or not shown on the drawings, to advice the General Contractor accordingly, prior to or at the time of pouring concrete slabs, beams or the building of walls, etc. He shall furnish all such sleeves, anchors, and supports in place, and all necessary information for the proper location of said chases or openings. Show all information on the coordination drawings.

B. If a contractor shall fail to observe and comply with those requirements, he shall cut, at his own expense, after receiving the consent of the Architect, such chases or opening as may be necessary and proper, providing and building in place all lintels required by these openings, doing the necessary patching and rebuilding of the work required under the direction of the General Contractor and he hall be responsible for all loss or delay resulting therefrom.

3.11 EQUIPMENT BASES AND SUPPORTS:

A. Provide housekeeping pads of concrete, minimum 4” thick and extending 4” beyond supported equipment.

B. Provide templates, anchor bolts, and accessories for mounting and anchoring equipment.

C. Construct supports of steel members. Brace and fasten and flanges bolted to structure.

D. Provide rigid anchors for pipes after vibration isolation components are installed.

END OF SECTION 230501

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 230513 - COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Single phase electric motors.

B. Three phase electric motors.

1.2 RELATED SECTIONS

A. Section 23 8101 – Terminal Heat Transfer Units.

1.3 REFERENCES

A. ABMA STD 9 - Load Ratings and Fatigue Life for Ball Bearings; American Bearing Manufacturers Association, Inc.; 1990 (Reapproved 2000).

B. IEEE 112 - IEEE Standard Test Procedure for Polyphase Induction Motors and Generators; Institute of Electrical and Electronic Engineers; 2004.

C. NEMA MG 1 - Motors and Generators; National Electrical Manufacturers Association; 2009, Revision 1 - 2010.

D. ASHRAE (American Society of Heating, Refrigeration, and Air-Conditioning Engineers) Standard 90.1 Energy Standard for Buildings Except Low-Rise Residential Buildings.

E. NFPA 70 - National Electrical Code; National Fire Protection Association; 2017.

1.4 SUBMITTALS

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

B. Product Data: Provide wiring diagrams with electrical characteristics and connection requirements.

C. Test Reports: Indicate test results verifying nominal efficiency and power factor for three phase motors larger than 1/2 horsepower.

D. Manufacturer's Installation Instructions: Indicate setting, mechanical connections, lubrication, and wiring instructions.

E. Operation Data: Include instructions for safe operating procedures.

F. Maintenance Data: Include assembly drawings, bearing data including replacement sizes, and lubrication instructions.

1.5 QUALITY ASSURANCE

A. Conform to NFPA 70.

B. Motors shall comply with ASHRAE Standard 90.1 Energy Standard for Buildings Except Low-Rise Residential Buildings current edition.

C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect motors stored on site from weather and moisture by maintaining factory covers and suitable weather-proof covering. For extended outdoor storage, remove motors from equipment and store separately.

1.7 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Century

B. Baldor

C. Lincoln Motors

D. A. O. Smith Electrical Products Company

2.2 GENERAL CONSTRUCTION AND REQUIREMENTS

A. Construction:

1. TEFC type except where specifically noted otherwise.
2. Design for continuous operation in 40 degrees C environment.
3. Design for temperature rise in accordance with NEMA MG 1 limits for insulation class, service factor, and motor enclosure type.
4. All motors shall be high efficiency type.

B. Provide motors with phase loss protection.

C. Motors for use with VFD's shall be designed and approved by the manufacturer for use with VFD's.

D. Mechanical Contractor shall provide all motors that are required. Each motor shall be the correct service type and have a horsepower rating that is adequate for the device it is intended to drive. Motors shall not exceed their full load rating, including the service factor rating, whenever the driven equipment is operating at the specified capacity under normal operating conditions.

E. Insulation shall be Class B. Motors shall be dripproof in dry, non-hazardous locations, weather protected where exposed to the weather or dampness, and totally enclosed, fan cooled where specified. Dripproof and totally enclosed fan cooled motors, fractional and integral horsepower, shall have service factor ratings of 1.15 and 1.0 respectively. Fractional horsepower motors shall have sealed, permanently lubricated, ball bearings unless sleeve bearings are standard with a manufacture of equipment which utilized direct driven fans. Integral horsepower motors shall have ball bearings with grease zerk fittings and drain ports. All motors shall be rated for continuous duty. Maximum temperature rise shall not exceed 40 degrees C. for dripproof frame motors and 55 degrees C. for totally enclosed motors in a 40 degree C. ambient condition. Motors shall be suitable for the electrical service specified, scheduled or shown.

F. Motors shall have been tested and approved by the Underwriters' Laboratories, Inc. Motors shall be manufactured and classified in accordance with the current NEMA Standard Publication No. Mg 1 entitled "Motors and Generators."

G. Motors shall be dynamically balanced and tested at the factory before shipment. They shall be relatively quiet while running. Connections to direct driven devices shall be made with a flexible coupling. Motors for V-belt drive service shall be furnished with a steel base and a screw device for adjusting belt tension.

H. Motors shall be mounted so that they are readily accessible for maintenance. Motor terminal boxes shall be accessible. Covers shall not be blocked by other equipment. Watertight terminal boxes shall be provided on those motors in wet locations or where they are exposed to the weather. Motor mounting arrangement shall be such that the motor mounting bolts are accessible in order to facilitate its removal.

I. Explosion-Proof Motors: UL approved and labelled for hazard classification, with over temperature protection.

J. Visible Nameplate: Indicating motor horsepower, voltage, phase, cycles, RPM, full load amps, locked rotor amps, frame size, manufacturer's name and model number, service factor, power factor, efficiency.

K. Wiring Terminations:

1. Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70, threaded for conduit.
2. For fractional horsepower motors where connection is made directly, provide threaded conduit connection in end frame.

2.3 ELECTRICAL CONNECTIONS

A. All electrical connections shall be made by the Electrical Contractor. Motors and controls for equipment furnished by each Contractor shall be furnished and set by the Contractor furnishing the equipment. Where electrical work is specifically indicated to be performed by the Plumbing, Fire Protection or Heating Contractor, this Contractor shall perform the work in conformance with Electrical Specifications for this project.

2.4 MOTOR CONTROLLERS

A. Mechanical Contractor shall provide motor controllers. The items shall be products of one manufacturer, Allen-Bradley, Square D, General Electric or Westinghouse, and shall meet latest N.E.M.A. and IEEE Specifications. Starters and contactors shall be horsepower rated. Starters shall include the proper size heater elements

B. Magnetic starters shall be provided with "On-Off-Auto" switches on the starter.

C. Unless otherwise noted, control and pilot devices such as electric thermostats, alternators, float controls, aquastats, etc., shall be furnished and installed by the Mechanical Contractor. Each device shall be provided with all auxiliary features and accessories which may be required for correct operation of the associated equipment.

D. Magnetic starters shall be provided with start-stop pushbuttons on the starters unless remote control pushbuttons or other methods of starting are specified elsewhere.

E. Unless otherwise noted elsewhere, all magnetic motor starters controlled with a remote pilot device shall contain a control circuit transformer, as an integral part of the controller, providing control power at a maximum 120 volts for the pilot device. The exact control circuit voltage shall be coordinated with the ATC supplier prior to the purchase of any motor controllers.

F. Starters and protective devices which are provided as an integral part of the equipment furnished under the Mechanical Contracts, shall be supplied.

G. For use in manual starting of fractional horsepower motors up to but not including 1/2 horsepower, the Mechanical Contractor shall furnish a thermal manual toggle switch type starter with pilot light specifically designed for this purpose. Each starter shall be provided with proper size heater element for the motor to be controlled. Heater elements shall be readily removable and interchangeable. Starters shall be arranged for flush or surface mounting as indicated or as required.

H. Controllers and wiring diagrams shall be delivered to the Electrical Contractor.

2.5 MOTOR DISCONNECTS:

A. Unless otherwise noted, motors located out of sight of their respective electric panels shall be provided with disconnect switches at the motors by the Mechanical Contractor.

B. All exhaust and supply fans on the roof shall be provided with disconnecting means at the motors as an integral part of the equipment.

2.6 ENCLOSURES:

A. Motor controllers and disconnects shall be provided with standard approved enclosures to suit the locations in which they are installed and the conditions under which they are to operate.

2.7 MOTOR CONTROL WIRING:

A. The Electrical Contractor shall run the power wiring system from the various supply panels indicated, to the motors and motor controllers and shall make final connections unless otherwise noted on the Drawings. The Mechanical Contractors shall run all control wiring from the motor controllers to the pilot devices.

B. Starters, and protective control devices which are provided as integral part of the motors or motor-operated equipment shall be prewired at the factory.

C. After final connections are completed, the Mechanical Contractor shall test each motor for proper rotation. Before applying current to the motor, the Mechanical Contractor shall check the motor for alignment, oil, etc. The Mechanical Contractor shall make any necessary adjustments to the starter and control equipment for proper starting and overload protection.

END OF SECTION 230513

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 230554 - MECHANICAL IDENTIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK:

A. In addition to this section, refer to drawings and/or other sections for complete extent of mechanical identification work required.

1.3 QUALITY ASSURANCE:

A. Manufacturers: Firms regularly engaged in manufacture of identification devices of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. ANSI Standards: Comply with ANSI A13.1 for lettering size, colors, and viewing angles of identification devices.

1.4 SUBMITTALS:

A. Product Data: Submit product specifications and installation instructions for each identification material and device required.

B. Samples: Submit samples of each color, lettering style and other graphic representation required for each identification materials or system.

PART 2 - PRODUCTS

2.1 MECHANICAL IDENTIFICATION MATERIALS:

A. General: Provide manufacturer's standard products of categories and types required for each application as referenced in other Division-23 sections. Where more than single type is specified for application, selection is Installer's option, but provide single selection for each product category.

B. Plastic Pipe Markers:

1. General: Provide manufacturer's standard pre-printed, flexible or semi-rigid, permanent, color coded, plastic-sheet pipe markers, complying with ANSI A13.1.

a. Small Pipes: For external diameters 2" and smaller (including insulation if any), provide full-bank pipe markers, extending 360 degrees around pipe at each location, fastened by one of the following methods:

1) Snap-on application of pre-tensioned semi-rigid plastic pipe marker.

b. Lettering: Manufacturer's standard pre-printed nomenclature which best describes piping system in each instance, as selected by Architect/Engineer in cases of variance with names as shown or specified.
c. Arrows: Print each pipe marker with arrows indicating direction of flow, either integrally with piping system service lettering (to accommodate both directions), or as separate unit of plastics.

C. Stencils:

1. Provide with clean cut symbols and letters of following sizes:

a. 2-1/2" to 6" outside diameter of pipe or insulation: 12" long color field, 1-1/4" high letters.
b. 8" to 12" outside diameter of pipe or insulation: 24" long color field, 2-1/2" high letters.

D. Valve Tags:

1. Engraved plastic tags: Provide laminated three-layer with engraved black letters on light contrasting background color. Piping system abbreviation in 1/4" high letters and sequenced valve numbers 1/2" high, and with 5/32" hole for fastener.
2. Provide 1-1/2" diameter tags, except as otherwise indicated.

E. Valve Tag Fasteners: Manufacturer's standard solid brass chain (wire link or beaded type), or solid brass S-hooks of the sizes required for proper attachment of tags to valves, and manufactured specifically for that purpose.

F. Engraved Plastic-Laminate Signs:

1. General: Provide engraving stock melomine plastic laminate, complying with FS L-P-387, in the sizes and thicknesses indicated, engraved with engraver's standard letter style of the sizes and working indicate, black with white core (letter color) except as otherwise indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.

2. Thickness: 1/16" for units up to 20 sq. in. or 8" length; 1/8" for larger units.

    a. Fasteners: Self-tapping stainless steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate the substance.

3. Letter Size: 3"

H. Manufacturer:

1. General: Subject to compliance with requirements, provide mechanical identification materials of one of the following:

    a. Brady (W.H.) Company, Signmark Div.
    b. Seton Name Plate Corp.

2.2 LETTERING AND GRAPHICS:

A. General: Coordinate names, abbreviations and other designations used in mechanical identification work, with corresponding designations shown, specified or schedule. Provide numbers, lettering and working as indicated or, if not otherwise indicated, as recommended by manufacturers or as required for proper identification and operation/maintenance of mechanical systems and equipment.

1. Multiple Systems: Where multiple systems of same generic name are shown and specified, provide identification which indicates individual system number as well as service (as examples: Boiler No. 3, Air Supply No. 1H, Standpipe F12).

2.3 APPLICATION AND INSTALLATION:

A. General Installation Requirements:

1. Coordination: Where identification is to be applied to surfaces which require insulation, painting or other covering or finish, including valve tags in finished mechanical spaces, install identification after completion of coverings and painting. Install identification prior to installation of acoustical ceilings and similar removable concealment.

B. Piping System Identification:

1. General: Install pipe markers of one of the following types on each system indicated to receive identification, and include arrows to show normal direction of flow:

   a. Stenciled markers, including color-coded background band or rectangle, and contrasting lettering of black or white. Extend color band or rectangle 2" beyond ends of lettering.
   b. Plastic pipe markers, with application system as indicated under "Materials" in this section. Install on pipe insulation segment where required for hot non-insulated pipes.

2. Locate pipe markers and color bands as follows wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces.
3. Near each valve and control device.

   a. Near each branch, excluding short take-offs for fixtures and terminal units; mark each pipe at branch, where there could be question of flow pattern.

4. Near locations where pipes pass through walls or floors/ceilings, or enter non-accessible enclosures.
5. At access doors, manholes and similar access points which permit view of concealed piping.
6. Near major equipment items and other points of origination and termination.

   a. Spaced intermediately at maximum spacing of 50' along each piping run, except reduce spacing to 25' in congested areas of piping and equipment.

7. On piping above removable acoustical ceilings, except omit intermediately spaced markers.
8. For HVAC piping, use green background with white letters. Submit all designations prior to installation for approval and the following designations.

   a. Hot water supply HWS
   b. Hot water Return HWR

C. Valve Identification:

1. General: Provide valve tag on every valve, cock and control device in each piping system; exclude check valves, valves within factory-fabricated equipment units, and HVAC terminal devices. List each tagged valve in valve schedule for each piping system.

D. Mechanical Equipment Identification: Provide marker on ceiling grid below VAV boxes, fan coils, etc. with equipment ID numbers.

1. General: Install engraved plastic laminate sign on or near each major item of mechanical equipment and each operational device, as specified herein if not otherwise specified for each item or device. Provide signs for the following general categories of equipment and operational devices:

a. Main control and operating valves, including safety devices and hazardous units such as gas outlets.
b. Terminal Heating Equipment.

PART 3 - EXECUTION

3.1 MECHANICAL IDENTIFICATION:

A. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.

B. Install tags with corrosion resistant chain.

C. Install plastic pipe markers in accordance with manufacturer's instructions.

D. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.

E. Install underground plastic pipe markers 6 to 8” below finished grade, directly above buried pipe.

F. Identify air handling units, pumps, heat transfer equipment, tanks, and water treatment devices with stencil painting. Small devices, such as in-line pumps, may be identified with tags.

G. Identify control panels and major control components outside panels with plastic nameplates.

H. Identify thermostats relating to terminal boxes or valves with nameplates.

I. Identify valves in main and branch piping with tags.

J. Identify air terminal units and radiator valves with numbered tags.

K. Tag automatic controls, instruments, and relays. Key to control schematic.

L. Identify piping, concealed or exposed, with plastic pipe markers. Use tags on piping 3/4" diameter and smaller. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20' on straight runs including risers and drops, adjacent to each valve and tee, at each side of penetration of structure or enclosure, and at each obstruction.

M. Identify ductwork with stenciled painting. Identify with air handling unit identification number and areas served.

N. Provide ceiling tacks to locate valves or dampers above T-bar type panel ceilings. Locate in corner of panel closest to equipment.

END OF SECTION 230554

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Testing, adjustment, and balancing of air systems.

B. Testing, adjustment, and balancing of hydronic systems.

C. Measurement of final operating condition of HVAC systems.

1.2 REFERENCES

A. AABC MN-1 - AABC National Standards for Total System Balance; Associated Air Balance Council; 2002.

B. ASHRAE Std 111 - Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems; American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.; 2008.

C. NEBB (TAB) - Procedural Standards for Testing Adjusting Balancing of Environmental Systems; National Environmental Balancing Bureau; 2015, Seventh Edition.

D. SMACNA (TAB) - HVAC Systems Testing, Adjusting, and Balancing; Sheet Metal and Air Conditioning Contractors' National Association; 2002.

1.3 SUBMITTALS

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

B. Qualifications: Submit name of adjusting and balancing agency and TAB supervisor for approval within 30 days after award of Contract.

C. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.

1. Submit to Architect.
2. Submit six weeks prior to starting the testing, adjusting, and balancing work.
3. Include certification that the plan developer has reviewed the contract documents, the equipment and systems, and the control system with the Architect and other installers to sufficiently understand the design intent for each system.

4. Include at least the following in the plan:

   a. Preface: An explanation of the intended use of the control system.
   b. List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
   c. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
   d. Identification and types of measurement instruments to be used and their most recent calibration date.
   e. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
   f. Final test report forms to be used.
   g. Detailed step-by-step procedures for TAB work for each system and issue, including:

      1) Terminal flow calibration (for each terminal type).
      2) Diffuser proportioning.
      3) Branch/submain proportioning.
      4) Total flow calculations.
      5) Rechecking.
      6) Diversity issues.

   h. Expected problems and solutions, etc.
   i. Criteria for using air flow straighteners or relocating flow stations and sensors; analogous explanations for the water side.
   j. Details of how TOTAL flow will be determined; for example:

      1) Air: Sum of terminal flows via control system calibrated readings or via hood readings of all terminals, supply (SA) and return air (RA) pitot traverse, SA or RA flow stations.
      2) Water: Pump curves, circuit setter, flow station, ultrasonic, etc.

   k. Specific procedures that will ensure that both air and water side are operating at the lowest possible pressures and methods to verify this.
   l. Confirmation of understanding of the outside air ventilation criteria under all conditions.
   m. Method of verifying and setting minimum outside air flow rate will be verified and set and for what level (total building, zone, etc.).
   n. Method of checking building static and exhaust fan and/or relief damper capacity.
   o. Proposed selection points for sound measurements and sound measurement methods.
   p. Methods for making coil or other system plant capacity measurements, if specified.
   q. Time schedule for TAB work to be done in phases (by floor, etc.).
   r. Description of TAB work for areas to be built out later, if any.
   s. Time schedule for deferred or seasonal TAB work, if specified.

t. False loading of systems to complete TAB work, if specified.
u. Exhaust fan balancing and capacity verifications, including any required room pressure differentials.
v. Interstitial cavity differential pressure measurements and calculations, if specified.
w. Procedures for field technician logs of discrepancies, deficient or uncompleted work by others, contract interpretation requests and lists of completed tests (scope and frequency).
x. Procedures for formal progress reports, including scope and frequency.
y. Procedures for formal deficiency reports, including scope, frequency and distribution.

D. Control System Coordination Reports: Communicate in writing to the controls installer all setpoint and parameter changes made or problems and discrepancies identified during TAB which affect the control system setup and operation.

E. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.

1. Revise TAB plan to reflect actual procedures and submit as part of final report.
2. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.
3. Provide reports in soft cover, letter size, 3-ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.
4. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
5. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
6. Test Reports: Indicate data on AABC MN-1 forms, forms prepared following ASHRAE Std 111, or NEBB forms.
7. Include the following on the title page of each report:

a. Name of Testing, Adjusting, and Balancing Agency.
b. Address of Testing, Adjusting, and Balancing Agency.
c. Telephone number of Testing, Adjusting, and Balancing Agency.
d. Project name.
e. Project location.
f. Project Architect.
g. Project Engineer.
h. Project Contractor.
i. Report date.

1.4 QUALITY ASSURANCE

A. Perform total system balance in accordance with AABC MN-1, ASHRAE Std 111, or NEBB Procedural Standards for Testing, Balancing and Adjusting of Environmental Systems.

1. Maintain one copy of each document on site.

B. TAB Agency Qualifications: Company specializing in the testing, adjusting, and balancing of systems specified in this Section with minimum three years documented experience certified by AABC or NEBB.

C. Perform Work under supervision of AABC Certified Test and Balance Engineer or NEBB Certified Testing, Balancing and Adjusting Supervisor experienced in performance of this Work and licensed at the Pennsylvania.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. Perform total system balance in accordance with one of the following:

1. AABC MN-1, AABC National Standards for Total System Balance.
2. ASHRAE Std 111, Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.
3. NEBB Procedural Standards for Testing Adjusting Balancing of Environmental Systems.
4. SMACNA HVAC Systems Testing, Adjusting, and Balancing.

B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.

C. Where HVAC systems and/or components interface with life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with the authorities having jurisdiction.

D. TAB Agency Qualifications:

1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
2. Having minimum of three years documented experience.
3. Certified by one of the following:

a. AABC, Associated Air Balance Council: www.aabchq.com; upon completion submit AABC National Performance Guaranty.

E. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

3.2 TESTING, ADJUSTING, AND BALANCING AGENCIES

A. H.T. Lyons.

B. Optimum Performance Balancing.

C. Associated Air Balance Engineers.

D. Eastern Air Balancing

E. Mountain Air Balancing.

3.3 EXAMINATION

A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:

1. Systems are started and operating in a safe and normal condition.
2. Temperature control systems are installed complete and operable.
3. Proper thermal overload protection is in place for electrical equipment.
4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
5. Duct systems are clean of debris.
6. Fans are rotating correctly.
7. Fire and volume dampers are in place and open.
8. Air coil fins are cleaned and combed.
9. Access doors are closed and duct end caps are in place.
10. Air outlets are installed and connected.
11. Duct system leakage is minimized.
12. Hydronic systems are flushed, filled, and vented.
13. Pumps are rotating correctly.
14. Proper strainer baskets are clean and in place.
15. Service and balance valves are open.

B. Submit field reports. Report defects and deficiencies noted during performance of services which prevent system balance.

C. Beginning of work means acceptance of existing conditions.

3.4 INSTALLATION TOLERANCES

A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.

B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

C. Hydronic Systems: Adjust to within plus or minus 10 percent of design.

3.5 RECORDING AND ADJUSTING

A. Field Logs: Maintain written logs including:

1. Running log of events and issues.
2. Discrepancies, deficient or uncompleted work by others.
3. Contract interpretation requests.
4. Lists of completed tests.

B. Ensure recorded data represents actual measured or observed conditions.

C. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

D. Mark on the drawings the locations where traverse and other critical measurements were taken and cross reference the location in the final report.

E. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

F. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

G. Check and adjust systems approximately six months after final acceptance and submit report.

3.6 AIR SYSTEM PROCEDURE

A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.

B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.

C. Measure air quantities at air inlets and outlets.

D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.

E. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Affect volume control by duct internal devices such as dampers and splitters.

F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.

G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.

H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.

I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.

K. Where modulating dampers are provided, take measurements and balance at extreme conditions.

3.7 WATER SYSTEM PROCEDURE

A. Adjust water systems to provide required or design quantities.

B. Use calibrated Venturi tubes, orifices, or other metered fittings and pressure gauges to determine flow rates for system balance. Where flow metering devices are not installed, base flow balance on temperature difference across various heat transfer elements in the system.

C. Adjust systems to provide specified pressure drops and flows through heat transfer elements prior to thermal testing. Perform balancing by measurement of temperature differential in conjunction with air balancing.

D. Effect system balance with automatic control valves fully open to heat transfer elements.

E. Effect adjustment of water distribution systems by means of balancing cocks, valves, and fittings. Do not use service or shut-off valves for balancing unless indexed for balance point.

F. Where available pump capacity is less than total flow requirements or individual system parts, full flow in one part may be simulated by temporary restriction of flow to other parts.

3.8 MINIMUM DATA TO BE REPORTED

A. Duct Traverses:

1. System zone/branch
2. Duct size
3. Area
4. Design velocity
5. Design air flow
6. Test velocity
7. Test air flow
8. Duct static pressure
9. Air temperature
10. Air correction factor

B. Terminal Unit Data:

1. Manufacturer
2. Type(constant, variable, fan powered, single, dual duct)
3. Identification/number
4. Location
5. Model number
6. Size
7. Minimum static pressure
8. Minimum design air flow
9. Maximum design air flow
10. Maximum actual air flow
11. Inlet static pressure

C. Air Distribution Tests:

1. Air terminal number
2. Room number/location
3. Terminal type
4. Terminal size
5. Area factor
6. Design velocity
7. Design air flow
8. Test (final) velocity
9. Test (final) air flow
10. Percent of design air flow

END OF SECTION 230593

SECTION 230714 - HVAC DUCT INSULATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Duct insulation.

1.2 RELATED SECTIONS

A. Section 23 0554 – Mechanical Identification.

1.3 REFERENCES

A. ASTM C 553 - Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2002.

B. ASTM C 612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2004.

C. ASTM C 1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material); 2005.

D. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2005.

E. ASTM E 96/E 96M - Standard Test Methods for Water Vapor Transmission of Materials; 2005.

F. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials; National Fire Protection Association; 2006.

G. SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association; 2005.

H. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Underwriters Laboratories Inc.; 2003.

I. IECC 2018 - International Energy Conservation Code.

1.4 SUBMITTALS

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

B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

C. Manufacturer's Instructions: Indicate installation procedures which ensure acceptable workmanship and installation standards will be achieved.

D. Submit MSS information for all products.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section with not less than five years of documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified in this section, with minimum 5 years of experience and approved by manufacturer.

1.6 DELIVERY, STORAGE, AND PROTECTION

A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.

B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

C. Store indoors or in suitable storage facilities. Do not store outdoors.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.

B. Maintain temperature during and after installation for minimum period of 24 hours.

C. All insulation and adhesives shall be formaldehyde free.

PART 2 - PRODUCTS

2.1 REQUIREMENTS FOR ALL PRODUCTS OF THIS SECTION

A. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E 84, NFPA 255, or UL 723.

2.2 GLASS FIBER, FLEXIBLE

A. MANUFACTURER:

1. Johns Manville Corporation: www.jm.com. Microlite XG.

a. Approved formaldehyde-free equal.

2. Insulation: ASTM C 553-92; formaldehyde-free, flexible glass fiber, noncombustible blanket.

a. 'K' ('Ksi') value: 0.29 at 75 degrees F (0.042 at 24 degrees C), when tested in accordance with ASTM C 518.

1) Maximum Service Temperature: 250 degrees F (232 degrees C).
2) Maximum Water Vapor Sorption: 5.0 percent by weight.

3. Vapor Barrier Jacket:

a. Porous interior sealant primers shall not have VOC content in excess of 775 grams/liter, less water and compounds exempt by the applicable LEED standard.
b. Kraft paper with glass fiber yarn and bonded to aluminized film.
c. Moisture Vapor Permeability: 0.058 ng/Pa s m, when tested in accordance with ASTM E 96/E 96M.
d. Secure with pressure sensitive tape.

4. Vapor Barrier Tape:

a. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive formaldehyde-free rubber based adhesive.

2.3 GLASS FIBER, RIGID

A. Manufacturer:

1. Knauf Fiber Glass: www.knauffiberglass.com.
2. Johns Manville Corporation: www.jm.com.
3. Owens Corning Corp: www.owenscorning.com.

4. CertainTeed Corporation: www.certainteed.com.

B. Insulation: ASTM C 612; rigid, noncombustible blanket.

1. 'K' ('Ksi') value: 0.24 at 75 degrees F (0.036 at 24 degrees C), when tested in accordance with ASTM C 518.
2. Maximum service temperature: 450 degrees F (232 degrees C).
3. Maximum Water Vapor Sorption: 5.0 percent.
4. Maximum Density: 8.0 lb/cu ft (128 kg/cu m).
5. Vapor Barrier Jacket:

a. Kraft paper with glass fiber yarn and bonded to aluminized film.
b. Moisture Vapor Permeability: 0.058 ng/Pa s m, when tested in accordance with ASTM E 96/E 96M.
c. Secure with pressure sensitive tape.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that ducts have been tested before applying insulation materials.

B. Verify that surfaces are clean, foreign material removed, and dry.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with NAIMA National Insulation Standards.

C. Insulated ducts conveying air below ambient temperature:

1. Provide insulation with vapor barrier jackets.
2. Finish with tape and vapor barrier jacket.
3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
4. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.
5. Insulated ducts conveying air above ambient temperature:

a. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.

D. External Duct Insulation Application:

1. Install without sag on underside of duct. Use welded pin mechanical fasteners where necessary to prevent sagging. Lift duct off trapeze hangers and insert spacers.
2. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
3. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.
4. Install Insulation materials with smooth and even surfaces.
5. Maintain integrity of vapor barrier on ductwork insulation, and protect it to prevent puncture and other damage.
6. Extend ductwork insulation without interruption through walls, floors, and similar ductwork penetrations except where otherwise indicated.

3.3 PROTECTION AND REPLACEMENT:

A. Replace damaged insulation, which cannot be repaired satisfactorily, including units with vapor barrier damage and moisture saturated units.

B. Protection: The installer of the ductwork insulation shall advise the contractor of required protection for the insulation work during the remainder of the construction period to avoid damage and deterioration.

3.4 SCHEDULES

A. All fresh air intake ducts from the outside intake louver or vent to the unit casing shall be externally insulated with 2” thick fiberglass.

END OF SECTION 230714

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 230719 - HVAC PIPING INSULATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Piping insulation.

B. Jackets and accessories.

1.2 RELATED SECTIONS

A. Section 07 8400 - Firestopping.

B. Section 23 2113 - Hydronic Piping: Placement of hangers and hanger inserts.

1.3 REFERENCES

A. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2007.

B. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2007.

C. ASTM C 177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded Hot Plate Apparatus; 2004.

D. ASTM C 195 - Standard Specification for Mineral Fiber Thermal Insulating Cement; 2007.

E. ASTM C 449/C 449M - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement; 2000.

F. ASTM C 533 - Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation; 2009.

G. ASTM C 534 - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2007a.

H. ASTM C 547 - Standard Specification for Mineral Fiber Pipe Insulation; 2007.

I. ASTM C 552 - Standard Specification for Cellular Glass Thermal Insulation; 2007.

J. ASTM C 578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2009.

K. ASTM C 585 - Standard Practice for Inner and Outer Diameters of Rigid Thermal Insulation for Nominal Sizes of Pipe and Tubing (NPS System); 2009.

L. ASTM C 591 - Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation; 2009.

M. ASTM C 610 - Standard Specification for Molded Expanded Perlite Block and Pipe Thermal Insulation; 2009.

N. ASTM C 795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008.

O. ASTM D 1056 - Standard Specification for Flexible Cellular Materials--Sponge or Expanded Rubber; 2007.

P. ASTM D 2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics; 2006.

Q. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2010.

R. ASTM E 96/E 96M - Standard Test Methods for Water Vapor Transmission of Materials; 2005.

S. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials; National Fire Protection Association; 2006.

T. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

U. IECC 2018 - International Energy Conservation Code.

1.4 SUBMITTALS

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

B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

C. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than five years of documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum 5 years of experience.

1.6 DELIVERY, STORAGE, AND PROTECTION

A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Maintain ambient conditions required by manufacturers of each product.

B. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 - PRODUCTS

2.1 REQUIREMENTS FOR ALL PRODUCTS OF THIS SECTION

A. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E 84, NFPA 255, or UL 723.

2.2 GLASS FIBER

A. Manufacturers:

1. Knauf Insulation: www.knaufusa.com.
2. Johns Manville Corporation: www.jm.com.
3. Owens Corning Corp: www.owenscorning.com.
4. CertainTeed Corporation: www.certainteed.com.

B. Insulation: ASTM C 547 and ASTM C 795; rigid molded, noncombustible.

1. 'K' value: ASTM C177, 0.24 at 75 degrees F.
2. Maximum service temperature: 850 degrees F.
3. Maximum moisture absorption: 0.2 percent by volume.

C. Insulation: ASTM C 547 and ASTM C 795; semi-rigid, noncombustible, end grain adhered to jacket.

1. 'K' value: ASTM C177, 0.24 at 75 degrees F.
2. Maximum service temperature: 650 degrees F.
3. Maximum moisture absorption: 0.2 percent by volume.

D. Vapor Barrier Jacket: White kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E 96/E 96M of 0.02 perm-inches.

2.3 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

A. Manufacturer:

1. Armacell International: www.armacell.com.

B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C 534 Grade 1; use molded tubular material wherever possible.

1. Minimum Service Temperature: -40 degrees F.
2. Maximum Service Temperature: 220 degrees F.
3. Connection: Waterproof vapor barrier adhesive.

2.4 JACKETS

A. PVC Plastic.

1. Manufacturers:

a. Johns Manville Corporation: www.jm.com.
b. Owens Corning Corp..
c. Knauf Insulation.

2. Jacket: One piece molded type fitting covers and sheet material, off-white color.

a. Minimum Service Temperature: 0 degrees F.
b. Maximum Service Temperature: 220 degrees F.
c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E 96/E 96M.
d. Thickness: 10 mil.
e. Connections: Brush on welding adhesive. Tape all joints in addition to adhesive.
f. Match

B. Aluminum Jacket: ASTM B209 (ASTM B209M) formed aluminum sheet.

1. Thickness: 0.016 inch sheet.
2. Finish: Smooth.

3. Joining: Longitudinal slip joints and 2 inch laps.
4. Fittings: 0.016 inch thick die shaped fitting covers with factory attached protective liner.
5. Metal Jacket Bands: 3/8 inch wide; 0.015 inch thick aluminum.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that piping has been tested before applying insulation materials.

B. Verify that surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Exposed Piping: Locate insulation and cover seams in least visible locations.

C. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, and expansion joints.

D. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.

E. Inserts and Shields:

1. Application: Piping 1-1/2 inches diameter or larger.
2. Shields:

    a. Galvanized steel (minimum 18 gauge) between pipe hangers or pipe hanger rolls and inserts.
    b. Single-piece Molded Polypropylene Copolymer pipe saddle such as Armacell Insuguard or approved equal.

3. Insert location: Between support shield and piping and under the finish jacket.
4. Insert configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
5. Insert material:

    a. Flexible elastomeric foam, with thickness equal to or greater than the pipe insulation such as ArmaFiix EcoLight Pipe Support.
    b. Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.

F. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, refer to Section 07 8400.

G. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet above finished floor): Finish with PVC jacket and fitting covers.

H. General: Install insulation products in accordance with the manufacturer's written instructions, and in accordance with the recognized industry practices to ensure that the installation serves its intended purpose.

I. Install insulation of pipe systems subsequent to testing and acceptance of tests.

J. Install insulation materials with smooth and even surfaces. Insulate each continuous run of piping with full length units of insulation, with a single cut piece to complete the run. Do not cut pieces of scraps abutting each other.

K. Clean and dry pipe surfaces prior to insulating. Butt insulation joints firmly together to ensure a complete and tight fit over surfaces to be covered.

L. Cover valves, fittings and similar items in each piping system with equivalent thickness and composition of insulation as applied to adjoining pipe run. Install factory molded, precut or job fabricated units (at installer's option) except where a specific form or type is indicated. Valves in chilled water systems shall be insulated with removable factory pre-molded insulators. Any condensation problems shall be corrected by the Contractor. Damage to finishes caused by condensation shall be corrected by this Contractor.

M. Extend piping insulation without interruption through walls, floors and similar piping penetrations, except where otherwise indicated.

N. Pipe Hanger Insulation Inserts: Butt pipe insulation against pipe hanger insulation inserts. For hot pipes, apply 3 inch wide vapor barrier stage or band over the butt joints. For cold piping apply wet coat of vapor barrier lap cement on butt joints and seal joints with 3 inch wide vapor barrier tape or band.

O. Replace damaged insulation which cannot be repaired satisfactorily including units with vapor barrier damage and moisture saturated units.

P. Protection: Insulation Installer shall advise the Contractor of required protection for the insulation work during the remainder of the construction period to avoid damage and deterioration.

3.3 SCHEDULE

A. HVAC Systems:

1. HVAC PIPING SYSTEM INSULATION:

a. Hot Low Pressure Piping (to 200 Deg. F. (121 Deg. C.):

1) Application Requirements: Insulate the following hot low pressure HVAC piping systems.

(a) HVAC hot water supply and return piping.

2) Insulate each piping system specified above with one of the following types and thickness of insulation:

(a) Insulation: Fiberglass or Flexible Closed Cell Elastomeric; 1 1/2" thick for pipe sizes up to and including 1 1/4” in diameter. 2" thick for pipe sizes 1 1/2" in diameter and larger.

END OF SECTION 230719

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 230993 - HVAC CONTROL SEQUENCE

PART 1 - GENERAL

1.1 DESCRIPTION OF THE WORK:

A. Control Sequence is hereby defined to mean the manner in which, and methods by which, the automatic temperature controls function. The requirements for each type of operation are specified in this section.

B. All new control valves and sensors shall be provided by Siemens and be and extension of the existing building automation system (BAS). A graphical interface shall be created or updated for all new equipment listed below in the sequence of operation.

1.2 SUBMITTALS:

A. General: Submittals on temperature control work are required for shop drawings, manufacturer's data, operating instructions, maintenance manuals, wiring diagrams and the system guarantee and product warranties.

1.3 RELATED SECTIONS:

A. Refer to the requirements of Division 1 and coordinate the division of responsibility of the work with Section 01 1000 – Summary of the Project.

PART 2 – CONTROLS

2.1 CABINET UNIT HEATER AND UNIT HEATER:

A. Provide a space temperature sensor for control of each cabinet unit heater. The sensor shall be controlled through the BAS and be indexed to occupied or unoccupied cycle based upon its respective zone signal. The sensor shall cycle the cabinet heater fan to maintain the day or night temperature setpoint. Any time that the unit fan is energized, the two position hot water control valve shall open.

2.2 ELEVATOR SUMP PIT HIGH WATER LEVEL ALARM:

A. Provide a water level sensor or float switch to monitor the elevator sump pit water levels and indicate an alarm on the BAS upon sensing a high water condition.

2.3 THERMOSTAT GUARDS:

A. Provide stainless steel covers over new temperature sensors.

2.4 ALARMING:

A. Any alarm that the Owner defines as critical shall initiate an alarm to the remote Operator Workstation and shall generate an alarm message there. Utilize the District's Ethernet communications and data system.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Install all sensors and controls following manufacturer’s recommendations.

3.2 TEST-ADJUST-BALANCE (TAB) COORDINATION AND ASSIST:

A. Include all labor for coordination and assistance to the TAB contractor for final system testing, adjusting and balancing.

END OF SECTION 230993

SECTION 232113 - HYDRONIC PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Hydronic system requirements.

B. Heating water piping, above grade.

C. Pipe hangers and supports.

D. Unions, flanges, mechanical couplings, and dielectric connections.

E. Valves:

1. Ball valves.

1.2 RELATED REQUIREMENTS

A. Section 07 8400 - Firestopping.

B. Section 08 3100 - Access Doors and Panels.

C. Section 09 9000 - Painting and Coating.

D. Section 23 0553 – Mechanical Identification.

E. Section 23 0719 - HVAC Piping Insulation.

F. Section 23 2114 - Hydronic Specialties.

G. Section 23 2500 - HVAC Water Treatment: Pipe cleaning.

1.3 REFERENCE STANDARDS

A. ASME (BPV IX) - Boiler and Pressure Vessel Code, Section IX - Welding and Brazing Qualifications; The American Society of Mechanical Engineers; 2010.

B. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; The American Society of Mechanical Engineers; 2011.

C. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; The American Society of Mechanical Engineers; 2012 (ANSI B16.18).

D. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings; 2001 (R2010).

E. ASME B31.5 - Refrigeration Piping and Heat Transfer Components; 2010.

F. ASME B31.9 - Building Services Piping; 2011 (ANSI/ASME B31.9).

G. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

H. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2011a.

I. ASTM A312/A 312M; - Standard specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipe 2006.

J. ASTM A536 - Standard Specification for Ductile Iron Castings; 1984 (Reapproved 2009).

K. ASTM B32 - Standard Specification for Solder Metal; 2008.

L. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2009.

M. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2005 (Reapproved 2011).

N. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers; 1992 (Reapproved 2008).

O. ASTM F1476 - Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications; 2007.

P. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2010.

Q. AWWA C606 - Grooved and Shouldered Joints; 2011 (ANSI/AWWA C606).

R. MSS SP-58 - Pipe Hangers and Supports - Materials, Design and Manufacture, Selection, Application, and Installation; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.; 2009.

1.4 SUBMITTALS

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

B. Welders Certificate: Include welders certification of compliance with ASME (BPV IX).

1. Provide weld test results.

C. Product Data:

1. Include data on pipe materials, pipe fittings, valves, and accessories.
2. Provide manufacturers catalogue information.
3. Indicate valve data and ratings.
4. Show grooved joint couplings, fittings, valves, and specialties on drawings and product submittals, specifically identified with the manufacturer's style or series designation.

D. Manufacturer's Installation Instructions: Indicate hanging and support methods, joining procedures.

E. Project Record Documents: Record actual locations of valves.

F. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 6000 - Product Requirements, for additional provisions.
2. Valve Repacking Kits: One for each type and size of valve.
3. 1 spare valve handle for each type valve.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with minimum three years of experience.

C. Provide all grooved joint couplings, fittings, valves, specialties, and grooving tools from a single manufacturer.

D. Date stamp all castings used for coupling housings, fittings, valve bodies, etc. for quality assurance and traceability.

E. Coupling Manufacturer:

1. Perform on-site training by factory-trained representative to the Contractor's field personnel in the proper use of grooving tools and installation of grooved joint products.

2. Periodic job site visits by factory-trained representative to ensure best practices in grooved joint installation.

F. Welder Qualifications: Certify in accordance with ASME (BPV IX).

1. Provide certificate of compliance from authority having jurisdiction, indicating approval of welders.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary protective coating on cast iron and steel valves. Coating shall be as recommended and supplied by the valve manufacturer.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Protect piping systems from entry of foreign materials by temporary plugs, completing sections of the work, and isolating parts of completed system. Temporarily cap or plug incomplete piping sections at the end of each day.

PART 2 PRODUCTS

2.1 HYDRONIC SYSTEM REQUIREMENTS

A. Comply with ASME B31.9 and applicable federal, state, and local regulations.

B. Piping: Provide piping, fittings, hangers and supports as required, as indicated, and as follows:

1. Where more than one piping system material is specified, provide joining fittings that are compatible with piping materials and ensure that the integrity of the system is not jeopardized.
2. Use non-conducting dielectric connections whenever jointing dissimilar metals.
3. Grooved mechanical joints may be used in accessible locations only.

a. Accessible locations include those exposed on interior of building, in pipe chases, and in mechanical rooms, aboveground outdoors, and as approved by Architect.
b. Grooved mechanical connections and joints comply with AWWA C606.

1) Ductile Iron: Comply with ASTM A536, Grade 65-45-12.

c. Use rigid joints unless otherwise indicated.

4. Provide pipe hangers and supports in accordance with ASME B31.9 or MSS SP-58 unless indicated otherwise. Indicate all drawings and supports on the coordination drawings.

C. Valves: Provide valves where indicated:

1. Provide drain valves where indicated, and if not indicated provide at least at main shut-off, low points of piping, bases of vertical risers, and at equipment. Use 3/4 inch ball valves with cap; pipe to nearest floor drain.
2. Isolate equipment using butterfly valves with lug end flanges or grooved mechanical couplings.

D. Welding Materials and Procedures: Conform to ASME (BPV IX).

2.2 HEATING WATER PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A53/A53M, Schedule 40, black, using one of the following joint types. Use for piping diameters greater than 2”:

1. Welded Joints: ASTM A234/A234M, wrought steel welding type fittings; AWS D1.1 welded.
2. Grooved Joints: AWWA C606 grooved pipe, fittings of same material, and mechanical couplings.

B. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), drawn, using one of the following joint types. Use up to 2" size only:

1. Solder Joints: ASME B16.18 cast brass/bronze or ASME B16.22, solder wrought copper fittings.

a. Solder: ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.

2. Copper Press Fittings (all pipe sizes): Shall conform to the material and sizing requirements of ASME B16.18 or ASME B16.22. O-rings for copper press fittings shall be EPDM. Copper press fittings shall be EPDM. Copper press fittings shall be manufactured by Viega and installed utilizing Rigid Tool Company as "Pro Press System". Complete installation shall comply with manufacturers recommendations.
3. Tee Connections: Mechanically extracted collars with notched and dimpled branch tube.

2.3 PIPE HANGERS AND SUPPORTS

A. Provide hangers and supports that comply with Section 23 2117.

2.4 UNIONS, FLANGES, MECHANICAL COUPLINGS, AND DIELECTRIC CONNECTIONS

A. Unions for Pipe 2 Inches and Under:

1. Ferrous Piping: 150 psig malleable iron, threaded.
2. Copper Pipe: Bronze, soldered joints.
3. Unions are not required in installations using grooved mechanical joint couplings. (The couplings shall serve as unions and disconnect points.)

B. Flanges for Pipe Over 2 Inches:

1. Ferrous Piping: 150 psig forged steel, slip-on.

C. Mechanical Couplings for Grooved and Shouldered Joints: Two or more curved housing segments with continuous key to engage pipe groove, circular C-profile gasket, and bolts to secure and compress gasket.

1. Dimensions and Testing: In accordance with AWWA C606.
2. Mechanical Couplings: Comply with ASTM F1476.
3. Housing Material: Ductile iron, galvanized or enamel coated complying with ASTM A536.
4. Gasket Material: EPDM suitable for operating temperature range from -30 degrees F to 230 degrees F.
5. Bolts and Nuts: Hot dipped galvanized.
6. When pipe is field grooved, provide coupling manufacturer's grooving tools.
7. Sizes through 12 Inches (300 mm):

    a. Rigid Type: Housings shall be cast with bolt pads to provide rigidity and system support and hanging in accordance with ANSI B31.1 and B31.9.

        1) 2 (50 mm) through 12 Inches (300 mm): Installation-Ready, for direct stab installation without field disassembly, with grade EHP gasket rated to +250 deg F (+120 degrees C).

    b. Flexible Type: For use in locations where vibration attenuation and stress relief are required. Three flexible couplings may be used in lieu of a flexible connector. The couplings shall be placed in close proximity to the source of the vibration.

8. Manufacturers:

    a. Victaulic Company: www.victaulic.com.
    b. Anvil International: www.anvilintl.com.

D. Dielectric Connections:

1. Waterways:

a. Water impervious insulation barrier capable of limiting galvanic current to 1 percent of short circuit current in a corresponding bimetallic joint.
b. Dry insulation barrier able to withstand 600 volt breakdown test.
c. Construct of galvanized steel with threaded end, cast bronze with solder joint end, or grooved end connections to match connecting piping.
d. Suitable for the required operating pressures and temperatures.

2.5 BALL VALVES

A. Manufacturers:

1. Conbraco Industries: www.conbraco.com.
2. Grinnell Mechanical Products, a Tyco International Co: www.grinnell.com.
3. Milwaukee Valve Company: www.milwaukeevalve.com.
4. Nibco, Inc: www.nibco.com.
5. Tyco Flow Control: www.tycoflowcontrol.com.
6. Victaulic Company: www.victaulic.com.
7. Anvil International: www.anvilintl.com.

B. Up To and Including 2 Inches:

1. Bronze one piece body, chrome plated brass ball, teflon seats and stuffing box ring, lever handle with balancing stops, solder ends with union. Extended insulated handle for use with insulated piping.

PART 3 EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Prepare pipe for grooved mechanical joints as required by coupling manufacturer.

C. Prepare piping connections to equipment using jointing system specified.

D. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

E. After completion, fill, clean, and treat systems. Refer to Section 23 2500 for additional requirements.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install heating water to ASME B31.9 requirements.

C. Route piping in orderly manner, parallel to building structure, and maintain gradient.

D. Install piping to conserve building space and to avoid interfere with use of space.

E. Group piping whenever practical at common elevations.

F. Sleeve pipe passing through partitions, walls and floors. Refer to Section 23 0501 and details.

G. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.

H. Slope piping and arrange to drain at low points.

I. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

1. For water systems, use adequate numbers of flexible couplings in header piping to accommodate thermal growth and contraction, and for the elimination of expansion loops. (In accordance with manufacturer’s instructions and as approved by the engineer.) Where expansion loops are required, use couplings on the loops. Submit Calculations from manufacturer to confirm deletion of expansion loops.
2. Flexible couplings may be used in header piping to accommodate thermal growth, thermal contraction in lieu of expansion loops.
3. Use flexible couplings in expansion loops.

J. Grooved Joints:

1. Grooved joints shall be installed in accordance with the manufacturer's latest published installation instructions. Grooved ends shall be clean and free from indentations, projections, and roll marks in the area from pipe end to groove. Gaskets shall be of an elastomer grade suitable for the intended service, and shall be molded and produced by the coupling manufacturer. The grooved coupling manufacturer's factory trained representative shall provide on-site training for contractor's field personnel in the use of grooving tools and installation of grooved joint products. The representative shall periodically visit the jobsite and review contractor is following best recommended practices in grooved product installation. (A distributor's representative is not considered qualified to conduct the training or jobsite visit(s).)

K. Pipe Hangers and Supports:

1. Refer to Section 23 2117.
2. Install in accordance with ASME B31.9, ASTM F708, or MSS SP-89.

3. Support horizontal piping as scheduled.
4. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
5. Place hangers within 12 inches of each horizontal elbow.
6. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
7. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
8. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
9. Provide copper plated hangers and supports for copper piping.
10. Prime coat all steel hangers and supports. Refer to Section 09 9000.

L. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 23 0719.

M. Provide access where valves and fittings are not exposed. Coordinate size and location of access doors with Section 08 3100.

N. Use eccentric reducers to maintain top of pipe level.

O. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welds.

P. Prepare unfinished pipe, fittings, supports, and accessories, ready for finish painting. Refer to Section 09 9000.

Q. Install valves with stems upright or horizontal, not inverted.

3.3 INSPECTION:

A. General: Clean exterior surfaces of installed piping systems of superfluous materials and prepare for application of specified coatings if any. Flush out piping systems with clean water before proceeding with required tests. Inspect each run of each system for completion of joints, supports and accessory items.

3.4 VALVE INSTALLATION:

A. General: Except as otherwise indicated, comply with the following requirements:

1. Install valves where required for proper operation of piping and equipment, including valves in branch lines where necessary to isolate sections of piping. Locate valves so as to be accessible and so that separate support can be provided when necessary.

2. Install valves with stems pointed up, in the vertical position, where possible, but in no case with stems pointed downward from a horizontal plane unless unavoidable. Install valve drains with hose-end adapter for each valve that must be installed with stem below horizontal plane.

B. Insulation: Where insulation is indicated, install extended stem valves, arranged in the proper manner to receive insulation.

3.5 SCHEDULES

A. Hanger Spacing for Copper Tubing.

1. 1/2 inch and 3/4 inch: Maximum span, 5 feet; minimum rod size, 1/4 inch.
2. 1 inch: Maximum span, 6 feet; minimum rod size, 1/4 inch.
3. 1-1/2 inch and 2 inch: Maximum span, 8 feet; minimum rod size, 3/8 inch.
4. 2-1/2 inch: Maximum span, 9 feet; minimum rod size, 3/8 inch.

B. Hanger Spacing for Steel Piping.

1. 1/2 inch, 3/4 inch, and 1 inch: Maximum span, 7 feet; minimum rod size, 1/4 inch.
2. 1-1/4 inches: Maximum span, 8 feet; minimum rod size, 3/8 inch.
3. 1-1/2 inches: Maximum span, 9 feet; minimum rod size, 3/8 inch.
4. 2 inches: Maximum span, 10 feet; minimum rod size, 3/8 inch.
5. 2-1/2 inches: Maximum span, 11 feet; minimum rod size, 3/8 inch.
6. 3 inches: Maximum span, 12 feet; minimum rod size, 3/8 inch.
7. 4 inches: Maximum span, 14 feet; minimum rod size, 1/2 inch.
8. 6 inches: Maximum span, 17 feet; minimum rod size, 1/2 inch.
9. 8 inches: Maximum span, 19 feet; minimum rod size, 5/8 inch.

END OF SECTION 232113

SECTION 232114 - HYDRONIC SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Air vents.

B. Strainers.

C. Balancing valves.

D. Valve Installation Kits.

1.2 RELATED REQUIREMENTS

A. Section 23 2113 - Hydronic Piping.

B. Section 23 2500 - HVAC Water Treatment: Pipe Cleaning.

1.3 SUBMITTALS

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

B. Product Data: Provide product data for manufactured products and assemblies required for this project. Include component sizes, rough-in requirements, service sizes, and finishes. Include product description, model and dimensions.

C. Manufacturer's Installation Instructions: Indicate hanging and support methods, joining procedures.

D. Maintenance Data: Include installation instructions, assembly views, lubrication instructions, and replacement parts list.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

2.1 AIR VENTS

A. Manufacturers:

1. Armstrong International, Inc: www.armstronginternational.com.
2. ITT Bell & Gossett: www.bellgossett.com.
3. Taco, Inc: www.taco-hvac.com.

B. Float Type:

1. Brass or semi-steel body, copper, polypropylene, or solid non-metallic float, stainless steel valve and valve seat; suitable for system operating temperature and pressure; with isolating valve.
2. Cast iron body and cover, float, bronze pilot valve mechanism suitable for system operating temperature and pressure; with isolating valve.

2.2 STRAINERS

A. Manufacturers:

1. Armstrong International, Inc: www.armstronginternational.com.
2. Flexicraft Industries: www.flexicraft.com.
3. Grinnell Mechanical Products, a Tyco International Co: www.grinnell.com.
4. The Metraflex Company: www.metraflex.com.
5. Victaulic Company: www.victaulic.com.
6. Anvil International: www.anvilintl.com.

B. Size 2 inch and Under:

1. Screwed brass or iron body for 175 psi working pressure, Y pattern with 1/32 inch stainless steel perforated screen.

C. Size 2-1/2 inch to 8 inch:

1. Provide flanged or grooved iron body for 175 psi working pressure, Y pattern with 3/64 inch stainless steel perforated screen.

2.3 BALANCING VALVES

A. Manufacturers:

1. Armstrong International, Inc: www.armstronginternational.com.
2. ITT Bell & Gossett: www.bellgossett.com.
3. Oventrop Corporation: www.oventrop.com.
4. Victaulic Company: www.victaulic.com.
5. Anvil International: www.anvilintl.com.

B. Size 2 inch and Smaller:

1. Provide ball or globe style with flow balancing, flow measurement, and shut-off capabilities, memory stops, minimum of two metering ports and NPT threaded or soldered connections.
2. Metal construction materials consist of bronze or brass.
3. Non-metal construction materials consist of Teflon, EPDM, or engineered resin.

C. Size 2.5 inch and Larger:

1. Provide ball or butterfly style with flow balancing, flow measurement, and shut-off capabilities, memory stops, minimum of two metering ports and flanged, grooved, or weld end connections.
2. Valve body construction materials consist of cast iron or ductile iron.
3. Internal components construction materials consist of brass, aluminum bronze, bronze, Teflon, EPDM, NORYL, or engineered resin.

2.4 VALVE INSTALLATION KITS:

A. In lieu of individual valves, strainers, and balancing valves, valve installation kits are acceptable for use for pipe sizes up to 2".

B. Valve kits shall be as supplied by Bell & Gosett, Oventrop, Nexus, Nutech, Meleney Equipment, Inc. or approved equal.

C. Supply valve kits shall include combination wye strainer and shutoff valve with pressure temperature test port, drain valve, tailpiece, and union end.

D. Return valve kits shall include calibrated balance and shut off valve with two pressure temperature test ports, tail piece, and union end.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install specialties in accordance with manufacturer's instructions.

B. Where large air quantities can accumulate, provide enlarged air collection standpipes. Provide in boiler room, chiller room, and pump rooms at air separators, and air handling mechanical equipment rooms at high points of piping systems.

C. Provide manual air vents at system high points and as indicated.

D. For automatic air vents in ceiling spaces or other concealed locations, provide vent tubing to nearest drain.

E. Provide valved drain and hose connection on strainer blow down connection. Provide caps with gaskets on discharge.

3.2 MAINTENANCE

A. See Section 01 7000 - Execution Requirements, for additional requirements relating to maintenance service.

B. Explain corrective actions to Owner's maintenance personnel in person.

END OF SECTION 232114

SECTION 232117 - PIPE HANGERS, SUPPORTS AND ANCHORS

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK:

A. This section specified hangers, supports and anchors for use in piping systems installed in other sections of these specifications.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Grinnell

B. Approved Equal.

2.2 HORIZONTAL PIPING HANGERS AND SUPPORTS:

A. General: Except as otherwise indicated, provide factory fabricated horizontal piping hangers and supports of the MSS type and size indicated, bolts (if any) and washers; comply with MSS SP-58 and the manufacturer's published product information. Where the MSS type or size is not indicated, provide proper selection determined by installer for installation requirements, and comply with MSS SP-69 and the manufacturer's published product information: size hangers and supports properly for piping including insulation, if any.

B. Adjustable Band Hangers: MSS Type 7, fabricated from steel.

C. Adjustable Swivel Band Hangers: MSS Type 10.

D. Clamp: MSS Type 4.

E. Double Bolt Clamp: MSS Type 3, including pipe spacers.

2.3 VERTICAL PIPING CLAMPS:

A. General: Except as otherwise indicated, provide factory fabricated vertical piping clamps of the MSS type and size indicated; comply with MSS SP-58 and the manufacturer's published product information. Where the MSS type or size is not indicated, provide proper selection as determined by the installer for installation requirements, and comply with MSS SP-69 and the manufacturer's published product information. Size clamps properly for piping, including insulation (if any).

B. Two Bolt Riser Clamp: MSS Type 8.

2.4 HANGER ROD ATTACHMENTS:

A. General: Except as otherwise indicated, provide factory fabricated hanger rod attachments of the MSS type and size indicated; comply with MSS SP-58 and the manufacturer's published product information. Where MSS type or size is not indicated, provide proper selection as determined by installer for installation requirements, and comply with MSS AP-69 and the manufacturer's published product information. Size attachments properly for piping, including insulation (if any).

B. Turnbuckles: MSS Type 13.

C. Weldless Eye Nut: MSS Type 17.

D. Malleable Eye Socket: MSS Type 16.

E. Clevises: MSS Type 14.

2.5 BUILDING ATTACHMENTS:

A. General: Except as otherwise indicated, provide factory fabricated building attachments of the MSS type and load rating indicated; comply with MSS SP-58 and the manufacturer's published product information. Where the MSS type or load rating is not indicated, provide proper selection determined by installer for installation requirements, and comply with MSS SP-69 and the manufacturer's published information. Size units properly for piping loading.

B. Concrete Inserts: MSS Type 18, steel.

C. Top Beam C-Clamps: MSS Type 19.

D. C-Clamps: MSS Type 23, steel

E. Top I-Beam Clamp: MSS Type 25.

F. Side Beam Clamp: MSS Type 20.

G. Beam Clamp/Eye Nut: MSS Type 28.

H. Wide Flange Beam Clamp/Eye Nut: MSS Type 29.

I. Beam Clamp/Extension Piece: MSS Type 30.

2.6 SADDLES AND SHIELDS:

A. General: Except as otherwise indicated, provide factory fabricated saddles and shields of the MSS type and size indicated; comply with MSS SP-58 and the manufacturer's published product information. Where the MSS type or size is not indicated, provide proper selection determined by installer for installation requirements, and comply with MSS SP-69 and the manufacturer's published product information. Size saddles and shields properly for insulation and vapor barriers (if any).

B. Protection Saddles: MSS Type 39.

C. Protection Shields: MSS Type 40.

D. High Density Insert Insulation Saddles: Provide products manufactured by Elcen Metal Products Company or Armacell International.

2.7 MISCELLANEOUS MATERIALS:

A. Metal Framing: Provide products complying with NEMA STD ML 1.

B. Steel Plates, Shapes and Bars: Provide products complying with ASTM A 36.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Proceed with the installation of hangers, supports and anchors only after the required building structural work has been completed in areas where work is to be installed. Correct inadequacies including (but not limited to) the proper placement of inserts, anchors and other building attachments.

3.2 INSTALLATION OF BUILDING ATTACHMENTS:

A. Install building attachments at the required locations within concrete or onto structural steel for proper piping support. Space attachments within the maximum piping span length indicated in MSS SP-69. Install additional building attachments where support is required for additional concentrated loads, including valves, flanges, guides, strainers, expansion joints, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten insert securely to forms. Where concrete with compressive strength less than 2500 psi is indicated, install reinforcing bars through the openings at the top of inserts. Prior to placing concrete, install nut in insert and screw threaded rod thru nut until rod is firmly against top of the insert body.

3.3 INSTALLATION OF HANGERS AND SUPPORTS:

A. General: Install hangers, supports, clamps and attachments to support piping properly from the building structure; comply with MSS SP-69. Arrange for grouping of parallel runs of horizontal piping to be supported together on trapeze type hangers where possible. Install supports with the maximum spacing complying with MSS SP-69. Where piping of various sizes is to be supported together with trapeze hangers, space hangers for smallest pipe size or install intermediate supports for smaller diameter pipe. Do not use wire of perforated metal to support piping, and do not support piping from other piping.

B. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers and other accessories. Except as otherwise indicated for exposed continuous pipe runs, install hangers and supports of the same type and style as installed for adjacent similar piping.

C. Prevent electrolysis in support of copper tubing by the use of hangers and supports which are copper plated, or by other recognized industry methods.

3.4 PROVISIONS FOR MOVEMENT:

A. Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement between pipe anchors, and to facilitate the action of expansion joints, expansion loops, expansion bends and similar units.

B. Load Distribution: Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.

1. Pipe Slopes: Install hangers and supports to provide the indicated pipe slopes, and so that maximum pipe deflections allowed by ANSI B31 are not exceeded.

C. Insulated Piping: Comply with the following installation requirements:

1. Clamps: Attach clamps, including spacers (if any), to piping with clamps projecting through the insulation; do not exceed pipe stresses allowed by ANSI B31.
2. Shields: Where low compressive strength insulation of vapor barriers are indicated on chilled water piping, install coated protective shields.
3. Saddles: Where insulation without vapor barrier is indicated (hot water piping), install protection saddles.

3.5 HYDRONIC PIPING

A. Conform to ASTM F708, MSS SP58, MSS SP69, MSS SP 89.

B. Hangers for Pipe Sizes 1/2 to 1-1/2”. Malleable iron adjustable swivel, split ring.

C. Hangers for Cold Pipe Sizes 2” and Over: Carbon steel, adjustable, clevis.

D. Hangers for Hot Pipe Sizes 2 to 4”. Carbon steel, adjustable, clevis.

E. Hangers for Hot Pipe Sizes 6” and Over: Adjustable steel yoke, cast iron roll, double hanger.

F. Multiple or Trapeze Hangers. Steel channels with welded spacers and hanger rods.

G. Multiple or Trapeze Hangers for Hot Pipe Sizes 6” and Over: Steel channels with welded spacers and hanger rods, cast iron roll.

H. Wall Support for Pipe Sizes to 3”. Cast iron hook.

I. Wall Support for Pipe Sizes 4” and Over: Welded steel bracket and wrought steel clamp.

J. Wall Support for Hot Pipe Sizes 6” and Over: Welded steel bracket and wrought steel clamp with adjustable steel yoke and cast iron roll.

K. Vertical Support: Steel riser clamp.

L. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

M. Floor Support for Hot Pipe Sizes to 4”: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

N. Floor Support for Hot Pipe Sizes 6” and Over: Adjustable cast iron roll and stand, steel screws, and concrete pier or steel support.

O. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

3.6 ADJUSTMENT OF HANGERS AND SUPPORTS:

A. Adjust hangers and supports and place grout as required under supports to bring piping to proper levels and elevations.

END OF SECTION 232117

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 232500 - HVAC WATER TREATMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Cleaning of piping systems.

B. Chemical treatment.

1.2 RELATED SECTIONS

A. Section 23 2113 - Hydronic Piping.

B. Section 23 2114 - Hydronic Specialties.

1.3 SUBMITTALS

A. Submit the following to the Project Engineer for approval:

1. Manufacturers product data including components. Shop drawings showing system layout, measurements and space required.
2. A list of chemicals to be used for water treatment and pre-operational pipe and/or system cleanings.

    a. Dual Temperature Water System

B. Furnish City/Makeup water laboratory analysis.

C. Provide procedure for system cleanings. Upon completion of cleaning, provide written report that will include: times and dates of cleanings, problems encountered. A comparative analysis of system water to city/makeup water shall be provided indicating proper flushing of cleaning agents has been accomplished.

D. Submit Material Safety Data Sheets and Product Data Sheets for approval.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum five years of documented experience. Company shall have local representatives with water analysis laboratories and full time service personnel.

B. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum 5 years of experience and approved by manufacturer.

1.5 REGULATORY REQUIREMENTS

A. Conform to applicable code for addition of non-potable chemicals to building mechanical systems and to public sewage systems.

1.6 MAINTENANCE MATERIALS

A. See Section 01 6000 - Product Requirements, for additional provisions.

PART 2 – PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 PRETREATMENT PIPE CLEANING:

A. All Piping Systems during hydrostatic pressure testing:

B. Provide temporary connections with valves to fill and drain the piping and equipment after completion of the chemical cleanout procedure. Provide temporary blind flanges and/or caps to isolate the piping and equipment.

C. Provide temporary connections, valves, strainers, bypasses, and blank connections where required to clean out systems.

D. After each hydrostatic leak testing procedure is complete, drain the system until empty. Protect the piping interior with corrosion inhibitor, WS94L during hydrostatic testing procedure. Thoroughly clean the piping and flush as follows:

1. Cleaning will not take place more than 14 days prior to startup. Allowing the chemical treatment representative at least 30 days notice prior to startup.
2. Add chemical pipe cleaning compound and corrosion inhibitor as recommended by the chemical treatment manufacturer's representative to the system simultaneously with the filling of the system.
3. Circulate the cleaning compounds in the system for the time period specified by the chemical manufacturer (24 hours minimum). Drain the system until empty from its lowest point.
4. Fill the system again with fresh water and flush thoroughly until clean water is obtained. (Maintain continuous bleed-off and make-up as required during flushing operation). pH not to exceed a differential 0.5pH- 1.0pH of incoming water.
5. The cleaning and flushing procedures must be approved in writing by the chemical treatment representative. The chemical treatment representative shall supervise and certify in writing the cleaning and flushing of the piping systems. The Contractor shall install pumps, water meters, and coupon racks prior to the cleaning process.

3.2 CLOSED CIRCULATING WATER SYSTEMS:

A. Fill system with City water; start circulation pump and vent high points manually until all air is released from the system.

B. Flush the system with fresh water, drain a second time and refill. To ensure adequate flushing, the pH of the system water must not exceed a differential pH of the fresh incoming water by more than 0.5 pH-1.0pH.

C. Introduce the chemical cleaning solution into the system gradually by injecting into the suction side of the circulating pump, or by means of a bypass chemical feeder. (If it is a hot water heat system, slowly increase the temperature to 200.0 F.

D. While the water is being circulated, check to make sure that all passages are open and adequate flow velocity (3-5 ft. per sec.) are present throughout the system.

E. During circulation, open each drain connection for a short flow. Repeat at hourly intervals. Replace water drained during blow down with chemical solution as required until air is eliminated from the system. The chemical cleanout procedure shall be continuous in this manner for two full 8-hour periods.

END OF SECTION 232500

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 233100 - HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Metal ductwork.

B. Casing and plenums.

1.2 RELATED REQUIREMENTS

A. Section 07 8400 - Firestopping.

B. Section 09 9000 - Painting and Coating: Weld priming, weather resistant, paint or coating.

C. Section 23 0714 – HVAC Duct Insulation.

D. Section 23 3300 - Air Duct Accessories.

E. Section 23 3700 - Air Outlets and Inlets.

1.3 REFERENCE STANDARDS

A. ASHRAE (FUND) - ASHRAE Handbook - Fundamentals; 2021.

B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2008.

C. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and General Applications; 2012.

D. ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip; 2012.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2011.

F. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2010.

G. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2010.

H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2012.

I. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements; 2012.

J. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; National Fire Protection Association; 2012.

K. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; National Fire Protection Association; 2011.

L. SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual; Sheet Metal and Air Conditioning Contractors' National Association; 2012, 2nd Edition.

M. SMACNA (DCS) - HVAC Duct Construction Standards; 2005.

1.4 SUBMITTALS

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

B. Product Data: Provide data for duct materials.

C. Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate, following SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.6 REGULATORY REQUIREMENTS

A. Construct ductwork to NFPA 90A standards.

PART 2 PRODUCTS

2.1 DUCT ASSEMBLIES

A. All Ducts: Galvanized steel, unless otherwise indicated. All accessories shall be of the same material as the ductwork specified herein.

B. Outside Air Intake: 2 inch w.g. pressure class, galvanized steel.

2.2 MATERIALS

A. Galvanized Steel for Ducts: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.

B. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.

1. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
2. Surface Burning Characteristics: Flame spread of zero, smoke developed of zero, when tested in accordance with ASTM E84.

C. Hanger Rod: ASTM A36/A36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

D. Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:

1. Concrete Screw Type Anchors: Complying with ICC-ES AC193.

2.3 DUCTWORK FABRICATION

A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards and as indicated.

B. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.

C. Provide turning vanes of perforated metal with closed cell foam insulation when acoustical lining is indicated.

D. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

E. Fabricate continuously welded round and oval duct fittings in accordance with SMACNA HVAC Duct Construction Standards.

F. Seal all joints and fittings

PART 3 EXECUTION

3.1 INSTALLATION

A. Install, support, and seal ducts in accordance with SMACNA HVAC Duct Construction Standards.

B. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

C. Duct sizes indicated are inside clear dimensions. For lined ducts, maintain sizes inside lining.

D. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

3.2 CLEANING

A. The HVAC system shall be cleaned using source removal mechanical cleaning methods designed to extract contaminants from within the HVAC system and safely remove contaminants from the facility. It is the contractor's responsibility to select source removal methods that will render the HVAC system visibly clean and capable of passing cleaning verification. Means, methods and materials shall be as described in the NADCA General Specifications for the Cleaning of Commercial HVAC Systems manual, and other specified tests, in accordance with all general requirements. No cleaning method, or combination of methods, shall be used which could potentially damage components of the HVAC system or negatively alter the integrity of the system.

B. Exposed ductwork shall have its exterior cleaned (in accordance with the manufacturer's recommended methods) to the satisfaction of the Architect.

END OF SECTION 233100

SECTION 233300 - AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Air turning devices/extractors.

B. Backdraft dampers.

C. Duct access doors.

D. Duct test holes.

E. Fire dampers.

F. Flexible duct connections.

G. Volume control dampers.

1.2 RELATED SECTIONS

A. Section 23 3100 - HVAC Ducts and Casings.

1.3 REFERENCES

A. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems; National Fire Protection Association; 2018.

B. SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association; 2005.

C. UL 33 - Heat Responsive Links for Fire-Protection Service; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

D. UL 555 - Standard for Fire Dampers; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

1.4 SUBMITTALS

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

B. Product Data: Provide for shop fabricated assemblies including volume control dampers and duct access doors.

C. Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers and duct access doors.

D. Manufacturer's Installation Instructions: Provide instructions for fire dampers.

1.5 PROJECT RECORD DOCUMENTS

A. Record actual locations of access doors and test holes.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect dampers from damage to operating linkages and blades.

1.8 EXTRA MATERIALS

A. Provide two of each size and type of fusible link.

PART 2 - PRODUCTS

2.1 AIR TURNING DEVICES/EXTRACTORS - AIRFOIL TYPE

A. Manufacturers:

1. Ruskin Company: www.ruskin.com.
2. Titus: www.titus-hvac.com.

B. Multi-blade device with radius blades attached to pivoting frame and bracket, steel construction, with worm drive mechanism with removable key operator.

2.2 BACKDRAFT DAMPERS

A. Manufacturers:

1. Louvers & Dampers, Inc: www.louvers-dampers.com.
2. Nailor Industries Inc: www.nailor.com.
3. Ruskin Company: www.ruskin.com.
4. Pottorff: https://www.pottorff.com.

B. Multi-Blade, Parallel Action Gravity Balanced Backdraft Dampers: galvanized steel, with center pivoted blades of maximum 6 inch width, with flexible vinyl sealed edges, linked together in rattle-free manner with 90 degree stop, steel ball bearings, and plated steel pivot pin; adjustment device to permit setting for varying differential static pressure.

2.3 DUCT ACCESS DOORS

A. Manufacturers:

1. Ruskin Company: www.ruskin.com.
2. Approved Equal.

B. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

C. Fabrication: Rigid and close-fitting of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ducts, install minimum 1 inch thick insulation with sheet metal cover.

1. Less Than 12 inches Square: Secure with sash locks.
2. Up to 18 inches Square: Provide two hinges and two sash locks.
3. Up to 24 x 48 inches: Three hinges and two compression latches with outside and inside handles.
4. Larger Sizes: Provide an additional hinge.

D. Access doors with sheet metal screw fasteners are not acceptable.

2.4 DUCT TEST HOLES

A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

B. Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

2.5 FIRE DAMPERS

A. Manufacturers:

1. Louvers & Dampers, Inc: www.louvers-dampers.com.
2. Nailor Industries Inc: www.nailor.com.
3. Ruskin Company: www.ruskin.com.
4. Pottorff: https://www.pottorff.com.

B. Fabricate in accordance with NFPA 90A and UL 555, and as indicated.

C. Ceiling Dampers: Galvanized steel, 22 gage frame and 16 gage flap, two layers 0.125 inch ceramic fiber on top side and one layer on bottom side for round flaps, with locking clip.

D. Horizontal Dampers: Galvanized steel, 22 gage frame, stainless steel closure spring, and lightweight, heat retardant non-asbestos fabric blanket.

E. Curtain Type Dampers: Galvanized steel with interlocking blades. Provide stainless steel closure springs and latches for horizontal installations. Configure with blades out of air stream.

F. Multiple Blade Dampers: 16 gage galvanized steel frame and blades, oil-impregnated bronze or stainless steel sleeve bearings and plated steel axles, 1/8 x 1/2 inch plated steel concealed linkage, stainless steel closure spring, blade stops, and lock.

G. Fusible Links: UL 33, separate at 165 degrees F.

H. All dampers shall be dynamic type.

2.6 FLEXIBLE DUCT CONNECTIONS

A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

B. Flexible Duct Connections: Fabric crimped into metal edging strip.

1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz per sq yd.

    a. Net Fabric Width: Approximately 2 inches wide.

2. Metal: 3 inches wide, 24 gage thick galvanized steel.

2.7 VOLUME CONTROL DAMPERS

A. Manufacturers:

1. Louvers & Dampers, Inc: www.louvers-dampers.com.
2. Nailor Industries Inc: www.nailor.com.
3. Ruskin Company: www.ruskin.com.
4. Pottorff: https://www.pottorff.com.

B. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

C. Splitter Dampers:

1. Material: Same gage as duct to 24 inches size in either direction, and two gages heavier for sizes over 24 inches.
2. Blade: Fabricate of single thickness sheet metal to streamline shape, secured with continuous hinge or rod.
3. Operator: Minimum 1/4 inch diameter rod in self aligning, universal joint action, flanged bushing with set screw.

D. Single Blade Dampers: Fabricate for duct sizes up to 6 x 30 inch.

E. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 x 72 inch. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.

F. End Bearings: Except in round ducts 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon or sintered bronze bearings.

G. Quadrants:

1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.
3. Where rod lengths exceed 30 inches provide regulator at both ends.

PART 3 - EXECUTION

3.1 PREPARATION

A. Verify that electric power is available and of the correct characteristics.

3.2 INSTALLATION

A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA HVAC Duct Construction Standards - Metal and Flexible. Refer to Section 23 3100 for duct construction and pressure class.

B. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.

C. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere as indicated. Provide minimum 8 x 8 inch size for hand access, 18 x 18 inch size for shoulder access, and as indicated. Provide 4 x 4 inch for balancing dampers only. Review locations prior to fabrication.

D. Provide duct test holes where indicated and required for testing and balancing purposes.

E. Provide fire dampers at locations indicated, where ducts and outlets pass through fire rated components. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges.

F. Demonstrate re-setting of fire dampers to Owner's representative.

G. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.

H. At equipment supported by vibration isolators, provide flexible duct connections immediately adjacent to the equipment.

I. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off.

J. Provide turning vanes, Air Turning Devices, at all elbows greater than 45 degrees and all radiused elbows.

1. Provide Blades: 2" galvanized steel for up to and including 18" ducts.
2. Blades: 4 1/2" galvanized for ducts over 18"
3. Construction: Double wall blade.
4. Types: Gang operated blades with removable hex key.
5. Types: Gang operated blades with removable lever.
6. Types: Fixed blades for 90 degree elbows.

END OF SECTION 233300

SECTION 233700 - AIR OUTLETS AND INLETS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Registers/grilles.

1.2 REFERENCES

A. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; Air Movement and Control Association International, Inc.; 2007.

B. ARI 890 - Standard for Air Diffusers and Air Diffuser Assemblies; Air-Conditioning and Refrigeration Institute; 2008.

C. ASHRAE Std 70 - Method of Testing for Rating the Performance of Air Outlets and Inlets; American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc.; 2006.

D. SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association; 2005.

1.3 SUBMITTALS

A. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

B. Project Record Documents: Record actual locations of air outlets and inlets.

1.4 QUALITY ASSURANCE

A. Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Kreuger.

B. Price.

C. Titus.

D. Metalaire

2.2 CEILING REGISTERS/GRILLES

A. Description: Grilles shall have 3/4-inch blade spacing. The fixed deflection blades shall be available parallel to the long or short dimension of the grille. Construction shall be of extruded steel or aluminum with a 1¼-inch wide border on all sides. Minimum border thickness shall be 0.040-0.050 inch. Sizes 24 x 24 inches and smaller shall be constructed using a roll-formed frame. Corners shall be welded with full penetration resistance welds. Sizes larger than 24 x 24 inches shall be constructed by using heavy steel or aluminum extrusions and shall be interlocked at the four corners and mechanically staked to form a rigid frame. Screw holes shall be counter-sunk for a neat appearance. Deflection blades shall be contoured to a specifically designed and tested cross-section to meet published test performance data. Blades shall be firmly held in place by mullions from behind the grille and fixed in place by crimping or welding. Blade deflection angle shall be available at 35°.

B. Frame: Surface mounted with countersunk screw mounting. In ACT, where nominal dimensions are 18x18 or greater, lay-in type shall be used.

C. Color: As shown on drawings.

D. Damper: Optional opposed blade volume damper shall be constructed of heavy gauge steel or aluminum. Damper must be operable from the face of the grille.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Check location and sizes of outlets and inlets and make necessary adjustments in position and/or size to conform with architectural features, symmetry, lighting arrangement, and ceiling grid.

C. Paint ductwork visible behind air outlets and inlets matte black. Refer to Section 099000.

END OF SECTION 233700

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 238101 - TERMINAL HEAT TRANSFER UNITS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Cabinet unit heaters.

1.2 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.3 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

1.4 EXTRA MATERIALS

A. Provide two sets of filters for each piece of equipment requiring filters.

PART 2 - PRODUCTS

2.1 GENERAL

A. The contractor shall furnish and install all equipment with required mounting components and accessories to meet size, capacity and characteristics as required on the Equipment Schedule or on the plans. Units shall be installed in accordance with specifications and manufacturer recommendations.

2.2 CABINET UNIT HEATERS

A. Manufacturers:

1. Rittling.
2. Trane.
3. Sterling Hydronics.
4. Sigma.

B. Cabinet: 16 gauge steel with baked epoxy powder coating in manufacturer's standard paint color as selected by Architect.

1. Vertical Units:

    a. Removable front panel, 16 gauge steel, with discharge grille, channel-formed edges and ¼-turn tamper-proof allen-head cam fasteners.
    b. Louvered panel shall be supplied with two flush, hinged access doors with slotted cam-lock fasteners.

2. Horizontal Units:

    a. The front panel shall be hinged, 16 gauge steel providing full swing through 90° including removable safety chain(s) to prevent the panel from swinging fully open accidentally. Includes discharge grille, channel-formed edges and ¼-turn allen-head cam fasteners.

3. End pockets shall be no less than 8” in width, located on both sides of the unit.
4. Steel recessing flanges for recessing fan-coil units into wall or ceiling.
5. All concealed units shall have a minimum 1" duct collar on the discharge.

C. Filters: Minimum arrestance according to ASHRAE 52.1, and a minimum efficiency reporting value (MERV) according to ASHRAE 52.2.

    1. 1” Washable Aluminum Mesh: 70 percent arrestance and 2 MERV.

D. Hydronic Coils: Copper tube, with mechanically bonded aluminum fins spaced no closer than 0.083 inch (2.1 mm), rated for a minimum working pressure of 300 psig (2067 kPa) and a maximum entering-water temperature of 220 deg F (104 deg C). Minimum copper tube thickness shall be 0.016”. Minimum fin thickness shall be 0.0045”. Lanced fins shall not be acceptable. Coils shall be circuited for counter flow to maximize unit efficiency. Coil casing shall be fabricated from galvanized steel. Include manual air vent and drain valve.

E. Fan and Motor Board: Constructed from 18 gauge galvannealed steel.

    1. Fan: Forward curved, double width, centrifugal; directly connected to motor. galvanized-steel wheels and fan scrolls.
    2. Motor: Electronically commutated high-efficiency, programmable brushless DC motor; resiliently mounted on motor board. Shaded pole motors are not acceptable. Single speed motors are not acceptable. Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment."

F. Electrical Connection: Factory wire motors and controls for a single electrical connection.

    1. Provide a service disconnect switch to isolate power from the unit during maintenance.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install equipment exposed to finished areas after walls and ceiling are finished and painted. Do not damage equipment or finishes.

C. Protection: Provide finished cabinet units with protective covers during balance of construction.

D. Recessed Units: Install where indicated. Coordinate to assure correct recess size for recessed units.

3.2 CLEANING

A. After construction is completed, including painting, clean exposed surfaces of units. Vacuum clean coils and inside of cabinets.

B. Touch-up marred or scratched surfaces of factory-finished cabinets, using finish materials furnished by manufacturer.

C. Install new filters.

END OF SECTION 238101

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 260100 - GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specifications sections, apply to work specified in this section.

1.2 SCOPE OF PROJECT:

A. Provide a complete and operating electrical installation in accordance with these specifications and accompanying contract drawings. This includes all required labor, materials, apparatus and supervision.

B. Without limiting or restricting the volume of work and solely for the convenience of the Contractor, the work to be performed in general, comprises the following:
   1. Modifications and/or extensions to the existing distribution system.
   2. Final connections to all equipment, unless otherwise noted.

1.3 INTENT OF THIS SECTION:

A. This Section is intended as a supplement to each of the following Sections of Division 26 ELECTRICAL.

B. Consider each article of this Section as a part of each of the following Sections insofar as such requirements may be termed applicable.

1.4 TRUE INTENT:

A. The Drawings and Specifications are intended to provide a complete and perfectly operating system. Therefore, it is specifically agreed and understood by the Contractor that anything, be it labor, material or equipment, which is not described in the Specifications or specifically shown on the Drawings, but is necessary for the operation and completion of a perfectly operating system, according to the true intent of the Specifications and Drawings and as interpreted by the architect, shall be furnished by the Contractor as a part of his Contract, at no extra charge, as though it were specifically detailed and described.

1.5 DEFINITIONS:

A. General - Basic Contract definitions are included in the Conditions of the Contract.

B. Indicated - The term indicated refers to graphic representations, notes, or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as shown, noted, scheduled, and

specified are used to help the reader locate the reference. There is no limitation on location.

C. Directed - Terms such as directed, requested, authorized, selected, approved, required, and permitted mean directed by the Architect, requested by the Architect, and similar phrases.

D. Approved - The term approved, when used in conjunction with the Architect's action on the Contractor's submittals, applications and requests, is limited to the Architects duties and responsibilities as stated in the Conditions of the Contract.

E. Regulation - The term regulation includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

F. Furnish - The term furnish means supply and deliver to the Project Site, ready for unloading, unpacking, assembly, installation and similar operations.

G. Install - The tem install describes operations at the Project site including the actual unloading, unpacking, assembly, erection, placing anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. Provide - The term provide means to furnish and install, complete and ready for the intended use.

I. Contractor - The Contractor or Electrical Contractor - The term means the Contractor responsible for all work under this section.

J. Installer - An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.
   1. The term experienced, when used with the term installer, means having a minimum of five previous projects similar in size and scope to this project, being familiar with the special requirements indicated, and having complied with requirements of the authority having jurisdiction.
   2. Trades - Using terms such as carpentry is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as carpenter. It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

   3. Assigning Specialists - Certain Section of the Specifications require that specific construction activities are performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no choice or

option. However, the ultimate responsibility for fulfilling Contract requirements remains with the Contractor.

a. This requirement is not to be interpreted to conflict with enforcing building codes and similar regulations governing the Work. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.

K. Testing Agencies - A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.6 VISITS TO SITE:

A. Attention is directed to the necessity for all the Electrical Contractor to visit the site and examine all conditions affecting the proper execution of this Contract. Submission of proposals shall be considered evidence that Contractors have visited and examined the site.

B. Existing contours and topography as indicated, are believed to be reasonably correct, but are not guaranteed. Where conditions at project site do not agree exactly with conditions as indicated, Contractor shall assume all responsibility for said discrepancy.

C. No extra payment will be allowed the Electrical Contractor for extra work caused by failure to visit, examine and clarify.

1.7 RULES AND REGULATIONS

A. Perform in accordance with the rules and regulations of the National Electric Code (NEC), International Building Code (IBC) and other Codes and Standards cited in this specification and the requirements of the Utility Companies serving this project.

B. Certificates of Approval in triplicate, for rough and finished wiring from a Certified Inspection Service must be delivered to the Engineer before final payment can be authorized.

C. Perform all work in accordance with the rules and regulations of the Pennsylvania Department of Labor and Industry, Federal Department of Labor (Occupational Safety and Health Administration) and any other national, state, or local authority having jurisdiction.

D. Perform all Construction, design, fabrication, tests, rating, and installation in compliance with the regulations of all local, state or national agencies having jurisdiction over the project. Pay all costs involved in work necessary to comply with these regulations.

E. The Contractor assumes all responsibility and liability for any code violations, damage or injury which occurs as a result of deviation from or a change to the requirements of these plans and specifications which has not been approved in writing by the Engineer.

1.8 SUBMITTAL OF SHOP DRAWINGS FOR REVIEW:

A. Submit Shop Drawings in accordance with SUBMITTALS Division 1 and as indicated in subsequent Sections of this Division. Assume responsibility for quantities and correct mounting details. In addition, submit other shop drawings as may be requested by the Architect.
   1. Building Wire
   2. Conduit
   3. Fittings
   4. Outlet Boxes
   5. Circuit Breakers

1.9 PRODUCT:

A. Have materials delivered to site. Unload and store materials in allotted location, and protect from damage. Deliver materials to their point of installation.

B. Deliver materials to Project site in manufacturer's original unopened containers with manufacturer's name and product identification clearly marked thereon.

1.10 COMPLIANCE WITH GENERAL STANDARDS AND REGULATIONS:

A. Provide equipment that is in conformity with these specifications and applicable requirements of the following:
   1. AASHTO American Assoc. of State Highway and Transportation Officials
   2. ACI American Concrete Institute
   3. AISC American Institute of Steel Construction
   4. AISI American Iron and Steel Institute
   5. ANSI American National Standards Institute
   6. ASTM American Society for Testing and Materials
   7. AWS American Welding Society
   8. CBM Certified Ballast Manufacturers Assoc.
   9. CRSI Concrete Reinforcing Steel Institute
   10. EIA Electronic Industries Assoc.
   11. ETLETL Testing Laboratories Inc.
   12. FM Factory Mutual Research Assoc.
   13. ICEA Insulated Cable Engineers Association, Inc.
   14. IEC International Electrotechnical Commission
   15. IEEE Institute of Electrical and Electronic Engineers
   16. IESNA Illuminating Engineering Society of North America
   17. IMSA International Municipal Signal Association
   18. LPI Lighting Protection Institute
   19. NEC National Electric Code
   20. NECA National Electrical Contractors Association
   21. NEMA National Electrical Manufacturers Association
   22. NETA International Electrical Testing Association
   23. NFPA National Fire Protection Association
   24. UL Underwriters Laboratories, Inc

1.11 COMPLIANCE WITH FEDERAL GOVERNMENT AGENCIES

A. Names and titles of federal government standard - or Specification-producing agencies are often abbreviated. The following acronyms or abbreviations referenced in the Contract Documents indicate names of standard - Specification-producing agencies of the federal government. Names and addresses are subject to change but are believed to be, but are not assured to be, accurate and up to the date of the Contract Documents.
   1. ADA Americans With Disabilities Act
   2. CFR Code of Federal Regulations
   3. EPA Environmental Protection Agency
   4. FAA Federal Aviation Administration (US Dept. of Transportation)
   5. FCC Federal Communication Commission
   6. FS Federal Specification (from GSA); Specifications Unit (WFISIS)
   7. MIL Military Standardization Documents (US Department of Defense) Naval Publications and Forms Center
   8. OSHA Occupational Safety and Health Administration (US Department of Labor)
   9. REA Rural Electrification Administration (US Department of Agriculture)

1.12 GUARANTEE:

A. Each Contractor shall unconditionally guarantee in writing all materials, equipment, and workmanship for a period of one year from date of acceptance by Owner. The Contractor shall provide free service for all equipment involved in his Contract during this guarantee period.

B. The guarantee shall include restoration to its original condition of all adjacent work that must be disturbed in fulfilling this guarantee.

C. All such repairs and/or replacements shall be made without delay and at the convenience of the Owner.

PART 2 – PRODUCTS

2.1 REFER TO DIVISION 26 – ELECTRICAL

PART 3 - EXECUTION

3.1 LOCATION OF MATERIAL:

A. Locate all power apparatus, conduit, and other materials to result in proper operation of the building and to avoid conflicts with the work of other trades. Obtain required location information sufficiently in advance of installation time to allow uninterrupted progress of the work. Check layouts of equipment with shop drawings of all trades to determine roughing-in requirements. Do not scale drawings for exact locations. Exercise proper

judgment to secure a neat arrangement of conduit, piping, ductwork and other material; and to overcome local interferences to best advantage of the Project.

B. Where physical interferences cannot be resolved readily, consult with the Construction Manager and Architect and prepare dated, dimensioned drawings correcting the interferences. Obtain written approval of the Construction Manager and Architect for such changes and distribute the drawings to all interested parties as directed by the Construction Manager and Architect.

C. Locate switches and other manually operated devices in a location easily accessible and convenient to operating personnel. If any such devices are mounted in a location deemed inaccessible or impractical, relocate devices at no increase in contract costs.

3.2 COLOR CODING OF WIRING

A. Color code all wiring in accordance with the following table. In general, use factory colored insulation. Use colored vinyl tape for black insulation on cables No. 8 and larger. Apply pressure sensitive tape in half-lap serving for distance of 6" at cable terminations, in pull boxes, manholes, panels, and similar locations.

	Phase	208/120 Volts
1.	Phase "A"	Black
2.	Phase "B"	Blue
3.	Phase "C"	Red
4.	Neutral	White
5.	Equipment ground	Green

3.3 PHASING

A. Phase building load centers and panelboards "A", "B", "C" top to bottom and left to right. Identify the neutral, although it may be in different locations for different equipment.

B. Connect transformers in all systems so that:
1. "A" Phase is terminated at "H1" connection.
2. "B" Phase is terminated at "H2" connection.
3. "C" Phase is terminated at "H3" connection.
4. "X1" connection shall be the "A" Phase.
5. "X2" connection shall be the "B" Phase.
6. "X3" connection shall be the "C" Phase.

C. Ascertain from Power Company phase identifications at the point of connection and thereafter carry out and maintain this consistent system of color coding, phase identification and positioning.

D. Verify phase rotation after all terminations at equipment have been made, by producing a 1-2-3 rotation on a phase sequence meter when connected to "A", "B", and "C" phases. Make phase rotation compatible with existing distribution system.

3.4 GROUNDING RESISTANCE TEST:

A. Provide grounding system resistance test to verify resistance. Maximum resistance shall be 5 ohms.

B. Send final certified test reports and Certifications to Construction Manager for approval and transmittal to the Owner in accordance with SUBMITTALS, Division 1.

3.5 INSPECTION AND CERTIFICATION:

A. Obtain and deliver a final Certificate of Approval from the applicable NEC inspection authority having jurisdiction. Make delivery to Construction Manager for transmittal to the Owner upon completion of the work and before final payment in accordance with PROJECT CLOSE-OUT, Division 1. Pay all charges made by the inspection authority and include their cost in the bid.

3.6 INSTALLATION:

A. Install equipment in accordance with manufacturer's recommendations.

3.7 AS-BUILT DRAWINGS:

A. During construction, the Contractor shall maintain a record set of installation prints. He shall record on these prints, all deviations from the Contract Drawings in pipe sizing, location, and details. The record set of installation prints shall be updated at the end of each month and shall be delivered to the Construction Manager and the Architect.

B. At the completion of the work, the Contractor shall forward these prints to the Construction Manager and the Architect for incorporation into the final As-Built Drawings.

3.8 INSTRUCTION TO EMPLOYEES:

A. At the completion of the work, and before final acceptance of the building by the Owner, each Contractor, together with the representatives of the manufacturers of the equipment installed by the Contractor, shall instruct the designated employees of the Owner in the care, adjustment, maintenance and operation of equipment installed by him.

B. Three copies of factory maintenance schedules shall be furnished for each of equipment. Acceptance of materials and equipment is conditional upon receipts of maintenance manuals.

C. A representative of the manufacturer of each piece of equipment shall inspect his respective pieces of equipment, make final adjustments, and put them in a satisfactory working condition.

END OF SECTION 260100

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 PROJECT INCLUDES

A. Single conductor building wire.

B. Wire and cable for 600 volts and less.

C. Wiring connectors.

D. Electrical tape.

E. Heat shrink tubing.

F. Wire pulling lubricant.

1.2 RELATED REQUIREMENTS

A. Section 078400 - Firestopping.

B. Section 260526 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.

1.3 REFERENCE STANDARDS

A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013.

B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2011.

C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes; 2010.

D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2009).

E. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; 2010.

F. ASTM D4388 - Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes; 2013.

G. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.

H. NECA 120 - Standard for Installing Armored Cable (AC) and Metal-Clad Cable (MC); National Electrical Contractors Association; 2006.

I. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy; National Electrical Manufacturers Association; 2009 (ANSI/NEMA WC 70/ICEA S-95-658).

J. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; International Electrical Testing Association; 2013 (ANSI/NETA ATS).

K. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

L. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.

M. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.

N. UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.

O. UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.

P. UL 486D - Sealed Wire Connector Systems; Current Edition, Including All Revisions.

Q. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.

R. UL 1569 - Metal-Clad Cables; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
   2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
   3. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.

C. Product Data: Provide for each cable assembly type.

D. Test Reports: Indicate procedures and values obtained.

E. Design Data: Indicate voltage drop and ampacity calculations for aluminum conductors substituted for copper conductors. Include proposed modifications to raceways, boxes, wiring gutters, enclosures, etc. to accommodate substituted conductors.

F. Project Record Documents: Record actual installed circuiting arrangements. Record actual routing for underground circuits.

G. Project Record Documents: Record actual locations of components and circuits.

1.6 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

1.8 FIELD CONDITIONS

A. Do not install or otherwise handle thermoplastic-insulated conductors at temperatures lower than 14 degrees F, unless otherwise permitted by manufacturer's instructions. When installation below this temperature is unavoidable, notify Architect and obtain direction before proceeding with work.

B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience and with service facilities within 100 miles of Project.

C. Products: Furnish products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.1 PRODUCTS

A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.

B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.

C. Nonmetallic-sheathed cable is not permitted.

D. Underground feeder and branch-circuit cable is not permitted.

E. Service entrance cable is not permitted.

F. Armored cable is not permitted.
   1. For isolated ground circuits, unless provided with an additional isolated/insulated grounding conductor.

G. Concealed Dry Interior Locations: Use only building wire with Type THHN insulation in raceway.

H. Exposed Dry Interior Locations: Use only building wire with Type THHN insulation in raceway.

I. Above Accessible Ceilings: Use only building wire with Type THHN insulation in raceway.

J. Wet or Damp Interior Locations: Use only building wire with Type THWN insulation in raceway.

K. Exterior Locations: Use only building wire with Type THWN insulation in raceway.

L. Underground Installations: Use only building wire with Type THWN insulation in raceway.

M. Use solid conductor for feeders and branch circuits 10 AWG and smaller.

N. Use stranded conductors for control circuits.

O. Use conductor not smaller than 12 AWG for power and lighting circuits.

P. Use conductor not smaller than 18 AWG for control circuits.

Q. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 75 feet.

2.2 CONDUCTOR MANUFACTURERS

A. Cerro Wire LLC: www.cerrowire.com.

B. Southwire Company: www.southwire.com.

C. Substitutions: See Section 016000 - Product Requirements.

2.3 CONDUCTOR GENERAL REQUIREMENTS

A. Provide products that comply with requirements of NFPA 70.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Provide new conductors and cables manufactured not more than one year prior to installation.

D. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.

E. Comply with NEMA WC 70.

F. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.

G. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.

H. Conductors for Grounding and Bonding: Also comply with Section 260526.

I. Conductors and Cables Installed Exposed in Spaces Used for Environmental Air (only where specifically permitted): Plenum rated, listed and labeled as suitable for use in return air plenums.

J. Conductor Material:
   1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
   2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B 787M unless otherwise indicated.
   3. Tinned Copper Conductors: Comply with ASTM B33.

K. Minimum Conductor Size:
   1. Branch Circuits: 12 AWG.
      a. Exceptions:
         1) 20 A, 120 V circuits longer than 75 feet: 10 AWG, for voltage drop.
         2) 20 A, 120 V circuits longer than 150 feet: 8 AWG, for voltage drop.
   2. Control Circuits: 14 AWG.

L. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

M. Conductor Color Coding:
   1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
   2. Color Coding Method: Integrally colored insulation.
      a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.
   3. Color Code:
      a. 208Y/120 V, 3 Phase, 4 Wire System:

1) Phase A: Black.
2) Phase B: Red.
3) Phase C: Blue.
4) Neutral/Grounded: White.

b. Equipment Ground, All Systems: Green.
c. Travelers for 3-Way and 4-Way Switching: Pink.
d. For modifications or additions to existing wiring systems, comply with existing color code when existing code complies with NFPA 70 and is approved by the authority having jurisdiction.
e. For control circuits, comply with manufacturer's recommended color code.

2.4 SINGLE CONDUCTOR BUILDING WIRE

A. Manufacturers:
1. Copper Building Wire:
a. Cerro Wire LLC: www.cerrowire.com.
b. Encore Wire Corporation: www.encorewire.com.
c. Southwire Company: www.southwire.com.
d. Substitutions: See Section 016000 - Product Requirements.

B. Description: Single conductor insulated wire.

C. Conductor Stranding:
1. Feeders and Branch Circuits:
a. Size 10 AWG and Smaller: Solid.
b. Size 8 AWG and Larger: Stranded.

D. Insulation Voltage Rating: 600 V.

E. Insulation:
1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2, except as indicated below.
a. Size 4 AWG and Larger: Type XHHW-2.
b. Fixture Wiring Within Luminaires: Type TFFN/TFN for luminaires with labeled maximum temperature of 90 degrees C; Approved suitable type for luminaires with labeled maximum temperature greater than 90 degrees C.

2.5 WIRING CONNECTORS

A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.

B. Connectors for Grounding and Bonding: Comply with Section 260526.

C. Wiring Connectors for Splices and Taps:

1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.
2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or compression connectors.

D. Wiring Connectors for Terminations:
   1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
   2. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.
   3. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.
   4. Provide motor pigtail connectors for connecting motor leads in order to facilitate disconnection.
   5. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.

E. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.

F. Do not use push-in wire connectors as a substitute for twist-on insulated spring connectors.

G. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.
   1. Manufacturers:
      a. 3M: www.3m.com.
      b. Ideal Industries, Inc: www.idealindustries.com.
      c. NSI Industries LLC: www.nsiindustries.com.
      d. Substitutions: See Section 016000 - Product Requirements.

H. Mechanical Connectors: Provide bolted type or set-screw type.
   1. Manufacturers:
      a. Burndy: www.burndy.com.
      b. Ilsco: www.ilsco.com.
      c. Thomas & Betts Corporation: www.tnb.com.
      d. Substitutions: See Section 016000 - Product Requirements.

I. Compression Connectors: Provide circumferential type or hex type crimp configuration.
   1. Manufacturers:
      a. Burndy: www.burndy.com.
      b. Ilsco: www.ilsco.com.
      c. Thomas & Betts Corporation: www.tnb.com.
      d. Substitutions: See Section 016000 - Product Requirements.

2.6 WIRING ACCESSORIES

A. Electrical Tape:
   1. Manufacturers:
      a. 3M: www.3m.com.
      b. Plymouth Rubber Europa: www.plymouthrubber.com.
      c. Substitutions: See Section 016000 - Product Requirements.
   2. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F.
   3. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F and suitable for continuous temperature environment up to 221 degrees F.
   4. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil; suitable for continuous temperature environment up to 194 degrees F and short-term 266 degrees F overload service.
   5. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil; suitable for continuous temperature environment up to 176 degrees F.
   6. Varnished Cambric Electrical Tape: Cotton cambric fabric tape, with or without adhesive, oil-primed and coated with high-grade insulating varnish; minimum thickness of 7 mil; suitable for continuous temperature environment up to 221 degrees F.
   7. Moisture Sealing Electrical Tape: Insulating mastic compound laminated to flexible, all-weather vinyl backing; minimum thickness of 90 mil.

B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.
   1. Manufacturers:
      a. 3M: www.3m.com.
      b. Burndy: www.burndy.com.
      c. Thomas & Betts Corporation: www.tnb.com.
      d. Substitutions: See Section 016000 - Product Requirements.

C. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.
   1. Manufacturers:
      a. 3M: www.3m.com.
      b. American Polywater Corporation: www.polywater.com.
      c. Ideal Industries, Inc: www.idealindustries.com.
      d. Substitutions: See Section 016000 - Product Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that interior of building has been protected from weather.

B. Verify that work likely to damage wire and cable has been completed.

C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.

D. Verify that field measurements are as shown on the drawings.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.3 INSTALLATION

A. Circuiting Requirements:
   1. Unless dimensioned, circuit routing indicated is diagrammatic.
   2. When circuit destination is indicated and routing is not shown, determine exact routing required.
   3. Arrange circuiting to minimize splices.
   4. Include circuit lengths required to install connected devices within 10 ft of location shown.
   5. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
   6. Maintain separation of wiring for emergency systems in accordance with NFPA 70.
   7. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are shown as separate, combining them together in a single raceway is permitted, under the following conditions:
      a. Provide no more than six current-carrying conductors in a single raceway. Dedicated neutral conductors are considered current-carrying conductors.
      b. Increase size of conductors as required to account for ampacity derating.
      c. Size raceways, boxes, etc. to accommodate conductors.
   8. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among up to three single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.
   9. Provide oversized neutral/grounded conductors where indicated and as specified below.
      a. Provide 200 percent rated neutral for feeders fed from K-rated transformers.

b. Provide 200 percent rated neutral for feeders serving panelboards with 200 percent rated neutral bus.

B. Install products in accordance with manufacturer's instructions.

C. Install conductors and cable in a neat and workmanlike manner in accordance with NECA 1.

D. Install metal-clad cable (Type MC) in accordance with NECA 120.

E. Installation in Raceway:
1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
2. Pull all conductors and cables together into raceway at same time.
3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.

F. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.

G. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
1. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conductors and cables to lay on ceiling tiles.
2. Installation in Vertical Raceways: Provide supports where vertical rise exceeds permissible limits.

H. Install conductors with a minimum of 12 inches of slack at each outlet.

I. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.

J. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.

K. Make wiring connections using specified wiring connectors.
1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
3. Do not remove conductor strands to facilitate insertion into connector.

4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.
5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

L. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
1. Dry Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
a. For taped connections, first apply adequate amount of rubber splicing electrical tape or electrical filler tape, followed by outer covering of vinyl insulating electrical tape.
b. For taped connections likely to require re-entering, including motor leads, first apply varnished cambric electrical tape, followed by adequate amount of rubber splicing electrical tape, followed by outer covering of vinyl insulating electrical tape.
2. Damp Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.
b. For taped connections, follow same procedure as for dry locations but apply outer covering of moisture sealing electrical tape.
3. Wet Locations: Use heat shrink tubing.

M. Insulate ends of spare conductors using vinyl insulating electrical tape.

N. Field-Applied Color Coding: Where vinyl color coding electrical tape is used in lieu of integrally colored insulation as permitted in Part 2 under "Color Coding", apply half overlapping turns of tape at each termination and at each location conductors are accessible.

O. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.

P. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

3.4 FIELD QUALITY CONTROL

A. Perform inspection, testing, and adjusting in accordance with Section 014000.

B. Inspect and test in accordance with NETA ATS, except Section 4.

C. Perform inspections and tests listed in NETA ATS, Section 7.3.2. The insulation resistance test is required for all conductors. The resistance test for parallel conductors listed as optional is not required.
   1. Disconnect surge protective devices (SPDs) prior to performing any high potential testing. Replace SPDs damaged by performing high potential testing with SPDs connected.

D. Correct deficiencies and replace damaged or defective conductors and cables.

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 PROJECT INCLUDES

A. Grounding and bonding requirements.

B. Conductors for grounding and bonding.

C. Connectors for grounding and bonding.

D. Grounding and bonding components.

1.2 RELATED REQUIREMENTS

A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.

B. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

A. IEEE 81 - Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System; 2012.

B. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.

C. NEMA GR 1 - Grounding Rod Electrodes and Grounding Rod Electrode Couplings; National Electrical Manufacturers Association; 2007.

D. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; International Electrical Testing Association; 2013 (ANSI/NETA ATS).

E. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. NFPA 780 - Standard for the Installation of Lightning Protection Systems; National Fire Protection Association; 2014.

G. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Verify exact locations of underground metal water service pipe entrances to building.
2. Coordinate the work with other trades to provide steel reinforcement complying with specified requirements for concrete-encased electrode.
3. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.5 PERFORMANCE REQUIREMENTS

A. Grounding System Resistance: 5 ohms.

1.6 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittals procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.

C. Shop Drawings:
1. Indicate proposed arrangement for signal reference grids. Include locations of items to be bonded and methods of connection.

D. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

E. Field quality control test reports.

F. Project Record Documents: Record actual locations of grounding electrode system components and connections.

1.7 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

C. Installer Qualifications for Signal Reference Grids: Company with minimum five years documented experience with high frequency grounding systems.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 GROUNDING AND BONDING REQUIREMENTS

A. Do not use products for applications other than as permitted by NFPA 70 and product listing.

B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.

C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

D. Grounding System Resistance:
   1. Achieve specified grounding system resistance under normally dry conditions unless otherwise approved by Architect. Precipitation within the previous 48 hours does not constitute normally dry conditions.
   2. Grounding Electrode System: Not greater than 5 ohms to ground, when tested according to IEEE 81 using "fall-of-potential" method.
   3. Between Grounding Electrode System and Major Electrical Equipment Frames, System Neutral, and Derived Neutral Points: Not greater than 0.5 ohms, when tested using "point-to-point" methods.

E. Grounding Electrode System:
   1. Provide connection to required and supplemental grounding electrodes indicated to form grounding electrode system.
      a. Provide continuous grounding electrode conductors without splice or joint.
      b. Install grounding electrode conductors in raceway where exposed to physical damage. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.
   2. Metal Underground Water Pipe(s):
      a. Provide connection to underground metal domestic and fire protection (where present) water service pipe(s) that are in direct contact with earth for at least 10 feet at an accessible location not more than 5 feet from the point of entrance to the building.
      b. Provide bonding jumper(s) around insulating joints/pipes as required to make pipe electrically continuous.
      c. Provide bonding jumper around water meter of sufficient length to permit removal of meter without disconnecting jumper.
   3. Metal Building or Structure Frame:
      a. Provide connection to metal building or structure frame effectively grounded in accordance with NFPA 70 at nearest accessible location.
   4. Provide additional ground electrode(s) as required to achieve specified grounding electrode system resistance.
   5. Ground Bar: Provide ground bar, separate from service equipment enclosure, for common connection point of grounding electrode system bonding jumpers as permitted in NFPA 70. Connect grounding electrode conductor provided for service-supplied system grounding to this ground bar.

a. Ground Bar Size: 1/4 by 2 by 12 inches unless otherwise indicated or required.
b. Where ground bar location is not indicated, locate in accessible location as near as possible to service disconnect enclosure.
c. Ground Bar Mounting Height: 18 inches above finished floor unless otherwise indicated.

F. Separately Derived System Grounding:
1. Separately derived systems include, but are not limited to:
a. Transformers (except autotransformers such as buck-boost transformers).
b. Uninterruptible power supplies (UPS), when configured as separately derived systems.
c. Generators, when neutral is switched in the transfer switch.
2. Provide grounding electrode conductor to connect derived system grounded conductor to nearest effectively grounded metal building frame. Unless otherwise indicated, make connection at neutral (grounded) bus in source enclosure.
3. Provide bonding jumper to connect derived system grounded conductor to nearest metal building frame and nearest metal water piping in the area served by the derived system, where not already used as a grounding electrode for the derived system. Make connection at same location as grounding electrode conductor connection.
4. Provide system bonding jumper to connect system grounded conductor to equipment ground bus. Make connection at same location as grounding electrode conductor connection. Do not make any other connections between neutral (grounded) conductors and ground on load side of separately derived system disconnect.
5. Where the source and first disconnecting means are in separate enclosures, provide supply-side bonding jumper between source and first disconnecting means.

G. Bonding and Equipment Grounding:
1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.

6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.
7. Provide bonding for interior metal piping systems in accordance with NFPA 70. This includes, but is not limited to:
   a. Metal gas piping.

2.2 GROUNDING AND BONDING COMPONENTS

A. General Requirements:
   1. Provide products listed, classified, and labeled as suitable for the purpose intended.
   2. Provide products listed and labeled as complying with UL 467 where applicable.

B. Conductors for Grounding and Bonding, in addition to requirements of Section 260519:
   1. Use insulated copper conductors unless otherwise indicated.
      a. Exceptions:
      1) Use bare copper conductors where installed underground in direct contact with earth.
      2) Use bare copper conductors where directly encased in concrete (not in raceway).

C. Connectors for Grounding and Bonding:
   1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
   2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
   3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.
   4. Manufacturers - Mechanical and Compression Connectors:
      a. Burndy: www.burndy.com.
      b. Harger Lightning & Grounding: www.harger.com.
      c. Thomas & Betts Corporation: www.tnb.com.
      d. Substitutions: See Section 016000 - Product Requirements.

D. Ground Bars:
   1. Description: Copper rectangular ground bars with mounting brackets and insulators.
   2. Size: As indicated.
   3. Holes for Connections: As indicated or as required for connections to be made.
   4. Manufacturers:
      a. Erico International Corporation: www.erico.com.
      b. Harger Lightning & Grounding: www.harger.com.
      c. ThermOweld, a brand of Continental Industries, Inc: www.thermoweld.com.
      d. Substitutions: See Section 016000 - Product Requirements.

2.3 PRODUCTS

A. Foundation Electrodes: 2/0 AWG.

2.4 CONNECTORS AND ACCESSORIES

A. Mechanical Connectors: Bronze.

B. Exothermic Connections:

C. Wire: Stranded copper.

D. Grounding Electrode Conductor: Size to meet NFPA 70 requirements.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that work likely to damage grounding and bonding system components has been completed.

B. Verify that field measurements are as shown on the drawings.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install grounding and bonding system components in a neat and workmanlike manner in accordance with NECA 1.

C. Make grounding and bonding connections using specified connectors.
   1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
   2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
   3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
   4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
   5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

D. Identify grounding and bonding system components in accordance with Section 260553.

3.3 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for additional requirements.

B. Inspect and test in accordance with NETA ATS except Section 4.

C. Perform inspections and tests listed in NETA ATS, Section 7.13.

D. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.

E. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

END OF SECTION 260526

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 PROJECT INCLUDES

A. Support and attachment components for equipment, conduit, cable, boxes, and other electrical work.

1.2 RELATED REQUIREMENTS

A. Section 260534 - Conduit: Additional support and attachment requirements for conduits.

B. Section 260537 - Boxes: Additional support and attachment requirements for boxes.

1.3 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2013.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2013.

D. MFMA-4 - Metal Framing Standards Publication; Metal Framing Manufacturers Association; 2004.

E. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.

F. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

G. UL 5B - Strut-Type Channel Raceways and Fittings; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
   2. Coordinate the work with other trades to provide additional framing and materials required for installation.
   3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.

4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

B. Sequencing:
1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 033000.

1.5 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for metal channel (strut) framing systems, non-penetrating rooftop supports, and post-installed concrete and masonry anchors.

C. Shop Drawings: Include details for fabricated hangers and supports where materials or methods other than those indicated are proposed for substitution.

D. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.6 QUALITY ASSURANCE

A. Comply with NFPA 70.

B. Comply with applicable building code.

C. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 SUPPORT AND ATTACHMENT COMPONENTS

A. General Requirements:
1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.

3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported with a minimum safety factor. Include consideration for vibration, equipment operation, and shock loads where applicable.
4. Do not use products for applications other than as permitted by NFPA 70 and product listing.
5. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
6. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
    a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
    b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel, or approved equivalent unless otherwise indicated.
    c. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
    d. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

B. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.
1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
2. Conduit Clamps: Bolted type unless otherwise indicated.
3. Manufacturers:
    a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com.
    b. Erico International Corporation: www.erico.com.
    c. O-Z/Gedney, a brand of Emerson Industrial Automation: www.emersonindustrial.com.
    d. Thomas & Betts Corporation: www.tnb.com.
    e. Substitutions: See Section 016000 - Product Requirements.

C. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.
1. Manufacturers:
    a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com.
    b. Erico International Corporation: www.erico.com.
    c. O-Z/Gedney, a brand of Emerson Industrial Automation: www.emersonindustrial.com.
    d. Thomas & Betts Corporation: www.tnb.com.
    e. Substitutions: See Section 016000 - Product Requirements.

D. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.
1. Comply with MFMA-4.
2. Channel (Strut) Used as Raceway (only where specifically indicated): Listed and labeled as complying with UL 5B.
3. Channel Material:

a. Indoor Dry Locations: Use painted steel, zinc-plated steel, or galvanized steel.
b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel.

4. Minimum Channel Thickness: Steel sheet, 12 gage, 0.1046 inch.
5. Minimum Channel Dimensions: 1-5/8 inch width by 13/16 inch height.
6. Manufacturers:
   a. Cooper B-Line, a division of Eaton Corporation: www.cooperindustries.com.
   b. Thomas & Betts Corporation: www.tnb.com.
   c. Unistrut, a brand of Atkore International Inc: www.unistrut.com.
   d. Substitutions: See Section 016000 - Product Requirements.

E. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
   1. Minimum Size, Unless Otherwise Indicated or Required:
      a. Equipment Supports: 1/2 inch diameter.
      b. Single Conduit up to 1 inch (27mm) trade size: 1/4 inch diameter.
      c. Single Conduit larger than 1 inch (27mm) trade size: 3/8 inch diameter.
      d. Trapeze Support for Multiple Conduits: 3/8 inch diameter.
      e. Outlet Boxes: 1/4 inch diameter.
      f. Luminaires: 1/4 inch diameter.

F. Anchors and Fasteners:
   1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
   2. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.
   3. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
   4. Hollow Masonry: Use toggle bolts.
   5. Hollow Stud Walls: Use toggle bolts.
   6. Steel: Use beam clamps, machine bolts, or welded threaded studs.
   7. Sheet Metal: Use sheet metal screws.
   8. Plastic and lead anchors are not permitted.
   9. Powder-actuated fasteners are not permitted.
   10. Hammer-driven anchors and fasteners are not permitted.
   11. Preset Concrete Inserts: Continuous metal channel (strut) and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
      a. Comply with MFMA-4.
      b. Channel Material: Use galvanized steel.
      c. Minimum Channel Thickness: Steel sheet, 12 gage, 0.1046 inch minimum base metal thickness.
      d. Manufacturer: Same as manufacturer of metal channel (strut) framing system.
   12. Post-Installed Concrete and Masonry Anchors: Evaluated and recognized by ICC Evaluation Service, LLC (ICC-ES) for compliance with applicable building code.
   13. Manufacturers - Mechanical Anchors:
      a. Hilti, Inc: www.us.hilti.com.
      b. ITW Red Head, a division of Illinois Tool Works, Inc: www.itwredhead.com.
      c. Powers Fasteners, Inc: www.powers.com.

d. Simpson Strong-Tie Company Inc: www.strongtie.com.
e. Substitutions: See Section 016000 - Product Requirements.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as shown on the drawings.

B. Verify that mounting surfaces are ready to receive support and attachment components.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install support and attachment components in a neat and workmanlike manner in accordance with NECA 1.

C. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.

D. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.

E. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.

F. Unless specifically indicated or approved by Architect, do not provide support from roof deck.

G. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.

H. Equipment Support and Attachment:
1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.

I. Conduit Support and Attachment: Also comply with Section 260534.

J. Box Support and Attachment: Also comply with Section 260537.

K. Secure fasteners according to manufacturer's recommended torque settings.

L. Remove temporary supports.

3.3 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for additional requirements.

B. Inspect support and attachment components for damage and defects.

C. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

D. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION 260529

SECTION 260534 - CONDUIT

PART 1 GENERAL

1.1 PROJECT INCLUDES

A. Galvanized steel rigid metal conduit (RMC).

B. Aluminum rigid metal conduit (RMC).

C. Flexible metal conduit (FMC).

D. Liquidtight flexible metal conduit (LFMC).

E. Electrical metallic tubing (EMT).

F. Rigid polyvinyl chloride (PVC) conduit.

G. Liquidtight flexible nonmetallic conduit (LFNC).

H. Conduit fittings.

I. Accessories.

J. Conduit, fittings and conduit bodies.

1.2 RELATED REQUIREMENTS

A. Section 078400 - Firestopping.

B. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Metal clad cable (Type MC) and armored cable (Type AC), including uses permitted.

C. Section 260526 - Grounding and Bonding for Electrical Systems.
   1. Includes additional requirements for fittings for grounding and bonding.

D. Section 260529 - Hangers and Supports for Electrical Systems.

E. Section 260537 - Boxes.

F. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2005.

B. ANSI C80.3 - American National Standard for Steel Electrical Metallic Tubing (EMT); 2005.

C. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.

D. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); National Electrical Contractors Association; 2006.

E. NECA 102 - Standard for Installing Aluminum Rigid Metal Conduit; National Electrical Contractors Association; 2004.

F. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC); National Electrical Contractors Association; 2003.

G. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; National Electrical Manufacturers Association; 2012 (ANSI/NEMA FB 1).

H. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit; National Electrical Manufacturers Association; 2013.

I. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing; National Electrical Manufacturers Association; 2013.

J. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

K. UL 1 - Flexible Metal Conduit; Current Edition, Including All Revisions.

L. UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.

M. UL 6A - Electrical Rigid Metal Conduit-Aluminum, Red Brass, and Stainless Steel; Current Edition, Including All Revisions.

N. UL 360 - Liquid-Tight Flexible Steel Conduit; Current Edition, Including All Revisions.

O. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.

P. UL 651 - Schedule 40 and 80 Rigid PVC Conduit and Fittings; Current Edition, Including All Revisions.

Q. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.

R. UL 1660 - Liquid-Tight Flexible Nonmetallic Conduit; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
   2. Coordinate the arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
   3. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.
   4. Coordinate the work with other trades to provide roof penetrations that preserve the integrity of the roofing system and do not void the roof warranty.
   5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

B. Sequencing:
   1. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.

1.5 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittals procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.

C. Shop Drawings:

   1. Include proposed locations of roof penetrations and proposed methods for sealing.

D. Project Record Documents: Record actual routing for conduits installed underground and conduits 2 inch (53 mm) trade size and larger.

1.6 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and shown.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.

B. Accept conduit on site. Inspect for damage.

C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

D. Protect PVC conduit from sunlight.

PART 2 PRODUCTS

2.1 CONDUIT APPLICATIONS

A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.

B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.

C. Underground:
   1. Under Slab on Grade: Use rigid PVC conduit.
   2. Exterior, Direct-Buried: Use rigid PVC conduit.
   3. Exterior, Embedded Within Concrete: Use rigid PVC conduit.
   4. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit where emerging from underground.
   5. Where rigid polyvinyl (PVC) conduit larger than 2 inch (53 mm) trade size is provided, use galvanized steel rigid metal conduit elbows for bends.

D. Embedded Within Concrete:
   1. Within Slab on Grade: Not permitted.
   2. Within Slab Above Ground: Not permitted.
   3. Within Concrete Walls Above Ground: Use galvanized steel rigid metal conduit.
   4. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit where emerging from concrete.
   5. Where electrical metallic tubing (EMT) emerges from concrete into salt air, use corrosion protection tape to provide supplementary corrosion protection for a minimum of 4 inches on either side of where conduit emerges.

E. Concealed Within Masonry Walls: Use electrical metallic tubing (EMT).

F. Concealed Within Hollow Stud Walls: Use electrical metallic tubing (EMT).

G. Concealed Above Accessible Ceilings: Use electrical metallic tubing (EMT).

H. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit.

I. Exposed, Interior, Not Subject to Physical Damage: Use electrical metallic tubing (EMT).

J. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit.
   1. Locations subject to physical damage include, but are not limited to:
      a. Where exposed below 8 feet, except within electrical and communication rooms or closets.
      b. Where exposed below 20 feet in warehouse areas.

K. Corrosive Locations Above Ground: Use aluminum rigid metal conduit.
   1. Corrosive locations include, but are not limited to:
      a. Cooling towers.

L. Hazardous (Classified) Locations: Use galvanized steel rigid metal conduit.

M. Connections to Vibrating Equipment:
   1. Dry Locations: Use flexible metal conduit.
   2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit.
   3. Maximum Length: 6 feet unless otherwise indicated.
   4. Vibrating equipment includes, but is not limited to:
      a. Transformers.
      b. Motors.

N. Fished in Existing Walls, Where Necessary: Use flexible metal conduit.

2.2 PRODUCTS

A. Fittings for Grounding and Bonding: Also comply with Section 260526.

B. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.

C. Provide products listed, classified, and labeled as suitable for the purpose intended.

D. Minimum Conduit Size, Unless Otherwise Indicated:
   1. Branch Circuits: 3/4 inch (21 mm) trade size.
   2. Branch Circuit Homeruns: 3/4 inch (21 mm) trade size.
   3. Control Circuits: 1/2 inch (16 mm) trade size.
   4. Underground, Interior: 3/4 inch (21 mm) trade size.

G. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.3 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

A. Manufacturers:
   1. Allied Tube & Conduit: www.alliedeg.com.
   2. Republic Conduit: www.republic-conduit.com.
   3. Wheatland Tube Company: www.wheatland.com.
   4. Substitutions: See Section 016000 - Product Requirements.

B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.

C. Fittings:
   1. Manufacturers:
      a. Bridgeport Fittings Inc: www.bptfittings.com.

b. O-Z/Gedney, a brand of Emerson Industrial Automation: www.emersonindustrial.com.
c. Thomas & Betts Corporation: www.tnb.com.
d. Substitutions: See Section 016000 - Product Requirements.

2. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
3. Material: Use steel or malleable iron.
   a. Do not use die cast zinc fittings.
4. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.4 ALUMINUM RIGID METAL CONDUIT (RMC)

A. Manufacturers:
1. Allied Tube & Conduit: www.alliedeg.com.
2. Republic Conduit: www.republic-conduit.com.
3. Wheatland Tube Company: www.wheatland.com.
4. Substitutions: See Section 016000 - Product Requirements.

B. Description: NFPA 70, Type RMC aluminum rigid metal conduit complying with ANSI C80.5 and listed and labeled as complying with UL 6A.

C. Fittings:
1. Manufacturers:
   a. Bridgeport Fittings Inc: www.bptfittings.com.
   b. O-Z/Gedney, a brand of Emerson Industrial Automation: www.emersonindustrial.com.
   c. Thomas & Betts Corporation: www.tnb.com.
   d. Substitutions: See Section 016000 - Product Requirements.
2. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
3. Material: Use aluminum.
4. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.5 FLEXIBLE METAL CONDUIT (FMC)

A. Manufacturers:
1. AFC Cable Systems, Inc: www.afcweb.com.
2. Electri-Flex Company: www.electriflex.com.
3. International Metal Hose: www.metalhose.com.
4. Substitutions: See Section 016000 - Product Requirements.

B. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.

C. Fittings:

1. Manufacturers:
   a. Bridgeport Fittings Inc: www.bptfittings.com.
   b. O-Z/Gedney, a brand of Emerson Industrial Automation: www.emersonindustrial.com.
   c. Thomas & Betts Corporation: www.tnb.com.
   d. Substitutions: See Section 016000 - Product Requirements.
2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
3. Material: Use steel or malleable iron.
   a. Do not use die cast zinc fittings.

2.6 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

A. Manufacturers:
   1. AFC Cable Systems, Inc: www.afcweb.com.
   2. Electri-Flex Company: www.electriflex.com.
   3. International Metal Hose: www.metalhose.com.
   4. Substitutions: See Section 016000 - Product Requirements.

B. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.

C. Fittings:
   1. Manufacturers:
      a. Bridgeport Fittings Inc: www.bptfittings.com.
      b. O-Z/Gedney, a brand of Emerson Industrial Automation: www.emersonindustrial.com.
      c. Thomas & Betts Corporation: www.tnb.com.
      d. Substitutions: See Section 016000 - Product Requirements.
   2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   3. Material: Use steel or malleable iron.
      a. Do not use die cast zinc fittings.

2.7 ELECTRICAL METALLIC TUBING (EMT)

A. Manufacturers:
   1. Allied Tube & Conduit: www.alliedeg.com.
   2. Republic Conduit: www.republic-conduit.com.
   3. Picoma; _____: http://www.picoma.com.
   4. Wheatland Tube Company: www.wheatland.com.
   5. Substitutions: See Section 016000 - Product Requirements.

B. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.

C. Fittings:
   1. Manufacturers:

a. Bridgeport Fittings Inc: www.bptfittings.com.
b. O-Z/Gedney, a brand of Emerson Industrial Automation: www.emersonindustrial.com.
c. Thomas & Betts Corporation: www.tnb.com.
d. Substitutions: See Section 016000 - Product Requirements.

2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
3. Material: Use steel or malleable iron.
   a. Do not use die cast zinc fittings.
4. Connectors and Couplings: Use compression (gland) type.
   a. Do not use indenter type connectors and couplings.

2.8 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

A. Manufacturers:
1. Cantex Inc: www.cantexinc.com.
2. Carlon, a brand of Thomas & Betts Corporation: www.carlon.com.
3. JM Eagle: www.jmeagle.com.
4. Substitutions: See Section 016000 - Product Requirements.

B. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.

C. Fittings:
1. Manufacturer: Same as manufacturer of conduit to be connected.
2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

2.9 LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT (LFNC)

A. Manufacturers:
1. AFC Cable Systems, Inc: www.afcweb.com.
2. Electri-Flex Company: www.electriflex.com.
3. International Metal Hose: www.metalhose.com.
4. Substitutions: See Section 016000 - Product Requirements.

B. Description: NFPA 70, Type LFNC liquidtight flexible nonmetallic conduit listed and labeled as complying with UL 1660.

C. Fittings:
1. Manufacturer: Same as manufacturer of conduit to be connected.
2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B; suitable for the type of conduit to be connected.

2.10 ACCESSORIES

A. Corrosion Protection Tape: PVC-based, minimum thickness of 20 mil.

B. Conduit Joint Compound: Corrosion-resistant, electrically conductive; suitable for use with the conduit to be installed.

C. Solvent Cement for PVC Conduit and Fittings: As recommended by manufacturer of conduit and fittings to be installed.

D. Pull Strings: Use nylon cord with average breaking strength of not less than 200 pound-force.

E. Sealing Compound for Sealing Fittings: Listed for use with the particular fittings to be installed.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as shown on drawings.

B. Verify that mounting surfaces are ready to receive conduits.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install conduit in a neat and workmanlike manner in accordance with NECA 1.

C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.

D. Install aluminum rigid metal conduit (RMC) in accordance with NECA 102.

E. Install rigid polyvinyl chloride (PVC) conduit in accordance with NECA 111.

F. Install liquidtight flexible nonmetallic conduit (LFNC) in accordance with NECA 111.

G. Conduit Routing:
   1. Unless dimensioned, conduit routing indicated is diagrammatic.
   2. When conduit destination is indicated and routing is not shown, determine exact routing required.
   3. Conceal all conduits unless specifically indicated to be exposed.
   4. Conduits in the following areas may be exposed, unless otherwise indicated:
      a. Electrical rooms.
      b. Mechanical equipment rooms.
      c. Within joists in areas with no ceiling.

5. Unless otherwise approved, do not route conduits exposed:
   a. Across floors.
   b. Across roofs.
   c. Across top of parapet walls.
   d. Across building exterior surfaces.
6. Conduits installed underground or embedded in concrete may be routed in the shortest possible manner unless otherwise indicated. Route all other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.
7. Arrange conduit to maintain adequate headroom, clearances, and access.
8. Arrange conduit to provide no more than the equivalent of four 90 degree bends between pull points.
9. Arrange conduit to provide no more than 150 feet between pull points.
10. Route conduits above water and drain piping where possible.
11. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.
12. Maintain minimum clearance of 6 inches between conduits and piping for other systems.
13. Maintain minimum clearance of 12 inches between conduits and hot surfaces. This includes, but is not limited to:
    a. Heaters.
    b. Hot water piping.
    c. Flues.
14. Group parallel conduits in the same area together on a common rack.

H. Conduit Support:
1. Secure and support conduits in accordance with NFPA 70 and Section 260529 using suitable supports and methods approved by the authority having jurisdiction.
2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
4. Use conduit strap to support single surface-mounted conduit.
   a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.
5. Use metal channel (strut) with accessory conduit clamps to support multiple parallel surface-mounted conduits.
6. Use conduit clamp to support single conduit from beam clamp or threaded rod.
7. Use trapeze hangers assembled from threaded rods and metal channel (strut) with accessory conduit clamps to support multiple parallel suspended conduits.
8. Use of spring steel conduit clips for support of conduits is not permitted.
9. Use of wire for support of conduits is not permitted.
10. Where conduit support intervals specified in NFPA 70 and NECA standards differ, comply with the most stringent requirements.

I. Connections and Terminations:

1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
3. Use suitable adapters where required to transition from one type of conduit to another.
4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
6. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
7. Secure joints and connections to provide maximum mechanical strength and electrical continuity.

J. Penetrations:
1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
2. Make penetrations perpendicular to surfaces unless otherwise indicated.
3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
4. Conceal bends for conduit risers emerging above ground.
5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
7. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty. Include proposed locations of penetrations and methods for sealing with submittals.
8. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.

K. Underground Installation:
1. Minimum Cover, Unless Otherwise Indicated or Required:
   a. Underground, Exterior: 24 inches.
   b. Under Slab on Grade: 12 inches to bottom of slab.
2. Provide underground warning tape in accordance with Section 260553 along entire conduit length.

L. Concrete Encasement: Where conduits not otherwise embedded within concrete are indicated to be concrete-encased, provide concrete in accordance with Section 033000 with minimum concrete cover of 3 inches on all sides unless otherwise indicated.

M. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
   1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
   2. Where conduits are subject to earth movement by settlement or frost.

N. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:
   1. Where conduits pass from outdoors into conditioned interior spaces.
   2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
   3. Where conduits penetrate coolers or freezers.

O. Provide pull string in all empty conduits and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches at each end.

P. Provide grounding and bonding in accordance with Section 260526.

3.3 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for additional requirements.

B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

C. Correct deficiencies and replace damaged or defective conduits.

END OF SECTION 260534

SECTION 260535 - SURFACE RACEWAYS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Surface raceway systems.

B. Wireways.

1.2 RELATED REQUIREMENTS

A. Section 260526 - Grounding and Bonding for Electrical Systems.

B. Section 260529 - Hangers and Supports for Electrical Systems.
   1. Includes metal channel (strut) used as raceway.

C. Section 260534 - Conduit.

D. Section 260537 - Boxes.

E. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.

B. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

D. UL 5 - Surface Metal Raceways and Fittings; Current Edition, Including All Revisions.

E. UL 5A - Nonmetallic Surface Raceways and Fittings; Current Edition, Including All Revisions.

F. UL 111 - Outline of Investigation for Multioutlet Assemblies; Current Edition, Including All Revisions.

G. UL 870 - Wireways, Auxiliary Gutters, and Associated Fittings; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the placement of raceways with millwork, furniture, equipment, etc. installed under other sections or by others.
2. Coordinate rough-in locations of outlet boxes provided under Section 260537 and conduit provided under Section 260534 as required for installation of raceways provided under this section.
3. Verify minimum sizes of raceways with the actual conductors and components to be installed.
4. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

B. Sequencing:
1. Do not install raceways until final surface finishes and painting are complete.
2. Do not begin installation of conductors and cables until installation of raceways is complete between outlet, junction and splicing points.

1.5 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets including dimensions, knockout sizes and locations, materials, fabrication details, finishes, service condition requirements, and accessories.
1. Surface Raceway Systems: Include information on fill capacities for conductors and cables.

C. Shop Drawings:
1. Pre-wired Surface Raceway Systems: Provide plan and elevation views including dimensioned locations of wiring devices and circuiting arrangements.

D. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.6 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 RACEWAY REQUIREMENTS

A. Provide all components, fittings, supports, and accessories required for a complete raceway system.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Do not use raceways for applications other than as permitted by NFPA 70 and product listing.

2.2 SURFACE RACEWAY SYSTEMS

A. Manufacturers:
   1. Hubbell Incorporated: www.hubbell-wiring.com.
   2. Wiremold, a brand of Legrand North America, Inc: www.legrand.us.
   3. Substitutions: See Section 016000 - Product Requirements.

B. Surface Metal Raceways: Listed and labeled as complying with UL 5.

C. Multioutlet Assemblies: Listed and labeled as complying with UL 111.

D. Surface Raceway System:
   1. Raceway Type: Two channel, painted steel.
   2. Length: As indicated on the drawings.
   3. Color: To be selected by Architect.
   4. Accessory Device Boxes: Suitable for the devices to be installed; color to match raceway.
   5. Integrated Device Provisions:
      a. Receptacles:
         1) Comply with Section 262726, except for finishes.
         2) Configuration: As indicated on the drawings.
         3) Color: Match raceway.
         4) Spacing: As indicated on the drawings.
      b. Communications Outlets:
         1) Voice and Data Jacks: As specified in Section 271005.
         2) Configuration: As indicated on the drawings.
         3) Spacing: As indicated on the drawings.

2.3 WIREWAYS

A. Manufacturers:
   1. Cooper B-Line, a division of Cooper Industries: www.cooperindustries.com.
   2. Hoffman, a brand of Pentair Technical Products: www.hoffmanonline.com.
   3. Schneider Electric; Square D Products: www.schneider-electric.us.
   4. Substitutions: See Section 016000 - Product Requirements.

B. Description: Lay-in wireways and wiring troughs with removable covers; listed and labeled as complying with UL 870.

C. Wireway Type, Unless Otherwise Indicated:
   1. Indoor Clean, Dry Locations: NEMA 250, Type 1, painted steel with screw-cover.

D. Finish for Painted Steel Wireways: Manufacturer's standard grey unless otherwise indicated.

E. Minimum Wireway Size: 6 by 6 inches unless otherwise indicated.

F. Where wireway size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.4 SOURCE QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for additional requirements.

B. Factory test each production unit for pre-wired surface raceway systems to verify proper wiring.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as shown on the drawings.

B. Verify that outlet boxes and conduit terminations are installed in proper locations and are properly sized in accordance with NFPA 70 to accommodate raceways.

C. Verify that mounting surfaces are ready to receive raceways and that final surface finishes are complete, including painting.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install raceways in a neat and workmanlike manner in accordance with NECA 1.

C. Install raceways plumb and level.

D. Arrange wireways and associated raceway connections to comply with NFPA 70, including but not limited to requirements for deflected conductors and wireways used as pullboxes. Increase size of wireway where necessary.

E. Secure and support raceways in accordance with Section 260529 at intervals complying with NFPA 70 and manufacturer's requirements.

F. Close unused raceway openings.

G. Provide grounding and bonding in accordance with Section 260526.

3.3 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for additional requirements.

B. Inspect raceways for damage and defects.

C. Surface Raceway Systems with Integrated Devices: Test each wiring device to verify operation and proper polarity.

D. Correct wiring deficiencies and replace damaged or defective raceways.

3.4 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.5 PROTECTION

A. Protect installed raceways from subsequent construction operations.

END OF SECTION 260535

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 260537 - BOXES

PART 1 GENERAL

1.1 PROJECT INCLUDES

A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.

B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches.

C. Underground boxes/enclosures.

D. Pull and junction boxes.

1.2 RELATED REQUIREMENTS

A. Section 078400 - Firestopping.

B. Section 083100 - Access Doors and Panels: Panels for maintaining access to concealed boxes.

C. Section 260526 - Grounding and Bonding for Electrical Systems.

D. Section 260529 - Hangers and Supports for Electrical Systems.

E. Section 262726 - Wiring Devices:
1. Wall plates.

1.3 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.

B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; National Electrical Contractors Association; 2010.

C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; National Electrical Manufacturers Association; 2012 (ANSI/NEMA FB 1).

D. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; National Electrical Manufacturers Association; 2013 (ANSI/NEMA OS 1).

E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); National Electrical Manufacturers Association; 2014.

F. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

G. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

H. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

I. UL 508A - Industrial Control Panels; Current Edition, Including All Revisions.

J. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
6. Coordinate the work with other trades to preserve insulation integrity.
7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
8. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for outlet and device boxes, junction and pull boxes, floor boxes, and underground handhole enclosures.

C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

D. Project Record Documents: Record actual locations for outlet and device boxes, pull boxes, cabinets and enclosures, floor boxes, and underground handhole enclosures.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 016000 - Product Requirements, for additional provisions.

1.6 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 BOXES

A. General Requirements:
   1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
   2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
   3. Provide products listed, classified, and labeled as suitable for the purpose intended.
   4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
   5. Provide grounding terminals within boxes where equipment grounding conductors terminate.

B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:
   1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
   2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
   3. Use cast iron boxes or cast aluminum boxes where exposed galvanized steel rigid metal conduit or exposed intermediate metal conduit (IMC) is used.
   4. Use suitable concrete type boxes where flush-mounted in concrete.
   5. Use suitable masonry type boxes where flush-mounted in masonry walls.
   6. Use raised covers suitable for the type of wall construction and device configuration where required.
   7. Use shallow boxes where required by the type of wall construction.
   8. Do not use "through-wall" boxes designed for access from both sides of wall.
   9. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
   10. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.

11. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
12. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes.
13. Minimum Box Size, Unless Otherwise Indicated:
14. Wall Plates: Comply with Section 262726.
15. Manufacturers:

C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches:
    1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
    2. NEMA 250 Environment Type, Unless Otherwise Indicated:
        a. Indoor Clean, Dry Locations: Type 1, painted steel.
        b. Outdoor Locations: Type 3R, painted steel.
    3. Junction and Pull Boxes Larger Than 100 cubic inches:
        a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.
        b. Boxes 6 square feet and Larger: Provide sectionalized screw-cover or hinged-cover enclosures.
    4. Cabinets and Hinged-Cover Enclosures, Other Than Junction and Pull Boxes:
    5. Finish for Painted Steel Enclosures: Manufacturer's standard grey unless otherwise indicated.
    6. Manufacturers:

D. Underground Boxes/Enclosures:
    1. Description: In-ground, open bottom boxes furnished with flush, non-skid covers with legend indicating type of service and stainless steel tamper resistant cover bolts.
    2. Size: As indicated on drawings.
    3. Depth: As required to extend below frost line to prevent frost upheaval, but not less than 12 inches.
    4. Applications:
        a. Do not use polymer concrete enclosures in areas subject to deliberate vehicular traffic.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as shown on drawings.

B. Verify that mounting surfaces are ready to receive boxes.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Provide separate boxes for emergency power and normal power systems.

E. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.

F. Flush-mount boxes in finished areas unless specifically indicated to be surface-mounted.

G. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.

H. Box Locations:
   1. Locate boxes to be accessible. Provide access panels in accordance with Section 083100 as required where approved by the Architect.

I. Box Supports:
   1. Secure and support boxes in accordance with NFPA 70 and Section 260529 using suitable supports and methods approved by the authority having jurisdiction.
   2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
   3. Installation Above Suspended Ceilings: Do not provide support from ceiling grid or ceiling support system.
   4. Use far-side support to secure flush-mounted boxes supported from single stud in hollow stud walls. Repair or replace supports for boxes that permit excessive movement.

J. Install boxes plumb and level.

K. Flush-Mounted Boxes:
   1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch or does not project beyond finished surface.
   2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.

3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch at the edge of the box.

L. Install boxes as required to preserve insulation integrity.

M. Underground Boxes/Enclosures:
1. Install enclosure on gravel base, minimum 6 inches deep.
2. Install additional bracing inside enclosures in accordance with manufacturer's instructions to minimize box sidewall deflections during backfilling. Backfill with cover bolted in place.

N. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

O. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.

P. Close unused box openings.

Q. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.

R. Provide grounding and bonding in accordance with Section 260526.

3.3 CLEANING

A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

3.4 PROTECTION

A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

END OF SECTION 260537

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 PROJECT INCLUDES

A. Electrical identification requirements.

B. Identification nameplates and labels.

C. Wire and cable markers.

D. Voltage markers.

E. Warning signs and labels.

1.2 RELATED REQUIREMENTS

A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.

B. Section 262726 - Wiring Devices - Lutron: Device and wallplate finishes; factory pre-marked wallplates.

1.3 REFERENCE STANDARDS

A. ANSI Z535.2 - American National Standard for Environmental and Facility Safety Signs; 2011.

B. ANSI Z535.4 - American National Standard for Product Safety Signs and Labels; 2011.

C. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. UL 969 - Marking and Labeling Systems; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Verify final designations for equipment, systems, and components to be identified prior to fabrication of identification products.

B. Sequencing:
   1. Do not conceal items to be identified, in locations such as above suspended ceilings, until identification products have been installed.
   2. Do not install identification products until final surface finishes and painting are complete.

1.5 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittals procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.

C. Shop Drawings: Provide schedule of items to be identified indicating proposed designations, materials, legends, and formats.

D. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation and installation of product.

1.6 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

1.7 FIELD CONDITIONS

A. Do not install adhesive products when ambient temperature is lower than recommended by manufacturer.

PART 2 PRODUCTS

2.1 IDENTIFICATION REQUIREMENTS

A. Identification for Equipment:
   1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
      a. Panelboards:
         1) Identify voltage and phase.
         2) Identify power source and circuit number. Include location when not within sight of equipment.
         3) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.
         4) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.
      b. Enclosed switches, circuit breakers, and motor controllers:
         1) Identify voltage and phase.
         2) Identify load(s) served. Include location when not within sight of equipment.

   2. Emergency System Equipment:
      a. Use identification nameplate or voltage marker to identify emergency system equipment in accordance with NFPA 70.

b. Use identification nameplate at each piece of service equipment to identify type and location of on-site emergency power sources.

3. Use identification label to identify overcurrent protective devices for branch circuits serving fire alarm circuits. Identify with text "FIRE ALARM CIRCUIT".
4. Arc Flash Hazard Warning Labels: Use warning labels to identify arc flash hazards for electrical equipment, such as switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers that are likely to require examination, adjustment, servicing, or maintenance while energized.
   a. Minimum Size: 3.5 by 5 inches.
   b. Legend: Include orange header that reads "WARNING", followed by the word message "Arc Flash and Shock Hazard; Appropriate PPE Required; Do not operate controls or open covers without appropriate personal protection equipment; Failure to comply may result in injury or death; Refer to NFPA 70E for minimum PPE requirements" or approved equivalent.
5. Use warning signs to identify electrical hazards for entrances to all rooms and other guarded locations that contain exposed live parts operating at 600 V nominal or less with the word message "DANGER; Electrical hazard; Authorized personnel only" or approved equivalent.
6. Use warning labels, identification nameplates, or identification labels to identify electrical hazards for equipment where multiple power sources are present with the word message "DANGER; Hazardous voltage; Multiple power sources may be present; Disconnect all electric power including remote disconnects before servicing" or approved equivalent.

B. Identification for Conductors and Cables:
1. Color Coding for Power Conductors 600 V and Less: Comply with Section 260519.
2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.
3. Use underground warning tape to identify direct buried cables.

C. Identification for Devices:
1. Wiring Device and Wallplate Finishes: Comply with Section 262726.
2. Use identification label to identify fire alarm system devices.
   a. For devices concealed above suspended ceilings, provide additional identification on ceiling tile below device location.

2.2 PRODUCTS

A. Identification Nameplates:
1. Manufacturers:
   a. Brimar Industries, Inc: www.brimar.com.
   b. Kolbi Pipe Marker Co: www.kolbipipemarkers.com.
   c. Seton Identification Products: www.seton.com.
   d. Substitutions: See Section 016000 - Product Requirements.

2. Materials:
   a. Indoor Clean, Dry Locations: Use plastic nameplates.
3. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch; engraved text.
   a. Exception: Provide minimum thickness of 1/8 inch when any dimension is greater than 4 inches.
4. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch high; Four, located at corners for larger sizes.

B. Identification Labels:
1. Manufacturers:
   a. Brady Corporation: www.bradyid.com.
   b. Brother International Corporation: www.brother-usa.com.
   c. Panduit Corp: www.panduit.com.
   d. Substitutions: See Section 016000 - Product Requirements.
2. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
   a. Use only for indoor locations.
3. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

C. Format for Equipment Identification:
1. Minimum Size: 1 inch by 2.5 inches.
2. Legend:
   a. System designation where applicable:
      1) Fire Alarm System: Identify with text "FIRE ALARM".
   b. Equipment designation or other approved description.
   c. Other information as indicated.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height:
   a. System Designation: 1 inch.
   b. Equipment Designation: 1/2 inch.
   c. Other Information: 1/4 inch.
5. Color:
   a. Normal Power System: White text on black background.
   b. Emergency Power System: White text on red background.
   c. Fire Alarm System: White text on red background.

D. Format for General Information and Operating Instructions:
1. Minimum Size: 1 inch by 2.5 inches.
2. Legend: Include information or instructions indicated or as required for proper and safe operation and maintenance.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 1/4 inch.
5. Color: Black text on white background unless otherwise indicated.

E. Format for Caution and Warning Messages:

1. Minimum Size: 2 inches by 4 inches.
2. Legend: Include information or instructions indicated or as required for proper and safe operation and maintenance.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 1/2 inch.
5. Color: Black text on yellow background unless otherwise indicated.

F. Format for Fire Alarm Device Identification:
1. Minimum Size: 3/8 inch by 1.5 inches.
2. Legend: Designation indicated and device zone or address.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 3/16 inch.
5. Color: Red text on white background.

G. Nameplates: Engraved three-layer laminated plastic, black letters on white background.

H. Locations:
1. Each electrical distribution and control equipment enclosure.
2. Communication cabinets.

I. Letter Size:
1. Use 1/8 inch letters for identifying individual equipment and loads.
2. Use 1/4 inch letters for identifying grouped equipment and loads.

J. Labels: Embossed adhesive tape, with 3/16 inch white letters on black background. Use only for identification of individual wall switches and receptacles, control device stations.

K. Wire Markers
1. Manufacturers:
2. Brady Corporation; www.bradyid.com.
3. HellermannTyton; www.hellermanntyton.com.
4. Panduit Corp: www.panduit.com.
a. Substitutions: See Section 016000 - Product Requirements.

L. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.

M. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.

N. Legend: Power source and circuit number or other designation indicated.

O. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.
1. Do not use handwritten text.

P. Minimum Text Height: 1/8 inch.

Q. Color: Black text on white background unless otherwise indicated.

2.3 WARNING SIGNS AND LABELS

A. Manufacturers:
   1. Brimar Industries, Inc: www.brimar.com.
   2. Clarion Safety Systems, LLC: www.clarionsafety.com.
   3. Seton Identification Products: www.seton.com.
   4. Substitutions: See Section 016000 - Product Requirements.

B. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.

C. Warning Signs:
   1. Materials:
      a. Indoor Dry, Clean Locations: Use factory pre-printed rigid plastic or self-adhesive vinyl signs.
      b. Outdoor Locations: Use factory pre-printed rigid aluminum signs.
   2. Rigid Signs: Provide four mounting holes at corners for mechanical fasteners.
   3. Minimum Size: 7 by 10 inches unless otherwise indicated.

D. Warning Labels:
   1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
      a. Do not use labels designed to be completed using handwritten text.
   2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
   3. Minimum Size: 2 by 4 inches unless otherwise indicated.

PART 3 EXECUTION

3.1 PREPARATION

A. Clean surfaces to receive adhesive products according to manufacturer's instructions.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
   1. Surface-Mounted Equipment: Enclosure front.
   2. Flush-Mounted Equipment: Inside of equipment door.

3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
4. Elevated Equipment: Legible from the floor or working platform.
5. Branch Devices: Adjacent to device.
6. Interior Components: Legible from the point of access.
7. Conductors and Cables: Legible from the point of access.
8. Devices: Outside face of cover.

C. Install identification products centered, level, and parallel with lines of item being identified.

D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.

E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.

F. Install underground warning tape above buried lines with one tape per trench at 3 inches below finished grade.

G. Secure rigid signs using stainless steel screws.

H. Mark all handwritten text, where permitted, to be neat and legible.

3.3 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for additional requirements.

B. Replace self-adhesive labels and markers that exhibit bubbles, wrinkles, curling or other signs of improper adhesion.

END OF SECTION 260553

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 260923 - LIGHTING CONTROL DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Occupancy sensors.

B. Outdoor photo controls.

1.2 RELATED REQUIREMENTS

A. Section 260526 - Grounding and Bonding for Electrical Systems.

B. Section 260537 - Boxes.

C. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

D. Section 262726 - Wiring Devices: Devices for manual control of lighting, including wall switches, wall dimmers, fan-speed controllers, and wall plates.

E. Section 265100 - Interior Lighting.

1.3 REFERENCE STANDARDS

A. ANSI C136.24 - American National Standard for Roadway and Area Lighting Equipment - Nonlocking (Button) Type Photocontrols; 2004 (R2010).

B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.

C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2008.

D. NEMA 410 - Performance Testing for Lighting Controls and Switching Devices with Electronic Fluorescent Ballasts; National Electrical Manufacturers Association; 2011.

E. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. UL 773 - Plug-in Locking Type Photocontrols for Use with Area Lighting; Current Edition, Including All Revisions.

G. UL 773A - Nonindustrial Photoelectric Switches for Lighting Control; Current Edition, Including All Revisions.

H. UL 916 - Energy Management Equipment; Current Edition, Including All Revisions.

I. UL 917 - Clock-Operated Switches; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the placement of lighting control devices with millwork, furniture, equipment, etc. installed under other sections or by others.
2. Coordinate the placement of wall switch occupancy sensors with actual installed door swings.
3. Coordinate the placement of occupancy sensors with millwork, furniture, equipment or other potential obstructions to motion detection coverage installed under other sections or by others.
4. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

B. Sequencing:

1. Do not install lighting control devices until final surface finishes and painting are complete.

1.5 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Include ratings, configurations, standard wiring diagrams, dimensions, colors, service condition requirements, and installed features.

1. Occupancy Sensors: Include detailed motion detection coverage range diagrams.

C. Shop Drawings:

1. Occupancy Sensors: Provide lighting plan indicating location, model number, and orientation of each occupancy sensor and associated system component.

D. Field Quality Control Reports.

E. Manufacturer's Installation Instructions: Include application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

F. Operation and Maintenance Data: Include detailed information on device programming and setup.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 016000 - Product Requirements, for additional provisions.

H. Project Record Documents: Record actual installed locations and settings for lighting control devices.

1.6 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.7 DELIVERY, STORAGE, AND PROTECTION

A. Store products in a clean, dry space in original manufacturer's packaging in accordance with manufacturer's written instructions until ready for installation.

1.8 FIELD CONDITIONS

A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.9 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Provide five year manufacturer warranty for all occupancy sensors.

PART 2 PRODUCTS

2.1 ALL LIGHTING CONTROL DEVICES

A. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

B. Unless specifically indicated to be excluded, provide all required conduit, wiring, connectors, hardware, components, accessories, etc. as required for a complete operating system.

C. Products for Switching of Electronic Fluorescent Ballasts: Tested and rated to be suitable for peak inrush currents specified in NEMA 410.

2.2 OCCUPANCY SENSORS

A. Manufacturers:

1. WattStopper: www.wattstopper.com.
2. Lutron
3. Leviton
4. Acuity
5. Substitutions: See Section 016000 - Product Requirements.
6. Source Limitations: Furnish products produced by a single manufacturer and obtained from a single supplier.

B. All Occupancy Sensors:

1. Description: Factory-assembled commercial specification grade devices for indoor use capable of sensing both major motion, such as walking, and minor motion, such as small desktop level movements, according to published coverage areas, for automatic control of load indicated.
2. Sensor Technology:

    a. Passive Infrared (PIR) Occupancy Sensors: Designed to detect occupancy by sensing movement of thermal energy between zones.
    b. Ultrasonic Occupancy Sensors: Designed to detect occupancy by sensing frequency shifts in emitted and reflected inaudible sound waves.
    c. Passive Infrared/Ultrasonic Dual Technology Occupancy Sensors: Designed to detect occupancy using a combination of both passive infrared and ultrasonic technologies.

3. Provide LED to visually indicate motion detection with separate color LEDs for each sensor type in dual technology units.
4. Operation: Unless otherwise indicated, occupancy sensor to turn load on when

occupant presence is detected and to turn load off when no occupant presence is detected during an adjustable turn-off delay time interval.

5. Dual Technology Occupancy Sensors: Field configurable turn-on and hold-on activation with settings for activation by either or both sensing technologies.
6. Passive Infrared Lens Field of View: Field customizable by addition of factory masking material, adjustment of integral blinders, or similar means to block motion detection in selected areas.
7. Turn-Off Delay: Field adjustable, up to a maximum time delay setting of not less than 15 minutes and not more than 30 minutes.
8. Sensitivity: Field adjustable.
9. Adaptive Technology: Field selectable; capable of self-adjusting sensitivity and time delay according to conditions.
10. Integral Photocell: For field selectable and adjustable inhibition of automatic turn-on of load when ambient lighting is above the selected level.
11. Compatibility: Suitable for controlling incandescent lighting, low-voltage lighting with electronic and magnetic transformers, fluorescent lighting with electronic and magnetic ballasts, and fractional motor loads, with no minimum load requirements.
12. Load Rating for Line Voltage Occupancy Sensors: As required to control the load indicated on the drawings.
13. Isolated Relay for Low Voltage Occupancy Sensors: SPDT dry contacts, ratings as required for interface with system indicated.

C. Ceiling Mounted Occupancy Sensors:

1. All Ceiling Mounted Occupancy Sensors:

    a. Description: Low profile occupancy sensors designed for ceiling installation.
    b. Unless otherwise indicated or required to control the load indicated on the drawings, provide low voltage units, for use with separate compatible accessory power packs.
    c. Provide field selectable setting for disabling LED motion detector visual indicator.
    d. Occupancy sensor to be field selectable as either manual-on/automatic-off or automatic on/off.
    e. Finish: White unless otherwise indicated.

2. Passive Infrared (PIR) Ceiling Mounted Occupancy Sensors:

    a. Standard Range Sensors: Capable of detecting motion within an area of 450 square feet at a mounting height of 9 feet, with a field of view of 360 degrees.
    b. Extended Range Sensors: Capable of detecting motion within an area of 1,200 square feet at a mounting height of 9 feet, with a field of view of 360 degrees.

3. Ultrasonic Ceiling Mounted Occupancy Sensors:

    a. Standard Range Sensors: Capable of detecting motion within an area of 500 square feet at a mounting height of 9 feet, with a field of view of 360 degrees.

b. Extended Range Sensors: Capable of detecting motion within an area of 2,000 square feet at a mounting height of 9 feet.

4. Passive Infrared/Ultrasonic Dual Technology Ceiling Mounted Occupancy Sensors:

a. Standard Range Sensors: Capable of detecting motion within an area of 450 square feet at a mounting height of 9 feet, with a field of view of 360 degrees.

b. Extended Range Sensors: Capable of detecting motion within an area of 1,200 square feet at a mounting height of 9 feet, with a field of view of 360 degrees.

D. Power Packs for Low Voltage Occupancy Sensors:

1. Description: Plenum rated, self-contained low voltage class 2 transformer and relay compatible with specified low voltage occupancy sensors for switching of line voltage loads.
2. Provide quantity and configuration of power and slave packs with all associated wiring and accessories as required to control the load indicated on the drawings.
3. Input Supply Voltage: Dual rated for 120/277 V ac.
4. Load Rating: As required to control the load indicated on the drawings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as shown on the drawings.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.

C. Verify that openings for outlet boxes are neatly cut and will be completely covered by devices or wall plates.

D. Verify that final surface finishes are complete, including painting.

E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to lighting control devices.

F. Verify that the service voltage and ratings of lighting control devices are appropriate for the service voltage and load requirements at the location to be installed.

G. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.3 INSTALLATION

A. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.

B. Coordinate locations of outlet boxes provided under Section 260537 as required for installation of lighting control devices provided under this section.

1. Mounting Heights: Unless otherwise indicated, as follows:

a. Wall Switch Occupancy Sensors: 48 inches above finished floor to the top of the box.

C. Install lighting control devices in accordance with manufacturer's instructions.

D. Unless otherwise indicated, connect lighting control device grounding terminal or conductor to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

E. Install lighting control devices plumb and level, and held securely in place.

F. Where required and not furnished with lighting control device, provide wall plate in accordance with Section 262726.

G. Where applicable, install lighting control devices and associated wall plates to fit completely flush to mounting surface with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

H. Identify lighting control devices in accordance with Section 260553.

I. Occupancy Sensor Locations:

1. Location Adjustments: Locations indicated are diagrammatic and only intended to indicate which rooms or areas require devices. Provide quantity and locations as

required for complete coverage of respective room or area based on manufacturer's recommendations for installed devices.

2. Locate ultrasonic and dual technology passive infrared/ultrasonic occupancy sensors a minimum of 4 feet from air supply ducts or other sources of heavy air flow and as per manufacturer's recommendations, in order to minimize false triggers.

J. Unless otherwise indicated, install power packs for lighting control devices above accessible ceiling or above access panel in inaccessible ceiling near the sensor location.

3.4 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for additional requirements.

B. Inspect each lighting control device for damage and defects.

C. Test occupancy sensors to verify proper operation, including time delays and ambient light thresholds where applicable. Verify optimal coverage for entire room or area. Record test results in written report to be included with submittals.

D. Test outdoor photo controls to verify proper operation, including time delays where applicable.

E. Correct wiring deficiencies and replace damaged or defective lighting control devices.

3.5 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

B. Adjust occupancy sensor settings to minimize undesired activations while optimizing energy savings, and to achieve desired function as indicated or as directed by Architect.

C. Where indicated or as directed by Architect, install factory masking material or adjust integral blinders on passive infrared (PIR) and dual technology occupancy sensor lenses to block undesired motion detection.

D. Adjust external sliding shields on outdoor photo controls under optimum lighting conditions to achieve desired turn-on and turn-off activation as indicated or as directed by Architect.

3.6 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.7 CLOSEOUT ACTIVITIES

A. Training: Train Owner's personnel on operation, adjustment, programming, and maintenance of lighting control devices.

1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
2. Provide minimum of two hours of training.
3. Instructor: Qualified contractor familiar with the project and with sufficient knowledge of the installed lighting control devices.
4. Location: At project site.

END OF SECTION 260923

THIS PAGE INTENTIOANLLY LEFT BLANK

SECTION 262416 - PANELBOARDS AND CIRCUIT BREAKERS

PART 1 GENERAL

1.1 PROJECT INCLUDES

A. New circuit breakers installed in existing panelboards.

1.2 RELATED REQUIREMENTS

A. Section 260526 - Grounding and Bonding for Electrical Systems.

B. Section 260529 - Hangers and Supports for Electrical Systems.

C. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

A. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service; Federal Specification; Revision E, 2013.

B. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.

C. NECA 407 - Standard for Installing and Maintaining Panelboards; National Electrical Contractors Association; 2009.

D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

E. NEMA KS 1 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum); National Electrical Manufacturers Association; 2013.

F. NEMA PB 1 - Panelboards; National Electrical Manufacturers Association; 2011.

G. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less; National Electrical Manufacturers Association; 2013 (ANSI/NEMA PB 1.1).

H. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; International Electrical Testing Association; 2013 (ANSI/NETA ATS).

I. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

J. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

K. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

L. UL 67 - Panelboards; Current Edition, Including All Revisions.

M. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.

N. UL 869A - Reference Standard for Service Equipment; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
   2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
   3. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted panelboards where indicated.
   4. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
   5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.5 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for circuit breakers, and other installed components and accessories.

C. Shop Drawings: Indicate outline and support point dimensions, voltage, short circuit current ratings, conductor terminal information, and installed features and accessories.
   1. Clearly indicate whether proposed short circuit current ratings are fully rated or, where acceptable, series rated systems.

D. Field Quality Control Test Reports.

E. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

F. Project Record Documents: Record actual installed locations of panelboards and actual installed circuiting arrangements.

G. Maintenance Data: Include information on replacement parts and recommended maintenance procedures and intervals.

H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 016000 - Product Requirements, for additional provisions.
   2. Panelboard Keys: Two of each different key.

1.6 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store panelboards in accordance with manufacturer's instructions and NECA 407.

B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

C. Handle carefully in accordance with manufacturer's written instructions to avoid damage to panelboard internal components, enclosure, and finish.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Match existing panelboard manufacturer.

2.2 OVERCURRENT PROTECTIVE DEVICES

A. Molded Case Circuit Breakers:
   1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
   2. Interrupting Capacity:
      a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
         1) 10,000 rms symmetrical amperes at 240 VAC or 208 VAC.
      b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
   3. Conductor Terminations:
      a. Provide mechanical lugs unless otherwise indicated.

b. Provide compression lugs where indicated.
c. Lug Material: Copper, suitable for terminating copper conductors only.

4. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.
   a. Provide field-adjustable magnetic instantaneous trip setting for circuit breaker frame sizes 225 amperes and larger.
5. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.
6. Provide listed switching duty rated circuit breakers with SWD marking for all branch circuits serving fluorescent lighting.
7. Do not use tandem circuit breakers.
8. Do not use handle ties in lieu of multi-pole circuit breakers.
9. Provide multi-pole circuit breakers for multi-wire branch circuits as required by NFPA 70.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Provide grounding and bonding in accordance with Section 260526.
   1. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on isolated/insulated ground bus.
   2. Terminate branch circuit isolated grounding conductors on isolated/insulated ground bus only. Do not terminate on solidly bonded equipment ground bus.

C. Multi-Wire Branch Circuits: Group grounded and ungrounded conductors together in the panelboard as required by NFPA 70.

D. Set field-adjustable circuit breaker tripping function settings as indicated.

E. Set field-adjustable ground fault protection pickup and time delay settings as indicated.

F. Provide filler plates to cover unused spaces in panelboards.

G. Provide circuit breaker lock-on devices to prevent unauthorized personnel from de-energizing essential loads where indicated.

3.2 FIELD QUALITY CONTROL

A. Perform inspection, testing, and adjusting in accordance with Section 014000.

B. Perform field inspection and testing in accordance with Section 014000.

C. Inspect and test in accordance with NETA ATS, except Section 4.

D. Molded Case Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1 for all main circuit breakers and circuit breakers larger than 225 amperes. Tests listed as optional are not required.

E. Test shunt trips to verify proper operation.

F. Correct deficiencies and replace damaged or defective panelboards or associated components.

G. Perform inspections and tests listed in NETA STD ATS, Section 7.5 for switches, Section 7.6 for circuit breakers.

3.3 ADJUSTING

A. Load Balancing: For each panelboard, rearrange circuits such that the difference between each measured steady state phase load does not exceed 20 percent and adjust circuit directories accordingly. Maintain proper phasing for multi-wire branch circuits.

END OF SECTION 262416

THIS PAGE INTENTIOANLLY LEFT BLANK

SECTION 262717 - EQUIPMENT WIRING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Electrical connections to equipment.

1.2 RELATED REQUIREMENTS

A. Section 260534 - Conduit.

B. Section 260519 - Low-Voltage Electrical Power Conductors and Cables (600 V and Less).

C. Section 260537 - Boxes.

D. Section 262726 - Wiring Devices.

E. Section 262818 - Enclosed Switches.

1.3 REFERENCE STANDARDS

A. NEMA WD 1 - General Color Requirements for Wiring Devices; National Electrical Manufacturers Association; 1999 (R 2010).

B. NEMA WD 6 - Wiring Devices - Dimensional Requirements; National Electrical Manufacturers Association; 2002 (R2008).

C. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.
   2. Determine connection locations and requirements.

B. Sequencing:
   1. Install rough-in of electrical connections before installation of equipment is required.
   2. Make electrical connections before required start-up of equipment.

1.5 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide wiring device manufacturer’s catalog information showing dimensions, configurations, and construction.

C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.6 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Listed, classified, and labeled as suitable for the purpose intended.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.1 MATERIALS

A. Cords and Caps: NEMA WD 6; match receptacle configuration at outlet provided for equipment.
   1. Colors: Conform to NEMA WD 1.
   2. Cord Construction: NFPA 70, Type SO, multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
   3. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.

B. Disconnect Switches: As specified in individual equipment sections.

C. Wiring Devices: As specified in Section 262726.

D. Flexible Conduit: As specified in Section 260534.

E. Wire and Cable: As specified in Section 260519.

F. Boxes: As specified in Section 260537.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that equipment is ready for electrical connection, wiring, and energization.

3.2 ELECTRICAL CONNECTIONS

A. Make electrical connections in accordance with equipment manufacturer's instructions.

B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.

C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.

D. Provide receptacle outlet to accommodate connection with attachment plug.

E. Provide cord and cap where field-supplied attachment plug is required.

F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.

G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.

H. Install terminal block jumpers to complete equipment wiring requirements.

I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

END OF SECTION 262717

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 262818 – ENCLOSED SWITCHES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Enclosed safety switches.

B. Fusible switches.

C. Nonfusible switches.

1.2 RELATED REQUIREMENTS

A. Section 26 0526 - Grounding and Bonding for Electrical Systems.

B. Section 26 0529 - Hangers and Supports for Electrical Systems.

C. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.3 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.

B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2008.

C. NEMA FU 1 - Low Voltage Cartridge Fuses; National Electrical Manufacturers Association; 2002 (R2007).

D. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum); National Electrical Manufacturers Association; 2001 (R2006).

E. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

G. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

H. UL 98 - Enclosed and Dead-Front Switches; Current Edition, Including All Revisions.

1.4 SUBMITTALS

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

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for enclosed switches and other installed components and accessories.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Siemens Industry, Inc: www.sea.siemens.com.

B. Eaton Corporation; Cutler-Hammer Products: www.eaton.com.

C. General Electric Company: www.geindustrial.com.

D. Schneider Electric; Square D Products: www.schneider-electric.us.

2.2 ENCLOSED SAFETY SWITCHES

A. Description: Quick-make, quick-break, enclosed safety switches complying with NEMA KS 1, type HD (heavy duty), and listed and labeled as complying with UL 98; ratings, configurations, and features as indicated on the drawings.

B. Provide products listed and labeled by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

C. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:

1. Altitude: Less than 6,600 feet.
2. Ambient Temperature: Between -22 degrees F and 104 degrees F.

E. Voltage Rating: Suitable for circuit voltage.

F. Short Circuit Current Rating:

G. Provide with switch blade contact position that is visible when the cover is open.

H. Conductor Terminations: Suitable for use with the conductors to be installed.

I. Provide solidly bonded equipment ground bus in each enclosed safety switch, with a suitable lug for terminating each equipment grounding conductor.

J. Enclosures: Comply with NEMA KS 1 and NEMA 250, and list and label as complying

with UL 50 and UL 50E.

1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:

K. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.

L. Heavy Duty Switches:

1. Conductor Terminations:

a. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.

2. Provide externally operable handle with means for locking in the OFF position, capable of accepting three padlocks.

2.3 COMPONENTS

A. Fusible Switch Assemblies: NEMA KS 1, Type HD enclosed load interrupter knife switch.

1. Externally operable handle interlocked to prevent opening front cover with switch in ON position.
2. Handle lockable in OFF position.
3. Fuse clips: Designed to accommodate NEMA FU1, Class R fuses.

B. Nonfusible Switch Assemblies: NEMA KS 1, Type HD enclosed load interrupter knife switch.

1. Externally operable handle interlocked to prevent opening front cover with switch in ON position.
2. Handle lockable in OFF position.

C. Enclosures: NEMA KS 1.

1. Interior Dry Locations: Type 1.
2. Exterior Locations: Type 3R.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install enclosed switches in accordance with manufacturer's instructions.

B. Install enclosed switches securely, in a neat and workmanlike manner in accordance with NECA 1.

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Provide required supports in accordance with Section 26 0529.

E. Install enclosed switches plumb.

F. Except where indicated to be mounted adjacent to the equipment they supply, mount enclosed switches such that the highest position of the operating handle does not exceed 79 inches above the floor or working platform.

G. Provide grounding and bonding in accordance with Section 26 0526.

H. Provide identification nameplate for each enclosed switch in accordance with Section 26 0553.

I. Provide arc flash warning labels in accordance with NFPA 70.

J. Install fuses in fusible disconnect switches.

K. Apply adhesive tag on inside door of each fused switch indicating NEMA fuse class and size installed.

END OF SECTION 262818

SECTION 265100 - INTERIOR LIGHTING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Interior luminaires.

B. Emergency lighting units.

C. Exit signs.

D. Ballasts and drivers.

E. Luminaire accessories.

1.2 RELATED REQUIREMENTS

A. Section 260533.16 - Boxes for Electrical Systems.

B. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

C. Section 260923 - Lighting Control Devices: Automatic controls for lighting including occupancy sensors, outdoor motion sensors, time switches, outdoor photo controls, and daylighting controls.

1.3 REFERENCE STANDARDS

A. 47 CFR 15 - Radio Frequency Devices; current edition.

B. ANSI C82.11 - American National Standard for Lamp Ballasts - High Frequency Fluorescent Lamp Ballasts - Supplements; 2011.

C. IEC 60529 - Degrees of Protection Provided by Enclosures (IP Code); 2013 (Corrigendum 2015).

D. IEEE C62.41.2 - IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits; 2002 (Corrigendum 2012).

E. IESNA LM-63 - ANSI Approved Standard File Format for Electronic Transfer of Photometric Data and Related Information; 2002 (Reaffirmed 2008).

F. IES LM-79 - Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products; 2008.

G. IES LM-80 - Approved Method: Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays, and Modules; 2015, with Errata (2017).

H. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

I. NECA/IESNA 500 - Standard for Installing Indoor Commercial Lighting Systems; 2006.

J. NECA/IESNA 502 - Standard for Installing Industrial Lighting Systems; 2006.

K. NEMA 410 - Performance Testing for Lighting Controls and Switching Devices with Electronic Drivers and Discharge Ballasts; 2016.

L. NEMA LE 4 - Recessed Luminaires, Ceiling Compatibility; 2012.

M. NFPA 70 - National Electrical Code; 2017.

N. NFPA 101 - Life Safety Code; 2017.

O. UL 844 - Luminaires for Use in Hazardous (Classified) Locations; Current Edition, Including All Revisions.

P. UL 924 - Emergency Lighting and Power Equipment; Current Edition, Including All Revisions.

Q. UL 935 - Fluorescent-Lamp Ballasts; Current Edition, Including All Revisions.

R. UL 1598 - Luminaires; Current Edition, Including All Revisions.

S. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the installation of luminaires with mounting surfaces installed under other sections or by others. Coordinate the work with placement of supports, anchors, etc. required for mounting. Coordinate compatibility of luminaires and associated trims with mounting surfaces at installed locations.
2. Coordinate the placement of luminaires with structural members, ductwork, piping, equipment, diffusers, fire suppression system components, and other potential conflicts installed under other sections or by others.

3. Coordinate the placement of exit signs with furniture, equipment, signage or other potential obstructions to visibility installed under other sections or by others.
4. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

1.5 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings:

1. Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
2. Provide photometric calculations where luminaires are proposed for substitution upon request.

C. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.

1. LED Luminaires:
   a. Include estimated useful life, calculated based on IES LM-80 test data.
   b. Include IES LM-79 test report upon request.
2. Provide electronic files of photometric data certified by a National Voluntary Laboratory Accreditation Program (NVLAP) lab or independent testing agency in IESNA LM-63 standard format upon request.

D. Sustainable Design Documentation: Submit manufacturer's product data on lamp mercury content and rated lamp life, showing compliance with specified requirements.

E. Samples:

1. Provide one sample(s) of each luminaire proposed for substitution upon request.
2. Provide one sample(s) of each product finish illustrating color and texture upon request.

F. Certificates for Dimming Ballasts: Manufacturer's documentation of compatibility with dimming controls to be installed.

G. Operation and Maintenance Data: Instructions for each product including information on replacement parts.

H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 016000 - Product Requirements, for additional provisions.

1.6 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.7 DELIVERY, STORAGE, AND PROTECTION

A. Receive, handle, and store products according to NECA/IESNA 500 (commercial lighting), NECA/IESNA 502 (industrial lighting), and manufacturer's written instructions.

B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

1.8 FIELD CONDITIONS

A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.9 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Provide five year manufacturer warranty for all LED luminaires, including drivers.

PART 2 PRODUCTS

2.1 LUMINAIRE TYPES

A. Furnish products as indicated in luminaire schedule included on the drawings. Only products listed on design drawings will be considered during construction.

B. Substitutions: See Section 016000 - Product Requirements, except where individual luminaire types are designated with substitutions not permitted.

2.2 LUMINAIRES

A. Provide products that comply with requirements of NFPA 70.

B. Provide products that are listed and labeled as complying with UL 1598, where applicable.

C. Provide products listed, classified, and labeled as suitable for the purpose intended.

D. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.

F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

G. Recessed Luminaires:

1. Ceiling Compatibility: Comply with NEMA LE 4.
2. Luminaires Recessed in Insulated Ceilings: Listed and labeled as IC-rated, suitable for direct contact with insulation and combustible materials.
3. Luminaires Recessed in Sloped Ceilings: Provide suitable sloped ceiling adapters.

H. Hazardous (Classified) Location Luminaires: Listed and labeled as complying with UL 844 for the classification of the installed location.

I. LED Luminaires:

1. Components: UL 8750 recognized or listed as applicable.
2. Tested in accordance with IES LM-79 and IES LM-80.
3. LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

J. LED Tape Lighting Systems: Provide all power supplies, drivers, cables, connectors, channels, covers, mounting accessories, and interfaces as necessary to complete installation.

1. LED Tape - General Requirements:

a. Listed.
b. Designed for field cutting in accordance with listing.

c. Wet Location Applications: IEC 60529, IP 68 (waterproof) rated.

2. White LED Tape:

K. Track Lighting Systems: Provide track compatible with specified track heads, with all connectors, power feed fittings, dead ends, hangers and canopies as necessary to complete installation.

L. Luminaires Mounted in Continuous Rows: Provide quantity of units required for length indicated, with all accessories required for joining and aligning.

2.3 EMERGENCY LIGHTING UNITS

A. Description: Emergency lighting units complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.

B. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.

C. Battery:

1. Sealed maintenance-free lead calcium unless otherwise indicated.
2. Size battery to supply all connected lamps, including emergency remote heads where indicated.

D. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.

E. Provide low-voltage disconnect to prevent battery damage from deep discharge.

2.4 EXIT SIGNS

A. Description: Internally illuminated exit signs with LEDs unless otherwise indicated; complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.

1. Number of Faces: Single or double as indicated or as required for the installed location.
2. Directional Arrows: As indicated or as required for the installed location.

2.5 BALLASTS AND DRIVERS

A. Ballasts/Drivers - General Requirements:

1. Provide ballasts containing no polychlorinated biphenyls (PCBs).
2. Minimum Efficiency/Efficacy: Provide ballasts complying with all current applicable federal and state ballast efficiency/efficacy standards.

B. Dimmable LED Drivers:

1. Dimming Range: Continuous dimming from 100 percent to five percent relative light output unless dimming capability to lower level is indicated, without flicker.
2. Control Compatibility: Fully compatible with the dimming controls to be installed.

2.6 ACCESSORIES

A. Stems for Suspended Luminaires: Steel tubing, minimum 1/2" size, factory finished to match luminaire or field-painted as directed.

B. Threaded Rods for Suspended Luminaires: Zinc-plated steel, minimum 1/4" size, field-painted as directed.

C. Provide accessory plaster frames for luminaires recessed in plaster ceilings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.

C. Verify that suitable support frames are installed where required.

D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.3 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of luminaires provided under this section.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Install products in accordance with manufacturer's instructions.

D. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 500 (commercial lighting) and NECA 502 (industrial lighting).

E. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

F. Suspended Ceiling Mounted Luminaires:

1. Do not use ceiling tiles to bear weight of luminaires.
2. Do not use ceiling support system to bear weight of luminaires unless ceiling support system is certified as suitable to do so.
3. Secure surface-mounted and recessed luminaires to ceiling support channels or framing members or to building structure.
4. Secure pendant-mounted luminaires to building structure.
5. Secure lay-in luminaires to ceiling support channels using listed safety clips at four corners.
6. In addition to ceiling support wires, provide two galvanized steel safety wire(s), minimum 12 gage, connected from opposing corners of each recessed luminaire to building structure.
7. See appropriate Division 9 section where suspended grid ceiling is specified for additional requirements.

G. Recessed Luminaires:

1. Install trims tight to mounting surface with no visible light leakage.
2. Non-IC Rated Luminaires: Maintain required separation from insulation and combustible materials according to listing.
3. Luminaires Recessed in Fire-Rated Ceilings: Install using accessories and firestopping materials to meet regulatory requirements for fire rating.

H. Suspended Luminaires:

1. Install using the suspension method indicated, with support lengths and accessories as required for specified mounting height.

I. Install accessories furnished with each luminaire.

J. Bond products and metal accessories to branch circuit equipment grounding conductor.

K. Emergency Lighting Units:

1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.

L. Exit Signs:

1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.

M. Remote Ballasts: Install in accessible location as indicated or as required to complete installation, using conductors per manufacturer's recommendations not exceeding manufacturer's recommended maximum conductor length to luminaire.

3.4 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for additional requirements.

B. Inspect each product for damage and defects.

C. Operate each luminaire after installation and connection to verify proper operation.

D. Test self-powered exit signs, emergency lighting units to verify proper operation upon loss of normal power supply.

E. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.

3.5 ADJUSTING

A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Architect. Secure locking fittings in place.

B. Aim and position adjustable emergency lighting unit lamps to achieve optimum illumination of egress path as required or as directed by Architect or authority having jurisdiction.

C. Exit Signs with Field-Selectable Directional Arrows: Set as indicated or as required to properly designate egress path as directed by Architect or authority having jurisdiction.

3.6 CLEANING

A. Clean surfaces according to NECA 500 (commercial lighting), NECA 502 (industrial lighting), and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

3.7 CLOSEOUT ACTIVITIES

A. See Section 017800 - Closeout Submittals, for closeout submittals.

B. See Section 017900 - Demonstration and Training, for additional requirements.

C. Demonstration: Demonstrate proper operation of luminaires to Architect, and correct deficiencies or make adjustments as directed.

D. Just prior to Substantial Completion, replace all lamps that have failed.

3.8 PROTECTION

A. Protect installed luminaires from subsequent construction operations.

END OF SECTION 265100

SECTION 312000 – EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes, but is not limited to, the following:

1. Preparing subgrades for slabs-on-grade, walks, pavements, lawns and plantings.
2. Excavation and backfilling for buildings and structures.
3. Drainage course for building floor slabs-on-grade.
4. Subbase course for site concrete.
5. All grading and filling for the project.
6. Imported structural fill.
7. Removal and replacement of unsuitable materials.
8. Site demolition and clearing.
9. Shoring and Bracing.
10. Disposal of excess materials

B. Excavating and Backfilling for Electrical Work: Excavation and backfill required in conjunction with underground electrical utilities and buried electrical appurtenances within the building will be provided by the respective contractors installing the materials as specified in the specifications for Plumbing Construction, HVAC Construction, and Electrical Construction.

C. Related Sections include the following:

1. Division 32 Section “Turf and Grasses” and “Synthetic Turf” for site seeding and lawns.

2. “Summary of Work”, specifically relating to the requirement for arsenic soil remediation via soil replacement/capping.

D. Unit Prices: See proposal pages for unit prices.

E. Allowances: See proposal pages for material allowances.

1.3 DEFINITIONS

A. Backfill: Soil materials or imported structural fill materials used to fill an excavation.

B. Bedding Course: Layer placed over the excavated subgrade in a trench before laying a pipe.

C. Offsite Borrow: Satisfactory soil fill and select structural fill imported from off- site for use as backfill or fill.

D. Drainage Course: Layer supporting slab-on-grade used to minimize capillary flow of pore water.

E. Excavation: Removal of material encountered above subgrade elevations.

1. Additional Excavation: Excavation below subgrade elevations as directed by the Architect or the Geotechnical Consultant.

a. When excavation has reached required subgrade elevations, notify Geotechnical Consultant, who will make an inspection of conditions. If Geotechnical Consultant determines that bearing materials at required subgrade elevations are unsuitable, continue excavation until suitable bearing materials are encountered and replace excavated material as directed by Geotechnical Consultant. The Contract Sum will be adjusted in accordance with the unit prices set forth by the contractor in the Form of Proposal.

2. Bulk Excavation: Excavations more than 10 feet in width and pits more than 30 feet in either length or width.

3. Unauthorized Excavation: Excavation below the subgrade elevations or beyond indicated dimensions without written direction by the Architect or Geotechnical Consultant. Unauthorized excavation, as well as remedial work directed by the Architect or Geotechnical Consultant, shall be without additional compensation.

F. Fill: Soil materials or select structural fill materials used to raise existing grades.

G. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical, appurtenances, or other man-made stationary features constructed above or below the ground surface.

H. Subbase Course: Layer placed between the subgrade and base course for asphalt paving, or layer between the subgrade and a drainage course of a concrete pavement or walk.

I. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

J. Unsuitable Material: Soils, debris, waste, frozen materials, and other deleterious materials to be determined by the Owner's Geotechnical Consultant to be unsuitable to attain required bearing capacity.

K. Utilities include on-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.4 QUALITY ASSURANCE

A. Codes and Standards: Perform excavation work in compliance with applicable requirements of authorities having jurisdiction.

B. Geotechnical Consultant: The Owner shall provide and pay for the services of a Geotechnical Consultant who will have the responsibility of determining what subgrade is acceptable or unacceptable and must be removed by the Contractor. The fill and or structural soil fill or select structural fill shall be installed and compacted under the direction and observation of the Geotechnical Consultant. See Form of Proposal for unit prices and allowances on this work. The Geotechnical Consultant will also document quantities of all materials on a daily basis. The Geotechnical Consultant will also monitor other earthwork that the Owner determines.

C. Pre-Excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earthwork operations. Submit before earthwork begins.

1.5 PROJECT CONDITIONS

A. Site Information: Data in subsurface investigation reports was used for the basis of the design and are available to the Contractor for information only. Conditions are not intended as representations or warranties of accuracy or continuity between soil borings. The Owner will not be responsible for interpretations or conclusions drawn from this data by the Contractor.

1. Additional test borings and other exploratory operations may be performed by the Contractor, at the Contractor's option; however, no change in the Contract Sum will be authorized for such additional exploration.

B. Site Verification: Verify layout information shown on the drawings before proceeding to lay out the work. Locate and protect existing benchmarks and control points. Preserve permanent reference points during construction.

C. Prior to the start of any earth moving activities and site work, the Contractor shall be fully responsible to verify all site grades, contours, etc. and shall take all field measurements of existing conditions, benchmarks, property lines, and topography to determine if there are any omissions or inconsistencies in the Contract Documents.

D. In the event that inconsistencies, errors or discrepancies are discovered, then the Contractor shall immediately notify the Architect in writing. If the Contractor commences earth moving activities or site work, it will be considered an acceptance by the Contractor of the Contract Documents and site grades and conditions. Claims for additional compensation or extension of time from the Contractor for failing to comply with the specified verification procedures will not be considered.

E. Existing Utilities: Locate existing underground utilities in areas of excavation work. If utilities are indicated to remain in place, provide adequate means of support and protection during earthwork operations. The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning earthwork and sitework, investigate and verify the existence and location of underground utilities and other construction.

1. Prior to excavation the Contractor shall comply with all regulations on excavation as set forth in the Contract Documents General Conditions of the Contract and with all regulatory bodies having jurisdiction on this project.

    a. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. The Owner and Architect shall be notified immediately, should active utilities not indicated on the drawings be encountered. Such utilities shall be adequately protected, supported or relocated as directed by the Architect

    b. Abandoned utilities not indicated on the drawings which are encountered in excavating within the limits of the buildings shall be removed to a point at least three (3) feet outside of the building walls, or as required by local regulations. Except as otherwise specified above, abandoned utilities may remain in place, provided they do not interfere with the new construction, in which case they shall be removed to the full extent of such interference. Remaining lines shall be suitably plugged or capped. The Architect shall make the final determination on which abandoned utility lines can be abandoned in-place.

    c. A. Warning Tape: Acid and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6” wide and 4 mils thick, continuously inscribed with a description of the utility; color as follows:
        a. Red: Electric.
        b. Yellow: Gas, oil, steam, and dangerous materials.
        c. Orange: Telephone and other communications.
        d. Blue: Water systems.
        e. Green: Sewer systems.

F. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.

1. Operate warning lights as recommended by authorities having jurisdiction.

2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

3. Perform excavation by hand within dripline of large trees to remain. Protect root systems from damage or dryout to the greatest extent possible. Maintain moist condition for root system and cover exposed roots with moistened burlap.

1.6 SUBSURFACE INFORMATION

A. Any available data concerning subsurface materials or conditions which is based upon soundings, test pits or test borings, has been obtained by the Owner to assist the Architect in designing this project. Its accuracy or completeness is not guaranteed by the Owner or the Architect and in no event is it to be considered as part of the contract Drawings or Specifications. This information is provided the Contractors for information purposes only.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Subbase Material: Shall meet the requirements of PennDOT No. 2A coarse aggregate and Select Granular Material 2RC.

B. Drainage Fill: Drainage fill shall be AASHTO Size #57 stone in accordance with the gradation set forth in PennDOT 408 Section 703. No modified base is permitted.

1. Use under building floor slabs-on-grade.

C. Fill Materials: Fill materials shall be classified as follows:

1. Structural Soil Fill: Fill supporting slabs, pavements, and foundations is considered herein to be structural fill. Structural fill shall be placed on an approved, proof rolled, nonyielding, level subgrade, in lifts not exceeding 8 inches (loose thickness), unless otherwise directed by the Geotechnical Engineer. Structural fill shall be maintained nominally at Optimum Moisture Content (ASTM D-698) and uniformly compacted to the percentages of Maximum Dry Density (ASTM D-698) recommended by the Geotechnical Engineer.

For Structural Soil Fill Areas beneath parking lot interior landscape

islands:

The following details are to ensure adequate soil media for plant growth where Structural Soil Fill is required.

a. Gravel shall consist of crushed stone approximately one inch in diameter.
b. Soils shall consist of loam to clay loam, containing at least 20% clay content.
c. Ratio of stone to soil shall be 80% stone to 20% soil by dry weight.

1. Borrow Fill: Borrow fill shall be clean well-graded soils with good strength characteristics with a maximum particle size of 3 inches and containing not more than 20% silt/clay (by weight). Samples of on-site or borrow sources of fill shall be submitted to the Geotechnical Engineer for testing at least 1 week before use on site. A minimum of 65 lbs. or two (2) five-gallon buckets is required for testing.

2. Structural Aggregate Fill (for ALTERNATE No. 2): structural fill 2A stone, including spreading and compacting to 98% of its maximum dry density as established by ASTM D 698 in 8" lifts.

D. Top Soil: All stockpiled top soil shall be used for all lawn areas. In the event there is a shortage of stockpiled top soil the Contractor shall import top soil at his expense.

1. Imported top soil shall be natural, fertile, friable loam or sandy loam as classified by the U. S. Department of Agriculture Soil Classification system, and typical of the cultivated topsoils of locality. The soil shall contain not less than 1% or more than 8% by weight, of decayed organic matter (humus), as determined by ASTM F 1647. The topsoil shall be taken from a well drained, arable site, free from sub-soil, large stones, earth clods, sticks, stumps, clay lumps, roots, or other objectionable, extraneous matter of debris. Topsoil shall also be free of Quackgrass

rhizomes, Agropyron Repens, and the nut-like tubers of Nutgrass, Cyperus Esculentus, and all other primary noxious weeds. Topsoil shall not have a pH of less than 6.0 or greater than 7.5. Topsoil shall not be delivered or used for planting while in a frozen or muddy condition. The top soil shall be approved by the Architect prior to use and after review of a test report.

a. Topsoil shall conform to the following particle size distribution, as determined by pipette method in compliance with ASTM F1632:

Sand	22. to 2 mm)	40% to 60%
Silt	23. to 0.05 mm)	30% to 40%
Clay	(<0.002 mm)	10% to 20%
Gravel	(>2.0 mm)	<15%

2. Maximum size shall be 1/2 inches largest diameter.

a. If organic amendments are needed to obtain the specified organic matter content of the topsoil, the organic matter source may be a peat or compost material. The peat shall be Canadian sphagnum peat having an ash content not exceeding 15%, as determined by ASTM D 2974. Composts may be used, provided that the material has been composted in an in-vessel system and has an ash content not exceeding 40%, and is screened to 1/4 inch.

3. In the event there is a surplus of stockpiled top soil then the Contractor shall deposit and spread the top soil as directed by the Architect. Surplus top soil shall not be removed from the site.

4. Existing topsoil slated for reuse shall be tested by an accredited soil testing lab or agency to determine pH levels and nutrient availability. Topsoil shall be amended as required based on results of soil test. Topsoil testing and amendments shall be at the contractor's expense.

PART 3 - EXECUTION

3.1 SITE DEMOLITION AND CLEARING

A. Remove all improvements, abandoned structures, paved surfaces, utility lines and other items shown on the drawings and indicated to be removed or required to be removed in order to install new work as shown.

B. Remove all objectionable material, rubbish and junk within the Project limits.

C. Clear and grub the site of small caliper vegetative matter and roots. Hand grub under drip line of trees designated to remain.

D. Remove trees, including stumps and root systems, unless specifically indicated to remain.

E. Dispose of removed material off site in accordance with requirements of this specification. Burning of waste material on the site is not permitted.

3.2 STRIPPING TOP SOIL

A. Before starting rough grading, top soil shall be removed to its full depths and hauled from the site for use in future finish grading. Remove heavy growths of grass before stripping topsoil.

3.3 ROUGH GRADING

A. All areas within and outside the building shall be rough graded to subgrade elevations, which shall be finished grades less thicknesses of finish materials as shown on the Drawings. Only satisfactory fill as previously specified shall be used.

B. If fill for construction of embankments is to be placed on existing slopes steeper than 4:1, benches shall be cut into the slope so that fill can be placed in level lifts.

C. Benches shall be cut wide enough to allow passage of compaction equipment.

D. Fill shall be placed and compacted in accordance with requirements of this section.

E. At the end of each working day the fill surfaces shall be sealed by rolling to promote surface runoff and graded to prevent ponding of water.

3.4 EXCAVATION

A. General:

1. The Contractor shall complete the excavation in phases as indicated on the drawings and in Section 011000 “Summary of Work”.
2. In the event that there is excess excavated material remaining after completion of backfilling shall remain the property of Contractor, removed from the construction area, and disposed of legally, off-site. However in the event the excavated material can be used in filling and rough grading on the site as determined by the Architect, it shall remain on the site and be used for grading and filling.
3. When excavation has reached required subgrade elevations, notify the Geotechnical Consultant, who will make an inspection of conditions. If the Geotechnical Consultant determines that bearing materials at required subgrade elevations are unsuitable, continue excavation until suitable bearing materials are encountered and replace excavated material as to the extent directed by the Geotechnical Consultant.
4. All footings and slabs shall be placed on suitable native soil or select structural fill tested and prepared in accordance with the project specifications. No footings or slabs shall be placed on existing fill material. Fill material shall be removed and replaced per the project specifications.
5. Erect and maintain barricades, fences, warning lights and other protection required to comply with all applicable regulations for safety of all persons at excavations
6. Excavation to full depth is not to be done when rain or freezing conditions are imminent. All excavated bearing surfaces shall be protected from frost. Where bearing surfaces are damaged by water, mud, or otherwise disturbed, all loose mud or other materials shall be removed and the surface regraded. Where the foundation excavation has been carried below plan grade due to errors in excavation, freezing, removal of mud or other loose materials or overshot or pitted rock surface, the foundation bearing surface shall be restored to plan grade with the same strength concrete as that specified for the footing above it at no additional cost to the Owner.
7. When cutting of paved surfaces is required, the surface shall be machine cut in a neat, uniform manner. No paving shall be broken except that

which has been previously cut. Edges of the cut pavement shall be protected during excavation and construction. Any edges which become broken shall be squared prior to pavement replacement

8. Hand excavation shall be done in any circumstance where machine excavation could damage existing or new structures or other underground improvements. Exploratory pits shall be hand dug to locate existing underground lines at connection points or points of crossing.

B. Excavation: Removal of material encountered above subgrade elevations. All excavation within the project limits is considered classified in the base bid.

1. Additional Excavation: Excavation below subgrade elevations as directed by the Engineer. Additional excavation and replacement material for stabilization of yielding or otherwise unacceptable materials may be authorized by the Engineer. Subgrade stabilization shall be made by undercutting below the proposed subgrade excavation elevation, placing geotextile fabric and backfilling with AASHTO #1 stone in 6" compacted lifts to the design subgrade elevation. Payment for additional excavation will be made on a per unit basis as listed in the Bid Form. The contractor shall include in their base bid excavation below subgrade in amounts as identified in the contract documents and on the Bid Form.

2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be without additional compensation

C. Storage of material or regular parking of vehicles which contain highly flammable or explosive cargoes are prohibited. Storage of flammable fuels or fueling of vehicles is also prohibited.

D. Excavation is CLASSIFIED in base bid and includes excavation to the natural Subgrade elevations indicated or required for construction and shall be classified as earth and rock.

E. Excavation Classifications: The following classifications of excavation will be made when rock is encountered:

1. Earth Excavation includes excavation of pavements and other obstructions visible on surface; underground structures, utilities, and other items indicated to be demolished and removed; unauthorized excavation; and all earth and other materials encountered that are not classified as rock under subparagraphs below. The Contractor shall not receive any increase in the Contract Time or the Contract Price for any earth excavation.

2. Rock Excavation Types: Rock excavation includes bulk and trench rock excavation.

a. Bulk Rock Excavation: Bulk rock excavation includes removal and disposal of materials and obstructions, except boulders, which are encountered and cannot be removed with heavy-duty excavating

equipment without drilling, jack hammering or ripping. Excavation equipment equal to Caterpillar Model No. D-8 or D-9 or equivalent track-mounted loader, rated at not less than 84,850 pounds operating weight, 310 HP rated power and developing minimum of 50,070-pound bucket breakout force (measured in accordance with SAE J732). Excavation which can be accomplished with this equipment or equivalent shall be considered as Earth Excavation. Comply with any of the following methods for removal of rock. Method must be approved by the Geotechnical Engineer prior to commencing removal:

1) Ripping: Rock excavation by ripping methods shall mean removal of rock type materials using tractors equipped with rock ripping mechanism such as No. D-8 and No. D-9 Ripper Tractors by Caterpillar Company. Rock ripping methods shall be attempted for all bulk rock excavation and shallow (4'-0"±) trench rock excavation, as it is encountered at the site; unless waived by the Geotechnical Engineer. Existing site rock which cannot be ripped with ripper tractors, and this fact is established after trial ripping, shall be excavated by rock excavation methods employing ram hammering and drilling. Intermittent ripping performed to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation.
2) Hand Method: Rock excavation by hand method shall mean removal of rock type materials by a worker using pneumatic vibrating chippers when other rock removal methods are ruled out as too dangerous to existing building and its stability.
3) Ram Hammer: Rock excavation by ram hammer method shall mean removal of rock type materials using boom mounted pneumatic, impact hammer equipment, when other rock removal methods are ruled out as too dangerous to existing building and its stability.
4) Boulders: Boulder excavation shall mean removal of free floating rock by excavation equipment at least equal to Caterpillar Model No. 973 or No. 320 track mounted equipment. Boulders which cannot be removed with the above equipment shall be removed and compensated for by ripping, hand method or ram-hammer. Boulders encountered shall be set aside for measurement, then removed from the site, including those not qualified as rock. Large boulders shall be split into smaller units as required for disposal at no additional cost.

b. Trench Rock Excavation:

1) Rock excavation for footings trenches and pits includes removal and disposal of materials and obstructions encountered that cannot be excavated with a 1.0 cubic yard (SAE heaped) capacity, Type T, 36 inch side bucket on a track-mounted power excavator, equivalent to Caterpillar

Model No.325, and rated at not less than 204 HP flywheel and 64460 pound weight with a short stick.

2) Trenches in excess of 10 feet in width and pits in excess of 30 feet in either length or width are classified as bulk rock excavation.

3) Ripping hand method, ram hammer, and boulder rock removal methods may be used for trench rock removal. Reference Bulk Rock Excavation for description and definition of these methods. Intermittent ripping performed to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation.

F. Storage of material or regular parking of vehicles which contain highly flammable or explosive cargoes are prohibited. Storage of flammable fuels or fueling of vehicles is also prohibited.

G. Do not perform rock excavation work until material to be excavated has been cross-sectioned and classified by the Construction Manager. Such excavation will be paid on the basis of conditions of the Contract relative to changes in work. If the Contractor proceeds with excavation prior to such cross-sectioning and classification, such excavation shall be conclusively deemed to be earth excavation.

H. Rock payment lines are limited to the following:

1. Two feet outside of concrete work for which forms are required, except footings.

2. One foot outside perimeter of footings and twenty-four (24) inches below bottom (unless shown to rest on rock).

3. In pipe trenches, 6 inches below invert elevation of pipe and 2 feet wider than inside diameter of pipe, but not less than 3 feet minimum trench width.

4. Outside dimensions of concrete work where no forms are required.

5. Under slabs on grade, 6 inches below bottom of concrete slab.

6. Boulders which can be removed with specified equipment but extend beyond limits of responsibility and/or rock payment lines shall be considered within rock payment lines.

I. When a question arises concerning classification of material to be excavated, Geotechnical Engineer shall be notified and their decision shall be final. No extra payment will be allowed unless a formal construction change directive or a change order is prepared and issued by the Project Manager or Owner’s Representative.

J. Contractor shall keep a running account of all rock excavation completed. A plan shall be kept noting location, quantity, type of excavation and date of removal for all rock excavation, and each quantity shall be initialed by Geotechnical Engineer or his

official field representative directly on this plan signifying agreement to its removal. When all excavation work is completed, this rock excavation report shall be submitted to the Geotechnical Engineer and Owner's Representative to serve as a permanent record of rock excavation work completed.

3.5 STABILITY OF EXCAVATIONS

A. General: Comply with local codes, ordinances, and requirements of agencies having jurisdiction.

B. Slope sides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

C. Shore and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers, and cross braces, in good serviceable condition. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Extend shoring and bracing as excavationprogresses.

1. Comply with all laws and regulations of the Federal Occupational Safety and Health Act of 1970 (OSHA), latest edition, as amended.
2. The Contractor shall provide and maintain sheathing, shoring and bracing as necessary to protect workmen and work of this project and existing structures. Restoration of damaged areas to original condition is the Contractor's responsibility. The Contractor shall submit his plan for sheeting, shoring and bracing for approval before commencing work.
3. It is also the Contractor's responsibility to remove temporary sheathing, shoring, bracing and protection when no longer required by adjacent conditions and completion of foundation construction or backfill and rough grading.

3.6 DEWATERING

A. Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area. Prevent surface water from entering the building.

1. Do not allow water to accumulate in excavations. Remove water to prevent softening of soil and changes detrimental to stability of subgrades. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.

2. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.
3. Whenever possible, avoid allowing foundation excavations to remain

open for extended periods.

4. The Contractor shall pump out, or otherwise remove, any water which may be found in the excavation, and shall provide drainage ditches, underdrains, flumes, well points, and pumping equipment, suction and discharge lines, as necessary to keep the excavation entirely clear of water while the foundations are being built or other operations are being performed requiring a dry condition.

3.7 EXCAVATION FOR STRUCTURES

A. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 foot and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, and other construction and for inspection.

B. Foundations: Foundations shall bear on the undisturbed dense zones of Stratum I, Stratum II, Stratum III, or on structural fill as defined in the Geotechnical Report. Soft conditions encountered during foundation construction shall be excavated and replaced with structural fill. Foundations shall be designed for a maximum soil bearing capacity of 4 KSF on the dense zones of Stratum I, Stratum II, Stratum III, or structural fill. Foundations shall not be placed intermittently on soils and boulders. Small boulders encountered within or directly beneath the footing bearing surface shall be removed and replaced with structural fill. Larger boulders shall either be fully or partially removed and replaced with structural fill. Trench excavation through areas containing boulders may require substantial over-excavation to facilitate boulder removal. Partial removal can be completed by splitting or hammering to a minimum of 12" below the footing bottom elevation. Should the foundation excavation encounter hard bedrock, the foundation is to be undercut a minimum of 12 inches. The undercut area is to be backfilled with a structural fill or a low strength flowable fill (max 500 psi) “cushioning” layer to limit the potential for differential foundation settlement and the development of stress concentrations caused by a rock protrusion.

C. Slab on Grade: Prior to the placement of fill the exposed slab subgrade areas shall be proof rolled with a heavy smooth drum roller (minimum 15-ton static weight) to detect the presence of loose or soft zones. This proof rolling operation shall be performed in the proposed fill areas under the supervision of the Geotechnical Engineer. Proof rolling of the subgrade shall also be performed in the cut areas when the required grades have been achieved and immediately prior to pouring the floor slab. Loose or soft zones detected during the proof rolling operation shall be repaired to the satisfaction of the Geotechnical Engineer. All slab subgrade areas shall be evaluated by the Geotechnical Engineer prior to pouring the slab so that repairs can be completed. A smooth drum roller shall be made available to seal the subgrade in the event of predicted precipitation.

D. Excavation for Underground Tanks, Basins and Mechanical or Electrical Structures: Conform to elevations and dimensions indicated within a tolerance of plus or minus 0.10 foot; plus a sufficient distance to permit placing and removal of concrete

formwork, installation of services and other construction and for inspection. Do not disturb bottom of excavations intended for bearing surface.

3.8 EXCAVATION FOR WALKS AND PAVEMENTS

A. Pavement and sidewalk areas shall be prepared in a manner similar to the slab on grade areas. A minimum of 8 inches of crushed aggregate base shall be used beneath exterior pavements due to the frost heave potential of the subgrade soils. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades. Unless noted otherwise, maintain subgrade with same slope and pitch as indicated for finish surface.

3.9 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated slopes, lines, depths, and invert elevations.

1. Beyond building perimeter, excavate trenches for water lines to allow installation of top of pipe below frost line or to minimum depth indicated elsewhere herein or on the Contract Drawings.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches (300 mm) higher than top of pipe or conduit, unless otherwise indicated.

1. Clearance: A minimum of twelve inches (12”) each side of pipe or conduit, or as otherwise indicated.

C. Trench Bottoms: Excavate and shape trench as required to place bedding material and to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove large stones and sharp objects to avoid point loading.

1. Remove unstable, soft and unsuitable materials at or below the bottom of the trench upon which bedding material is to be laid.

2. Where encountering rock or another unyielding bearing surface, carry trench excavation six inches (6”) below outside surface of pipe to receive bedding course.

3. Refer to Article, “Utility Trench Backfill” for bedding and backfill requirements.

3.10 APPROVAL OF SUBGRADE

A. Notify Geotechnical Engineer when excavations have reached required subgrade. Provide minimum 24 hours of notice of completion time to allow for scheduled inspection. Proof-roll prepared subgrade surface to check for unstable areas and areas

requiring additional compaction. Do not proof roll wet or saturated subgrades, or subgrades occurring within two to three feet of the water table. Perform proof-rolling with a Smooth drum roller with a minimum static weight of 15 tons or loaded tandem-axle dump truck as directed and observed by the Geotechnical Engineer. The proof rolling shall be performed in the presence of the Geotechnical Engineer. The proof rolling operation shall cover the entire width and length of the proposed panel area.

B. Do not backfill trenches until tests and inspections have been made and the Geotechnical Engineer/Owner has been informed in writing of the test results and authorizes proceeding with the backfill. Do not damage or displace pipe systems.

C. When Geotechnical Engineer determines that unforeseen unsatisfactory soil is present at and below subgrade, continue excavation and replace with compacted backfill or fill material as directed.

1. Unforeseen additional excavation and replacement material will be paid according to the contract provisions for changes in work. No such payment will be made however, if the work is not first authorized by the Geotechnical Engineer and Owner's Representative, or if the subgrade material became saturated and soft as a result of the Contractor's failure to properly protect the excavation or properly divert surface runoff away from excavations.

D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by the Geotechnical Engineer at the Contractor's expense.

E. No stone aggregate base course or subbase course shall be placed until the subgrade of the entire section or portion of the project under preparation is approved for line, grade and stability.

F. No topsoil is to be placed until the subgrade of an entire sub-area or portion of project under preparation is brought to an even plane and uniform depth consistent with the proposed finish grade as required by the drawings, and reviewed by the Geotechnical Engineer.

3.11 UNAUTHORIZED EXCAVATION

A. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Geotechnical Engineer. Unauthorized excavation as well as remedial work directed by the Geotechnical Engineer shall be at the Contractor's expense.

B. Fill unauthorized excavation under foundations or wall footings by extending indicated bottom elevation or concrete foundation or footing to excavation bottom, without altering required top elevation. Controlled low-strength material may be used to bring elevations to proper position when acceptable to the Geotechnical Engineer.

1. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of the same classification, unless otherwise directed by

the Geotechnical Engineer. Fill unauthorized excavations under other construction directed by the Geotechnical Engineer.

C. Where indicated widths of utility trenches are exceeded, provide stronger pipe, or special installation procedures, as required by the Owner's Representative.

3.12 ADDITIONAL EXCAVATION

A. When excavation has reached required subgrade elevations, notify the Geotechnical Engineer who will make an observation of conditions and render recommendations.

1. If unsuitable or excessively fractured bearing materials are encountered at required subgrade elevations, carry excavations to the level decided by the Geotechnical Engineer and replace excavated material as authorized by the Geotechnical Engineer.
2. Removal of unsuitable material and its replacement as authorized will be paid on basis of contract conditions relative to changes in work.

3.13 STORAGE OF SOIL MATERIALS

A. Stockpile excavated materials acceptable for backfill and fill soil materials, including acceptable borrow materials.

1. Stockpile soil materials without intermixing.
2. Place, grade and shape stockpiles to drain surface water.
3. Provide protection to prevent wind-blown dust, and accumulation of excessive moisture that may preclude use of material as intended for use on the project.
4. Stockpile soil materials away from edge of excavations. Do not store within drip line or remaining trees.
5. Dispose of excess soil material and waste materials as specified herein.

3.14 COLD WEATHER PROTECTION

A. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.

3.15 BACKFILL AND FILL

A. General: In the event that there is a shortage of suitable excavated soil material, the Contractor shall import fill materials complying with paragraph 2.1.C of this specification (except as noted below).

1. The suitability of excavated soil materials for use as fill shall be determined by the Geotechnical Consultant. In any event, the fill materials to be used at various locations are to be as specified in paragraph 2.1.C.

B. Backfill excavations as promptly as possible, but not until completion of adjoining and related work.

C. Prior to placing backfill, contractor is to provide Owner's Representative or Geotechnical Engineer with the written anticipated Schedule of Backfill Operations a minimum of forty-eight (48) hours in advance. No backfills shall be placed without the Owner's Representative or geo-technical testing agent at the site.

D. Backfill excavations promptly, but not before completing the following:

1. Acceptance of construction below finish grade including, where applicable, damp-proofing, water-proofing, and perimeter insulation, pipe bedding and joints.

2. Surveying locations of underground utilities for record documents.

3. Testing, inspecting, and approval of underground utilities.

4. Removal of all concrete form-work from excavation.

5. Removal of trash and debris from excavation.

6. Removal of temporary shoring and bracing and sheeting.

7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

E. Place backfill on subgrades free of mud, frost, snow or ice, deleterious/vegetative material.

3.16 PLACEMENT AND COMPACTION

A. Ground Surface Preparation: Strip and stockpile topsoil. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow strip/bench sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bondwith existing surface.

B. Proofrolling: Following the removal of all top soil and prior to the placement of structural fill, the exposed slab subgrade areas and exterior concrete and asphalt paved areas shall be proofrolled and compacted with a smooth surfaced steel drum vibratory roller having a minimum static weight of fifteen (15) tons. Proofrolling shall extend at least ten feet beyond the foundation perimeter. If the proofrolling should uncover any area which is observed to be soft or unstable, the unstable material shall be removed and replaced as provided in Section 3.1 paragraph A-3.

C. Placing of Fill Materials: Place the specified structural fill, backfill and soil fill materials in all areas, in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 6 inches in loose depth for material compacted by hand-operated tampers.

D. Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification.

E. Place imported structural fill, backfill and fill materials evenly adjacent to structures to required elevations. Prevent wedging action of backfill against structures by carrying material uniformly around structure to approximately same elevation in each lift.

F. Compaction: Control soil and fill compaction, providing minimum percentage of density specified for each area classification indicated below. Correct improperly compacted areas or lifts as directed by Architect or Construction Manager if soil density tests indicate inadequate compaction.

1. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum dry density, in accordance with ASTM D 698:

   a. Under concrete building slabs, under concrete foundations and footings, compact each layer of imported structural fill material at 98 percent of maximum dry density. Extend compacted area beyond the exterior face of the building a distance equal to the depth of fill at that area but not less than 10 feet.
   b. Under exterior concrete and asphalt paving compact each layer of backfill or fill material at 98 percent of maximum dry density.
   c. Under lawn or unpaved areas, compact each layer of backfill or fill material at 95 percent of maximum dry density.
   d. At exterior face building foundation walls and walls beyond the exterior of the face of the building, each layer of backfill or fill shall be compacted to 95 percent of maximum dry density.
   e. At asphalt and concrete paving the top 6 to 8 inches of subgrade under the paving and aggregate base course shall be compacted to 98 percent of the maximum dry density. The aggregate base course shall also be compacted to 100 percent of the maximum dry density.

2. Moisture Control: Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within the optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification.

   a. Cohesive soil must achieve moisture conditioning before compaction by the addition of water applied uniformly to surface, scarified and mixed by discing or harrowing before compacting. If the soil is too wet to achieve proper compaction, it must be scarified and air dried before compacting, or it must be removed and replaced.
   b. Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade or layer of soil material. Apply water in minimum quantity as necessary to prevent free water from appearing on surface during or subsequent to compaction operations.
   c. Remove and replace, or scarify and air dry, otherwise satisfactory

soil material that is too wet to permit compaction to the specified density.

d. Stockpile or spread soil material that has been removed because it is too wet to permit compaction. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.

e. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain ice.

3.17 GRADING

A. General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surfaces within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades.

B. Establish “Limits of Grading” in the field by installing fence, stakes, flags, or other means acceptable to the Architect.

C. Grading Inside Building Lines: Finish subgrade to a tolerance of 0.10 foot when tested with a 10 foot straightedge.

D. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes and as follows:

1. Lawn or Unpaved Areas: Finish areas to receive topsoil to within not more than 0.10 foot above or below required subgrade elevations.

2. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.10 foot above or below required subgrade elevation.

E. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each areaclassification.

3.18 FINISH GRADE PREPARATION

A. The surface grades shall be surveyed in accordance with these specifications and any undulations or irregularities resulting from applications and soil structuring shall be corrected.

1. Spread evenly and grade topsoil to a maximum depth of 8 inches, but not less than a depth of 6 inches.

B. Cultivate and till the sub-soil to a depth of 4-6 inches (depth may be limited by subsurface conditions).

C. Regrade, re-firm and grade the soil surface. This is a smoothing and leveling operation to establish the final crown contours and elevations.

3.19 DRAINAGE COURSE

A. General: Drainage course consists of placement of drainage fill material, in layers of indicated thickness, over subgrade surface to support building slab.

B. Placing: Place drainage fill material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting material during placement operations.

1. When a compacted subbase course is indicated to be 6 inches thick or less, place material in a single layer. When indicated to be more than 6 inches thick, place material in equal layers, except no single layer more than 6 inches or less than 3 inches in thickness when compacted.

3.20 FIELD QUALITY CONTROL

A. Quality Control Testing During Construction: Allow testing service to inspect and approve each subgrade and fill layer before further backfill or construction work is performed.

1. Perform field density tests in accordance with ASTM D 1556 (sand cone method).

a. Field density tests may also be performed by the nuclear method in accordance with ASTM D 2922, providing that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D 1556. In conjunction with each density calibration check, check the calibration curves furnished with the moisture gages in accordance with ASTM D 3017.
b. If field tests are performed using nuclear methods, make calibration checks of both density and moisture gages at beginning of work, on each different type of material encountered, and at intervals as directed by the Architect.

2. Footing Subgrade: For each excavated strata of soil on which footings will be placed, perform at least one test to verify required design bearing capacities. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested strata when acceptable to Architect.

a. The bearing surface is to be evaluated by the Geotechnical consultant to confirm that the correct bearing strata has been reached and that the bearing surface is free of loose/soft/disturbed conditions. The evaluation shall be recorded on the daily field report for each foundation element.

3. Building Slabs Subgrade: Perform at least one field density test of subgrade for every 2,000 sq. ft. of building slabs and paved area, but in no case fewer than three tests. In each compacted fill layer, perform one

field density test for every 1,000 sq. ft. of overlaying paved area, but in no case fewer than three tests.

4. Grass Areas: Same frequency as specified for building slabs and paved areas.

5. If in opinion of Architect, based on testing service reports and inspection, subgrade or fills that have been placed are below specified density, perform additional compaction and testing until specified density is obtained. The additional compaction and testing shall be provided by the Contractor at his expense.

3.21 EROSION CONTROL

A. Provide erosion control methods in accordance with requirements of authorities having jurisdiction and as specified in Section 311100 “Sedimentation and Erosion Control Systems”.

3.22 PROTECTION

A. Protection of Graded Areas: Protect newly graded areas from traffic freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, settled, rutted or where they lose compaction due to subsequent construction operations or weatherconditions.

1. Scarify or remove and replace soil material to depth as directed by the Architect or Geotechnical Consultant; reshape and recompact.

C. Where settling occurs during general project warranty period, remove finished surfacing, backfill with additional soil material, compact and reconstruct surface.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

D. Protection of Stormwater Infiltration Areas: Protect areas for new stormwater infiltration facilities from compaction.

1. Install temporary construction fencing around bed perimeter to prevent access to excavation and prevent construction equipment from traversing bed area.

2. Excavate area for infiltration bed, taking care to prevent compaction of soil at facility floor. Bed shall be excavated from perimeter and equipment shall not be permitted to enter facility excavation.

3.23 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Removal from Owner's Property: Remove waste materials, including unacceptable excavated material, trash, and debris, legally dispose of it, off the Owner's property. The Contractor shall obtain approval of the dump site(s) from the Owner's Representative, which approval will not relieve the Contractor of its responsibility herein.

3.24 CLEAN UP

A. Any paved area (either new or existing) over which hauling operations or other moving equipment are conducted, shall be kept clean and any soil or other material which may be spilled or left upon the paved surfaces shall be removed. Paved surfaces shall be left broom clean. Wet down surfaces as required to prevent excessive airborne dust.

3.25 GEOTECHNICAL ENGINEERING REPORT

A. Any available data concerning subsurface materials or conditions which is based upon soundings, test pits or test borings, has been obtained by the Owner to assist the Architect in designing this project. Its accuracy or completeness is not guaranteed by the Owner or the Architect and in no event is it to be considered as part of the contract Drawings or Specifications. This information is provided the Contractors for information purposes only.

END OF SECTION 312000

SECTION 329200 – LAWNS AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Lawn seeded areas.
2. Soil amendments.
3. Initial maintenance of seeded areas.
4. All areas throughout the entire site which are disturbed by construction activities, shall be seeded.

B. Related Sections include the following:

1. Division 31 Section “Earthwork” for top soil, distribution, and fine grading.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Seed germination and purity tests will be furnished to the Architect for approval prior to applying seed. For each seed lot number, the Contractor will be required to furnish:

1. State or country of origin.
2. Kind of seed and variety.
3. Seed purity, germination, weed content, and inert matter.
4. Delivery slips to substantiate the quantities delivered to the site.

C. The Contractor shall provide and pay for topsoil testing. The testing agency shall be acceptable to the Architect. Provide test data for the following:

1. pH factor.
2. Mechanical analysis.
3. Percentage of organic content.
4. Recommendations on type and quantity of additives required to establish

satisfactory pH factor and supply nutrients to a satisfactory level of planting.

D. Maintenance Instructions: Provide (2) sets of instructions recommending procedures to be established by the Owner for maintenance of grass areas. Instructions shall be organized by calendar months for a one-year period.

1.4 QUALITY ASSURANCE

A. Seed Quality Standards: All seed shall be fresh, clean, new crop seed delivered to the site in the original unopened containers. Seed shall be Gold Tag Certified by the state or country of origin.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Seed will be delivered to the site in the original, sealed and labeled and undamaged containers.

B. Fertilizers and other materials shall be delivered and stored in original unopened packages, kept dry and not opened until needed for use. Damaged or faulty packages shall not be used.

1.6 SITE CONDITIONS

A. Utilities: All underground utility work shall be installed, inspected and approved before operations are started.

B. Coordinate all seed work to avoid conflict and disturbance with other operations.

1.7 WARRANTY

A. Grass Warranty: The Contractor shall warrant the condition of the lawn areas for one year from the date of Substantial Completion. This warranty shall include services by the Contractor, as required to maintain lawn areas and keep them free of weeds, fungus, insects and bare spots. The Contractor shall provide all labor and equipment necessary (normal wear and tear, mowing and watering is not included) except as hereinafter specified in Initial Maintenance.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Seed Mixture: As indicated on the drawings.

B. Lime: Lime shall be standard ground agricultural limestone not less than 50% lime oxides (calcium oxide and magnesium oxide), 98% of which will pass a

twenty (20) mesh sieve: 40% of which will pass a one hundred (100) mesh sieve.

C. Fertilizers: All fertilizers shall be uniform in composition, free flowing and suitable for application with approved equipment, delivered to the site in original bags or cartons and fully labeled in conformance with applicable state fertilizer laws bearing the name, trade name or trademark and warranty of the producer.

1. Contractor shall review topsoil analysis and provide fertilizer with recommended quantities of nitrogen, phosphorus and potash nutrients and soil amendments to be added to produce satisfactory topsoil.

D. Straw Mulch: Wheat or oat straw, free of viable seed, well cured to less than 20% moisture content by weight.

E. Mulch Binder: Either water soluble natural vegetable gum blended with gelling and hardening agents or a water-soluble blend of hydrophilic polymers, viscosifiers, sticking aids and gums.

F. Pre-Emergent Weed Control: “Tupersan” manufactured by DuPont, or approved equal.

G. Post-Emergent Broadleaf Herbicide: “Confront’ and “Banvil” manufactured by Dow AgroServices or approved equal.

H. Non-Selective Herbicide: “Round-Up” manufactured by Monsanto Company or approved equal.

I. Organic Amendments:

1. Compost is a widely used bulk organic soil amendment and a recycled product. Because it is applied at much greater rates than fertilizer, compost has a significant cumulative effect on nutrient availability and may reduce or eliminate initial fertilization. Consider each plant’s pH and soluble salt requirements and how they relate to the compost being used and the resulting soil-compost mix.

2. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1/2-inch sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

a. Organic Matter Content: 50 to 60 percent of dry weight.

b. Feedstock: Agricultural, food, or industrial residuals, biosolids, yard trimmings NOT PERMITTED.

c. Leaf Mold: Double ground, aged leaf matter.

d. Spent Mushroom Substrate: Composted, sterilized spent mushroom soil.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive lawns and grass for compliance with requirements and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

1. Protect adjacent and adjoining areas from hydro seeding and hydro mulching overspray.

2. Protect grade stakes set by others until directed to remove them.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 FINISH GRADE PREPARATION

A. Any stones larger than 2 inches in any dimension shall be removed from the top 3 inches utilizing a mechanical rock picker.

B. Final grading shall be accomplished utilizing a LASER ASSISTED hydraulic land plane attached to a flotation tired agricultural tractor.

C. Cultivate and restructure the topsoil to a depth of 3-4 inches. Grade tolerance shall be held to 1/2 inch per foot.

D. Final stone pick the surface of any stones larger than 1 inch in any dimension.

3.4 SOIL STRUCTURING

A. After the topsoil for grass and sod is prepared and graded to the proper elevations, the following materials shall be applied and tilled (mixed) into the full depth of the topsoil taking care not to disturb the subsoil.

1. Amendments shall be added at rates and concentrations recommended by the top soil analysis provided by the Contractor.

2. Incorporate 3 Cu. Yd. organic matter (1-inch layer) per 1,000 sq. ft. into

top 6-inches of top soil.

B. After incorporation of the above materials, the topsoil shall be refirmed by dry-rolling (topsoil moisture content must be near zero percent) with a five (5) ton roller on a dual flotation tired agricultural tractor.

3.5 SEEDING

A. Seeding will not be permitted until final precision grading is reviewed by the Architect.

B. Seeding shall be done between the dates indicated on the plans. Seed during favorable weather conditions.

C. Seed using a manually-propelled or power-drawn hopper devices. Uniformly distribute the seed by sowing half the seed in one direction and the remainder at right angles to the direction of the first sowing. Cover seed an average depth of 1/4 inch by means of chain harrow, cultipacker, or other approved method.

D. Hydro seeding will be permitted on steep slopes only with approval of the Architect.

3.6 MAINTENANCE AND ESTABLISHMENT

A. Mowing: The Contractor shall mow all areas 6 times at a height of 2-1/2 inches to 3 inches and be responsible for establishing an acceptable stand of grass. Do not mow grass to less than 2.5 inches.

B. Establishment Acceptance: An acceptable stand of grass means the existence of a minimum of 72 viable turf plants per square foot and no bare spot shall exceed a 2 inch by 2 inch area. At the time of final inspection, all areas achieving this criteria will be accepted as completed and only those specific areas not meeting this criteria will continue to receive maintenance until the criteria is met.

C. Maintain areas by watering, weeding, mowing, trimming, and other operations such as rolling, regrading, replanting as required to establish a smooth, acceptable lawn, free of eroded or bare areas.

D. Watering: Provide and maintain temporary piping, hoses, and lawn-watering equipment to convey water from sources and to keep lawn uniformly moist to a depth of 4 inches.

1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.

2. Water lawn with a fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.

E. Mow lawns as soon as there is enough top growth to cut with mower set at specified height of 2.5 to 3 inches for principal species planted. Repeat mowing as required to maintain specified height. Remove no more than 40 percent of grass leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Time initial and subsequent mowings to maintain grass height as heretofore specified. Capture and remove cuttings from lawn areas and properly dispose of off-site.

F. At the end of the planting season apply insoluble 60% nitrogen fertilizer at the rate of 4.5 lbs/1000 square feet.

G. The following Spring apply an application of pre-emergence weed control at the manufacturer's recommended rate and an application of insoluble 60% nitrogen fertilizer at the rate of 4.5 lbs/1000 square feet.

H. Prior to June 1st, apply an application of broad leaf herbicide at the manufacturer's recommended rate and an application of insoluble 60% nitrogen fertilizer at the rate of 4.5 lbs/1000 square feet.

3.7 ACCEPTANCE

A. When work and initial maintenance and establishment is substantially completed Architect will, upon request, make an inspection to determine acceptability.

1. Grass work may be inspected for acceptance in parts agreeable to Architect, provided work offered for inspection is complete, including maintenance.

B. Replant rejected work and continue specified maintenance until re-inspected by Architect and found to be acceptable.

C. Seeded lawns will be acceptable provided requirements, including maintenance, have been met and healthy, well-rooted, even-colored, viable lawn is established, free of weeds, open joints, bare areas, and surface irregularities.

3.8 CLEANUP

A. Promptly remove soil and debris, created by lawn work, from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto surface of roads, walks, or other paved areas.

B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after lawn is established.

C. Remove nondegradable erosion-control measures after grass establishment period.

END OF SECTION 329200