

PROGRESSIVE
COMPANIES



PROJECT MANUAL FOR:

**WAYNE COUNTY PORT AUTHORITY
DETROIT POLICE HARBOR MASTER
PLEASURE DRIVE AND SUNSET DRIVE
DETROIT, MI 48207
PROJECT NO. 20890001.4
ISSUED FOR PERMIT AND BID SET
SEPTEMBER 1, 2026**

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**PROJECT MANUAL FOR:
WAYNE COUNTY PORT AUTHORITY
DETROIT POLICE HARBOR MASTER
PLEASURE DRIVE AND SUNSET DRIVE
DETROIT, MI 48207**

**PREPARED FOR:
WAYNE COUNTY PORT AUTHORITY
130 E. ATWATER STREET
DETROIT, MI 48226**

**PREPARED BY:
PROGRESSIVE AE, INC.
(PROGRESSIVE COMPANIES)
616/361-2664 (TELEPHONE)**

PROJECT NO: 20890001.4

SEPTEMBER 1, 2026 - ISSUED FOR PERMIT AND BID SET

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NOTE: REFERENCES WITHIN THE TECHNICAL SPECIFICATIONS TO DIVISION 00 AND 01 REFER INSTEAD TO THE OWNER'S PROPRIETARY FRONT-END SECTIONS LISTED ABOVE, WITH THE EXCEPTION OF SECTIONS 01 3000, 01 3219, 01 3250, 01 3300, 01 4000, 01 7123 AND 01 7700). THESE DOCUMENTS ARE AVAILABLE FROM THE OWNER AND REPLACE INSTRUCTIONS AND REFERENCES TO DIVISION 00 AND 01 NOTED HEREIN.

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ADVERTISEMENT FOR BIDS

**Detroit/Wayne County Port Authority
Detroit, Michigan
Environmental Protection Agency Clean Port Program
EV Charging Station Construction Services**

General Notice

Detroit/Wayne County Port Authority (Owner) is requesting Bids for the construction of the following Project:

EV Charging Station Construction Services

This Project is funded by the United States Environmental Protection Agency (EPA) under Assistance Agreement No. 00E04042, awarded pursuant to the Inflation Reduction Act and Clean Air Act Section 133 (Clean Ports Program). All work performed under this Contract shall comply with all applicable federal statutes, regulations, executive orders, and EPA programmatic requirements associated with this award.

Bids for the construction of the Project will be received by the Detroit/Wayne County Port Authority via email to: **rfp@portdetroit.com**, until **October 7, 2026 at 5:00 PM** local time. Late submissions will not be considered.

The Project includes the following Work:

The selected Contractor will perform construction and installation services for EV Charging Stations at the following terminal:

- ◆ Detroit Police Harbor Master, Belle Isle, Detroit, MI

The Contractor will perform full construction services: site preparation, foundation work, PV module and inverter installation, trenching, conduit, grounding, and commissioning.

Permitting & Regulatory Compliance:

- ◆ Ensure compliance with NEC, IBC, local codes, and DTE Energy interconnection requirements.
- ◆ Use only materials listed, tested, and labeled by Underwriters Laboratories (UL), Factory Manual (FM), Electrical Testing Laboratories (ETL), or another nationally recognized testing laboratory.
- ◆ Secure all necessary permits for construction and interconnection.
- ◆ Provide documentation that all applicable federal grant requirements are satisfied, including Build America, Buy America (BABA) compliance/waiver requirements, Davis-Bacon Act requirements, and other applicable grant conditions.

The Contractor will manage all subcontractors and construction personnel.

The Contractor will attend biweekly coordination meetings with the Port Authority, Owner's Representative, and partner representatives.

Workforce and Labor Compliance:

- ◆ Perform all work under a Project Agreement with the Michigan Building and Construction Trades Council (MBCTC).
- ◆ Require all contractors of any tier to execute a Letter of Assent to the Project Agreement prior to starting work.
- ◆ Ensure Davis-Bacon prevailing wage compliance for all tiers of contractors.
- ◆ Register all non-journey-level workers in a U.S. Department of Labor BAT-approved registered pre-apprenticeship program.

The Contractor will maintain day-to-day coordination with the Port Authority and project stakeholders.

The Contractor will ensure all decisions align with project goals, budget, and schedule.

Important Note: The selected Contractor will not procure EV equipment or chargers. Electrical connections between the solar array and EV chargers will be designed under a separate contract. Coordination with that engineer is required to ensure system compatibility.

Bids are requested for the following Contract: **EV Charging Station Construction Services**

Obtaining the Bidding Documents

Information and Bidding Documents for the Project can be found at the following designated website:

Bids & Proposals – Detroit/Wayne County Port Authority

<https://portdetroit.com/category/bids-proposals/>

Bidding Documents may be downloaded from the designated website. The designated website will be updated periodically with addenda, lists of registered plan holders, reports, and other information relevant to submitting a Bid for the Project. All official notifications, addenda, and other Bidding Documents will be offered only through the designated website. Neither Owner nor Engineer will be responsible for Bidding Documents, including addenda, if any, obtained from sources other than the designated website.

Pre-Bid Conference

A non-mandatory pre-bid conference and site visit for the Project will be held on September 17, 2026, at 11:00 A.M. at the Detroit Police Harbor Master Facility, Pleasure Drive, Belle Isle, Detroit, Michigan 48207. Attendance at the pre-bid conference is encouraged but not required.

Instructions to Bidders.

For all further requirements regarding bid submittal, qualifications, procedures, and contract award, refer to the Instructions to Bidders that are included in the Bidding Documents.

This Advertisement is issued by:

Owner: **Detroit/Wayne County Port Authority**

By: **Mark Schrupp**

Title: **Executive Director**

Date: **September 7, 2026**

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SECTION 00 11 53

QUALIFICATIONS STATEMENT

ARTICLE 1—GENERAL INFORMATION

1.01 Provide contact information for the Business:

Legal Name of Business:			
Corporate Office			
Name:		Phone number:	
Title:		Email address:	
Business address of corporate office:			
Local Office			
Name:		Phone number:	
Title:		Email address:	
Business address of local office:			

1.02 Provide information on the Business's organizational structure:

Form of Business:	☐ Sole Proprietorship ☐ Partnership ☐ Corporation		
☐ Limited Liability Company ☐ Joint Venture comprised of the following companies:			
1.			
2.			
3.			
Provide a separate Qualification Statement for each Joint Venturer.			
Date Business was formed:		State in which Business was formed:	
Is this Business authorized to operate in the Project location?		☐ Yes ☐ No ☐ Pending	

- 1.03 Identify all businesses that own Business in whole or in part (25% or greater), or that are wholly or partly (25% or greater) owned by Business:

Name of business:		Affiliation:	
Address:			
Name of business:		Affiliation:	
Address:			
Name of business:		Affiliation:	
Address:			

- 1.04 Provide information regarding the Business's officers, partners, and limits of authority.

Name:		Title:		
Authorized to sign contracts: ☐ Yes ☐ No		Limit of Authority:	\$	
Name:		Title:		
Authorized to sign contracts: ☐ Yes ☐ No		Limit of Authority:	\$	
Name:		Title:		
Authorized to sign contracts: ☐ Yes ☐ No		Limit of Authority:	\$	
Name:		Title:		

ARTICLE 2—LICENSING

- 2.01 Provide information regarding licensure for Business:

Name of License:			
Licensing Agency:			
License No:		Expiration Date:	
Name of License:			
Licensing Agency:			
License No:		Expiration Date:	

ARTICLE 3—DIVERSE BUSINESS CERTIFICATIONS

- 3.01 Provide information regarding Business's Diverse Business Certification, if any. Provide evidence of current certification.

Certification	Certifying Agency	Certification Date
☐ Disadvantaged Business Enterprise		
☐ Minority Business Enterprise		
☐ Woman-Owned Business Enterprise		
☐ Small Business Enterprise		
☐ Disabled Business Enterprise		
☐ Veteran-Owned Business Enterprise		
☐ Service-Disabled Veteran-Owned Business		
☐ HUBZone Business (Historically Underutilized) Business		
☐ Other		
☐ None		

ARTICLE 4—SAFETY

- 4.01 Provide information regarding Business's safety organization and safety performance.

Name of Business's Safety Officer:		
Safety Certifications		
Certification Name	Issuing Agency	Expiration

- 4.02 Provide Worker's Compensation Insurance Experience Modification Rate (EMR), Total Recordable Frequency Rate (TRFR) for incidents, and Total Number of Recorded Manhours (MH) for the last 3 years and the EMR, TRFR, and MH history for the last 3 years of any proposed Subcontractor(s) that will provide Work valued at 10% or more of the Contract Price. Provide documentation of the EMR history for Business and Subcontractor(s).

Year									
Company	EMR	TRFR	MH	EMR	TRFR	MH	EMR	TRFR	MH

ARTICLE 5—FINANCIAL

- 5.01 Provide information regarding the Business's financial stability. Provide the most recent audited financial statement, and if such audited financial statement is not current, also provide the most current financial statement.

Financial Institution:			
Business address:			
Date of Business's most recent financial statement:		☐ Attached	
Date of Business's most recent audited financial statement:		☐ Attached	
Financial indicators from the most recent financial statement			
Contractor's Current Ratio (Current Assets ÷ Current Liabilities)			
Contractor's Quick Ratio ((Cash and Cash Equivalents + Accounts Receivable + Short Term Investments) ÷ Current Liabilities)			

ARTICLE 6—SURETY INFORMATION

- 6.01 Provide information regarding the surety company that will issue required bonds on behalf of the Business, including but not limited to Performance and Payment Bonds.

Surety Name:			
Surety is a corporation organized and existing under the laws of the state of:			
Is surety authorized to provide surety bonds in the Project location?	☐ Yes ☐ No		
Is surety listed in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" published in Department Circular 570 (as amended) by the Bureau of the Fiscal Service, U.S. Department of the Treasury? ☐ Yes ☐ No			
Mailing Address (principal place of business):			
Physical Address (principal place of business):			
Phone (main):		Phone (claims):	

ARTICLE 7—INSURANCE

- 7.01 Provide information regarding Business's insurance company(s), including but not limited to its Commercial General Liability carrier. Provide information for each provider.

Name of insurance provider, and type of policy (CLE, auto, etc.):			
Insurance Provider		Type of Policy (Coverage Provided)	
Are providers licensed or authorized to issue policies in the Project location?		☐ Yes ☐ No	
Does provider have an A.M. Best Rating of A-VII or better?		☐ Yes ☐ No	
Mailing Address (principal place of business):			
Physical Address (principal place of business):			
Phone (main):		Phone (claims):	

ARTICLE 8—CONSTRUCTION EXPERIENCE

- 8.01 Provide information that will identify the overall size and capacity of the Business.

Average number of current full-time employees:	
Estimate of revenue for the current year:	
Estimate of revenue for the previous year:	

- 8.02 Provide information regarding the Business's previous contracting experience.

Years of experience with projects like the proposed project:				
As a general contractor:		As a joint venturer:		
Has Business, or a predecessor in interest, or an affiliate identified in Paragraph 1.03:				
Been disqualified as a bidder by any local, state, or federal agency within the last 5 years? ☐ Yes ☐ No				
Been barred from contracting by any local, state, or federal agency within the last 5 years? ☐ Yes ☐ No				
Been released from a bid in the past 5 years? ☐ Yes ☐ No				
Defaulted on a project or failed to complete any contract awarded to it? ☐ Yes ☐ No				

Refused to construct or refused to provide materials defined in the contract documents or in a change order? ☐ Yes ☐ No
Been a party to any currently pending litigation or arbitration? ☐ Yes ☐ No
Provide full details in a separate attachment if the response to any of these questions is Yes.

- 8.03 List all projects currently under contract in Schedule A and provide indicated information.
- 8.04 List a minimum of three and a maximum of six projects completed in the last 5 years in Schedule B and provide indicated information to demonstrate the Business's experience with projects similar in type and cost of construction.
- 8.05 In Schedule C, provide information on key individuals whom Business intends to assign to the Project. Provide resumes for those individuals included in Schedule C. Key individuals include the Project Manager, Project Superintendent, Quality Manager, and Safety Manager. Resumes may be provided for Business's key leaders as well.

ARTICLE 9—FEDERAL GRANT COMPLIANCE REPRESENTATIONS AND CERTIFICATIONS

- 9.01 By submission of this Statement of Qualifications, the Business hereby certifies, represents, and acknowledges that:
- A. EPA Clean Ports Program Compliance: The Business understands that this Project is funded in whole or in part by the U.S. Environmental Protection Agency (EPA) under the Clean Ports Program (CFDA 66.051) pursuant to the Inflation Reduction Act and is subject to all applicable federal statutes, regulations, and terms and conditions of EPA Assistance Agreement No. 00E04042.
 - B. Suspension and Debarment: Neither the Business nor any of its principals is presently suspended, debarred, proposed for debarment, declared ineligible, or voluntarily excluded from participation in federally assisted transactions, as defined in 2 CFR Part 180.
 - C. Build America, Buy America (BABA): The Business acknowledges that all iron, steel, manufactured products, and construction materials incorporated into the Project must comply with the Build America, Buy America Act requirements, unless a written waiver is approved by EPA. The Business agrees to comply with all BABA requirements and to ensure full flow-down to all subcontractors and suppliers.
 - D. Davis-Bacon and Related Acts (DBRA): The Business acknowledges that all construction activities funded under this Project are subject to the Davis-Bacon and Related Acts and agrees to comply with all applicable wage determinations, payroll reporting, and labor standards, including full flow-down to all subcontractors.
 - E. Workforce Qualifications – EV Infrastructure: The Business acknowledges that installation, operation, or maintenance of electric vehicle charging infrastructure under this Project must be performed by electricians certified under the Electric Vehicle Infrastructure Training Program (EVITP) or another EPA-approved equivalent program, and agrees to ensure compliance for all applicable work.

- F. Foreign Entity of Concern: The Business certifies that it is not owned by, controlled by, headquartered in, or subject to the direction of a foreign entity of concern as defined at 10 U.S.C. § 4872(d), and that no prohibited equipment or materials will be supplied under this Project.
- G. Audit, Access, and Records: The Business agrees to provide EPA, the EPA Office of Inspector General, the Comptroller General of the United States, and the Contracting Agency full access to records, personnel, and work sites related to this Project, and to retain all required records in accordance with 2 CFR § 200.334 and EPA grant conditions.
- H. Subcontractor Flow-Down: The Business agrees to incorporate all applicable federal grant requirements, including but not limited to BABA, DBRA, audit access, record retention, and eligibility restrictions, into all subcontracts and purchase orders at all tiers.
- I. Certification that the Bidder is not suspended or debarred from participation in federally assisted projects pursuant to 2 CFR Part 180, and is eligible for award.
- J. Certification that the Bidder has experience complying with Build America, Buy America (Pub. L. 117-58, §§ 70911-70917) and Davis-Bacon and Related Acts requirements applicable to federally funded infrastructure projects, or will comply upon award.
- K. Acknowledgment that the Bidder agrees to provide EPA, the Owner, and their authorized representatives access to records, personnel, and project sites as required under 2 CFR §§ 200.334–200.337

ARTICLE 10—REQUIRED ATTACHMENTS

10.01 Provide the following information with the Statement of Qualifications:

- A. If Business is a Joint Venture, separate Qualifications Statements for each Joint Venturer, as required in Paragraph 1.02.
- B. Diverse Business Certifications if required by Paragraph 3.01.
- C. Certification of Business's safety performance if required by Paragraph 4.02.
- D. Financial statements as required by Paragraph 5.01.
- E. Attachments providing additional information as required by Paragraph 8.02.
- F. Schedule A (Current Projects) as required by Paragraph 8.03.
- G. Schedule B (Previous Experience with Similar Projects) as required by Paragraph 8.04.
- H. Schedule C (Key Individuals) and resumes for the key individuals listed, as required by Paragraph 8.05.
- I. Additional items as pertinent.

This Statement of Qualifications is offered by:

Business:

(typed or printed name of organization)

By:

(individual's signature)

Name:

(typed or printed)

Title:

(typed or printed)

Date:

(date signed)

(If Business is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:

(individual's signature)

Name:

(typed or printed)

Title:

(typed or printed)

Address for giving notices:

Designated Representative:

Name:

(typed or printed)

Title:

(typed or printed)

Address:

Phone:

Email:

Schedule A – Current Projects

Name of Organization					
Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Schedule B – Previous Experience with Similar Projects

Name of Organization					
Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Schedule B – Previous Experience with Similar Projects

Name of Organization					
Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Project Owner			Project Name		
General Description of Project					
Project Cost			Date Project		
Key Project Personnel	Project Manager	Project Superintendent	Safety Manager	Quality Control Manager	
Name					
Reference Contact Information (listing names indicates approval to contacting the names individuals as a reference)					
	Name	Title/Position	Organization	Telephone	Email
Owner					
Designer					
Construction Manager					

Schedule C – Key Individuals

Project Manager			
Name of individual			
Years of experience as project manager			
Years of experience with this organization			
Number of similar projects as project manager			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	
Project Superintendent			
Name of individual			
Years of experience as project superintendent			
Years of experience with this organization			
Number of similar projects as project superintendent			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	

Candidate's role on project		Candidate's role on project	
-----------------------------	--	-----------------------------	--

Safety Manager			
Name of individual			
Years of experience as project manager			
Years of experience with this organization			
Number of similar projects as project manager			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	
Quality Control Manager			
Name of individual			
Years of experience as project superintendent			
Years of experience with this organization			
Number of similar projects as project superintendent			
Number of similar projects in other positions			
Current Project Assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference Contact Information (listing names indicates approval to contact named individuals as a reference)			
Name		Name	
Title/Position		Title/Position	
Organization		Organization	
Telephone		Telephone	

Email		Email	
Project		Project	
Candidate's role on project		Candidate's role on project	

SECTION 00 21 13

INSTRUCTIONS TO BIDDERS FOR CONSTRUCTION CONTRACT

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ARTICLE 1—DEFINED TERMS

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

- A. Issuing Office – The office from which the Bidding Documents are to be issued, and which registers plan holders.

ARTICLE 2—BIDDING DOCUMENTS

2.01 Bidder shall obtain a complete set of Bidding Requirements and proposed Contract Documents (together, the Bidding Documents). See the Agreement for a list of the Contract Documents. It is Bidder's responsibility to determine that it is using a complete set of documents in the preparation of a Bid. Bidder assumes sole responsibility for errors or misinterpretations resulting from the use of incomplete documents, by Bidder itself or by its prospective Subcontractors and Suppliers.

2.02 Bidding Documents are made available for the sole purpose of obtaining Bids for completion of the Project and permission to download or distribution of the Bidding Documents does not confer a license or grant permission or authorization for any other use. Authorization to download documents, or other distribution, includes the right for plan holders to print documents solely for their use, and the use of their prospective Subcontractors and Suppliers, provided the plan holder pays all costs associated with printing or reproduction. Printed documents may not be re-sold under any circumstances.

2.03 Owner has established a Bidding Documents Website as indicated in the Advertisement for Bids. Owner recommends that Bidder register as a plan holder with the Issuing Office at such website and obtain a complete set of the Bidding Documents from such website. Bidders may rely that sets of Bidding Documents obtained from the Bidding Documents Website are complete, unless an omission is blatant. Registered plan holders will receive Addenda issued by Owner.

Bidding Documents may be downloaded from: <https://portdetroit.com/category/bids-proposals/>. Bids received from Contractors other than those on the official plan holder's list will not be accepted.

2.04 Electronic Documents

- A. When the Bidding requirements indicate that electronic (digital) copies of the Bidding Documents are available, such documents will be made available to the Bidders as Electronic Documents in the manner specified.

1. Bidding Documents will be provided in PDF (Portable Document Format or .pdf) format. It is the intent of the Engineer and Owner that such Electronic Documents are to be exactly representative of the paper copies of the documents. However, because the Owner and Engineer cannot totally control the transmission and receipt of Electronic Documents nor the Contractor's

means of reproduction of such documents, the Owner and Engineer cannot and do not guarantee that Electronic Documents and reproductions prepared from those versions are identical in every manner to the paper copies.

B. Unless otherwise stated in the Bidding Documents, the Bidder may use and rely upon complete sets of Electronic Documents of the Bidding Documents, described in Paragraph 2.04.A above. However, Bidder assumes all risks associated with differences arising from transmission/receipt of Electronic Documents versions of Bidding Documents and reproductions prepared from those versions and, further, assumes all risks, costs, and responsibility associated with use of the Electronic Documents versions to derive information that is not explicitly contained in printed paper versions of the documents, and for Bidder's reliance upon such derived information.

C. After the Contract is awarded, the Owner will provide or direct the Engineer to provide for the use of the Contractor documents that were developed by Engineer as part of the Project design process, as Electronic Documents in native file formats.

1. Release of such documents will be solely for the convenience of the Contractor. No such document is a Contract Document.
2. Unless the Contract Documents explicitly identify that such information will be available to the Successful Bidder (Contractor), nothing herein will create an obligation on the part of the Owner or Engineer to provide or create such information, and the Contractor is not entitled to rely on the availability of such information in the preparation of its Bid or pricing of the Work. In all cases, the Contractor shall take appropriate measures to verify that any electronic/digital information provided in Electronic Documents is appropriate and adequate for the Contractor's specific purposes.
3. In no case will the Contractor be entitled to additional compensation or time for completion due to any differences between the actual Contract Documents and any related document in native file format.

ARTICLE 3—QUALIFICATIONS OF BIDDERS

3.01 Bidder is to submit the following information on Section 00 11 53, Qualifications Statement, with its Bid, to demonstrate Bidder's qualifications to perform the Work:

- A. Written evidence establishing its qualifications such as financial data, previous experience, and present commitments.
- B. A written statement that Bidder is authorized to do business in the state where the Project is located, or a written certification that Bidder will obtain such authority prior to the Effective Date of the Contract.
- C. Bidder's state or other contractor license number, if applicable.
- D. Subcontractor and Supplier qualification information.
- E. Other required information regarding qualifications.

3.02 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.

3.03 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.

ARTICLE 4—PRE-BID CONFERENCE

4.01 A non mandatory Pre-bid Conference and Inspection Tour will be held at the Harbor Master, located at Pleasure Drive, Detroit, MI 48207, on **September 17, 2026, at 11 A.M.** Representatives of Owner and Engineer will be present to discuss the Project. Bidders are encouraged to attend and participate in the conference; however, attendance at this conference is not required to submit a Bid. The Owner does not guarantee or represent that any existing construction or conditions conform to the Drawings. Bidder shall visit the site and satisfy themselves as to existing conditions. All necessary information shall be verified in the field before work begins. No claim for extra cost will be allowed by the Owner because of the Bidder's/Contractor's unfamiliarity with site conditions.

4.02 Information presented at the Pre-bid Conference does not alter the Contract Documents. Owner will issue Addenda to make any changes to the Contract Documents that result from discussions at the Pre-bid Conference or from questions that are formally submitted in accordance with Article 7 of these Instructions to Bidders. Information presented and statements made at the Pre-bid Conference will not be binding or legally effective unless incorporated in Addenda.

ARTICLE 5—SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER'S SAFETY PROGRAM; OTHER WORK AT THE SITE

5.01 Site and Other Areas

A. The Site is identified in the Bidding Documents. By definition, the Site includes rights-of-way, easements, and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.

5.02 Existing Site Conditions

A. Subsurface and Physical Conditions; Hazardous Environmental Conditions

1. The Supplementary Conditions identify the following regarding existing conditions at or adjacent to the Site:
 - a. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data.
 - b. Those drawings known to Owner of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data.

- c. Reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.
 - d. Technical Data contained in such reports and drawings.
 - 2. Owner will make copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, has been identified and established in the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any Technical Data or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.
 - 3. If the Supplementary Conditions do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply.
 - 4. *Geotechnical Baseline Report/Geotechnical Data Report*: The Bidding Documents contain a Geotechnical Baseline Report (GBR) and Geotechnical Data Report (GDR).
 - a. As set forth in the Supplementary Conditions, the GBR describes certain select subsurface conditions that are anticipated to be encountered by Contractor during construction in specified locations ("Baseline Conditions"). The GBR is a Contract Document.
 - b. The Baseline Conditions in the GBR are intended to reduce uncertainty and the degree of contingency in submitted Bids. However, Bidders cannot rely solely on the Baseline Conditions. Bids should be based on a comprehensive approach that includes an independent review and analysis of the GBR, all other Contract Documents, Technical Data, other available information, and observable surface conditions. Not all potential subsurface conditions are baselined.
 - c. Nothing in the GBR is intended to relieve Bidders of the responsibility to make their own determinations regarding construction costs, bidding strategies, and Bid prices, nor of the responsibility to select and be responsible for the means, methods, techniques, sequences, and procedures of construction, and for safety precautions and programs incident thereto.
 - d. As set forth in the Supplementary Conditions, the GDR is a Contract Document containing data prepared by or for the Owner in support of the GBR.
- B. Underground Facilities: Underground Facilities are shown or indicated on the Drawings and not on the Drawings referred to in Paragraph 5.03.A of these Instructions

to Bidders. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

5.03 Other Site-related Documents

A. The following other documents relating to conditions at or adjacent to the Site are known to Owner and made available to Bidders as Attachments to this Bid Package:

Attachment 1 Not applicable

If Site-related documents are not attached to this Invitation for Bid, the Owner will make available to any Bidder upon request.

B. Owner has not verified the contents of these other Site-related documents, and Bidder may not rely on the accuracy of any data or information in such documents. Bidder is responsible for any interpretation or conclusion Bidder draws from the other Site-related documents.

C. The other Site-related documents (listed above) are not part of the Contract Documents.

D. Bidders are encouraged to review the other Site-related documents, but Bidders will not be held accountable for any data or information in such documents. The requirement to review and take responsibility for documentary Site information is limited to information in (1) the Contract Documents and (2) the Technical Data.

5.04 Site Visit and Testing by Bidders

A. A Site visit is scheduled for **September 17, 2026, at 11 A.M., at the Harbor Master facility on Belle Isle**. Maps to the Site will be made available upon request.

B. Bidders visiting the Site are required to arrange their own transportation to the Site.

C. All access to the Site other than during a regularly scheduled Site visit must be coordinated through the Owner or Engineer contact as stated in Article 4. Bidder must conduct the required Site visit during normal working hours.

D. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.

E. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder general access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site. Bidder is responsible for establishing access needed to reach specific selected test sites.

F. Bidder must comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with

respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.

G. Bidder must fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

5.05 Owner's Safety Program

A. Site visits and work at the Site may be governed by an Owner safety program. If an Owner safety program exists, it will be noted in the Supplementary Conditions.

5.06 Other Work at the Site

A. Reference is made to Article 8 of the Supplementary Conditions for the identification of the general nature of other work of which Owner is aware (if any) that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) and relates to the Work contemplated by these Bidding Documents. If Owner is party to a written contract for such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other confidential matters), if any.

ARTICLE 6—BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

6.01 Express Representations and Certifications in Bid Form, Agreement

A. The Bid Form that each Bidder will submit contains express representations regarding the Bidder's examination of Project documentation, Site visit, preparation of the Bid, and certifications regarding lack of collusion or fraud in connection with the Bid. Bidder should review these representations and certifications and assure that Bidder can make the representations and certifications in good faith, before executing and submitting its Bid.

B. If Bidder is awarded the Contract, Bidder (as Contractor) will make similar express representations and certifications when it executes the Agreement.

6.02 Federal Grant Compliance Certification

A. By submitting a Bid, Bidder certifies that it understands and agrees that the Project is funded in part by EPA financial assistance under the Clean Ports Program and that:

1. All work shall comply with applicable EPA Assistance Agreement conditions;
2. No materials, equipment substitutions, or scope changes affecting federally funded elements may be made without prior written approval from the Owner and, where required, the EPA;
3. All federal requirements shall be flowed down to subcontractors of any tier;
4. Bidder agrees to comply with audit, record retention, and site access requirements under 2 CFR Part 200.

ARTICLE 7—INTERPRETATIONS AND ADDENDA

7.01 Owner on its own initiative may issue Addenda to clarify, correct, supplement, or change the Bidding Documents.

7.02 Bidder shall submit all questions about the meaning or intent of the Bidding Documents to rfp@portdetroit.com, not later than October 7, 2026, at 5 P.M. Eastern Time (ET). Answers along with questions (but not the identity of the questioner) will be emailed to registered firms and posted on the Port Authority website by 5 P.M. ET November 20, 2026.

7.03 Oral and other interpretations or clarifications will be without legal effect. Responses to questions are not part of the Contract Documents unless set forth in an Addendum that expressly modifies or supplements the Contract Documents.

ARTICLE 8—SUBSTITUTE AND “OR EQUAL” ITEMS

8.01 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration during the bidding and Contract award process of possible substitute or “or-equal” items. In cases in which the Contract allows the Contractor to request that Engineer authorize the use of a substitute or “or-equal” item of material or equipment, application for such acceptance may not be made to and will not be considered by Engineer until after the Effective Date of the Contract.

8.02 All prices that Bidder sets forth in its Bid will be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of “or-equal” or substitution requests are made at Bidder’s sole risk.

ARTICLE 9—SUBCONTRACTORS, SUPPLIERS, AND OTHERS

9.01 A Bidder must be prepared to retain specific Subcontractors and Suppliers for the performance of the Work if required to do so by the Bidding Documents or in the Specifications. If a prospective Bidder objects to retaining any such Subcontractor or Supplier and the concern is not relieved by an Addendum, then the prospective Bidder should refrain from submitting a Bid.

9.02 A Bidder must submit with their Bid a list of the Subcontractors or Suppliers proposed for performing Work, if required, on the project. This form is provided as Section 00 43 36, Tabulation of Subcontractors.

9.03 If requested by Owner, such list must be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor or Supplier. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor or Supplier, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case apparent Successful Bidder will submit a substitute, Bidder’s Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.

9.04 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors and Suppliers. Declining to make requested substitutions will constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor or Supplier, so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to subsequent revocation of such acceptance as provided in Paragraph 7.07 of the General Conditions.

ARTICLE 10—PREPARATION OF BID

10.01 The Bidder shall submit their Bid on the Bid Form which is included with the Bidding Documents. The Bid Form, Unit Price Bid Schedule, Bid Guaranty, forms, certifications, and documents constitute the Bid.

- A. All blanks on the Bid Form must be completed in ink and the Bid Form signed in ink. Erasures or alterations must be initialed and dated in ink by the person signing the Bid Form.
- B. All blank spaces for Bid prices in the Unit Price Bid Schedule shall be filled in with a unit price or a lump sum as applicable to the item. A Bid price must be indicated for each section, Bid item, alternate (if applicable), adjustment unit price item, and unit price item listed therein.
- C. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words “No Bid” or “Not Applicable.”
- D. The total amount of the Bid shall be obtained by adding the dollar amounts of the individual Bid items as shown in the Unit Price Bid Schedule.
- E. All words and figures shall be in ink or be type written. Bid prices of each item in the Unit Price Bid Schedule shall be stated in numbers.
 - 1. In the event that there is an error in the computed totals based upon the unit prices and estimated quantities, the unit prices shall govern.
 - 2. If erasures or changes appear in the Bid Form and the Unit Price Bid Schedule, each erasure or change shall be initialed and dated by the individual signing the Bid Form.

10.02 If Bidder has obtained the Bidding Documents as Electronic Documents, then Bidder shall prepare its Bid on a paper copy of the Bid Form printed from the Electronic Documents version of the Bidding Documents. The printed copy of the Bid Form must be clearly legible, printed on 8½ inch by 11-inch paper and as closely identical in appearance to the Electronic Document version of the Bid Form as may be practical. The Owner reserves the right to accept Bid Forms which nominally vary in appearance from the original paper version of the Bid Form, providing that all required information and submittals are included with the Bid.

10.03 A Bid by a corporation must be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation must be shown.

10.04 A Bid by a partnership must be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership must be shown.

10.05 A Bid by a limited liability company must be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm must be shown.

10.06 A Bid by an individual must show the Bidder's name and official address.

10.07 A Bid by a joint venture must be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture must have been formally established prior to submittal of a Bid, and the official address of the joint venture must be shown.

10.08 All names must be printed in ink below the signatures.

10.09 The Bid must contain an acknowledgment of receipt of all Addenda, the numbers of which must be filled in on the Bid Form.

10.10 Postal and e-mail addresses and telephone number for communications regarding the Bid must be shown.

10.11 The Bid must include a completed Section 00 11 53, Qualifications Statement, that shows evidence of Bidder's authority to do business in the state where the Project is located, or Bidder must certify in writing that it will obtain such authority within the time for acceptance of Bids and attach such certification to the Bid.

ARTICLE 11—BASIS OF BID

11.01 Lump Sum

A. Bidders must submit a Bid on a lump sum basis as set forth in the Unit Price Bid Schedule.

11.02 Unit Price

A. Bidders must submit a Bid on a unit price basis for each item of Work listed in the unit price section of the Unit Price Bid Schedule.

B. The "Bid Price" (sometimes referred to as the extended price) for each unit price Bid item will be the product of the "Estimated Quantity", which Owner or its representative has set forth in the Unit Price Bid Schedule, for the item and the corresponding "Bid Unit Price" offered by the Bidder. The total of all unit price Bid items will be the sum of these "Bid Prices"; such total will be used by Owner for Bid comparison purposes. The final quantities and Contract Price will be determined in accordance with Paragraph 13.03 of the General Conditions.

C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

ARTICLE 12—SUBMITTAL OF BID

12.01 A Bid must be received no later than the date and time prescribed and at the place indicated in the Advertisement for Bids and with all required documents.

12.02 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

ARTICLE 13—MODIFICATION AND WITHDRAWAL OF BID

13.01 An unopened Bid may be withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.

13.02 If a Bidder wishes to modify its Bid prior to the Bid Opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 15.01 and submit a new Bid prior to the date and time for the opening of Bids.

13.03 If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, the Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, the Bidder will be disqualified from further bidding on the Work.

ARTICLE 14—BIDS TO REMAIN SUBJECT TO ACCEPTANCE

14.01 All Bids will remain subject to acceptance for the period of time stated in Article 8 (above), but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 15—EVALUATION OF BIDS AND AWARD OF CONTRACT

15.01 Award of Contract

A. Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner also reserves the right to waive all minor Bid informalities not involving price, time, or changes in the Work.

B. Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible.

- C. If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, whether in the Bid itself or in a separate communication to Owner or Engineer, then Owner will reject the Bid as nonresponsive.
- D. If Owner awards the contract for the Work, such award will be to the responsible Bidder submitting the lowest responsive Bid.

15.02 Evaluation of Bids

- A. In evaluating Bids, Owner will consider whether the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.
- B. For the determination of the apparent low Bidder when unit price bids are submitted, Bids will be compared on the basis of the total of the products of the estimated quantity of each item and unit price Bid for that item, together with any lump sum items.

15.03 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.

15.04 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

ARTICLE 16—BONDS AND INSURANCE

16.01 Performance and Payment Bonds

- A. Article 6 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to Performance and Payment Bonds, other required bonds (if any), and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it must be accompanied by required bonds and insurance documentation.
- B. The successful Bidder shall provide a Performance Bond with a penal sum in the full amount of the Contract Price.
- C. The successful Bidder shall provide a Payment Bond with a penal sum in the full amount of the Contract Price.
- D. Article 8, Bid Security, of these Instructions to Bidders, addresses any requirements for providing Bid Bonds as part of the bidding process.
- E. For all insurance limit requirements, refer to Article 6 in Section 00 73 00, Supplementary Conditions.

16.02 Insurance

- A. The Contractor shall purchase and maintain, at their expense, all insurance required by the Contract.
- B. The **Detroit/Wayne County Port Authority; Detroit Police Harbor Master; and Foth Infrastructure & Environment, LLC** shall be listed as Additional Insureds.
- C. For all insurance limit requirements, refer to Article 6 in Section 00 73 00, Supplementary Conditions.

ARTICLE 17—SIGNING OF AGREEMENT

17.01 When Owner issues a Notice of Award to the Successful Bidder, it will be accompanied by the unexecuted counterpart of the Agreement along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder must execute and deliver the required number of counterparts of the Agreement and any bonds and insurance documentation required to be delivered by the Contract Documents to Owner. Within 10 days thereafter, Owner will deliver one fully executed counterpart of the Agreement to Successful Bidder, together with a PDF of the final contract Project Manual that includes all Contract Documents as stated in Paragraph 2.02 of the General Conditions.

ARTICLE 18—SALES AND USE TAXES

18.01 Supplies, materials, and equipment furnished as part of this Contract are exempt from state sales and use tax. Said taxes must not be included in the Bid. The Owner will provide a tax exemption number to the awarded Contractor. Refer to Paragraph SC-7.10 of the Supplementary Conditions for additional information.

18.02 All labor as part of this project complies with current prevailing state wage rates as well as the terms in the Pre-apprentice Summer Helper Agreement. In addition, the project is partially funded with federal funds from the USEPA Clean Ports Program and subject to federal Davis-Bacon Act minimum wage rates as determined by the U.S. Department of Labor including all regulations and requirements as stimulated by this funding authority. All Bids submitted should take these factors into consideration and be calculated accordingly. The project is also subject to the Buy American Act, 41 U.S.C. chapter 83.

ARTICLE 19—SCHEDULE

19.01 All work shall be completed by the Substantial Completion date no later than November 8, 2027, with final completion set for no later than November 30, 2027.

19.02 No exceptions will be made nor allowed if the Contractor fails to properly plan the procurement of all items in advance of the work. Late fees will be imposed if the construction is not done on time. Late fees will be deducted from the Contract via Change Order. Refer to Article 13 of the General Conditions.

ARTICLE 20—FEDERAL GRANT COMPLIANCE REQUIREMENTS

20.01 The Project is funded in part by the United States Environmental Protection Agency (EPA) under Assistance Agreement No. **5Y-00E04042** (Clean Ports Program). All Bidders, Contractors, and Subcontractors shall comply with all applicable federal statutes, regulations, executive orders, and grant conditions associated with this funding.

20.02 The successful Bidder shall certify compliance with the Build America, Buy America Act (Public Law 117-58, §§70911–70917). All iron, steel, manufactured products, and construction materials permanently incorporated into the Project shall be produced in the United States unless covered by an approved waiver.

The Bidder shall submit a BABA compliance certification prior to Notice of Award. Any request for a waiver must be submitted through the Owner and approved in writing by the EPA prior to incorporation of the affected material or product.

20.03 Bidders acknowledge that the Project is subject to the Davis-Bacon and Related Acts (40 U.S.C. §§ 3141–3148). The applicable U.S. Department of Labor wage determination is included in the Bidding Documents and shall govern all construction activities. Bidders shall include all costs associated with compliance with DBRA requirements in their Bid.

ARTICLE 21— WORKFORCE DEVELOPMENT REQUIREMENTS

21.01 As part of the Project's workforce development objectives, the Contractor shall participate in an on-site paid career exploration program designed to introduce entry-level individuals to careers in the electrical construction industry.

21.02 The program shall be implemented in partnership with the Southeastern Michigan Chapter of the National Electrical Contractors Association (SMC NECA), International Brotherhood of Electrical Workers Local Union 58 (IBEW Local 58), Management and Unions Serving Together (MUST), and the Detroit Electrical Industry Training Center (EITC).

21.03 The Contractor shall employ one qualified individual through the existing IBEW Local 58 Summer Helper Program. Employment shall be for a minimum period of ten (10) weeks and may include work on this Project and other projects performed by the Contractor within the region.

21.04 The Contractor shall comply with all requirements of the current SMC NECA and IBEW Local 58 Summer Helper Agreement.

21.05 Compensation for the Summer Helper participant shall include:

- A. First-punch wages of not less than \$26.64 per hour.
- B. Worker's Compensation coverage and all applicable federal, state, local, and collectively bargained benefits required under the Summer Helper Agreement.

21.06 The Contractor shall be eligible for reimbursement through the Summer Helper wage stipend program at a rate of \$18.00 per hour for up to 400 hours worked during the ten-week employment period, with total reimbursement not to exceed \$7,200.

21.07 The Contractor shall submit payroll reports and supporting documentation to MUST as required to obtain reimbursement under the wage stipend program.

21.08 Recruitment, screening, and placement of the Summer Helper participant shall be administered by the Detroit Electrical Industry Training Center (EITC) using its established application, screening, and placement procedures.

21.09 MUST shall provide the participant with a stipend of \$400 for eligible employment-related expenses in accordance with program requirements.

21.10 The Contractor shall cooperate with the Owner and workforce development partners in documenting participation in the program and supporting workforce development outcomes associated with the Project.

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SECTION 00 41 13

BID FORM FOR CONSTRUCTION CONTRACT

The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 1—OWNER AND BIDDER

1. This Bid is submitted to: **Detroit/Wayne County Port Authority, 130 E. Atwater Street, Detroit, MI 48226**
2. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2—ATTACHMENTS TO THIS BID

The following documents are submitted with and made a condition of this Bid:

- i. Required Bid security;
- ii. List of Proposed Subcontractors;
- iii. List of Proposed Suppliers;
- iv. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such authority within the time for acceptance of Bids;
- v. Contractor's license number as evidence of Bidder's State Contractor's License or a covenant by Bidder to obtain said license within the time for acceptance of Bids;
- vi. Required Bidder Qualification Statement with supporting data; and
- vii. Workforce Development Program Acknowledgement.

ARTICLE 3—BASIS OF BID—LUMP SUM BID AND UNIT PRICES

3.01 Lump Sum Bids

- A. Bidder will complete the Work in accordance with the Contract Documents for the following lump sum (stipulated) price(s), together with any Unit Prices indicated in Paragraph 3.02:

1. Lump Sum Price (Single Lump Sum)

Lump Sum Bid Price	\$
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2. Lump Sum Price (Base Bid and Alternates)

Lump Sum Bid Price for Base Bid	\$
Alternate A [Add] [Deduct]	\$
Alternate B [Add] [Deduct]	\$

- B. All specified cash allowance(s) are included in the price(s) set forth below, and have been computed in accordance with Paragraph 13.02 of the General Conditions.

Lump Sum for Cash Allowance 1	\$
Lump Sum for Cash Allowance 2	\$
Lump Sum for Cash Allowance 3	\$
Total for all Lump Sum for Cash Allowances	\$

- C. All specified contingency allowances are included in the price(s) set forth below, and have been computed in accordance with Paragraph 13.02 of the General Conditions.

Lump Sum Contingency Allowance 1	\$
Lump Sum Contingency Allowance 2	\$
Lump Sum Contingency Allowance 3	\$
Total for all Lump Sum Contingency Allowances	\$

3.02 *Total Bid Price (Lump Sum and Unit Prices)*

Total Bid Price (Total of all Lump Sum and Unit Price Bids)	\$
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ARTICLE 4—TIME OF COMPLETION

- 4.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.
- 4.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 5—BIDDER’S ACKNOWLEDGEMENTS: ACCEPTANCE PERIOD, INSTRUCTIONS, AND RECEIPT OF ADDENDA

5.01 *Bid Acceptance Period*

- A. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

5.02 *Instructions to Bidders*

- A. Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security.

5.03 *Receipt of Addenda*

- A. Bidder hereby acknowledges receipt of the following Addenda: **[Add rows as needed. Bidder is to complete table.]**

Addendum Number	Addendum Date

ARTICLE 6—BIDDER’S REPRESENTATIONS AND CERTIFICATIONS

6.01 Bidder’s Representations

- A. In submitting this Bid, Bidder represents the following:
1. Bidder has examined and carefully studied the Bidding Documents, including Addenda.
 2. Bidder has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
 3. Bidder is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
 4. Bidder has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.
 5. Bidder has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.
 6. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, if selected as Contractor; and (c) Bidder’s (Contractor’s) safety precautions and programs.
 7. Based on the information and observations referred to in the preceding paragraph, Bidder agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the

Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.

8. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
9. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
10. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
11. The submission of this Bid constitutes an incontrovertible representation by Bidder that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

6.02 *Bidder's Certifications*

A. The Bidder certifies the following:

1. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation.
2. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.
3. Bidder has not solicited or induced any individual or entity to refrain from bidding.
4. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 8.02.A:
 - a. Corrupt practice means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process.
 - b. Fraudulent practice means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition.
 - c. Collusive practice means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels.

- d. Coercive practice means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

BIDDER hereby submits this Bid as set forth above:

Bidder:

(typed or printed name of organization)

By:

(individual's signature)

Name:

(typed or printed)

Title:

(typed or printed)

Date:

(typed or printed)

If Bidder is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.

Attest:

(individual's signature)

Name:

(typed or printed)

Title:

(typed or printed)

Date:

(typed or printed)

Address for giving notices:

Bidder's Contact:

Name:

(typed or printed)

Title:

(typed or printed)

Phone:

Email:

Address:

Bidder's Contractor License No.: (if applicable)

SECTION 00 41 43
UNIT PRICE BID SCHEDULE

Item No.	Description	Unit	Estimated Quantity	Bid Unit Price	Extension
1					\$0
2					\$0
3					\$0
4					\$0
5					\$0
6					\$0
7					\$0
8					\$0
9					\$0
10					\$0
11					\$0
12					\$0
13					\$0
14					\$0
15					\$0
16					\$0
17					\$0
18					\$0
19					\$0
20					\$0

Item No.	Description	Unit	Estimated Quantity	Bid Unit Price	Extension
21					\$0
22					\$0
23					\$0
24					\$0
Total Unit Price Bid (Items 1 XX) =					\$0

ALTERNATE BID ITEMS

A1					\$0
A2					\$0

SECTION 00 43 13

BID BOND (PENAL SUM FORM)

Bidder Name: [Full formal name of Bidder] Address (<i>principal place of business</i>): [Address of Bidder's principal place of business]	Surety Name: [Full formal name of Surety] Address (<i>principal place of business</i>): [Address of Surety's principal place of business]
Owner Name: [Full formal name of Owner] Address (<i>principal place of business</i>): [Address of Owner's principal place of business]	Bid Project (<i>name and location</i>): [Owner project/contract name, and location of the project] Bid Due Date: [Enter date bid is due]
Bond Penal Sum: [Amount] Date of Bond: [Date]	
Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth in this Bid Bond, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.	
Bidder	Surety
_____ <i>(Full formal name of Bidder)</i>	_____ <i>(Full formal name of Surety) (corporate seal)</i>
By: _____ <i>(Signature)</i>	By: _____ <i>(Signature) (Attach Power of Attorney)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
Attest: _____ <i>(Signature)</i>	Attest: _____ <i>(Signature)</i>
Name: _____ <i>(Printed or typed)</i>	Name: _____ <i>(Printed or typed)</i>
Title: _____	Title: _____
<i>Notes: (1) Note: Addresses are to be used for giving any required notice. (2) Provide execution by any additional parties, such as joint venturers, if necessary.</i>	

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond will be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder occurs upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation will be null and void if:
 - 3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
 - 3.2. All Bids are rejected by Owner, or
 - 3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions does not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.
6. No suit or action will be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety, and in no case later than one year after the Bid due date.
7. Any suit or action under this Bond will be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder must be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Postal Service registered or certified mail, return receipt requested, postage pre-paid, and will be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond will be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute governs and the remainder of this Bond that is not in conflict therewith continues in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

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SECTION 01 11 00

SUMMARY OF WORK

PART 1 - GENERAL

SUMMARY

Section Includes

1. References
2. Specification Formats and Conventions
3. Work Covered by the Contract Documents
4. Work Under Other Contracts
5. Products Ordered in Advance
6. Owner-Furnished Products
7. Use of Premises
8. Owner's Occupancy Requirements
9. Work Restrictions
10. Project Utility Sources
11. Miscellaneous Provisions

1.0 REFERENCES

A. Definitions

1. Basic Contract definitions and terminology are included in the General Conditions of the Contract and the Supplementary Conditions.
2. The term "approved," when used to convey Engineer's action on Contractor's submittals, applications, and requests, is limited to Engineer's duties and responsibilities as stated in the General Conditions of the Contract.
3. The term "regulations" 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.

B. Industry Standards

1. Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
2. Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.

3. If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement.
4. The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements.
5. Each section of the specifications generally includes a list of reference standards normally referred to in that respective section. The purpose of this list is to furnish the Contractor with a list of standards normally used for outlining the quality control desired on the project. The lists are not intended to be complete or all inclusive, but only a general reference of standards that are regularly referred to.
6. Each entity engaged in construction on the Project shall be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents. Where copies of standards are needed to perform a required construction activity, obtain copies directly from the publication source and make them available on request.

2.0 SPECIFICATION FORMATS AND CONVENTIONS

- A. The Specifications are organized into Divisions and Sections using the 49-division format and The Construction Specifications Institute "MasterFormat" 2018 Edition Numbering and Titles.
- B. The Specifications use section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.
- C. General and Supplementary Conditions of the Contract apply to all Specification Sections.
- D. Sections in Division 01 govern the execution of the Work of all Sections in the Specifications.
- E. Project Identification
 1. Project Name: EV Charging Station Construction Services
 2. Project Location: Detroit Police Harbor Master, Belle Isle, Detroit, MI
 3. Owner: Detroit/Wayne County Port Authority
 4. Engineer: Progressive

5. Work will be performed under the following prime contracts:
 - a. Contract: EV Charging Station Construction Services

3.0 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work includes: The installation of EV Charging Stations that will support material handling and operational logistics at the Detroit Harbor Master partner terminal.

1. Contract Work

- a. Excavation and grading
 - b. Trenching for wires/cables
 - c. Installation of foundation
 - d. Installing and connecting charging stations
 - e. Wiring and securing cables
 - f. Site restoration

4.0 WORK UNDER OTHER CONTRACTS

- A. General

1. Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract.
 2. Coordinate the Work of this Contract with work performed under separate contracts.

- B. Preceding Work

1. None

- C. Concurrent Work

1. The following operations will be conducted simultaneously with the work under this Contract.
 2. A separate contract has been awarded to InCharge for the supply and delivery of EV charging stations

- D. Future Work

1. The contract with InCharge includes the following additional work to be performed at site after Substantial Completion.
 2. Completion of the following work will depend on successful completion of preparatory work under this Contract.

- a. A separate contract has been awarded to InCharge for charging station remote connection assistance, start-up, and testing.
3. Avoid encroachment of areas designated for future work.
4. Provide for connections to future work.

5.0 PRODUCTS ORDERED IN ADVANCE

A. General

1. Owner has negotiated Purchase Orders with suppliers of material and equipment to be incorporated into the Work.
2. Owner will assign these Purchase Orders to Contractor.
3. Costs for receiving, handling, storage if required, and installation of material and equipment are included in the Contract Sum.
4. Contractor's responsibilities are same as if Contractor had negotiated Purchase Orders, including responsibility to renegotiate purchase and to execute final Purchase-Order agreements.

B. List of Products Ordered in Advance:

1. Two (2) EV charging stations

6.0 OWNER-FURNISHED PRODUCTS

A. Owner will furnish the products indicated for installation by the Contractor.

1. The Contractor's Work includes providing support systems to receive Owner's equipment.
2. Owner will arrange for and deliver Shop Drawings and Product Data to Contractor. Contractor shall review Shop Drawings and Product Data and communicate any discrepancies or anticipated problems in use of product to Owner and Engineer.
3. Owner will arrange and pay for delivery of Owner-furnished items according to the agreed upon times in the Contractor's Construction Schedule, if applicable.
4. After delivery, Owner will inspect delivered items for damage. Contractor shall be present for and assist in Owner's inspection.
5. If Owner-furnished items are damaged, defective or missing, Owner will arrange for replacement.
6. Owner will arrange for manufacturer's field services and for delivery of manufacturer's warranties to Contractor.
7. Owner will furnish Contractor the earliest possible delivery date for Owner-furnished products. Using Owner-furnished earliest possible delivery dates, Contractor shall designate delivery dates of Owner-furnished items in Contractor's Construction Schedule.
8. Contractor is responsible for receiving, unloading, and handling Owner-furnished items at Project site.

9. Contractor is responsible for protecting Owner-furnished items from damage during storage and handling, including damage from exposure to the elements.
10. If Owner-furnished items are damaged as a result of Contractor's operations, Contractor shall repair or replace them.

B. Owner-Furnished Products:

1. EV Charging Stations (2)

7.0 USE OF PREMISES

A. General

1. Contractor shall have full use of the premises for construction operations, including use of the Project Site, as allowed by law, ordinances, permits, easement agreements and the Contract Documents.
2. Contractor's use of premises is limited only by Owner's right to perform work or to retain other contractors on portions of the Project.
3. The Project Site is limited to property boundaries, rights-of-way, easements and other areas designated in the Contract Documents.
4. Provide protection and safekeeping of material and products stored on or off the premises.
5. Move any stored material or products which interfere with operations of Owner or other Contractors.

B. Use of the Site

1. Limit use of premises to work areas indicated.
2. Do not disturb portions of Project site beyond areas in which the Work is indicated.
3. Limits
 - a. confine constructions operations to – See Drawing Set
4. Allow for Owner occupancy of Project site and use by the public.
5. Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

C. Use of Existing Building

1. Maintain existing building in a weathertight condition throughout construction period.
2. Repair damage caused by construction operations.
3. Protect building and its occupants during construction period.

8.0 OWNER'S OCCUPANCY REQUIREMENTS

A. Full Owner Occupancy

1. Owner will occupy site and buildings during entire construction period.
2. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage.
3. Perform the Work so as not to interfere with Owner's day-to-day operations and activities of other contractors.
4. Maintain existing exits, unless otherwise indicated.
 - a. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
 - b. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
 - c. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

B. Owner Occupancy of Completed Areas of Construction

1. Owner reserves the right to occupy and to place and install equipment in completed work areas, before Substantial Completion, provided such occupancy does not interfere with completion of the Work.
2. Such placement of equipment and partial occupancy shall not constitute acceptance of the total Work.
 - a. Follow procedure for Substantial Completion for each specific portion of the Work to be occupied before Owner occupancy.
 - b. Upon completion, Owner will operate and maintain electrical systems serving the site.
 - c. Upon completion, Owner will assume responsibility for maintenance and custodial service for the site.
3. Schedule early completion of designated areas for Owner's usage prior to Substantial Completion of entire project.

9.0 WORK RESTRICTIONS

A. On-Site Work Hours

1. Work shall be generally performed inside the existing building during normal business working hours of 8 A.M. to 5 P.M., Monday through Friday, except otherwise indicated.
 - a. Weekend Hours: Not allowed without coordinating with the Detroit Harbor Master and obtaining any required permitting
 - b. Early Morning Hours: Not allowed without coordinating with the Detroit Harbor Master and obtaining any required permitting
 - c. Hours for Utility Shutdowns: Coordinate with the Detroit Harbor Master

B. Existing Utility Interruptions

- a. 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:
- b. Notify Owner not less than two (2) working days in advance of proposed utility interruptions.
- c. Do not proceed with utility interruptions without Owner's written permission.

C. Easements

- a. Owner will provide easements for construction outside road right-of-way and outside Owner owned property.
- b. Work on easements shall be in strict compliance with the terms of the easements agreements.
- c. Owner, easement grantee, Contractor, and Engineer shall be in full agreement with the method of execution prior to beginning work.
 - 1) Remove only structures, trees, shrubs, and other obstructions as mutually agreed.
 - 2) Restore to original condition or better condition or the conditions of the agreement.

10. PROJECT UTILITY SOURCES

- a. Utility contact information will be provided prior to start of work and following contract award

11.0 MISCELLANEOUS PROVISIONS

- a. None

PART 1 - PRODUCTS (NOT USED)

PART 2 - EXECUTION (NOT USED)

END OF SECTION

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SECTION 01 22 00

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

SUMMARY

- A. All terms of payment will be negotiated during contracting.

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SECTION 01 3000 ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Administrative requirements.

1.02 RELATED REQUIREMENTS

- A. Section 01 6000 - Product Requirements: General product requirements.
- B. Section 01 7700 - Closeout Procedures: Contracted Construction Professional Spec Term's administrative and procedural requirements for contract closeout.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Comply with requirements of Section 01 7000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.
- B. Make the following types of submittals to Architect:
 - 1. Requests for Interpretation (RFI).
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Manufacturer's instructions and field reports.
 - 6. Applications for payment and change order requests.
 - 7. Progress schedules.
 - 8. Correction Punch List and Final Correction Punch List for Substantial Completion.
 - 9. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

END OF SECTION

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SECTION 01 3219 SUBMITTALS SCHEDULE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Submittal schedule.

1.02 SUBMITTALS

- A. Within 10 days after date of Agreement, submit submittal schedule.
- B. Within 10 days after joint review, submit complete schedule.
- C. Submit updated schedule with each Application for Payment.
- D. Submit in PDF format.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify each item by specification section number.
- C. Provide separate schedule of submittal dates for shop drawings, product data, and samples, and dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes.
- D. Indicate delivery dates for owner-furnished products.

3.02 REVIEW AND EVALUATION OF SCHEDULE

- A. Participate in joint review and evaluation of schedule with Architect at each submittal.

3.03 UPDATING SCHEDULE

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.

3.04 DISTRIBUTION OF SCHEDULE

- A. Distribute copies of updated schedules to Contractor's project site file, to subcontractors, suppliers, Architect, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

END OF SECTION

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SECTION 01 3250 REQUESTS FOR INTERPRETATION

PART 1 GENERAL

1.01 SUMMARY

- A. Section describes requirements and procedures for RFIs.

1.02 SECTION INCLUDES

- A. Definitions.
- B. Timing of RFI submittals.
- C. RFI preparation.
- D. Reason for RFI.
- E. RFI content.
- F. Attachments
- G. RFI Log.
- H. Review time.
- I. Responses.

1.03 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements for general administrative requirements and procedures.
- B. Section 01 3300 - Submittal Procedures for submittal requirements and procedures.

1.04 DEFINITIONS

- A. Request For Information (hereinafter referred to as an RFI): A request seeking information
- B. Request For Interpretation (hereinafter referred to as an RFI): A request seeking one of the following:
 - 1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently in more than one place in Contract Documents.
 - 2. A resolution to an issue which has arisen due to field conditions and affects design intent.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 TIMING OF RFI SUBMITTALS

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

3.02 RFI PREPARATION

- A. Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
 - 1. Prepare a separate RFI for each specific item.
 - a. Review, coordinate, and comment on requests originating with Subcontractors and/or materials suppliers. Do not forward requests which solely require internal coordination between Subcontractors.
 - b. Do not forward requests which solely require internal coordination between Subcontractors.
 - 2. Prepare in a format and with content acceptable to Owner.

3.03 REASON FOR RFI

- A. Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
 - 1. Include in each request Contracted Construction Professional Spec Term's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.
 - 2. Unacceptable Uses for RFIs: Do not use RFIs to request the following:

SECTION 01 3250 REQUESTS FOR INTERPRETATION

- a. Approval of submittals (use procedures specified elsewhere in this section). Approval of substitutions (see Section - 01 6000-Product Requirements) Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract). Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
- b. Approval of substitutions. See Section 01 2500 - Substitution Procedures.
- c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
- d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
3. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.
4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, Contract Documents, with no additional input required to clarify the question. They will be returned without a response, with an explanatory notation.
 - a. The Owner reserves the right to assess the Contracted Construction Professional Spec Term for the costs (on time-and-materials basis) incurred by the Architect, and any of its consultants, due to processing of such RFIs.

3.04 RFI CONTENT

- A. Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
 1. Official Project name and number , and any additional required identifiers established in Contract Documents.
 2. Owner 's, Architect's, and Contracted Construction Professional Spec Term's names.
 3. Discrete and consecutive RFI number, and descriptive subject/title.
 4. Issue date, and requested reply date.
 5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
 6. Annotations: Field dimensions and/or description of conditions which have engendered the request.

3.05 ATTACHMENTS

- A. Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.

3.06 RFI LOG

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

3.07 REVIEW TIME

- A. Architect will respond and return RFIs to Contracted Construction Professional Spec Term within eight consecutive calendar days of receipt.
- B. RFIs received after 12:00 noon on will be considered as having been received on the following regular working day.
- C. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.

3.08 RESPONSES

- A. Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contracted Construction Professional Spec Term's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.

SECTION 01 3250 REQUESTS FOR INTERPRETATION

1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered. Issue an amended RFI immediately and identify with an "R " suffix to the original number.
2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically noted to that effect in the response.
3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
4. Notify Architect within eight consecutive calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

END OF SECTION

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SECTION 01 3300 SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 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.

1.02 SUMMARY

- A. Section includes administrative and procedural requirements for submittals:
 - 1. Progress Schedule
 - 2. Schedule of Shop Drawings and Sample Submittals
 - 3. Shop Drawings
 - 4. Samples
 - 5. Quality Assurance and Quality Control Submittals

1.03 SUBMITTAL PROCEDURES

- A. Make submittals promptly in accordance with approved schedule, and in such sequence as to cause no delay in the Work or in the work of any other contractor.
 - 1. All complete submittals shall be submitted sufficiently in advance of construction requirements to provide no less than 5 days, excluding Saturdays, Sundays and legal holidays for review from the time received at the Owner's Engineer's reviewing office. For submittals of major equipment that require more than 5 days to review, due to its sheer complexity and amount of detail and also requiring review by more than one engineering discipline, a letter will be sent by the Engineer, or their designee, to the Contractor informing them of the circumstances and the date the submittal is expected to be returned to the Contractor.
 - 2. Unless otherwise stated in the respective Specifications Sections, shop drawings and product data shall be submitted digitally as a PDF.
 - 3. Submittal Content
 - a. The date of submission and the dates of any previous submissions.
 - b. The Project title and number.
 - c. Contractor identification.
 - d. The names of:
 - 1) Contractor
 - 2) Supplier
 - 3) Manufacturer
 - e. Identification of the product, with the specification section number, page and paragraph(s)
 - f. Field dimensions clearly identified as such.
 - g. Relation to adjacent or critical features of the Work or materials.
 - h. Applicable standards, such as ASTM or Federal Specification numbers.
 - i. Identification of deviations from Contract Documents.
 - j. Identification of revisions on resubmittals.
 - k. An 8-inch x 3-inch blank space for Contractor and Owner's Engineer's stamps.
 - l. Each submittal shall be stamped by the Contractor indicating that submittal was reviewed for conformance with the Contract Documents. The Engineer will not accept unstamped submittals.
 - m. Each shipment of drawings shall be accompanied by a transmittal form furnished by the Owner's Engineer giving a list of the drawing numbers and the names mentioned above.
- B. Submittal Transmittal
 - 1. Package each submittal appropriately for transmittal and handling. Transmit each submittal to the Engineer. The Engineer will not accept submittals received from sources other than the Contractor.
 - 2. On the transmittal, record relevant information and requests for Engineer action. On a form, or separate sheet, record deviations from Contract Document requirements, including variations, limitations, and justification. Include Contractor's certification that information complies with Contract Document requirements.

1.04 SUBMITTALS

- A. Submittal Register

SECTION 01 3300 SUBMITTAL PROCEDURES

1. The Contractor shall provide a complete list of all submittals included in the technical specifications for use as a submittal register to track the dates for submission, comment, resubmission and final acceptance of the project submittals.
- B. Progress Schedule
 1. The Contractor shall provide a construction schedule at the Pre-construction Conference or as otherwise deemed necessary. If changes are authorized that result in contract time changes, the Contractor shall submit a modified chart for approval by the Engineer.
- C. Work Plan Submission to State Enhanced Remedy (SER) Project Manager shall include the following:
 1. Contractor's Work Plan
 2. Site Specific QA/QC Plan
 3. Health and Safety Plan

1.05 CONTRACTOR'S RESPONSIBILITIES

- A. The Contractor shall review product data, including those by subcontractors, prior to submission to determine and verify the following:
- B. Field measurements
- C. Field construction criteria
- D. Catalog numbers and similar data
- E. Conformance with the Specifications
 1. Each submittal shall have affixed to it the following Certification Statement including the Contractor's Company name and signed by the Contractor. Certification Statement: "By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data, and I have checked and coordinated each item with other applicable approved submittals and all Contract requirements." Submittals and product data sheets 11 inch x 17 inch and smaller shall be bound together in an orderly fashion and bear the above Certification Statement on the cover sheet. The cover sheet shall fully describe the packaged data and include a listing of all items within the package. Provide to the Owner's Representative a copy of each submittal transmittal form for product data and samples at the time of submittal of said product data and samples to the Owner's Representative.
 - a. Submittals received "WITHOUT" Certification Statement will not be reviewed.
 2. If a submittal shows any deviation from the requirements of the Contract Documents, the Contractor shall make specific mention of the deviations in the submittal which shall detail same furnished by the Contractor to the Owner's Representative and provide a description of the deviations in detail which shall include all attachments and materials supporting the Contractor's request for deviating from the project Plans and Specifications.
 3. The review and acceptance of samples or product data by the Owner's Representative shall not relieve the Contractor from their responsibility with regard to the fulfillment of the terms of the Contract. All risks of error and omission are assumed by the Contractor, and the Owner's Representative will not have responsibility thereto.
 4. No portion of the work requiring a submittal shall be started whatsoever nor shall any materials be fabricated, placed or installed prior to the acceptance or qualified acceptance of such item. Fabrication performed, materials purchased, or on-site construction accomplished which does not conform to accepted submittals and data shall be at the Contractor's risk. The Owner will not be liable for any expense or delay due to corrections or remedies required to accomplish written conformity prior to any get ready costs, fabrication, installation or if required by Owner, removal of said work.
 5. Project work, materials, fabrication, and installation shall conform with approved applicable samples and product data.
 - a. Manufacturer's printed installation instructions, a part of product data submitted to the Owner's Representative will not be reviewed and are for informational purposes only.

SECTION 01 3300 SUBMITTAL PROCEDURES

1.06 REVIEW OF SHOP DRAWINGS, PRODUCT DATA, WORKING DRAWINGS AND SAMPLES

- A. The Owner's Representative's review is for general conformance with the design concept and contract drawings. Markings or comments shall not be construed as relieving the Contractor from compliance with the contract plans and specifications or from departures therefrom. The Contractor remains solely responsible for details and accuracy, for coordinating the work with all other associated work and trades, for selecting fabrication processes, for techniques of assembly, and for performing work in a safe manner.
- B. The review of shop drawings, data, and samples will be general. They shall not be construed:
 - 1. as permitting or allowing any departure from the Contract requirements.
 - 2. as relieving the Contractor of responsibility for any errors, including details, dimensions, and materials.
 - 3. as approving departures from details furnished by the Owner's Representative, except as otherwise provided herein.
- C. If the shop drawings, data or samples as submitted describe variations and show a departure from the Contract requirement which the Owner's Representative finds to be in the interest of the Owner and to be so minor as not to involve a change in Contract Price or time for performance, the Owner's Representative may return the reviewed drawings without noting an exception nevertheless not relieving the Contractor for any and all departures from the issued plans and specifications.
- D. One (maximum) copy of shop drawings or product data will be returned to the Contractor.
- E. Submittals will be returned to the Contractor under one of the action codes indicated and defined on the transmittal form furnished by the Owner's Representative.
- F. Resubmittals will be handled in the same manner as first submittals. The Contractor shall direct specific attention, in writing, on the letter of transmittal and on resubmitted shop drawings by use of revision triangles or other similar methods, to revisions other than the corrections requested by the Owner's Representative, on previous submissions. Any such revisions which are not clearly identified shall be made at the risk of the Contractor. The Contractor shall make corrections to any work done because of this type of revision that is not in accordance to the Contract Documents as may be required by the Owner's Representative.
- G. Partial submittals may not be reviewed. The Owner's Representative will be the only judge as to the completeness of a submittal. Submittals not complete will be returned to the Contractor and will be considered "Rejected" until resubmitted. The Owner's Representative may at his option provide a list or mark the submittal directing the Contractor to the areas that are incomplete.
- H. If the Contractor considers any correction indicated on the shop drawings to constitute a change to the Contract Documents the Contractor shall give written notice thereof to the Owner's Representative at least 7 working days prior to release for manufacture.
- I. When the shop drawings have been completed to the satisfaction of the Owner's Representative, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Owner's Representative. Shop drawings shall be stamped by a Professional Engineer registered in the State of the project when noted herein or as required by statute.

1.07 GENERAL PROCEDURES FOR SUBMITTALS

- A. Coordination of Submittal Times
 - 1. Prepare and transmit each submittal sufficiently in advance of performing the related work or other applicable activities, or within the time specified in the individual work sections of the Specifications so that the installation will not be delayed by processing times including disapproval resubmittal (if required), coordination with other submittals, inspection, testing (off-site and on-site), purchasing, fabrication, delivery and similar sequenced activities. No extension of time will be authorized because of the Contractor's failure to transmit submittals sufficiently in advance of the Work.
- B. Submittal Requirements

SECTION 01 3300 SUBMITTAL PROCEDURES

1. Failure to meet Submittal requirements to the satisfaction of the Engineer will constitute unsatisfactory performance of the work in accordance with the Contract Documents, therefore, the Engineer may recommend to the Owner that all or a portion of payments requested during the corresponding pay period be withheld until these requirements are met.
2. Detailed submittal requirements are specified in the technical specifications section.

1.08 CERTIFICATION FORMS

- A. If specified in other sections of these Specifications, the Contractor shall submit the applicable certification form for each item required and the form (attached to this Specification) completely filled in and stamped.

1.09 PRECONSTRUCTION SUBMITTALS

- A. At a minimum, the following submittals shall be provided in sufficient time to support the scheduled date for mobilization:
 1. Certificates of Liability Insurance
 2. List of proposed subcontractors
 3. List of proposed products and equipment. This includes, but is not limited to, the detailed requirements and items including, but not limited to materials and methods as set forth in the project plans and specifications.
 4. Construction progress schedule
 5. Submittal register
 6. All planning documents referenced in other sections.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

CERTIFICATE OF DESIGN

THE UNDERSIGNED HEREBY CERTIFIES THAT HE/SHE IS A PROFESSIONAL ENGINEER (P.E.) REGISTERED IN THE STATE OF _____ AND THAT HE/SHE HAS BEEN EMPLOYED BY (NAME OF CONTRACTOR) _____

_____ TO DESIGN
_____ IN ACCORDANCE WITH
SPECIFICATIONS SECTION _____ FOR THE (NAME OF PROJECT) _____

_____ THE UNDERSIGNED FURTHER CERTIFIES THAT HE/SHE HAS PERFORMED SIMILAR DESIGNS PREVIOUSLY AND HAS PERFORMED THE DESIGN OF THE _____; THAT SAID DESIGN IS IN CONFORMANCE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL CODES, RULES, AND REGULATIONS AND PROFESSIONAL PRACTICE STANDARDS; THAT HIS/HER SIGNATURE AND P.E. STAMP HAVE BEEN AFFIXED TO ALL CALCULATIONS AND DRAWINGS USED IN, AND RESULTING FROM, THE DESIGN; AND THAT THE USE OF THAT STAMP SIGNIFIES THE RESPONSIBILITY OF THE UNDERSIGNED FOR THAT DESIGN.

THE UNDERSIGNED HEREBY CERTIFIES THAT HE/SHE HAS PROFESSIONAL LIABILITY INSURANCE OR WILL BE COVERED BY AN EMPLOYER POLICY WITH LIMITS OF \$1,000,000.00 AND A CERTIFICATE OF INSURANCE IS ATTACHED.

THE UNDERSIGNED HEREBY AGREES TO MAKE ALL ORIGINAL DESIGN DRAWINGS AND CALCULATIONS AVAILABLE TO THE OWNERS REPRESENTATIVE WITH SEVEN (7) DAYS FOLLOWING WRITTEN REQUEST THEREFORE BY THE OWNER.

P.E. NAME CONTRACTOR'S NAME

SIGNATURE SIGNATURE

TITLE TITLE

ADDRESS ADDRESS

SECTION 01 35 43

ENVIRONMENTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. The Contractor shall furnish all labor, equipment, and materials required to ensure environmental procedures are adhered to during and as the result of construction operations under this Contract except for those measures set forth in other provisions of the Contract Plans and Specifications.
- B. Environmental protection requires consideration of air, water, and land. Where applicable, may also include monitoring and abatement of odors generated during sediment excavation and storage.

1.2 REFERENCES

- A. The publications listed below are incorporated into these Technical Specifications by reference. The publications are referred to in the text by basic designation only.

1. U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

33 CFR 328	Definitions
40 CFR 68	Chemical Accident Prevention Provisions
40 CFR 129	Toxic Pollutant Effluent Standards
40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 302	Designation, Reportable Quantities, and Notification
40 CFR 355	Emergency Planning and Notification
49 CFR 171-178	Hazardous Materials Regulations

1.3 DEFINITIONS

- A. Environmental Pollution

Environmental pollution is the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the environment aesthetically, culturally and/or historically.

B. Environmental Protection

Environmental protection is the prevention/control of environmental pollution and habitat disruption that may occur to the environment during the Work.

C. Contractor Generated Hazardous Waste

Contractor generated hazardous waste means materials that, if abandoned or disposed of, may meet the definition of Hazardous Wastes as defined by State regulations. These waste streams could consist of material brought on site by the Contractor to execute work but are not fully consumed during the course of construction. Examples include, but are not limited to, excess paint thinners (i.e., methyl ethyl ketone, toluene etc.), waste thinners, excess paints, excess solvents, waste solvents and sediment admixtures. Reasonable efforts should be made to re-use these materials for other applications on other projects. If possible, before the Contractor determines that partially consumed materials are waste and must be disposed of as hazardous waste. Materials determined to be hazardous waste must be managed in accordance with State regulations; including requirements for storage, transport, disposal, and obtaining a Generator Identification Number.

D. Waters of the United States

All waters which are under the jurisdiction of the Clean Water Act, as defined in 33 CFR 328.

E. Wetlands

Wetlands means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, and bogs.

1.4 ENVIRONMENTAL REQUIREMENTS

A. General

The Contractor shall minimize environmental pollution and damage that may occur as the result of construction operations. The environmental resources within the project boundaries and those affected outside the limits of permanent work shall be protected during the entire duration of this Contract. The Contractor shall comply with all applicable environmental Federal, State, and local laws and regulations. The Contractor shall be responsible for any delays resulting from failure to comply with environmental laws and regulations.

B. Environmental Permits

Based on the scope of work, State and Federal permits have not been obtained and are not anticipated to be needed as of the issuance of this RFP.

In the event that environmental permits are needed, all conditions shall be fully integrated into the performance of the Work set forth herein. The Contractor must fully adhere to the provisions set forth in all environmental permits and hold the Owner and Owner's Engineer harmless for any failure to adhere to all conditions as cited therein.

- C. The Contractor shall meet Owner's health and safety requirements as applicable.

1.5 SUBCONTRACTORS

The Contractor shall ensure compliance with this section by subcontractors.

1.6 SUBMITTALS

The following shall be submitted in accordance with Section 01 33 00, Submittal Procedures:

- A. Preconstruction Submittals
- B. Environmental Protection Plan: Prior to commencement of the Work, the Contractor shall:
 - 1. Submit in writing environmental procedures for implementing environmental protection. This includes a review of applicable permits and understanding of permit requirements.
 - 2. Meet with the Owner's Engineer to develop mutual understandings relative to compliance with the provisions of this section and administration of the environmental protection program.
- C. Best Management Practices Plan (BMP Plan): Contractor must submit and abide by a BMP Plan, prepared in accordance with the requirement of the project permits or as requested by the Owner's Engineer. The Contractor is responsible for adhering to all federal, state and local requirements, Contract Drawings, Specifications, and guidelines included in the permits for the Project obtained by the Engineer.
- D. Spill Prevention Control and Countermeasure Plan (SPCC Plan): Prior to commencement of the Work, Contractor shall submit an SPCC Plan for the control of any spill at the site. This shall include management practices for both containing and remediating any spill, and disposal of materials collected from the spill for any spills generated from the work.

1.7 ENVIRONMENTAL PROTECTION PLAN

- A. Prior to commencing construction activities or delivery of materials to the site, the Contractor shall submit an Environmental Protection Plan (EPP) for review and approval by the Owner's Representative. The purpose of the EPP is to present a comprehensive overview of known or potential environmental issues which the Contractor must address during the Work. Issues of concern shall be defined within the EPP as outlined in this section. The Contractor shall address each topic at a level of detail commensurate with the environmental issue and required construction task(s). Topics or issues which are not identified in this section, but which the Contractor considers necessary, shall be identified and discussed after those items formally identified in this section. Prior to the submittal of the EPP, the Contractor shall meet with the Owner's Representative for the purpose of discussing the implementation of the initial EPP; possible subsequent additions and revisions to the EPP including any reporting requirements; and methods for administration of the Contractor's environmental plans. The EPP shall be current and maintained onsite by the Contractor.

B. Compliance

No requirement in this Section shall be construed as relieving the Contractor of any applicable Federal, State, and local environmental protection laws and regulations. During Construction, the Contractor shall be responsible for identifying, implementing, and submitting for approval any additional requirements to be included in the EPP.

C. Contents

The EPP shall include, but shall not be limited to, the following:

1. Name(s) of person(s) within the Contractor's organization who is(are) responsible for ensuring adherence to the EPP.
2. Name(s) and qualifications of person(s) responsible for managing waste to be removed from the site, if applicable.
3. Name(s) and qualifications of person(s) responsible for training the Contractor's environmental protection personnel.
4. Description of the Contractor's environmental protection personnel training program.
5. Work area plan showing the proposed activity in each portion of the site and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas including methods for protection of features to be preserved within authorized work areas.
6. The SPCC Plan shall include the procedures, instructions, and forms to be used in the event of an unforeseen spill of a substance regulated by 40 CFR 68, 40 CFR 302, 40 CFR 355, and/or regulated under State or Local laws and regulations. Any spill above a reportable quantity should be reported to the respective States' Department of Environmental Protection at 1-800-292-4706. The proper

notifications need to comply with 310 CMR 40. This SPCC Plan shall include as a minimum:

- a. The name of the individual who will report any spills or hazardous substance releases and who will follow up with complete documentation. This individual shall immediately notify the Owner's Representative in addition to the legally required Federal, State, and local reporting channels (including the National Response Center 1-800-424-8802) if a reportable quantity is released to the environment. The plan shall contain a list of the required reporting channels and telephone numbers.
 - b. The name and qualifications of the individual who will be responsible for implementing and supervising the containment and cleanup.
 - c. A list of materials and equipment to be immediately available at the job site, tailored to cleanup work of the potential hazard(s) identified.
 - d. The names and locations of suppliers of containment materials and locations of additional fuel oil recovery, cleanup, restoration, and material-placement equipment available in case of an unforeseen spill emergency.
 - e. The methods and procedures to be used for expeditious contaminant cleanup.
- D. A Contaminant Prevention Plan that identifies potentially hazardous substances to be used on the job site; identifies the intended actions to prevent introduction of such materials into the air, water, or ground; and details provisions for compliance with Federal, State, and local laws and regulations for storage and handling of these materials. A copy of the Safety Data Sheets (SDS) and the maximum quantity of each hazardous material to be on site at any given time shall be included in the Contaminant Prevention Plan. As new hazardous materials are brought on site or removed from the site, the Plan shall be updated.

1.8 ENVIRONMENTAL ASSESSMENT OF CONTRACT DEVIATIONS

Any deviations, requested by the Contractor, from the drawings, plans, and specifications which may have an environmental impact, will be subject to approval by the Owner's Representative and may require an extended review, processing, and approval time. The Owner's Representative reserves the right to disapprove alternate methods, even if they are more cost effective, if the Owner's Representative determines that the proposed alternate method will have an adverse environmental impact.

1.9 NOTIFICATION

The Owner's Representative will notify the Contractor in writing of any observed noncompliance with Federal, State or local environmental laws or regulations, project Performance Standards, and other elements of the Contractor's EPP. The Contractor shall, after receipt of such notice, inform the Owner's Representative of the proposed corrective action and take such action when approved by the Owner's Representative. The Owner's Representative may issue an order stopping all or part of the work until satisfactory corrective

action has been taken. No time extensions shall be granted or equitable adjustments allowed to the Contractor for any such suspensions. This is in addition to any other actions the Owner's Representative may take under the Contract, or in accordance with the Federal Acquisition Regulation or Federal Law.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL

The Contractor shall be responsible for complying with all environmental regulations required by Federal, State, Regional, and local environmental laws and regulations.

3.2 LAND RESOURCES

- A. The Contractor shall confine all activities to areas defined by the drawings and specifications. Prior to the beginning of any construction, the Contractor shall identify any land resources to be preserved within the work area.
- B. The following additional specific erosion control measures (in addition to those measures shown on the Contract Drawings) shall be performed as needed by the Contractor to control erosion and sedimentation from exposed areas and from:
 - 1. All unused debris, soil, and other material shall be stockpiled in locations of relatively flat grades, away from any trees identified to be saved and upgradient of the erosion control sock and generally in the locations shown on the Construction Drawings. Stockpile side slopes shall not be greater than 2:1. All stockpiles shall be surrounded by erosion control sock and shall be placed outside the 100-foot buffer to any bordering vegetated wetland. Surrounding erosion control sock shall be inspected and maintained on a daily basis in accordance with the 'Erosion Control Sock' requirements described above.
 - 2. When stockpiles are not anticipated to be disturbed for long periods of time or left bare for more than 7 days, they should be covered in jute netting and/or watered on a regular basis to prevent dust from forming and potentially blowing off site. Should the surfaces of the piles appear to be dry and dust is being created, the piles should be covered or watered immediately.
 - 3. In addition, areas identified by the Owner's Representative as requiring treatment to control erosion and sedimentation controls shall be treated in accordance with the above notes and Construction Drawings.
- C. The Contractor shall immediately comply with any order from the Owner's Representative for the installation of additional erosion/sediment/turbidity controls

to protect resource areas beyond what is shown on the plans if field conditions or the Owner's Representative's judgment dictate that additional protection is necessary.

D. Contractor Facilities and Work Areas

The Contractor shall propose locations for field logistics/meeting areas, staging areas, and stockpile storage for approval by the Owner/Owner's Representative. Temporary movement or relocation of Contractor facilities shall be made only when approved by the Owner's Representative.

3.3 PROTECTION OF WATER RESOURCES

- A. At all times, special measures shall be taken to prevent chemicals, fuels, oils, greases, bituminous materials, waste washing, herbicides and insecticides, and cement and surface drainage from entering public or private waters.
- B. Any materials, waste, effluent, trash, garbage, oil, grease, chemicals, etc., in or adjacent to reservoirs, streams or other waterways shall be disposed of by Contractor. If any waste material is dumped in an unauthorized area, Contractor shall remove the material and restore the area to the condition of the adjacent undisturbed area. If necessary, contaminated soil shall be excavated, disposed of as specified herein, and replaced with suitable fill material, compacted and finished with topsoil, all at the expense of Contractor.
- C. Under no circumstances shall any equipment be allowed to operate (including grounding of vessels) in or on any grass beds, marshes, or mudflats. In addition, no equipment will be operated in such a manner as to cause damage to any resource areas.
- D. Absolutely no release is allowed into any waterway of any petroleum product, epoxies, resins, admixtures, touch-up coatings, concrete, wastewater of any kind, any foreign particulate which is associated with any of the activities, or the like of the Contractor. Accidental releases shall be reported to the appropriate authority, the Owner and Owner's Engineer, and, if applicable, the U.S. Coast Guard and local Harbormaster. The Contractor assumes all responsibilities for fines or penalties levied and agrees to fully indemnify the Owner and Engineer for any accidental, negligent, or intentional discharge of any foreign material into any waterway associated with the work prescribed herein.
- E. The Contractor shall monitor construction activities to prevent pollution of surface and ground waters. Toxic or hazardous chemicals shall not be applied to soil or vegetation. All water areas affected by construction activities shall be monitored by the Contractor. For construction activities immediately adjacent to impaired surface waters, the Contractor shall be capable of quantifying sediment or pollutant loading to that surface water as required by the Clean Water Act.

F. Wetlands

1. The Contractor shall not enter, disturb, destroy, or allow discharge of contaminants into any wetlands. The Contractor shall be responsible for the protection of wetlands in accordance with applicable regulations. Authorization to enter specific wetlands identified shall not relieve the Contractor from any obligation to protect other wetlands within, adjacent to, or in the vicinity of the construction site and associated boundaries.
2. In the event that wetland areas are destroyed in conjunction with the construction, they shall be replaced, at no cost to the Owner, by a firm experienced in restoration of such areas.

3.4 PROTECTION OF AIR RESOURCES

The Contractor shall keep construction activities under surveillance, management, and control to minimize pollution of air resources. All activities, equipment, processes, and work operated or performed by the Contractor in accomplishing the specified construction shall be in strict accordance with all State and Federal emission and performance laws and standards. Ambient Air Quality Standards set by the Environmental Protection Agency, specifically as they apply in the respective State, shall be maintained for all construction operations and activities.

A. Particulates

Dust particles; aerosols and gaseous by-products from construction activities shall be controlled at all times, including weekends, holidays and hours when work is not in progress. The Contractor shall maintain the work areas within or outside the project boundaries free from particulates which would cause the Federal, State, and local air pollution standards to be exceeded or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, baghouse, scrubbers, electrostatic precipitators or other methods will be permitted to control particulates in the work area. The Contractor must have sufficient, competent equipment available to accomplish these tasks. The Contractor shall implement particulate control measures whenever a particulate nuisance or hazard occurs. The Contractor shall comply with all State and local visibility regulations.

B. Odors

Odors from construction activities shall be controlled at all times for all construction activities, processing, and preparation of materials. The odors shall not cause a nuisance or health hazard and shall be in compliance with State regulations and/or more stringent local ordinances.

C. Sound Intrusions

The Contractor shall keep construction activities under surveillance and control to minimize environmental damage by noise. The Contractor shall also comply with local noise regulations and requirements. Sound measurements at the property line shall not exceed 90 dBA. The Contractor shall implement measures to mitigate noise pollution if the Contractor exceeds this standard and shall consider, at a minimum, the following mitigation measures to reduce site noise:

1. Staging of site works to maximize use of the existing site features/facilities as acoustic barriers where possible.
2. Noise and vibration awareness training for all site staff including subcontractors as part of general site induction and tailgate talk activities.
3. Strict adherence to approved works times. In the event that out of hours delivery activities are required.
4. Works shall be scheduled, where practical, to avoid simultaneous noisy activities occurring on site.
5. Vehicles shall not be left turned on or idling at the site for longer than minimum amount of time required completing site activities.
6. Should the above-listed activities prove ineffective, the Contractor shall halt work until the Contractor is able to propose an effective solution to control site noise.

3.5 RECYCLING AND WASTE MINIMIZATION

The Contractor shall participate in State and local government sponsored recycling programs. The Contractor is further encouraged to minimize solid waste generation throughout the duration of the project.

3.6 BIOLOGICAL RESOURCES

The Contractor shall make every reasonable effort to minimize interference with, disturbance to, and damage to fish, wildlife, and plants including their habitat. The Contractor shall be responsible for the protection of threatened and endangered animal and plant species including their habitat in accordance with Federal, State, Regional, and local laws and regulations.

3.7 PREVIOUSLY USED EQUIPMENT

The Contractor shall clean all previously used construction equipment prior to bringing it onto the project site. The Contractor shall ensure that the equipment is free from soil or sediment residuals, egg deposits from plant pests, noxious weeds, and plant seeds.

3.8 TRAINING OF CONTRACTOR PERSONNEL

The Contractor's personnel shall be trained in all phases of environmental protection and pollution control, and in accordance with the provisions contained in Section 00 70 00, General

Conditions, and in Section 00 80 00, Supplementary Conditions. The Contractor shall conduct environmental protection/pollution control meetings for all Contractor personnel prior to commencing construction activities. Additional meetings shall be conducted for new personnel and when site conditions change. The training and meeting agenda shall include: methods of detecting and avoiding pollution; familiarization with statutory and contractual pollution standards; installation and care of devices, vegetative covers, and instruments required for monitoring purposes to ensure adequate and continuous environmental protection/pollution control; anticipated hazardous or toxic chemicals or wastes, and other regulated contaminants; recognition and protection of archaeological sites, artifacts, wetlands, and endangered species and their habitat that are known to be in the area.

3.4 PROHIBITED CONSTRUCTION PROCEDURES

- A. The Contractor is advised that the disposal of any excess excavated material in wetlands, stream corridors, and floodplain is strictly prohibited. Any violation of this restriction by Contractor or any person employed by them will be brought to the immediate attention of the responsible regulatory agencies, with a request that appropriate action be taken against the offending parties. Therefore, the Contractor will be required to remove all fill/discharged sediment at their own expense and restore the area impacted.
- B. The Contractor shall comply with the following requirements regarding prohibited construction procedures as follows:
 - 1. Indiscriminate, arbitrary or capricious operations of equipment in any stream corridors, any wetlands or surface waters.
 - 2. Grounding/bottoming out of any equipment within environmental resource areas.
 - 3. Pumping of silt-laden water from trenches or other excavations into any surface waters, any stream corridors, or any wetlands.
 - 4. Decanting of untreated excess water from scows is prohibited.
 - 5. Damaging vegetation adjacent to, or outside of, the access road or right-of-way.
 - 6. Disposal of excess or unsuitable excavated material in wetlands or floodplain.
 - 7. Open burning of project debris.

3.9 POST-CONSTRUCTION CLEANUP

The Contractor shall clean up all areas used for Construction ("Construction Areas" shall be defined as any area used by the Contractor) to their pre- construction condition. The Contractor shall, unless otherwise instructed in writing by the Owner's Representative, obliterate all signs of temporary construction facilities such as work areas, structures, construction trailers, staging areas, stockpiles of excess or waste materials, and all other vestiges of construction prior to final acceptance of the work.

END OF SECTION

SECTION 01 4000 QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Submittals.
- B. Quality assurance.
- C. References and standards.
- D. Testing and inspection agencies and services.
- E. Contractor's construction-related professional design services.
- F. Contractor's design-related professional design services.
- G. Control of installation.
- H. Defect Assessment.

1.02 REFERENCE STANDARDS

- A. ASTM C1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants; 2008 (Reapproved 2023).
- B. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation; 2026.
- C. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2025.
- D. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in Testing of Soil and Rock as Used in Engineering Design and Construction; 2026.
- E. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2026.
- F. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2026.
- G. ASTM E699 - Standard Specification for Agencies Involved in Testing, Quality Assurance, and Evaluating of Manufactured Building Components; 2016.
- H. IAS AC89 - Accreditation Criteria for Testing Laboratories; 2025.

1.03 DEFINITIONS

- A. Contractor's Professional Design Services: Design of some aspect or portion of the project by party other than the design professional of record. Provide these services as part of the Contract for Construction.
 - 1. Design Services Types Required:
 - a. Construction-Related: Services Contractor needs to provide in order to carry out the Contractor's sole responsibilities for construction means, methods, techniques, sequences, and procedures.
 - b. Design-Related: Design services explicitly required to be performed by another design professional due to highly-technical and/or specialized nature of a portion of the project. Services primarily involve engineering analysis, calculations, and design, and are not intended to alter the aesthetic aspects of the design.
- B. Design Data: Design-related, signed and sealed drawings, calculations, specifications, certifications, shop drawings and other submittals provided by Contractor, and prepared directly by, or under direct supervision of, appropriately licensed design professional.

1.04 CONTRACTOR'S CONSTRUCTION-RELATED PROFESSIONAL DESIGN SERVICES

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

SECTION 01 4000 QUALITY REQUIREMENTS

1.05 CONTRACTOR'S DESIGN-RELATED PROFESSIONAL DESIGN SERVICES

- A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.
- B. Base design on performance and/or design criteria indicated in individual specification sections.
- C. Scope of Contractor's Professional Design Services: Provide for the following items of work:
 - 1. Structural Design of Formwork: As described in Section 03 1000 - Concrete Forming and Accessories.
 - 2. Concrete Mix Design: As described in Section 03 3000 - Cast-in-Place Concrete. No specific designer qualifications are required.
 - 3. Sprinkler Layout: Coordinate with ceiling installation, detailed pipe layout, and hydraulic calculations as described in Section 21 1300 - Fire-Suppression Sprinkler Systems.

1.06 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Designer's Qualification Statement: Submit for Architect's knowledge as contract administrator, or for Owner's information.
 - 1. Include information for each individual professional responsible for producing, or supervising production of, design-related professional services provided by Contractor.
 - a. Full name.
 - b. Professional licensure information.
 - c. Statement addressing extent and depth of experience specifically relevant to design of items assigned to Contractor.
- C. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.
 - 1. Include calculations that have been used to demonstrate compliance to performance and regulatory criteria provided, and to determine design solutions.
 - 2. Include required product data and shop drawings.
 - 3. Include a statement or certification attesting that design data complies with criteria indicated, such as building codes, loads, functional, and similar engineering requirements.
 - 4. Include signature and seal of design professional responsible for allocated design services on calculations and drawings.
- D. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
 - 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of inspector.
 - d. Date and time of sampling or inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of test/inspection.
 - h. Date of test/inspection.
 - i. Results of test/inspection.
 - j. Compliance with Contract Documents.
 - k. When requested by Architect, provide interpretation of results.
 - 2. Test report submittals are for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.
- E. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
 - 1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 - 2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.

SECTION 01 4000 QUALITY REQUIREMENTS

- F. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- G. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
 - 1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.
- H. Erection Drawings: Submit drawings for Architect's benefit as contract administrator or for Owner.
 - 1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.
 - 2. Data indicating inappropriate or unacceptable Work may be subject to action by Architect or Owner.

1.07 QUALITY ASSURANCE

- A. Testing Agency Qualifications:
 - 1. Prior to start of work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
 - 2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
 - 3. Qualification Statement: Provide documentation showing testing laboratory is accredited under IAS AC89.
- B. Designer Qualifications: Where professional engineering design services and design data submittals are specifically required of Contractor by Contract Documents, provide services of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

1.08 REFERENCES AND STANDARDS

- A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- C. Obtain copies of standards where required by product specification sections.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from Contract Documents by mention or inference otherwise in any reference document.

1.09 TESTING AND INSPECTION AGENCIES AND SERVICES

- A. Contractor shall employ and pay for services of an independent testing agency to perform other specified testing.
- B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- C. Contractor Employed Agency:
 - 1. Testing agency: Comply with requirements of ASTM E329, ASTM E543, ASTM E699, ASTM C1021, ASTM C1077, ASTM C1093, and ASTM D3740.
 - 2. Inspection agency: Comply with requirements of ASTM D3740 and ASTM E329.
 - 3. Laboratory: Authorized to operate in the State in which the Project is located.
 - 4. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.

SECTION 01 4000 QUALITY REQUIREMENTS

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

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 TESTING AND INSPECTION

- A. Testing Agency Duties:
 1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
 2. Perform specified sampling and testing of products in accordance with specified standards.
 3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 4. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
 5. Perform additional tests and inspections required by Architect.
 6. Submit reports of all tests/inspections specified.
- B. Limits on Testing/Inspection Agency Authority:
 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 2. Agency may not approve or accept any portion of the Work.
 3. Agency may not assume any duties of Contractor.
 4. Agency has no authority to stop the Work.
- C. Contractor Responsibilities:
 1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
 3. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
 - c. To facilitate tests/inspections.
 - d. To provide storage and curing of test samples.
 4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

SECTION 01 4000 QUALITY REQUIREMENTS

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

3.03 DEFECT ASSESSMENT

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

END OF SECTION

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SECTION 01 41 00

REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Underground Utilities
 - 2. Dewatering and/or Discharging Water
 - 3. Property Monuments
 - 4. Traffic Control
 - 5. Permits Required for the Project

1.2 UNDERGROUND UTILITIES

- A. Installation of and connections to underground utilities are part of this project. The Contractor and any subcontractors are expected to have experience working safely with and coordinating above and below ground utility work, with appropriate local stakeholders. The Contractor will work with the Owner and Owner's other contractors to obtain permissions to complete connection to the Utility in a timely manner.

1.3 DEWATERING AND/OR DISCHARGING WATER

- A. Neither dewatering and/or discharging wastewater or chlorinated water is anticipated for this project. In the event that any dewatering or discharge of water is required, the Contractor will notify the Owner and obtain appropriate permissions or permitting prior to dewatering and/or discharging wastewater or chlorinated water at the site and utilize industry best management practices.

1.4 PROPERTY MONUMENTS

- A. Protect iron pipe monuments from movement.
- B. The cost of replacement of any monuments moved or destroyed during construction shall be the Contractor's responsibility.
- C. Perpetuation of destroyed or moved monuments shall be performed in accordance with state statutes by a registered land surveyor.

1.5 TRAFFIC CONTROL

- A. Provide traffic control facilities including barricades, signs, lights, warning devices, pavement markings, flaggers, etc.
- B. Construct and use traffic control facilities in accordance with the U.S. Department of Transportation Federal Highway Administration's Manual on Uniform Traffic Control Devices for Streets and Highways.
- C. Maintain traffic control devices as required to properly safeguard the public travel through final completion, including during periods of suspension of work.

1.6 PERMITS REQUIRED FOR THE PROJECT

- A. The following permits are being obtained by the Owner:
 - 1. City of Detroit Building Permit
- B. All Permits associated with electrical work as described in these bidding documents are the responsibility of the Contractor. Permits required may include but not limited to general electrical permit, new power pole permit, excavation in right of way permit, and right of way occupancy permit.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 7123 FIELD ENGINEERING

PART 1 GENERAL

1.01 SUMMARY

- A. This Section includes requirements for field engineering services necessary for proper execution of the Work, including but not limited to:
 - 1. Engineering surveys provided by the Owner or Owner's Representative.
 - 2. Engineering surveys, staking, layout, and positioning provided by the Contractor.
 - 3. Verification of existing conditions and utilities.
 - 4. Horizontal and vertical control.
 - 5. Equipment positioning and control (where applicable).
 - 6. Record (as-constructed) measurements and markers.
 - 7. Quality control surveys and documentation.

1.02 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Special Conditions and Specification Sections, apply to the Work of this Section.
- B. Related Sections include, but are not limited to:
 - 1. 01 22 00 – Measurement and Payment
 - 2. 01 33 00 – Submittal Procedures
 - 3. 01 35 43 – Environmental Procedures
 - 4. 01 90 00 – General Safety Requirements

1.03 REFERENCE STANDARDS (WHERE APPLICABLE)

- A. U.S. Army Corps of Engineers (USACE), Engineering and Design – Hydrographic Surveying, EM 1110-2-1003
- B. U.S. Coast Guard, Navigation Rules and Regulations Handbook

1.04 SUBMITTALS

THE CONTRACTOR SHALL PROVIDE THE FOLLOWING IN ACCORDANCE WITH SECTION 01 33 00, SUBMITTAL PROCEDURES.

- A. Field Data
 - 1. Digital survey field data in ASCII format showing Easting, Northing, and Elevations using project datums, together with field notes sufficient to reproduce survey plots.
- B. Survey Data and Plots
 - 1. Survey plots showing latest data, previous surveys, and design templates. Submit within 1 day of completing field work.
- C. Survey Personnel
 - 1. List of personnel performing survey work, including qualifications and experience. Survey oversight shall be by a state licensed Professional Engineer (PE), Professional Land Surveyor (PLS), a THSOA Certified Hydrographer (CH), or other licensed or certified professional as required by the project. Submit prior to the Pre-Construction Conference.
- D. Site-Specific Survey Plan and Quality Assurance/Quality Control (QA/QC) Documentation
 - 1. Submit detailed procedures, equipment descriptions, personnel roles, and QA/QC measures. Field surveying shall not begin until approved.
- E. Survey Vessel Calibration Report: After confirmation of vessel calibration, the Contractor shall submit a survey vessel calibration report that includes the results of all QA/QC testing. It shall also include an XYZ ASCII file of the Contractor's survey of the reference surface provided by the Owner or the Owner's Engineer. No dredging shall be performed until the Contractor can confirm survey vessel performance.

2.02 QUALITY CONTROL

- A. Contractor QC is the means by which the Contractor verifies that the construction/ dredging work complies with the requirements of the contract specifications herein. Contractor QC shall be adequate to cover all phases of field engineering operations.
 - 1. The Contractor's survey work, to be performed under this contract, shall be accomplished by, reviewed, and approved by a PE, PLS, or CH familiar with and having a minimum of 5 years of personal experience with hydrographic surveys. The State of licensure shall be Michigan.

SECTION 01 7123 FIELD ENGINEERING

2. Surveys shall be performed with a Multibeam Echo-Sounder (MBES) survey system. MBES surveys for the project shall meet or exceed the most current USACE guidance. Data will be gathered using standard USACE procedures for Dredge Measurement & Payment Surveys for New Work or Rock Cuts as established in Table 3-1 of the USACE manual.
3. The Contractor shall correct deficiencies identified through QC surveys at no additional cost.

2.03 PROJECT CONDITIONS

- A. Existing Control Points
 1. The Owner or Owner's Representative will supply one (1) control point to the Contractor prior to the start of work. The Contractor shall be responsible for supplying additional control points as required in the performance of the work. In the instances where data is provided in differing vertical datum, it shall be the responsibility of the Contractor to ensure that the proper offsets are applied to the data to ensure that the project datum is utilized.
- B. Survey Datum
 1. The project datum for this project shall be Low Water Datum (LWD). In the instances where data is provided based upon a different defined datum, it shall be the responsibility of the Contractor to ensure that the proper offsets are applied to ensure that work is performed in accordance with the project datum of LWD. All measured field locations shall be converted to LWD prior to submittal. The Contractor shall, and the Owner's Engineer will then base all elevations/soundings when performing surveys on LWD.
 2. All horizontal positions shall be reported in North American Datum of 1983 (NAD 83) state plane coordinates, in International Feet. All coordinates and elevations shall be recorded to the nearest 100th of a foot. Soundings shall be rounded to one decimal place on Drawings.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

4.01 EXAMINATION

- A. Prior to beginning construction, examine the site and verify existing conditions. Investigate and verify the existence and location of site improvements, utilities, and existing facilities.
- B. Verify invert elevations at points of connection for sanitary sewer, storm sewer, water, and underground electrical systems.
- C. Notify the Engineer of discrepancies between field conditions and the Drawings.
- D. Contact utility notification services as required prior to excavation or disturbance of the site.
- E. Protect all utilities and appurtenances from damage.

4.02 ENGINEERING SURVEYS PROVIDED BY THE OWNER

- A. General
 1. Establish benchmarks and control points shown on the Drawings.
 2. Provide primary construction reference data for layout and alignment.
- B. Utility Systems
 1. Provide construction stakes for pipe location at critical horizontal and vertical alignment changes and at connection points.
- C. Roads, Streets, and Pavements
 1. Provide slope intercept stakes and clearing/grubbing limits.
 2. Provide earthwork data collection where unit-price quantities apply.
- D. Site Improvements and Structures
 1. Provide benchmarks and construction reference stakes defining limits and reference lines.

4.03 ENGINEERING SURVEYS PROVIDED BY THE CONTRACTOR

- A. General
 1. Locate, preserve, and protect all benchmarks, control points, and reference stakes.
 2. Protect property corners and monuments; replace those damaged due to Contractor negligence in accordance with applicable regulations.
 3. Verify Drawings against field control prior to staking.
 4. Provide all supplemental staking required to complete the Work.

SECTION 01 7123 FIELD ENGINEERING

5. Remove stakes only when directed by the Engineer.
- B. Utility Construction
 1. Check line and grade at each installed pipe length.
 2. Provide intermediate reference points for locating appurtenances.
- C. Roads and Pavements
 1. Provide subgrade and base course stakes at required intervals.
 2. Provide additional stakes necessary for alignment and grade control.
- D. Site Improvements and Buildings
 1. Provide stakes for grading, pavements, utilities, foundations, column lines, floor elevations, and facility components.

4.04 LAYOUT OF WORK

- A. Lay out all lines, grades, and elevations required for construction from established control points.
- B. Furnish all labor, equipment, and materials required for layout.
- C. Maintain layout markers until authorized for removal.
- D. Make field notes, calculations, and records available for inspection at all times.

4.05 RECORD MEASUREMENTS AND MARKERS

- A. General
 1. Provide record (as-constructed) survey information showing horizontal and vertical locations of buried utilities, structures, and facilities upon completion of Work.
- B. Utilities
 1. At a minimum, record:
 2. Deviations from Drawings.
 3. Valves, fittings, and changes in direction.
 4. Gravity sewer flow line elevations.
 5. Service terminations and branches.
- C. Markers
 1. Provide buried marker stakes indicating service termini, with stake color and size appropriate to utility type. Install magnetic locating features where required.

4.06 FINAL EXAMINATION AND ACCEPTANCE

- A. Submit final record surveys demonstrating compliance with contract requirements.
- B. Owner or Owner's Representative may perform independent verification surveys.
- C. Correct deficiencies identified during final examination.
- D. Final acceptance is subject to completion of all required surveys and documentation.

END OF SECTION

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SECTION 01 7700 CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for Contract Closeout, including, but not limited to, the following:
 - 1. Substantial Completion
 - 2. Final Completion
 - 3. Inspection Procedures
 - 4. Project Record Documents.
 - 5. Operation and Maintenance Manuals
 - 6. Warranties
 - 7. Instruction of Owner's Personnel
 - 8. Final Cleaning

1.02 SUBSTANTIAL COMPLETION

- A. Before notification that the Work is substantially complete, provide the following:
 - 1. Demonstrate to the Engineer that systems and system components operate as intended.
 - 2. Advise Owner of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 5. Prepare and submit Project Record Documents, operation and maintenance manuals, construction photographs, damage or settlement surveys, property surveys, and similar final record information.
 - 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 - 7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 - 8. Complete startup testing of systems.
 - 9. Submit test/adjust/balance records.
 - 10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 - 11. Advise Owner of changeover in heat and other utilities.
 - 12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 - 13. Complete final cleaning requirements, including touchup painting.
 - 14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
 - 15. Proof that "Notice of Completion of Easement Restoration" was submitted to grantors by certified mail. (Use form provided at the end of this specification.)
- B. Submit written notification to Owner and Engineer that the entire Work is ready for its intended use and the entire Work is substantially complete.
 - 1. If the items in paragraph A. above are complete, then within 14 days, the Owner, Contractor, and Engineer will make an inspection of the Work to determine status of completion.
 - 2. If Engineer considers the Work substantially complete, then Engineer will prepare and deliver to the Owner a tentative Certificate of Substantial Completion fixing the date of Substantial Completion with an attached tentative list of items to be completed or corrected before final payment.
 - 3. Engineer will issue a definitive Certificate of Substantial Completion with list of items to be completed or corrected or notify Contractor that the Work is not substantially complete within 21 days after submittal to Owner.
 - 4. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 - 5. Results of completed inspection will form the basis of requirements for Final Completion.

SECTION 01 7700 CLOSEOUT PROCEDURES

1.03 FINAL COMPLETION

- A. Before requesting final inspection for determining final completion, complete the following:
 - 1. Items identified as requiring correction or completion.
 - 2. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 - 3. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
- B. Submit a written notice that the entire Work is complete. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements.
 - 1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.04 PROJECT RECORD DOCUMENTS

- A. Do not use Project Record Documents for construction purposes. Protect these documents from deterioration and loss. Make Project Record Documents available for the Engineer's review during normal working hours.
- B. Maintain and submit one set of blue- or black-line white prints of Contract Drawings and Shop Drawings.
 - 1. Mark record drawings to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, Subcontractor, or similar entity, to prepare the marked-up record drawings.
 - a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
 - b. Accurately record information in an understandable drawing technique.
 - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - d. Mark contract drawings or shop drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where shop drawings are marked, show cross-reference on Contract Drawings.
 - 2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
 - 3. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - 4. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.
- C. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

1.05 OPERATION AND MAINTENANCE MANUALS

- A. See section Operation and Maintenance Data.

1.06 WARRANTIES

- A. Submit written warranties for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Submit properly executed warranties of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
 - 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8½ by 11 inch 115-by-280-mm paper.

SECTION 01 7700 CLOSEOUT PROCEDURES

2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 DEMONSTRATION AND TRAINING

- A. Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 1. Provide instructors experienced in operation and maintenance procedures.
 2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
 3. Schedule training with Owner through Engineer with at least 7 days advance notice.
 4. Coordinate instructors, including providing notification of dates, times, length of instruction, and course content.
- B. Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections. For each training module, develop a learning objective and teaching outline. Include instructions for the following:
 1. System design and operational philosophy.
 2. Review of documentation.
 3. Operations.
 4. Adjustments.
 5. Troubleshooting.
 6. Maintenance.
 7. Repair.

3.02 FINAL CLEANING

- A. Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal, state, and local environmental and antipollution regulations.
- B. Cleaning
 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Sweep concrete floors broom clean in unoccupied spaces.
 - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.

SECTION 01 7700 CLOSEOUT PROCEDURES

- k. Remove labels that are not permanent.
 - l. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 - m. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - n. Replace parts subject to unusual operating conditions.
 - o. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - p. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - q. Clean ducts, blowers, and coils if units were operated without filters during construction.
 - r. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
 - s. Leave Project clean and ready for occupancy.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION

TO: EASEMENT GRANTOR'S NAME

ADDRESS

NOTICE OF COMPLETION OF EASEMENT RESTORATION

PROJECT NAME

PROJECT OWNER

THE RESTORATION OF THE GRANTED EASEMENT FOR INSTALLATION OF UTILITIES AND OTHER IMPROVEMENTS IS BELIEVED TO BE COMPLETED. IF YOU TAKE EXCEPTION AND BELIEVE THE SITE RESTORATION OF THE GRANTED EASEMENT IS NOT COMPLETE TO YOUR UNDERSTANDING AND SATISFACTION, THEN ADVISE THE ENGINEER AND/OR PROJECT OWNER OF THE DEFICIENCIES IN WRITING. SHORTLY AFTER YOU HAVE PROVIDED SUCH NOTIFICATION OF RESTORATION DEFICIENCIES, ARRANGEMENTS WILL BE MADE TO VIEW THE SITE WITH YOU TO OBTAIN MUTUAL AGREEMENT FOR RESOLUTION.

IF THE ENGINEER AND/OR THE OWNER DO NOT HEAR FROM YOU IN WRITING WITHIN 10 DAYS FROM THE DATE OF RECEIPT OF THIS NOTICE, THEN IT WILL BE UNDERSTOOD THAT THE RESTORATION OF THE GRANTED EASEMENT IS SATISFACTORILY COMPLETE AND ACCEPTABLE TO YOU.

CONTRACTOR'S NAME

CONTRACTOR'S ADDRESS

CONTRACTOR'S PHONE NUMBER

SECTION 03 1000 CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Formwork for cast-in-place concrete, with shoring, bracing and anchorage.
- B. Openings for other work.
- C. Form accessories.
- D. Form stripping.

1.02 RELATED REQUIREMENTS

- A. Section 03 2000 - Concrete Reinforcing.
- B. Section 03 3000 - Cast-in-Place Concrete.
- C. Section 05 1200 - Structural Steel Framing: Placement of embedded steel anchors and plates in cast-in-place concrete.

1.03 REFERENCE STANDARDS

- A. ACI 301 - Specifications for Concrete Construction; 2020.
- B. ACI 318 - Building Code Requirements for Structural Concrete; 2019 (Reapproved 2022).
- C. ACI 347R - Guide to Formwork for Concrete; 2014 (Reapproved 2021).
- D. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary; 2019 (Reapproved 2022).
- E. ACI PRC-347 - Guide to Formwork for Concrete; 2014 (Reapproved 2021).
- F. ACI SPEC-117 - Specification for Tolerances for Concrete Construction and Materials and Commentary; 2010 (Reapproved 2015).
- G. ACI SPEC-301 - Specifications for Concrete Construction; 2020.
- H. ASME A17.1 - Safety Code for Elevators and Escalators Includes Requirements for Elevators, Escalators, Dumbwaiters, Moving Walks, Material Lifts, and Dumbwaiters with Automatic Transfer Devices; 2025.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver prefabricated forms and installation instructions in manufacturer's packaging.
- B. Store prefabricated forms off ground in ventilated and protected manner to prevent deterioration from moisture.
- C. Protect plastic foam products from damage and exposure to sunlight.

PART 2 PRODUCTS

2.01 FORMWORK - GENERAL

- A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.
- B. Design and construct concrete that complies with design with respect to shape, lines, and dimensions.
- C. Chamfer outside corners of beams, joists, columns, and walls.
- D. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.
- E. Comply with relevant portions of ACI CODE-318, ACI PRC-347, and ACI SPEC-301.

2.02 WOOD FORM MATERIALS

- A. Form Materials: At the discretion of the Contractor.

2.03 FORMWORK ACCESSORIES

- A. Form Ties: Removable type, galvanized metal, fixed length, cone type, with waterproofing washer, free of defects that could leave holes larger than 1 inch in concrete surface.
- B. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.
 - 1. Do not use materials containing diesel oil or petroleum-based compounds.
 - 2. Composition: Colorless, reactive, solvent-based compound.
 - a. VOC Content: In compliance with applicable local, State, and federal regulations.

SECTION 03 1000 CONCRETE FORMING AND ACCESSORIES

- C. Dowel Sleeves: Plastic sleeve and nailable plastic base for smooth, round, steel load-transfer dowels.
- D. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.
- E. Embedded Anchor Shapes, Plates, Angles and Bars: As specified in Section 05 1200.
- F. Waterstops: Bentonite and butyl rubber.
 - 1. Configuration: As indicated on drawings.
 - 2. Size: As indicated on drawings.
 - 3. Manufacturers:
 - a. AVM Industries, Inc; Aussie Swell Red: www.avmindustries.com/#sle.
 - b. Cetco, a Mineral Technologies Company; Waterstop-RX: www.mineralstech.com
 - c. GCP Applied Technologies; Adcor ES: www.gcpat.com
 - d. WR Medows; Waterstop EC Plus; www.wrmedows.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 EARTH FORMS

- A. Earth forms are not permitted.

3.03 ERECTION - FORMWORK

- A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI SPEC-301.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
- C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
- D. Align joints and make watertight. Keep form joints to a minimum.

3.04 APPLICATION - FORM RELEASE AGENT

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.05 INSERTS, EMBEDDED PARTS, AND OPENINGS

- A. Provide formed openings where required for items to be embedded in passing through concrete work.
- B. Locate and set in place items that will be cast directly into concrete.
- C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.
- D. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- E. Install waterstops in accordance with manufacturer's instructions, so they are continuous without displacing reinforcement.
- F. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
- G. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.06 FORM CLEANING

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.
 - 1. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

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2. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.07 FORMWORK TOLERANCES

- A. Construct formwork to maintain tolerances required by ACI SPEC-117, unless otherwise indicated.

3.08 FORM REMOVAL

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
- B. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

END OF SECTION

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SECTION 03 2000 CONCRETE REINFORCING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Reinforcing steel for cast-in-place concrete.
- B. Supports and accessories for steel reinforcement.

1.02 RELATED REQUIREMENTS

- A. Section 03 1000 - Concrete Forming and Accessories.
- B. Section 03 3000 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS

- A. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary; 2019 (Reapproved 2022).
- B. ACI MNL-66 - ACI Detailing Manual; 2020.
- C. ACI SPEC-301 - Specifications for Concrete Construction; 2020.
- D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2026.
- E. ASTM A706/A706M - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement; 2026.
- F. ASTM A775/A775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars; 2022.
- G. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2024.
- H. ASTM D3963/D3963M - Standard Specification for Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars; 2021.
- I. AWS D1.4/D1.4M - Structural Welding Code - Steel Reinforcing Bars; 2018, with Amendment (2020).
- J. CRSI (DA4) - Manual of Standard Practice; 2024.
- K. CRSI (P1) - Placing Reinforcing Bars, 10th Edition; 2019.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
- C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

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

PART 2 PRODUCTS

2.01 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
 - 1. Deformed billet-steel bars.
 - 2. Epoxy coated in accordance with ASTM A775/A775M.
- B. Steel Welded Wire Reinforcement (WWR): Plain type; ASTM A1064/A1064M.
 - 1. Form: Flat Sheets.
 - 2. WWR Style: As indicated on drawings.
- C. Reinforcement Accessories:
 - 1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.
 - 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
 - 3. Provide stainless steel, galvanized, or plastic components for placement within 1-1/2 inches of weathering surfaces.

2.02 FABRICATION

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

SECTION 03 2000 CONCRETE REINFORCING

- B. Welding of reinforcement is permitted only with the specific approval of Architect. Perform welding in accordance with AWS D1.4/D1.4M.
- C. Fabricate and handle epoxy-coated reinforcing in accordance with ASTM D3963/D3963M.
- D. Locate reinforcing splices not indicated on drawings at point of minimum stress.

PART 3 EXECUTION

3.01 PLACEMENT

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
- B. Accommodate placement of formed openings.
- C. Comply with applicable code for concrete cover over reinforcement.

3.02 FIELD QUALITY CONTROL

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

END OF SECTION

SECTION 03 3000 CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete for composite floor construction.
- B. Floors and slabs on grade.
- C. Concrete foundation walls and footings.
- D. Joint devices associated with concrete work.
- E. Miscellaneous concrete elements, including equipment pads.
- F. Concrete curing.

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

- A. ACI 211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide; 2022.
- B. ACI 301 - Specifications for Concrete Construction; 2020.
- C. ACI 302.1R - Guide to Concrete Floor and Slab Construction; 2015.
- D. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).
- E. ACI 305R - Guide to Hot Weather Concreting; 2020.
- F. ACI 306R - Guide to Cold Weather Concreting; 2016.
- G. ACI 308R - Guide to External Curing of Concrete; 2016.
- H. ACI 318 - Building Code Requirements for Structural Concrete; 2019 (Reapproved 2022).
- I. ACI CODE-318 - Building Code Requirements for Structural Concrete and Commentary; 2019 (Reapproved 2022).
- J. ACI PRC-211.1 - Selecting Proportions for Normal-Density and High Density-Concrete - Guide; 2022.
- K. ACI PRC-302.1 - Guide to Concrete Floor and Slab Construction; 2015.
- L. ACI PRC-304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).
- M. ACI PRC-305 - Guide to Hot Weather Concreting; 2020.
- N. ACI PRC-306 - Guide to Cold Weather Concreting; 2016.
- O. ACI PRC-308 - Curing of Concrete—Guide; 2026.
- P. ACI SPEC-301 - Specifications for Concrete Construction; 2020.
- Q. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2024a.
- R. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2026.
- S. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2026a.
- T. ASTM C143/C143M - Standard Test Method for Slump of Concrete; 2026a.
- U. ASTM C150/C150M - Standard Specification for Portland Cement; 2024.
- V. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete; 2020.
- W. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2024.
- X. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2025.
- Y. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2024.
- Z. ASTM C618 - Standard Specification for Coal Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2025a.
- AA. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing; 2025a.

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- BB. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2020a.
- CC. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 2024.
- DD. ASTM C1116/C1116M - Standard Specification for Fiber-Reinforced Concrete; 2023.
- EE. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures; 2020.
- FF. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete; 2025.
- GG. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2022.
- HH. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Asphalt Types); 2023.
- II. ASTM E1155/E1155M - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers; 2023.
- JJ. ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 2024.
- KK. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2017 (Reapproved 2023).
- LL. COE CRD-C 48 - Handbook for Concrete and Cement Standard Test Method for Water Permeability of Concrete; 1992.
- MM. COE CRD-C 572 - Handbook for Concrete and Cement Corps of Engineers Specifications for Polyvinylchloride Waterstop; 1974.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
 - 1. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.
- C. Mix Design: Submit proposed concrete mix design.
 - 1. Indicate proposed mix design complies with requirements of ACI CODE-318, Chapter 5 - Concrete Quality, Mixing and Placing.
- D. Test Reports: Submit report for each test or series of tests specified.

1.05 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI SPEC-301 and ACI CODE-318.
- B. Follow recommendations of ACI PRC-305 when concreting during hot weather.
- C. Follow recommendations of ACI PRC-306 when concreting during cold weather.

PART 2 PRODUCTS

2.01 FORMWORK

- A. Comply with requirements of Section 03 1000.

2.02 REINFORCEMENT MATERIALS

- A. Comply with requirements of Section 03 2000.

2.03 CONCRETE MATERIALS

- A. Cement: ASTM C150/C150M, Type I - Normal Portland type or ASTM C595/C595M, Type IL - Portland Limestone cement
 - 1. Acquire cement for entire project from same source.
- B. Fine and Coarse Aggregates: ASTM C33/C33M.
- C. Fly Ash: ASTM C618, Class C or F.
- D. Calcined Pozzolan: ASTM C618, Class N.
- E. Silica Fume: ASTM C1240, proportioned in accordance with ACI PRC-211.1.
- F. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

SECTION 03 3000 CAST-IN-PLACE CONCRETE

- G. Structural Fiber Reinforcement: ASTM C1116/C1116M.
 - 1. Fiber Type: Alkali-resistant synthetic.
 - 2. Products:
 - a. Fibermesh; Fibermesh 300 @ 1.5 pounds per cubic yard: www.fibermesh.com/#sle.
 - b. Substitutions: See Section 01 6000 - Product Requirements.

2.04 ADMIXTURES

- A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- B. Air Entrainment Admixture: ASTM C260/C260M.
- C. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.
- D. High Range Water Reducing Admixture: ASTM C494/C494M Type F.
- E. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.
- F. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.
- G. Water Reducing Admixture: ASTM C494/C494M Type A.
- H. Waterproofing Admixture: Admixture formulated to reduce permeability to liquid water, with no adverse effect on concrete properties.
 - 1. Admixture Composition: Crystalline, functioning by growth of crystals in capillary pores.
 - 2. Permeability of Cured Concrete: No measurable leakage when tested in accordance with COE CRD-C 48 at 200 psi; provide test reports.
 - 3. Products:
 - a. Kryton International, Inc; Krystol Internal Membrane (KIM): www.kryton.com/#sle.
 - b. Penetron; PENETRON ADMIX SB: www.penetron.com/#sle.
 - c. Xypex Chemical Corporation; Bio-San C500: www.xypex.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.

2.05 ACCESSORY MATERIALS

- A. Underslab Vapor Retarder:
 - 1. Sheet Material: ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. Single-ply polyethylene is prohibited.
 - 2. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.
 - 3. Products:
 - a. Fortifiber Building Systems Group ; Moistop Ultra 10: www.fortifiber.com.
 - b. Henry Company; Moistop Ultra 10: www.henry.com/#sle.
 - c. ISI Building Products; Viper VaporCheck II 10-mil (Class A): www.isibp.com/#sle.
 - d. Poly-America; Husky Yellow Guard Class A 10-mil Vapor Barrier: www.yellowguard.com/#sle.
 - e. Reef Industries: Vaporguard: www.reefindustries.com
 - f. Stego Industries, LLC; Stego Wrap Class A - 10 mils (0.25 mm): www.stegoindustries.com/#sle.
 - g. W. R. Meadows, Inc; PERMINATOR Class A - 10 mils (0.25 mm): www.wrmeadows.com/#sle.
 - h. Substitutions: See Section 01 6000 - Product Requirements.

2.06 BONDING AND JOINTING PRODUCTS

- A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.
- B. Epoxy Bonding System:
 - 1. Complying with ASTM C881/C881M and of Type required for specific application.
- C. Waterstops: PVC, complying with COE CRD-C 572.
 - 1. Configuration: As indicated on drawings.
 - 2. Size: As indicated on drawings.
 - 3. Products:
 - a. BoMetals, Inc: www.bometals.com/#sle.

SECTION 03 3000 CAST-IN-PLACE CONCRETE

b. Substitutions: See Section 01 6000 - Product Requirements.

D. Slab Isolation Joint Filler: 1/2-inch thick, height equal to slab thickness, with removable top section forming 1/2-inch deep sealant pocket after removal.

1. Material: ASTM D1751, cellulose fiber.

2.07 CURING MATERIALS

A. Evaporation Reducer: Liquid thin-film-forming compound that reduces rapid moisture loss caused by high temperature, low humidity, and high winds; intended for application immediately after concrete placement.

B. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound; complying with ASTM C309.

C. Curing and Sealing Compound, Moisture Emission-Reducing, Membrane-Forming: Clear, liquid sealer for application to newly-placed concrete; capable of providing adequate bond for flooring adhesives, initially and over the long term; with sufficient moisture vapor impermeability to prevent deterioration of flooring adhesives due to moisture emission.

1. Use this product to cure and seal all slabs to receive adhesively applied flooring or roofing.

2. Comply with ASTM C309 and ASTM C1315 Type I Class A.

3. VOC Content: Less than 100 g/L.

4. Solids Content: 25 percent, minimum.

D. Moisture-Retaining Sheet: ASTM C171.

1. Polyethylene film, white opaque, minimum nominal thickness of 4 mil, 0.004 inch.

2. White-burlap-polyethylene sheet, weighing not less than 3.8 ounces per square yard.

E. Water: Potable, not detrimental to concrete.

2.08 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI PRC-211.1 recommendations.

B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI SPEC-301.

1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

C. Normal Weight Concrete:

1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: As indicated on drawings.

2. Fly Ash Content: Maximum 25 percent of cementitious materials by weight.

3. Calcined Pozzolan Content: Maximum 10 percent of cementitious materials by weight.

4. Silica Fume Content: Maximum 5 percent of cementitious materials by weight.

5. Maximum Aggregate Size: 5/8 inch.

2.09 MIXING

A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.

B. Transit Mixers: Comply with ASTM C94/C94M.

C. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION

A. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.

1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.

2. Use latex bonding agent only for non-load-bearing applications.

SECTION 03 3000 CAST-IN-PLACE CONCRETE

- B. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Comply with ASTM E1643. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.
 - 1. Vapor Retarder Over Granular Fill: Install compactible granular fill before placing vapor retarder as indicated on drawings. Do not use sand.

3.03 PLACING CONCRETE

- A. Place concrete in accordance with ACI PRC-304.
- B. Place concrete for floor slabs in accordance with ACI PRC-302.1.
- C. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
- D. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.
- E. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.04 SLAB JOINTING

- A. Locate joints as indicated on drawings.
- B. Anchor joint fillers and devices to prevent movement during concrete placement.
- C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
- D. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16 inch thick blade and cut at least 1 inch deep but not less than one quarter (1/4) the depth of the slab.

3.05 FLOOR FLATNESS AND LEVELNESS TOLERANCES

- A. An independent testing agency, as specified in Section 01 4000, will inspect finished slabs for compliance with specified tolerances.
- B. Measure F(F) Floor Flatness and F(L) Floor Levelness in accordance with ASTM E1155/E1155M, within 48 hours after slab installation; report both composite overall values and local values for each measured section.
- C. Correct the slab surface if composite overall value is less than specified and if local value is less than two-thirds of specified value or less than F(F) 13/F(L) 10.
- D. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.06 CONCRETE FINISHING

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.
- C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
 - 1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal. Smooth rubbed finish to be used when finish is not indicated in drawings.
- 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.
- E. Concrete Slabs: Finish to requirements of ACI PRC-302.1 and as follows:
 - 1. Surfaces to Receive Thick Floor Coverings: "Wood float" as described in ACI PRC-302.1; thick floor coverings include quarry tile, ceramic tile, and Portland cement terrazzo with full bed setting system.

SECTION 03 3000 CAST-IN-PLACE CONCRETE

2. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI PRC-302.1; thin floor coverings include carpeting, resilient flooring, seamless flooring, resinous matrix terrazzo, thin set quarry tile, and thin set ceramic tile.
3. Decorative Exposed Surfaces: Trowel as described in ACI PRC-302.1; take measures necessary to avoid black-burnish marks; decorative exposed surfaces include surfaces to be stained or dyed, pigmented concrete, surfaces to receive liquid hardeners, surfaces to receive dry-shake hardeners, surfaces to be polished, and all other exposed slab surfaces.

- F. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:100 nominal.

3.07 CURING AND PROTECTION

- A. Comply with requirements of ACI PRC-308. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
 1. Normal concrete: Not less than seven days.
- C. Surfaces Not in Contact with Forms:
 1. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
 2. Final Curing: Begin after initial curing but before surface is dry.
 - a. Curing Compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

3.08 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm.
- C. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.
- D. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cubic yards or less of each class of concrete placed.
- E. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
- F. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

3.09 DEFECTIVE CONCRETE

- A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.
- B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.
- C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.10 PROTECTION

- A. Do not permit traffic over unprotected concrete floor surface until fully cured.

END OF SECTION

SECTION 26 0010 BASIC ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This section includes general administrative and procedural requirements for Division 26. The following administrative and procedural requirements are included in this Section to supplement the requirements specified in Division 01.

1.02 QUALITY ASSURANCE

- A. Reference to Codes, Standards, Specifications and recommendations of technical societies, trade organizations and governmental agencies shall mean that the latest edition of such publications adopted and published prior to submittal of the bid. Such codes or standards shall be considered a part of this Specification as though fully repeated herein.
- B. When codes, standards, regulations, etc. allow Work of lesser quality or extent than is specified under this Division, nothing in said codes shall be construed or inferred authority or reducing the quality, requirements or extent of the Contract Documents. The Contract Documents address the minimum requirements for construction.
- C. Work shall be performed in accordance with all applicable requirements of the latest edition of all governing codes, rules and regulations.
- D. All base material shall be ASTM and/or ANSI standards.
- E. All electrical apparatus furnished under this Section shall conform to NEMA standards and the NEC and bear the UL label where such label is applicable.
- F. Furnish only new, first-class quality, materials and equipment, delivered, erected, connected and finished in every detail, selected and arranged to fit properly into building spaces. Where no specific kind or quality of material is specified, furnish first-class standard article, approved by Architect.
- G. Furnish services of one or more experienced superintendents, to be in charge of installation of work, and all skilled workmen, electricians and laborers required to unload, transfer, erect, connect, adjust, start, operate and test each system.
- H. Do NOT install any product where it might be exposed to environment that is significantly different to that in which it was intended to be normally used.
- I. Perform all work in close cooperation with other trades and utility companies.
- J. Execute all work in conformity with best standards of practice. Lay out and install work in accordance with drawings, manufacturer's instructions, shop drawings, and field layouts of other trades.
- K. Drawings are diagrammatic and indicate the general arrangement and intent of systems and work included in these documents.
- L. Furnish all labor, material and equipment to install and successfully test electrical systems and work, complete and in place, as herein specified and as shown on drawings.

1.03 DEFINITION OF TERMS

- A. The following list of terms as used in the Division 26 documents shall be defined as follows:
 - 1. "Provide": Furnish, install and connect unless otherwise indicated.
 - 2. "Furnish": Purchase and deliver to Project site.
 - 3. "Install": Physically set the items in-place.
 - 4. "Connect": Make final electrical connections to a piece of equipment to make completely operational.
 - 5. "As directed": As directed by the Owner or their authorized Representative.

1.04 SUBMITTALS

- A. Submittals shall consist of detailed Shop Drawings, Specifications, block wiring diagrams, "catalog cuts" and data sheets containing physical and dimensional information, performance data, electrical characteristics, materials used in fabrication and material finish. Clearly indicate by arrows or brackets precisely what is being submitted on and those optional accessories which are included and those which are excluded. Furnish quantities of each submittal as noted in Division 01.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Refer to Division 01 for general requirements pertaining to delivery, storage and handling.

SECTION 26 0010 BASIC ELECTRICAL REQUIREMENTS

- B. Protect materials before, during and after installation.
- C. In event of damage, immediately make all repairs and replacements necessary at no additional cost.
- D. Deliver all materials to job-site in original unopened containers, where applicable, with all labels intact and legible at time of use. Store in strict accordance with manufacturer's recommendations.
- E. Examine all equipment and material delivered to jobsite prior to installation to ensure all specification requirements and shop drawing notes and comments have been incorporated by manufacturer. Installation of equipment or material signifies Contractor's acceptance and approval of equipment or material from manufacturer.

1.06 COORDINATION

- A. Discrepancies:
 - 1. In the event of discrepancies within the Contract Documents, the Engineer shall be so notified, within sufficient time, as delineated in Division 01, prior to the Bid Opening to allow the issuance of an Addendum.
 - 2. If, in the event that time does not permit notification or clarification of discrepancies prior to the Bid Opening, the following shall apply: The Drawings govern in matters of quantity and the Specifications govern in matters of quality. In the event of conflict within the Drawings involving quantities or within the Specifications involving quantities or within the Specifications involving quality, the greater quantity and higher quality shall apply. Such discrepancies shall be noted and clarified in the Contractor's Bid. No additional allowances will be made because of errors, ambiguities or omissions that reasonably should have been discovered during the preparation of the Bid.
- B. Project conditions:
 - 1. Examination of Project site: The Contractor shall visit the Project site and thoroughly review the locale, working conditions, conflicting utilities and the conditions in which the Electrical Work will take place. Verify all existing conditions in the field. No allowances will be made subsequently for any costs that may be incurred because of any error or omission due to failure to examine the Project site and to notify the Engineer of any discrepancies between Contract Documents and actual Project site conditions.
 - 2. Protection: Keep conduits, junction boxes, outlet boxes and other openings closed to prevent entry of foreign matter. Cover fixtures, equipment, devices and apparatus and protect them against dirt, paint, water, chemical or mechanical damage, before and during construction period. Prior to final acceptance, restore to original condition any fixture, apparatus or equipment damaged including restoration of damaged factory applied painted finishes. Protect bright finished surfaces and similar items until in service. No rust or damage will be permitted.
 - 3. Supervision: Contractor shall personally or through an authorized and competent representative constantly supervise the Work from beginning to completion and, within reason, keep the same foreman and workmen on the Project throughout the Project duration.
 - 4. Coordinate arrangement, mounting, and support of electrical equipment:
 - a. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
 - b. To provide for ease of disconnecting the equipment with minimum interference to other installations.
 - c. To allow right of way for piping and conduit installed at required slope.
 - d. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.
- C. Preparation:
 - 1. Drawings:
 - a. Layout: General layout indicated on the Drawings shall be followed except where other Work may conflict with the Drawings.
 - b. Accuracy: Drawings for the Work under this Section are essentially diagrammatic within the constraints of the symbology applied.

SECTION 26 0010 BASIC ELECTRICAL REQUIREMENTS

1.07 RECORD DOCUMENTS

- A. Provide Project Record Drawings as described herein:
 - 1. Drawings shall fully represent installed conditions including correct conduit and wire sizing as well as routing and revised fixture schedule listing Manufacturers and products actually installed. Contractor shall record all changes in the Work during the course of construction on PDF prints.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 PREPARATION

- A. Coordinate necessary preparation required for electrical equipment installation with all trades.

3.02 ROUGH-IN

- A. Contractor shall verify lines, levels and dimensions indicated on the Drawings and shall be responsible for the accuracy of the setting out of Work and for its strict conformance with existing conditions at the Project site.
- B. Verify final locations for rough-ins with field measurements and with the requirements for the actual equipment to be connected.
- C. Locate conduits, junction boxes, cable tray, etc., to allow access to air terminal units, piping, control valves, etc., for maintenance and repair.
- D. Verify locations of outlets and types of connections required for equipment installed by others.
- E. Relocate any improperly located outlet, and replace any incorrect connection caused by lack of preparation or coordination. Also, repair to the Owner's satisfaction any hole, etc., caused by these relocations/replacements.

3.03 ELECTRICAL INSTALLATION

- A. Preparation, sequencing, handling and installation shall be in accordance with Manufacturer's written instructions and technical data particular to the product specified and/or accepted equal except as otherwise specified. Comply with the following requirements:
 - 1. Shop Drawings prepared by Manufacturer.
 - 2. Verify all dimensions by field measurements.
 - 3. Where mounting height is not detailed or dimensioned, contact the Architect for direction prior to proceeding with rough-in.
 - 4. Install systems, materials and equipment to conform with approved submittal data, including coordination Drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are indicated only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Architect.
 - 5. Install systems, materials and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.
 - 6. Install electrical equipment to facilitate servicing, maintenance and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.
 - 7. Coordinate electrical systems, equipment and materials installations with other building components.
 - 8. Install systems, materials and equipment giving right-of-way priority to other systems that are required to maintain a specified slope.
 - 9. Conform to the National Electrical Contractor's Association "Standard of Installation" for general installation practice.

3.04 CUTTING, PATCHING, PAINTING AND SEALING

- A. Structural members shall in no case be drilled, bored or notched in such a manner that will impair their structural value. Cutting of holes, if required, shall be done with core drill and only with the approval of the Architect and Structural Engineer.
- B. Do not impair strength or function of work being cut or patched, i.e., do not weaken structural members and waterproof holes through exterior walls and ground floor. Use rotary type drilling tools and concrete cutting saws to cut concrete and masonry walls. Do not use torches for cutting steel.

SECTION 26 0010 BASIC ELECTRICAL REQUIREMENTS

- C. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.

3.05 SYSTEM INTERRUPTIONS

- A. Minimize all disruptions of service to fullest extent possible, including electrical power, lighting, fire alarm, security, clock/program, communications, nurse call, paging, intercom, public address, etc., systems. Provide temporary wiring and connections to maintain existing systems in service during construction. Coordinate all disruptions of service with Owner a minimum of two weeks prior to disruption.
- B. All disruptions of service shall be done at times convenient to Owner. Include premium time in bid for work requiring disruptions of service.

3.06 FIELD QUALITY CONTROL

- A. Testing
 - 1. General testing requirements:
 - a. The purpose of testing is to ensure that all tested electrical equipment, both Contractor and Owner supplied, is operational and within industry and Manufacturer's tolerances and is installed in accordance with design Specifications.
 - b. Tests and inspections shall determine suitability for energization.
 - c. Perform tests in presence of the Owner's Representative and furnish test equipment, facilities and technical personnel required to perform tests.
 - d. Tests shall be conducted during the construction period and at completion to determine conformity with applicable codes and with these Specifications.
 - 2. Testing safety and precautions:
 - a. Safety practices shall include the following requirements:
 - 1) Applicable State and Local safety operating procedures.
 - 2) OSHA.
 - 3) NSC.
 - 4) NFPA 70E.
 - 3. Conduct following tests on electrical installation during the course of construction:
 - a. Test conductors for grounds and shorts.
 - b. Test ground system.
 - c. Test phasing of switchboards and panelboards for compliance with NEC Article 408.
 - d. Test other systems as recommended by system manufacturer and as specified elsewhere.
 - e. Perform the following tests and inspections, to verify tightness of connections, and prepare reports.
 - 1) Initial Infrared Scanning: After substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of all electrical connections in panelboards, switches, circuit breakers, etc., and each splice in cables and conductors for No. 3 AWG and larger. If equipment does not have adequate IR viewing windows, remove front and rear covers of equipment and boxes so joints, splices, and connections are accessible to portable scanner.
 - 2) Instrument: Use an infrared scanning device designed to measure temperature or detect significant deviations from normal values. Provide calibration record device.
 - 3) Report: Prepare a certified report that identifies each piece of equipment checked and describes scanning results. Include notation of deficiencies detected, remedial action taken and observations after remedial action.
 - 4. Upon completion of the project:
 - a. Adjust voltage taps on all transformers for an optimum operating level.
 - b. Adjust all auxiliary systems for optimum performance.
 - c. Measure and record voltages at each panelboard, switchboard, motor control center and switchgear. Notify engineer if voltage imbalance between phases is greater than 1% or if voltage is more than 5% from nominal value.
 - 5. All tests shall be performed with apparatus de-energized and grounded except where otherwise specifically required by test procedure.
 - 6. Coordinate with General Contractor regarding testing schedule and availability of equipment ready for testing.

SECTION 26 0010 BASIC ELECTRICAL REQUIREMENTS

7. Notify Owner two weeks in advance of any testing.
8. Any products which fail during the tests or are ruled unsatisfactory by the Owner's Representative shall be replaced, repaired or corrected as prescribed by the Owner's Representative at the expense of the Contractor. Tests shall be performed after repairs, replacements or corrections until satisfactory performance is demonstrated.
9. Include all test results in the maintenance manuals.

3.07 CLEANING

- A. Prior to energizing of electrical equipment, the Contractor shall thoroughly clean the interior of enclosures from construction debris, scrap wire, etc. using Manufacturer's approved methods and materials.
- B. Upon completion of Project, prior to final acceptance, the Contractor shall thoroughly clean both the interior and exterior of all electrical equipment per Manufacturers approved methods and materials. Remove paint splatters and other spots, dirt and debris.
- C. Touch-up paint any marks, blemishes or other finish damage suffered during installation.
- D. Remove from site all debris and rubbish accumulating as result of electrical installation. Dispose of all debris and rubbish. Leave all electrical equipment rooms broom clean.

3.08 PROJECT CLOSEOUT

- A. Special tools: Provide one of each tool required for proper operation and maintenance of the equipment provided under this Section. All tools shall be delivered to the Owner at the Project completion.
- B. Keying: Provide two keys for each lock furnished under this Section and turn over to Owner.

END OF SECTION

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PART 1 GENERAL**1.01 SECTION INCLUDES**

- A. Single conductor building wire.
- B. Wiring connectors.
- C. Electrical tape.
- D. Heat shrink tubing.
- E. Wire pulling lubricant.
- F. Cable ties.

1.02 RELATED REQUIREMENTS

- A. Section 07 8400 - Firestopping.
- B. Section 26 0526 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.
- C. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013 (Reapproved 2024).
- B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2023.
- C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes; 2010, with Editorial Revision (2020).
- D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2020).
- E. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; 2024.
- F. ASTM D4388 - Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes; 2020.
- G. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- H. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy; 2021.
- I. NETA ATS - Standard for Acceptance Testing Specifications for Electrical Power Equipment And Systems; 2025.
- J. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- K. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.
- L. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.
- M. UL 267 - Outline of Investigation for Wire-Pulling Compounds; 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.

1.04 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.

SECTION 26 0519 LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

3. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

- A. See Section 01 3000 - 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. BABA Compliance Certificate(s).
- D. Project Record Documents: Record actual installed circuiting arrangements. Record actual routing.

1.06 QUALITY ASSURANCE

- A. Comply with 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.
- D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

1.08 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.

PART 2 PRODUCTS

2.01 CONDUCTOR AND CABLE APPLICATIONS

- 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.

2.02 CONDUCTOR AND CABLE 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 products that are compliant with Build America, Buy America (BABA) Act requirements.
- 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. 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/B787M unless otherwise indicated.
 3. Tinned Copper Conductors: Comply with ASTM B33.
- I. Minimum Conductor Size:
 1. Branch Circuits: 12 AWG, minimum.

- 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.
 - 3) 20 A, 277 V circuits longer than 150 feet: 10 AWG, for voltage drop.
- J. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- K. 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 but it would be preferred to have wiring with solid insulation color throughout the wiring.
 - 3. Color Code:
 - a. 480Y/277 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Brown.
 - 2) Phase B: Orange.
 - 3) Phase C: Yellow.
 - 4) Neutral/Grounded: Gray.
 - b. 240/120 V, 1 Phase, 3 Wire System:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Neutral/Grounded: White.
 - c. Equipment Ground, All Systems: Green.

2.03 SINGLE CONDUCTOR BUILDING WIRE

- A. Manufacturers:
 - 1. Copper Building Wire:
 - a. Cerro Wire LLC: www.cerrowire.com/#sle.
 - b. Encore Wire Corporation: www.encorewire.com/#sle.
 - c. General Cable Technologies Corporation: www.generalcable.com/#sle.
 - d. Service Wire Co: www.servicewire.com/#sle.
 - e. Southwire Company: www.southwire.com/#sle.
 - f. Substitutions: See Section 01 6000 - Product Requirements.
- B. Description: Single conductor insulated wire.
- C. Conductor Stranding:
 - 1. Feeders and Branch Circuits: Solid or stranded. .
 - a. Size 10 AWG and Smaller: Solid or Str.
 - b. Size 8 AWG and Larger: Stranded.
 - 2. Control Circuits: Stranded.
- D. Insulation Voltage Rating: 600 V.
- E. Insulation:
 - 1. Copper Building Wire: Type XHHW-2.

2.04 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. 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.
- C. Wiring Connectors for Terminations:
 - 1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.

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2. 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.
 3. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.
 4. Stranded Conductors Size 10 AWG and Smaller: Use crimped terminals for connections to terminal screws.
- D. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.
- E. 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.
- F. Mechanical Connectors: Provide bolted type or set-screw type.
- G. Compression Connectors: Provide circumferential type or hex type crimp configuration.
- H. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.

2.05 ACCESSORIES

- A. Electrical Tape:
1. 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.
 2. 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.
 3. 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.
 4. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil; suitable for continuous temperature environment up to 176 degrees F.
 5. 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.
 6. 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.
- C. Wire Pulling Lubricant:
1. Listed and labeled as complying with UL 267.
 2. Suitable for use with conductors/cables and associated insulation/jackets to be installed.
 3. Suitable for use at installation temperature.
- D. Cable Ties: Material and tensile strength rating suitable for application.

PART 3 EXECUTION

3.01 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 indicated.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

- A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.03 INSTALLATION

- A. Circuiting Requirements:
 - 1. Unless dimensioned, circuit routing indicated is diagrammatic.
 - 2. When circuit destination is indicated without specific routing, determine exact routing required.
 - 3. Arrange circuiting to minimize splices.
 - 4. Include circuit lengths required to install connected devices within 10 ft of location indicated.
 - 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 indicated 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.
- B. Install products in accordance with manufacturer's instructions.
- C. Perform work in accordance with NECA 1 (general workmanship).
- D. 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.
- E. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.
- F. 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.
- G. Install conductors with a minimum of 12 inches of slack at each outlet.
- H. Where conductors are installed in enclosures for future termination by others, provide a minimum of 5 feet of slack.
- 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.

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- 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. Identify conductors and cables in accordance with Section 26 0553.
- P. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.
- Q. 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.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 4000 - 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 7.3.2. 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

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.
- D. Ground rod electrodes.
- E. Ground access wells.

1.02 RELATED REQUIREMENTS

- A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.
- B. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. IEEE 81 - IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System; 2025.
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- C. NEMA GR 1 - Grounding Rod Electrodes and Grounding Rod Electrode Couplings; 2022.
- D. NETA ATS - Standard for Acceptance Testing Specifications for Electrical Power Equipment And Systems; 2025.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.
- G. IEEE 837 – Standard for Qualifying Permanent Connections Used on Substation Grounding.

1.04 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 Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
 - 1. Do not install ground rod electrodes until final backfill and compaction is complete.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittals procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.
- C. BABA compliance certificate(s).
- 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. Project Record Documents: Record actual locations of grounding electrode system components and connections.

1.06 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS**2.01 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.
- 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. Ground Rod Electrode(s):
 - a. Provide three electrodes in an equilateral triangle configuration unless otherwise indicated or required.
 - b. Space electrodes not less than 10 feet from each other and any other ground electrode.
 - c. Where location is not indicated, locate electrode(s) at least 5 feet outside building perimeter foundation as near as possible to electrical service entrance; where possible, locate in softscape (uncovered) area.
 3. Provide additional ground electrode(s) as required to achieve specified grounding electrode system resistance.
- F. Service-Supplied System Grounding:
1. For each service disconnect, provide grounding electrode conductor to connect neutral (grounded) service conductor to grounding electrode system. Unless otherwise indicated, make connection at neutral (grounded) bus in service disconnect enclosure.
 2. For each service disconnect, provide main bonding jumper to connect neutral (grounded) bus to equipment ground bus where not factory-installed. Do not make any other connections between neutral (grounded) conductors and ground on load side of service disconnect.
- G. Separately Derived System Grounding:
1. Separately derived systems include, but are not limited to:
 - a. Transformers (except autotransformers such as buck-boost transformers).
 2. Provide grounding electrode conductor to connect derived system grounded conductor to ground rods used for service grounding electrode system. Unless otherwise indicated, make connection at neutral (grounded) bus in source enclosure.
 3. Outdoor Source: Where the source of the separately derived system is located outside the building or structure supplied, provide connection to grounding electrode at source in accordance with NFPA 70.
 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.

SECTION 26 0526 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

5. Where the source and first disconnecting means are in separate enclosures, provide supply-side bonding jumper between source and first disconnecting means.
- H. 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.

2.02 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.
 3. Provide products that are compliant with Build America, Buy America (BABA) Act requirements.
- B. Conductors for Grounding and Bonding, in addition to requirements of Section 26 0519:
 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 or compression connectors 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. allG Fabrication: www.allgfab.com/#sle.
 - b. Burndy LLC: www.burndy.com.
 - c. Harger Lightning & Grounding: www.harger.com/#sle.
 - d. nVent ERICO: www.nvent.com/#sle.
 - e. Thomas & Betts Corporation: www.tnb.com/#sle.
 - f. Substitutions: See Section 01 6000 - Product Requirements.
 5. Manufacturers - Exothermic Welded Connections:
 - a. Burndy LLC: www.burndy.com/#sle.
 - b. nVent ERICO; Cadweld: www.nvent.com/#sle.
 - c. thermOweld, subsidiary of Continental Industries; division of Burndy LLC: www.thermoweld.com/#sle.
 - d. Harger Lightning & Grounding[<>]: www.harger.com.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
- D. Ground Rod Electrodes:
 1. Comply with NEMA GR 1.
 2. Material: Copper-bonded (copper-clad) steel.
 3. Size: 3/4 inch diameter by 10 feet length, unless otherwise indicated.

SECTION 26 0526 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

4. Where rod lengths of greater than 10 feet are indicated or otherwise required, sectionalized ground rods may be used.
5. Manufacturers:
 - a. allG Fabrication: www.allgfab.com/#sle.
 - b. Galvan Industries, Inc: www.galvanelectrical.com/#sle.
 - c. Harger Lightning & Grounding: www.harger.com/#sle.
 - d. nVent ERICO: www.nvent.com/#sle.
 - e. Substitutions: See Section 01 6000 - Product Requirements.
- E. Ground Access Wells:
 1. Description: Open bottom round or rectangular well with access cover for testing and inspection; suitable for the expected load at the installed location.
 2. Size: As required to provide adequate access for testing and inspection, but not less than minimum size requirements specified.
 3. Depth: As required to extend below frost line to prevent frost upheaval, but not less than 10 inches.
 4. Cover: Factory-identified by permanent means with word "GROUND".

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that work likely to damage grounding and bonding system components has been completed.
- B. Verify that field measurements are as indicated.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Ground Rod Electrodes: Unless otherwise indicated, install ground rod electrodes vertically. Where encountered rock prohibits vertical installation, install at 45 degree angle or bury horizontally in trench at least 30 inches (750 mm) deep in accordance with NFPA 70 or install at 45 degree angle or bury horizontally in trench at least 30 inches (750 mm) deep in accordance with NFPA 70.
 1. Outdoor Installations: Unless otherwise indicated, install with top of rod 6 inches below finished grade.
- D. 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.
- E. Identify grounding and bonding system components in accordance with Section 26 0553.
- F. Permanently attach equipment and grounding conductors prior to energizing equipment.
- G. Permanently ground entire light and power system in accordance with NEC, including service equipment, distribution panels, lighting panelboards, switch and starter enclosures, motor frames, grounding type receptacles, and other exposed non-current carrying metal parts of electrical equipment.

SECTION 26 0526 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

- H. Accomplish grounding of electrical system by using insulated grounding conductor installed with feeders and branch circuit conductors in conduits. Size grounding conductors in accordance with NEC. Install from grounding bus of serving panel to ground bus of served panel, grounding screw of receptacles, lighting fixture housing, light switch outlet boxes or metal enclosures of service equipment. Ground conduits by means of grounding bushings on terminations at panelboards with installed conductor to grounding bus.

3.03 FIELD QUALITY CONTROL

- A. See Section 01 4000 - 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

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SECTION 26 0529 HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Support and attachment requirements and components for equipment, conduit, cable, boxes, and other electrical work.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete equipment pads.
- B. Section 26 0533.13 - Conduit for Electrical Systems: Additional support and attachment requirements for conduits.
- C. Section 26 0533.16 - Boxes for Electrical Systems: Additional support and attachment requirements for boxes.

1.03 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2023.
- D. MFMA-4 - Metal Framing Standards Publication; 2004.
- E. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate sizes and arrangement of supports and bases with actual equipment and components to be installed.
 - 2. Coordinate work to provide additional framing and materials required for installation.
 - 3. Coordinate compatibility of support and attachment components with mounting surfaces at installed locations.
 - 4. Coordinate arrangement of supports with ductwork, piping, equipment and other potential conflicts.
 - 5. Notify Architect of conflicts with or deviations from 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 cured; see Section 03 3000.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for channel/strut framing systems, nonpenetrating rooftop supports, and post-installed concrete/masonry anchors.
- C. BABA compliance certificate(s).

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

- A. General Requirements:
 - 1. Comply with the following. Where requirements differ, comply with most stringent.
 - a. NFPA 70.
 - b. Requirements of authorities having jurisdiction.
 - 2. Provide required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for complete installation of electrical work.
 - 3. Provide products listed, classified, and labeled as suitable for purpose intended, where applicable.

SECTION 26 0529 HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

4. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for load to be supported. Include consideration for vibration, equipment operation, and shock loads where applicable.
 5. Do not use products for applications other than as permitted by NFPA 70 and product listing.
 6. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
 7. Steel Components: Use corrosion-resistant materials suitable for environment where installed.
 - a. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel, or approved equivalent unless otherwise indicated.
 - b. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
 - c. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
 8. Provide products that are compliant with Build America, Buy America (BABA) Act requirements.
- B. Conduit and Cable Supports: Straps and clamps suitable for 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.
- C. Outlet Box Supports: Hangers and brackets suitable for boxes to be supported.
- D. Metal Channel/Strut Framing Systems:
1. Description: Factory-fabricated, continuous-slot, metal channel/strut and associated fittings, accessories, and hardware required for field assembly of supports.
 2. Comply with MFMA-4.
 3. Minimum Channel Thickness: Steel sheet, 12 gauge, 0.1046 inch.
 4. Minimum Channel Dimensions: 1-5/8 inch wide by 13/16 inch high.
- E. Nonpenetrating Rooftop Supports for Low-Slope Roofs:
1. Description: Steel pedestals with thermoplastic or rubber bases that rest on top of roofing membrane, not requiring attachment to roof structure and not penetrating roofing assembly, with support fixtures as specified.
 2. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
 3. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports.
 4. Mounting Height: Provide minimum clearance of 6 inches under supported component to top of roofing.
- F. Anchors and Fasteners:
1. Unless otherwise indicated and where not otherwise restricted, use anchor and fastener types indicated for specified applications.
 2. Concrete Structural Elements: Use preset concrete inserts, expansion anchors, or screw anchors.
 3. Concrete Surfaces: Use self-drilling anchors or expansion anchors.
 4. Solid or Grout-Filled Masonry: Use expansion anchors.
 5. Powder-actuated fasteners are not permitted.
 6. Preset Concrete Inserts: Continuous metal channel/strut and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
 - a. Manufacturer: Same as manufacturer of metal channel/strut framing system.
 - b. Comply with MFMA-4.
 - c. Channel Material: Use galvanized steel.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- 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.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install hangers and supports in accordance with NECA 1.
- C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- D. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- E. 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 to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
 - 3. Unless otherwise indicated, mount floor-mounted equipment on properly sized concrete pad 4 inches in height; see Section 03 3000.
 - 4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- F. Preset Concrete Inserts: Use manufacturer provided closure strips to inhibit concrete seepage during concrete pour.
- G. Secure fasteners in accordance with manufacturer's recommended torque settings.
- H. Remove temporary supports.

3.03 FIELD QUALITY CONTROL

- A. See Section 01 4000 - 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.
- E. Install hangers and supports as required to adequately and securely support electrical system components, in a neat and workmanlike manner, as specified in NECA 1.
 - 1. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.
 - 2. Do not drill or cut structural members.
 - 3. Obtain permission from Architect before drilling or cutting structural members.
- F. Install surface-mounted cabinets and panelboards with minimum of four anchors.
- G. In wet and damp locations use steel channel supports to stand cabinets and panelboards 1 inch off wall.

3.04 INSTALLATION - EQUIPMENT BASES AND SUPPORTS

- A. Provide housekeeping pads of concrete, minimum 4 inches thick and extending 6 inches beyond supported equipment. Refer to Section 03 30 00.
- B. Using templates furnished with equipment, install anchor bolts, and accessories for mounting and anchoring equipment.
- C. Construct supports of steel members. Brace and fasten with flanges bolted to structure.

END OF SECTION

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SECTION 26 0533.13 CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Galvanized steel rigid metal conduit (RMC).
- B. Galvanized steel intermediate metal conduit (IMC).
- C. PVC-coated galvanized steel rigid metal conduit (RMC).
- D. Liquidtight flexible metal conduit (LFMC).
- E. Galvanized steel electrical metallic tubing (EMT).
- F. Rigid polyvinyl chloride (PVC) conduit.

1.02 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 0533.16 - Boxes for Electrical Systems.
- D. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- E. Section 26 2100 - Low-Voltage Electrical Service Entrance: Additional requirements for electrical service conduits.

1.03 REFERENCE STANDARDS

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2025.
- B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S); 2020.
- C. ANSI C80.6 - American National Standard for Electrical Intermediate Metal Conduit; 2025.
- D. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- E. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2020.
- F. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC); 2025.
- G. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
- H. NEMA RN 1 - Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Metal Conduit and Intermediate Metal Conduit; 2018.
- I. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit; 2020.
- J. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing; 2021.
- K. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- L. UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.
- M. UL 360 - Liquid-Tight Flexible Metal Conduit; Current Edition, Including All Revisions.
- N. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.
- O. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.
- P. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings; Current Edition, Including All Revisions.
- Q. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.
- R. UL 1242 - Electrical Intermediate Metal Conduit-Steel; Current Edition, Including All Revisions.
- S. UL 2419 - Outline of Investigation for Electrically Conductive Corrosion Resistant Compounds; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate minimum sizes of conduits with actual type and quantity of conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
 - 2. Coordinate arrangement of conduits with structural members, ductwork, piping, equipment, and other potential conflicts.

SECTION 26 0533.13 CONDUIT FOR ELECTRICAL SYSTEMS

3. Verify exact conduit termination locations required for boxes, enclosures, and equipment.
4. Coordinate work to provide roof penetrations that preserve integrity of roofing system and do not void roof warranty.
5. Notify Architect of conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

B. Sequencing:

1. Do not begin installation of conductors and cables until installation of conduit between termination points is complete.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittals procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.
- C. BABA Compliance Certificate(s).
- D. Project Record Documents: Record actual routing for conduits installed underground, conduits embedded within concrete slabs, and conduits 2-inch (53 mm) trade size and larger.

1.06 QUALITY ASSURANCE

- A. Documents at Project Site: Maintain at project site one copy of manufacturer's instructions and shop drawings.
- B. Product Listing Organization Qualifications: Organization recognized by OSHA as Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 CONDUIT APPLICATIONS

- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70, manufacturer's instructions, and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use conduit types indicated for specified applications. Where more than one listed application applies, comply with most restrictive requirements. Where conduit type for particular application is not specified, use galvanized steel rigid metal conduit.
- C. Underground:
 1. Exterior, Direct-Buried: Use rigid PVC conduit.
 2. Where rigid polyvinyl chloride (PVC) conduit is provided, transition to galvanized steel rigid metal conduit (RMC) or galvanized steel intermediate metal conduit (IMC) where emerging from underground.
 3. Where rigid polyvinyl (PVC) conduit larger than 2-inch (53 mm) trade size is provided, use PVC-coated galvanized steel rigid metal conduit (RMC) elbows for bends.
 4. Where galvanized steel rigid metal conduit (RMC) or galvanized steel intermediate metal conduit (IMC) is installed in direct contact with earth, use corrosion protection tape or factory-applied corrosion protection coating acceptable to authorities having jurisdiction to provide supplementary corrosion protection.
- D. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit (RMC) or galvanized steel intermediate metal conduit (IMC).
- E. Exposed, Exterior: Use galvanized steel rigid metal conduit (RMC) or galvanized steel intermediate metal conduit (IMC).

2.02 CONDUIT - GENERAL REQUIREMENTS

- A. Comply with NFPA 70.
- B. Provide conduit, fittings, supports, and accessories required for complete raceway system.
- C. Provide products listed, classified, and labeled as suitable for purpose intended.
- D. Minimum Conduit Size, Unless Otherwise Indicated:
 1. Branch Circuits: 3/4-inch trade size.
 2. Branch Circuit Homeruns: 3/4-inch trade size.

SECTION 26 0533.13 CONDUIT FOR ELECTRICAL SYSTEMS

3. Underground, Exterior: 1-inch trade size.
- E. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- F. Compliant with Build America, Buy America (BABA) Act requirements.

2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Manufacturers:
 1. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.com/#sle.
 2. Nucor Tubular Products: www.nucortubular.com/#sle.
 3. Western Tube, a division of Zekelman Industries: www.westerntube.com/#sle.
 4. Wheatland Tube, a division of Zekelman Industries: www.wheatland.com/#sle.
 5. Substitutions: See Section 01 6000 - 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. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 6.
 2. Material: Use steel or malleable iron.
 - a. Do not use die cast zinc fittings.
 3. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.

2.04 GALVANIZED STEEL INTERMEDIATE METAL CONDUIT (IMC)

- A. Manufacturers:
 1. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.com/#sle.
 2. Nucor Tubular Products: www.nucortubular.com/#sle.
 3. Western Tube, a division of Zekelman Industries: www.westerntube.com/#sle.
 4. Wheatland Tube, a division of Zekelman Industries: www.wheatland.com/#sle.
 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Description: NFPA 70, Type IMC galvanized steel intermediate metal conduit complying with ANSI C80.6 and listed and labeled as complying with UL 1242.
- C. Fittings:
 1. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 1242.
 2. Material: Use steel or malleable iron.
 - a. Do not use die cast zinc fittings.
 3. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.

2.05 PVC-COATED GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Manufacturers:
 1. ABB; Ocal: www.electrification.us.abb.com/#sle.
 2. Calbond, a division of Atkore International www.calbond.com/#sle.
 3. Robroy Industries: www.robroy.com/#sle.
 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit with external polyvinyl chloride (PVC) coating complying with NEMA RN 1 and listed and labeled as complying with UL 6.
- C. Exterior Coating: Polyvinyl chloride (PVC), nominal thickness of 40 mil, 0.040 inch.
- D. PVC-Coated Boxes and Fittings:
 1. Manufacturer: Same as manufacturer of PVC-coated conduit to be installed.
 2. Nonhazardous Locations: Use boxes and fittings listed and labeled as complying with UL 514A, UL 514B, or UL 6.
 3. Material: Use steel or malleable iron.
 4. Exterior Coating: Polyvinyl chloride (PVC), minimum thickness of 40 mil, 0.040 inch.

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- E. PVC-Coated Supports: Furnish with exterior coating of polyvinyl chloride (PVC), minimum thickness of 15 mil, 0.015 inch.

2.06 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

- A. Manufacturers:
 - 1. AFC Cable Systems, a division of Atkore International: www.afcweb.com/#sle.
 - 2. Electri-Flex Company: www.electriflex.com/#sle.
 - 3. International Metal Hose: www.metalhose.com/#sle.
 - 4. Substitutions: See Section 01 6000 - 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. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron.

2.07 GALVANIZED STEEL ELECTRICAL METALLIC TUBING (EMT)

- A. Manufacturers:
 - 1. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.com/#sle.
 - 2. Nucor Tubular Products: www.nucortubular.com/#sle.
 - 3. Western Tube, a division of Zekelman Industries: www.westerntube.com/#sle.
 - 4. Wheatland Tube, a division of Zekelman Industries: www.wheatland.com/#sle.
- B. Description: NFPA 70, Type EMT galvanized steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.
- C. Fittings:
 - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron.
 - 3. Connectors and Couplings: Use compression/gland or set-screw type.
 - a. Do not use indenter type connectors and couplings.
 - 4. Damp or Wet Locations, Where Permitted: Use fittings listed for use in wet locations.

2.08 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

- A. Manufacturers:
 - 1. ABB; Carlon: www.carlon.com/#sle.
 - 2. Allied Tube & Conduit, a division of Atkore International: www.alliedeg.com/#sle.
 - 3. Cantex Inc: www.cantexinc.com/#sle.
 - 4. Heritage Plastics, a division of Atkore International: www.heritageplastics.com/#sle.
 - 5. Substitutions: See Section 01 6000 - 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.

2.09 ACCESSORIES

- A. Corrosion Protection Tape: PVC-based, minimum thickness of 20 mil, 0.020 inch.
- B. Conduit Joint Compound: Corrosion-resistant, electrically conductive compound listed as complying with UL 2419; suitable for use with 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 or polyester tape with average breaking strength of not less than 1,250 lbf.

PART 3 EXECUTION**3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive conduits.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install conduit in accordance with NECA 1.
- C. Galvanized Steel Rigid Metal Conduit (RMC): Install in accordance with NECA 101.
- D. Intermediate Metal Conduit (IMC): Install in accordance with NECA 101.
- E. PVC-Coated Galvanized Steel Rigid Metal Conduit (RMC): Install using only tools approved by manufacturer.
- F. Rigid Polyvinyl Chloride (PVC) Conduit: Install in accordance with NECA 111.
- G. Conduit Routing:
 - 1. Unless dimensioned, conduit routing indicated is diagrammatic.
 - 2. When conduit destination is indicated without specific routing, determine exact routing required.
 - 3. Conceal 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 exposed conduits:
 - a. Across floors.
 - b. Across top of parapet walls.
 - 6. Conduits installed underground or embedded in concrete may be routed in shortest possible manner unless otherwise indicated. Route 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 equivalent of four 90-degree bends between pull points.
- H. Conduit Support:
 - 1. Secure and support conduits in accordance with NFPA 70 using suitable supports and methods approved by authorities having jurisdiction; see Section 26 0529.
 - 2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
 - 3. 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.
 - 4. Use metal channel/strut with accessory conduit clamps to support multiple parallel surface-mounted conduits.
 - 5. Use nonpenetrating rooftop supports to support conduits routed across rooftops, where approved.
- 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.

SECTION 26 0533.13 CONDUIT FOR ELECTRICAL SYSTEMS

6. Provide insulating bushings, insulated throats, or listed metal fittings with smooth, rounded edges at conduit terminations to protect conductors.
7. Secure joints and connections to provide 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. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.

K. 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 calculated in accordance with NFPA 70 for rigid polyvinyl chloride (PVC) conduit installed above ground to compensate for thermal expansion and contraction.
3. Where conduits are subject to earth movement by settlement or frost.

L. Provide grounding and bonding; see Section 26 0526.

3.03 FIELD QUALITY CONTROL

- A. See Section 01 4000 - 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. Where coating of PVC-coated galvanized steel rigid metal conduit (RMC) contains cuts or abrasions, repair in accordance with manufacturer's instructions.
- D. Correct deficiencies and replace damaged or defective conduits.

3.04 CLEANING

- A. Clean interior of conduits to remove moisture and foreign matter.

3.05 PROTECTION

- A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

END OF SECTION

SECTION 26 0533.16 BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION 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.

1.02 RELATED REQUIREMENTS

- A. Section 26 0529 - Hangers and Supports for Electrical Systems.
- B. Section 26 0533.13 - Conduit for Electrical Systems:
 - 1. Conduit bodies and other fittings.
 - 2. Additional requirements for locating boxes to limit conduit length and/or number of bends between pulling points.
- C. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2016.
- C. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- D. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
- E. NFPA 70 - National Electrical Code; 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 508A - Industrial Control Panels; Current Edition, Including All Revisions.
- I. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 2. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
 - 3. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
 - 4. Coordinate the work with other trades to preserve insulation integrity.
 - 5. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for cabinets and enclosures.
- C. BABA compliance certificate(s).
- D. Project Record Documents: Record actual locations for pull boxes, cabinets and enclosures, and underground boxes/enclosures.

1.06 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

SECTION 26 0533.16 BOXES FOR ELECTRICAL SYSTEMS

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 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.
 6. Provide products that are compliant with Build America, Buy America (BABA) Act requirements.
- B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:
1. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
 2. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
 3. Minimum Box Size, Unless Otherwise Indicated:
 - a. Wiring Devices: 4 inch square by 2-1/8 inch deep (100 by 54 mm) trade size.
 - b. Ceiling Outlets: 4 inch octagonal or square by 1-1/2 inch deep (100 by 38 mm) trade size.
 4. Manufacturers:
 - a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com/#sle.
 - b. E-Lids LLC: www.e-lids.com/#sle.
 - c. Hubbell Incorporated; Bell Products: www.hubbell-rtb.com/#sle.
 - d. Hubbell Incorporated; RACO Products: www.hubbell-rtb.com/#sle.
 - e. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com/#sle.
 - f. Thomas & Betts Corporation: www.tnb.com/#sle.
 - g. Substitutions: See Section 01 6000 - Product Requirements.
- C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches:
1. Comply with NEMA EN 10250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
 2. NEMA EN 10250 Environment Type, Unless Otherwise Indicated:
 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. Manufacturers:
 - a. Cooper B-Line, a division of Eaton Corporation: www.cooperindustries.com/#sle.
 - b. Hoffman, a brand of Pentair Technical Products: www.hoffmanonline.com/#sle.
 - c. Hubbell Incorporated; Wiegmann Products: www.hubbell-wiegmann.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive boxes.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.

SECTION 26 0533.16 BOXES FOR ELECTRICAL SYSTEMS

- B. Install boxes in accordance with NECA 1 (general workmanship) 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. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.
- E. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.
- F. Box Locations:
 - 1. Unless dimensioned, box locations indicated are approximate.
 - 2. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 26 0533.13.
- G. Box Supports:
 - 1. Secure and support boxes in accordance with NFPA 70 and Section 26 0529 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.
- H. Install boxes plumb and level.
- I. Install boxes as required to preserve insulation integrity.
- J. Close unused box openings.
- K. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.
- L. Provide grounding and bonding in accordance with Section 26 0526.

3.03 CLEANING

- A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

END OF SECTION

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SECTION 26 0553 IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical identification requirements.
- B. Identification nameplates and labels.
- C. Underground warning tape.

1.02 RELATED REQUIREMENTS

- A. Section 26 0519 - 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 26 0536 - Cable Trays for Electrical Systems: Additional identification requirements for cable tray systems.
- C. Section 26 0573 - Power System Studies: Arc flash hazard warning labels.

1.03 REFERENCE STANDARDS

- A. ANSI Z535.2 - American National Standard for Environmental and Facility Safety Signs; 2023.
- B. ANSI Z535.4 - American National Standard for Product Safety Signs and Labels; 2023.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 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.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittals procedures.
- B. BABA compliance certificates.

1.06 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

1.07 FIELD CONDITIONS

- A. Do not install adhesive products when ambient temperature is lower than recommended by manufacturer.

PART 2 PRODUCTS

2.01 IDENTIFICATION REQUIREMENTS

- A. General Requirements:
 - 1. Provide products that are compliant with Build America, Buy America (BABA) Act requirements.
- B. 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 ampere rating.
 - 2) Identify voltage and phase.
 - 3) Identify power source and circuit number. Include location when not within sight of equipment.
 - 4) Identify main overcurrent protective device. Use identification label for panelboards with a door. For power distribution panelboards without a door, use identification nameplate.
 - 5) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.
 - 6) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.

SECTION 26 0553 IDENTIFICATION FOR ELECTRICAL SYSTEMS

- b. Transformers:
 - 1) Identify kVA rating.
 - 2) Identify voltage and phase for primary and secondary.
 - 3) Identify power source and circuit number. Include location when not within sight of equipment.
 - 4) Identify load(s) served. Include location when not within sight of equipment.
- 2. Service Equipment:
 - a. Use identification nameplate to identify each service disconnecting means.
 - b. For buildings or structures supplied by more than one service, or any combination of branch circuits, feeders, and services, use identification nameplate or means of identification acceptable to authority having jurisdiction at each service disconnecting means to identify all other services, feeders, and branch circuits supplying that building or structure. Verify format and descriptions with authority having jurisdiction.
- 3. Use identification nameplate to identify disconnect location for equipment with remote disconnecting means.
- 4. Available Fault Current Documentation: Use identification label to identify the available fault current and date calculations were performed at locations requiring documentation by NFPA 70 including but not limited to the following.
 - a. Service equipment.
- 5. Arc Flash Hazard Warning Labels: Comply with Section 26 0573.
- C. Identification for Conductors and Cables:
 - 1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 0519.
 - 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.
- D. Identification for Cable Tray: Comply with Section 26 0536.
- E. Identification for Boxes:
 - 1. Use voltage markers to identify highest voltage present.
 - 2. Use identification labels or handwritten text using indelible marker to identify circuits enclosed.

2.02 IDENTIFICATION NAMEPLATES AND LABELS

- A. Identification Nameplates:
 - 1. Materials:
 - a. Indoor Clean, Dry Locations: Use plastic nameplates.
 - b. Outdoor Locations: Use plastic, stainless steel, or aluminum nameplates suitable for exterior use.
 - 2. 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.
 - 3. Stainless Steel Nameplates: Minimum thickness of 1/32 inch; engraved or laser-etched text.
 - 4. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch; engraved or laser-etched text.
 - 5. 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. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
 - 2. 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. Equipment designation or other approved description.
 - 3. Text: All capitalized unless otherwise indicated.
 - 4. Minimum Text Height:

SECTION 26 0553 IDENTIFICATION FOR ELECTRICAL SYSTEMS

- a. System Designation: 1 inch.
- b. Equipment Designation: 1/2 inch.
- 5. Color:
 - a. Normal Power System: Black text on white background.
 - b. Emergency Power System: White text on red background.

2.03 UNDERGROUND WARNING TAPE

- A. Materials: Use non-detectable type polyethylene tape suitable for direct burial, unless otherwise indicated.
- B. Foil-backed Detectable Type Tape: 3 inches wide, with minimum thickness of 5 mil, unless otherwise required for proper detection.
- C. Legend: Type of service, continuously repeated over full length of tape.
- D. Color:

PART 3 EXECUTION

3.01 PREPARATION

- A. Clean surfaces to receive adhesive products according to manufacturer's instructions.

3.02 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. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
 - 3. Elevated Equipment: Legible from the floor or working platform.
 - 4. Boxes: Outside face of cover.
 - 5. Conductors and Cables: Legible from the point of access.
- 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.
 - 1. Do not use adhesives on exterior surfaces except where substrate cannot be penetrated.
- 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. Mark all handwritten text, where permitted, to be neat and legible.

3.03 FIELD QUALITY CONTROL

- A. See Section 01 4000 - 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

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PART 1 GENERAL**1.01 SECTION INCLUDES**

- A. Short-circuit study.
- B. Protective device coordination study.
- C. Arc flash and shock risk assessment.
 - 1. Includes arc flash hazard warning labels.
- D. Criteria for the selection and adjustment of equipment and associated protective devices not specified in this section, as determined by studies to be performed.

1.02 RELATED REQUIREMENTS

- A. Section 26 0553 - Identification for Electrical Systems: Additional requirements for arc flash hazard warning labels.
- B. Section 26 2416 - Panelboards.
- C. Section 26 2816.16 - Enclosed Switches.

1.03 REFERENCE STANDARDS

- A. ANSI Z535.4 - American National Standard for Product Safety Signs and Labels; 2023.
- B. IEEE 141 - IEEE Recommended Practice for Electric Power Distribution for Industrial Plants; 1993 (Reaffirmed 1999).
- C. IEEE 242 - IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems; 2001, with Errata (2003).
- D. IEEE 399 - IEEE Recommended Practice for Industrial and Commercial Power Systems Analysis; 1997.
- E. IEEE 551 - IEEE Recommended Practice for Calculating Short-Circuit Currents in Industrial and Commercial Power Systems; 2006.
- F. IEEE 1584 - IEEE Guide for Performing Arc-Flash Hazard Calculations; 2018, with Errata (2019).
- G. NETA ATS - Standard for Acceptance Testing Specifications for Electrical Power Equipment And Systems; 2025.
- H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- I. NFPA 70E - Standard for Electrical Safety in the Workplace; 2024.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the work to provide equipment and associated protective devices complying with criteria for selection and adjustment, as determined by studies to be performed.
 - 2. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
 - 1. Submit study reports prior to or concurrent with product submittals.
 - 2. Do not order equipment until matching study reports and product submittals have both been evaluated by Engineer.
 - 3. Verify naming convention for equipment identification prior to creation of final drawings, reports, and arc flash hazard warning labels (where applicable).
- C. Scheduling:
 - 1. Arrange access to existing facility for data collection with Owner.
 - 2. Where work of this section involves interruption of existing electrical service, arrange service interruption with Owner.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Study preparer's qualifications.
- C. Study reports, stamped or sealed and signed by study preparer.

SECTION 26 0573 POWER SYSTEM STUDIES

- D. Product Data: In addition to submittal requirements specified in other sections, include manufacturer's standard catalog pages and data sheets for equipment and protective devices indicating information relevant to studies.
 - 1. Identify modifications made in accordance with studies that:
 - a. Can be made at no additional cost to Owner.
 - b. As submitted will involve a change to the contract sum.
- E. Arc Flash Hazard Warning Label Samples: One of each type and legend specified.
- F. Certification that field adjustable protective devices have been set in accordance with requirements of studies.
- G. Project Record Documents: Revise studies as required to reflect as-built conditions.
 - 1. Include hard copies with operation and maintenance data submittals.
 - 2. Include computer software files used to prepare studies with file name(s) cross-referenced to specific pieces of equipment and systems.

1.06 POWER SYSTEM STUDIES

- A. Scope of Studies:
 - 1. Perform analysis of new electrical distribution system as indicated on drawings.
 - 2. Except where study descriptions below indicate exclusions, analyze system at each bus from primary protective devices of utility source down to each piece of equipment involved, including parts of system affecting calculations being performed (e.g. fault current contribution from motors).
 - 3. Include in analysis alternate sources and operating modes (including known future configurations) to determine worst case conditions.
- B. General Study Requirements:
 - 1. Comply with NFPA 70.
 - 2. Perform studies utilizing computer software complying with specified requirements; manual calculations are not permitted.
- C. Data Collection:
 - 1. Compile information on project-specific characteristics of actual installed equipment, protective devices, feeders, etc. as necessary to develop single-line diagram of electrical distribution system and associated input data for use in system modeling.
 - a. Utility Source Data: Include primary voltage, maximum and minimum three-phase and line-to-ground fault currents, impedance, X/R ratio, and primary protective device information.
 - 1) Obtain up-to-date information from Utility Company.
 - b. Transformers: Include primary and secondary voltage ratings, kVA rating, winding configuration, percent impedance, and X/R ratio.
 - c. Protective Devices:
 - 1) Circuit Breakers: Include manufacturer/model, type (e.g. thermal magnetic, electronic trip), frame size, trip rating, voltage rating, interrupting rating, available field-adjustable trip response settings, and features (e.g. zone selective interlocking).
 - 2) Fuses: Include manufacturer/model, type/class (e.g. Class J), size/rating, and speed (e.g. time delay, fast acting).
 - d. Conductors: Include feeder size, material (e.g. copper, aluminum), insulation type, voltage rating, number per phase, raceway type, and actual length.
- D. Short-Circuit Study:
 - 1. Comply with IEEE 551 and applicable portions of IEEE 141, IEEE 242, and IEEE 399.
 - 2. For purposes of determining equipment short circuit current ratings, consider conditions that may result in maximum available fault current, including but not limited to:
 - a. Maximum utility fault currents.
 - b. Maximum motor contribution.
 - c. Known operating modes (e.g. utility as source, generator as source, utility/generator in parallel, bus tie breaker open/close positions).

SECTION 26 0573 POWER SYSTEM STUDIES

3. For each bus location, calculate the maximum available three-phase bolted symmetrical and asymmetrical fault currents. For grounded systems, also calculate the maximum available line-to-ground bolted fault currents.
- E. Protective Device Coordination Study:
 1. Comply with applicable portions of IEEE 242 and IEEE 399.
 2. Analyze alternate scenarios considering known operating modes (e.g. utility as source, generator as source, utility/generator in parallel, bus tie breaker open/close positions).
 3. Analyze protective devices and associated settings for suitable margins between time-current curves to provide adequate protection for equipment and conductors while achieving full selective coordination.
- F. Arc Flash and Shock Risk Assessment:
 1. Comply with NFPA 70E.
 2. Perform incident energy and arc flash boundary calculations in accordance with IEEE 1584 (as referenced in NFPA 70E Annex D), where applicable.
 - a. Where reasonable, study preparer may assume a maximum clearing time of two seconds in accordance with IEEE 1584, provided that the conditions are such that a worker's egress from an arc flash event would not be inhibited.
 3. For equipment with main devices mounted in separate compartmentalized sections, perform calculations on both the line and load side of the main device.
 4. Analyze alternate scenarios considering conditions that may result in maximum incident energy, including but not limited to:
 - a. Maximum and minimum utility fault currents.
 - b. Maximum and minimum motor contribution.
 - c. Known operating modes (e.g. utility as source, generator as source, utility/generator in parallel, bus tie breaker open/close positions).
- G. Study Reports:
 1. General Requirements:
 - a. Identify date of study and study preparer.
 - b. Identify study methodology and software product(s) used.
 - c. Identify scope of studies, assumptions made, implications of possible alternate scenarios, and any exclusions from studies.
 - d. Identify base used for per unit values.
 - e. Include single-line diagram and associated input data used for studies; identify buses on single-line diagram as referenced in reports, and indicate bus voltage.
 - f. Include conclusions and recommendations.
 2. Short-Circuit Study:
 - a. For each scenario, identify at each bus location:
 - 1) Calculated maximum available symmetrical and asymmetrical fault currents (both three-phase and line-to-ground where applicable).
 - 2) Fault point X/R ratio.
 - 3) Associated equipment short circuit current ratings.
 - b. Identify locations where the available fault current exceeds the equipment short circuit current rating, along with recommendations.
 3. Protective Device Coordination Study:
 - a. For each scenario, include time-current coordination curves plotted on log-log scale graphs.
 - b. For each graph include (where applicable):
 - 1) Partial single-line diagram identifying the portion of the system illustrated.
 - 2) Protective Devices: Time-current curves with applicable tolerance bands for each protective device in series back to the source, plotted up to the maximum available fault current at the associated bus.
 - 3) Conductors: Damage curves.
 - 4) Transformers: Inrush points and damage curves.
 - 5) Motors: Full load current, starting curves, and damage curves.
 - 6) Capacitors: Full load current and damage curves.

- c. For each protective device, identify fixed and adjustable characteristics with available ranges and recommended settings.
 - 1) Circuit Breakers: Include long time pickup and delay, short time pickup and delay, and instantaneous pickup.
 - 2) Include ground fault pickup and delay.
 - 3) Include fuse ratings.
 - 4) Protective Relays: Include current/potential transformer ratios, tap, time dial, and instantaneous pickup.
 - d. Identify cases where either full selective coordination or adequate protection is not achieved, along with recommendations.
4. Arc Flash and Shock Risk Assessment:
- a. For the worst case for each scenario, identify at each bus location:
 - 1) Calculated incident energy and associated working distance.
 - 2) Calculated arc flash boundary.
 - 3) Bolted fault current.
 - 4) Arcing fault current.
 - 5) Clearing time.
 - 6) Arc gap distance.
 - b. For purposes of producing arc flash hazard warning labels, summarize the maximum incident energy and associated data reflecting the worst case condition of all scenarios at each bus location.

1.07 QUALITY ASSURANCE

- A. Study Preparer Qualifications: Professional electrical engineer licensed in the State in which the Project is located and with minimum five years experience in preparation of studies of similar type and complexity using specified computer software.
 - 1. Study preparer may be employed by manufacturer of electrical distribution equipment.
 - 2. Study preparer may be employed by field testing agency.
- B. Computer Software for Study Preparation: Use the latest edition of commercially available software utilizing specified methodologies.
 - 1. Products:
 - a. EasyPower LLC: www.easypower.com/#sle.
 - b. ETAP/Operation Technology, Inc: www.etap.com/#sle.
 - c. SKM Systems Analysis, Inc: www.skm.com/#sle.
 - d. Substitutions: See Section 01 6000 - Product Requirements.

PART 2 PRODUCTS

2.01 ARC FLASH HAZARD WARNING LABELS

- A. Provide warning labels complying with ANSI Z535.4 to identify arc flash hazards for each work location analyzed by the arc flash and shock risk assessment.
 - 1. Materials: Comply with Section 26 0553.
 - 2. Legend: Provide custom legend in accordance with NFPA 70E based on equipment-specific data as determined by arc flash and shock risk assessment.
 - a. Include the following information:
 - 1) Arc flash boundary.
 - 2) Available incident energy and corresponding working distance.
 - 3) Nominal system voltage.
 - 4) Limited approach boundary.
 - 5) Restricted approach boundary.
 - 6) Equipment identification.
 - 7) Study preparer, report reference, and date calculations were performed.

PART 3 EXECUTION

3.01 INSTALLATION

3.02 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Provide the services of field testing agency or equipment manufacturer's representative to perform inspection, testing, and adjusting.

SECTION 26 0573 POWER SYSTEM STUDIES

- C. Inspect and test in accordance with NETA ATS, except Section 4.
- D. Adjust equipment and protective devices for compliance with studies and recommended settings.
- E. Notify Architect of any conflicts with or deviations from studies. Obtain direction before proceeding.

END OF SECTION

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SECTION 26 2200 LOW-VOLTAGE TRANSFORMERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General-purpose transformers.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete equipment pads.
- B. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- C. Section 26 0529 - Hangers and Supports for Electrical Systems.
- D. Section 26 0533.13 - Conduit for Electrical Systems: Flexible conduit connections.

1.03 REFERENCE STANDARDS

- A. 10 CFR 431 - Energy Efficiency Program for Certain Commercial and Industrial Equipment - Distribution Transformers; Current Edition.
- B. IEEE C57.94 - IEEE Recommended Practice for Installation, Application, Operation, and Maintenance of Dry-Type Distribution and Power Transformers; 2015.
- C. IEEE C57.96 - IEEE Standard Guide for Loading Dry-Type Distribution and Power Transformers; 2013.
- D. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- E. NECA 409 - Standard for Installing and Maintaining Dry-Type Transformers; 2015.
- F. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- G. NEMA ST 20 - Dry Type Transformers for General Applications; 2021.
- H. NETA ATS - Standard for Acceptance Testing Specifications for Electrical Power Equipment And Systems; 2025.
- I. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- J. UL 506 - Standard for Specialty Transformers; Current Edition, Including All Revisions.
- K. UL 1561 - Standard for Dry-Type General Purpose and Power Transformers; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 2. Coordinate the work with placement of supports, anchors, etc. required for mounting.
 - 3. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
 - 4. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Include voltage, kVA, impedance, tap configurations, insulation system class and rated temperature rise, efficiency, sound level, enclosure ratings, outline and support point dimensions, weight, required clearances, service condition requirements, and installed features.
- C. Shop Drawings: Provide dimensioned plan and elevation views of transformers and adjacent equipment with all required clearances indicated.
- D. BABA compliance certificate(s)
- E. Source Quality Control Test Reports: Include reports for tests designated in NEMA ST 20 as design and routine tests.
- F. 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.
- G. Project Record Documents: Record actual locations of transformers.

SECTION 26 2200 LOW-VOLTAGE TRANSFORMERS

1.06 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Transformer shall bear UL Energy Efficiency Verification Mark to confirm unit meets requirements of 10 CFR Part 431.
- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. 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.
- B. Handle in accordance with manufacturer's written instructions. Lift only with lugs provided for the purpose. Handle carefully to avoid damage to transformer internal components, enclosure, and finish.

1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. ABB: www.electrification.us.abb.com/#sle.
- B. Eaton Corporation: www.eaton.com/#sle.
- C. Schneider Electric; Square D Products: www.schneider-electric.us/#sle.
- D. Siemens Industry, Inc: www.new.siemens.com/#sle.
- E. Substitutions: See Section 01 6000 - Product Requirements.
- F. Source Limitations: Provide transformers produced by same manufacturer as other electrical distribution equipment used for project and obtained from single supplier.

2.02 TRANSFORMERS - GENERAL REQUIREMENTS

- A. Description: Factory-assembled, dry type transformers for 60 Hz operation designed and manufactured in accordance with NEMA ST 20 and listed, classified, and labeled as suitable for the purpose intended.
- B. Unless noted otherwise, transformer ratings indicated are for continuous loading according to IEEE C57.96 under the following service conditions:
 - 1. Altitude: Less than 3,300 feet.
 - 2. Ambient Temperature:
 - a. Greater than 10 kVA: Not exceeding 104 degrees F.
 - b. Less than 10 kVA: Not exceeding 77 degrees F.
- C. Core: High grade, non-aging silicon steel with high magnetic permeability and low hysteresis and eddy current losses. Keep magnetic flux densities substantially below saturation point, even at 10 percent primary overvoltage. Tightly clamp core laminations to prevent plate movement and maintain consistent pressure throughout core length.
- D. Impregnate core and coil assembly with non-hydroscopic thermo-setting varnish to effectively seal out moisture and other contaminants.
- E. Basic Impulse Level: 10 kV.
- F. Ground core and coil assembly to enclosure by means of a visible flexible copper grounding strap.
- G. Isolate core and coil from enclosure using vibration-absorbing mounts.
- H. Nameplate: Include transformer connection data, ratings, wiring diagrams, and overload capacity based on rated winding temperature rise.
- I. Provide products that are compliant with Build America, Buy America (BABA) Act requirements.

2.03 GENERAL PURPOSE TRANSFORMERS

- A. Description: Self-cooled, two winding transformers listed and labeled as complying with UL 506 or UL 1561; ratings as indicated on the drawings.
- B. Insulation System and Allowable Average Winding Temperature Rise:

SECTION 26 2200 LOW-VOLTAGE TRANSFORMERS

1. Less than 15 kVA: Class 180 degrees C insulation system with 115 degrees C average winding temperature rise.
2. 15 kVA and Larger: Class 220 degrees C insulation system with 150 degrees C average winding temperature rise.
- C. Coil Conductors: Continuous aluminum windings with terminations brazed or welded.
- D. Energy Efficiency: Comply with 10 CFR 431, Subpart K.
- E. Sound Levels: Standard sound levels complying with NEMA ST 20
- F. Mounting Provisions:
 1. 15 kVA through 75 kVA: Suitable for floor mounting.
 2. Larger than 75 kVA: Suitable for floor mounting.
- G. Transformer Enclosure: Comply with NEMA ST 20.
 1. Environment Type per NEMA EN 10250: Unless otherwise indicated, as specified for the following installation locations:
 - a. Outdoor locations: Type 3R.
 2. Construction: Steel.
 - a. Less than 15 kVA: Totally enclosed, non-ventilated.
 - b. 15 kVA and Larger: Ventilated.
 3. Finish: Manufacturer's standard grey, suitable for outdoor installations.
 4. Provide lifting eyes or brackets.
- H. Accessories:
 1. Mounting Brackets: Provide manufacturer's standard brackets.
 2. Weathershield Kits: Provide for ventilated transformers installed outdoors to provide a listed NEMA EN 10250, type 3R assembly.
 3. Lug Kits: Sized as required for termination of conductors as indicated on the drawings.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that suitable support frames and anchors are installed where required and that mounting surfaces are ready to receive transformers.
- C. Perform pre-installation tests and inspections on transformers per manufacturer's instructions and as specified in NECA 409. Correct deficiencies prior to installation.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.
- C. Install transformers in accordance with NECA 409 and IEEE C57.94.
- D. Use liquid tight flexible conduit, under the provisions of Section 26 0533.13, 2 feet minimum length, for connections to transformer case. Make conduit connections to side panel of enclosure.
- E. Arrange equipment to provide minimum clearances as specified on transformer nameplate and in accordance with manufacturer's instructions and NFPA 70.
- F. Install transformers plumb and level.
- G. Transformer Support:
 1. Provide required support and attachment in accordance with Section 26 0529, where not furnished by transformer manufacturer.
 2. Unless otherwise indicated, mount floor-mounted transformers on properly sized 4 inch high concrete pad constructed in accordance with Section 03 3000.
- H. Provide grounding and bonding in accordance with Section 26 0526.
- I. Remove shipping braces and adjust bolts that attach the core and coil mounting bracket to the enclosure according to manufacturer's recommendations in order to reduce audible noise transmission.

SECTION 26 2200 LOW-VOLTAGE TRANSFORMERS

- J. Where not factory-installed, install lugs sized as required for termination of conductors as indicated.

3.03 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Perform inspections and tests listed in NETA ATS Sections 7.2.1.1 and 7.2.1.2. Tests and inspections listed as optional are not required.

3.04 ADJUSTING

- A. Measure primary and secondary voltages and make appropriate tap adjustments.
- B. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

3.05 CLEANING

- A. Clean dirt and debris from transformer components according to manufacturer's instructions.
- B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

SECTION 26 2416 PANELBOARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Power distribution panelboards.
- B. Lighting and appliance panelboards.
- C. Overcurrent protective devices for panelboards.

1.02 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.
- D. Section 26 0573 - Power System Studies: Additional criteria for the selection and adjustment of equipment and associated protective devices specified in this section.
- E. Section 26 4300 - Surge Protective Devices.

1.03 REFERENCE STANDARDS

- A. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service; 2013e, with Amendments (2022).
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- C. NECA 407 - Standard for Installing and Maintaining Panelboards; 2025.
- D. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- E. NEMA PB 1 - Panelboards; 2011.
- F. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 1000V or Less; 2023.
- G. NETA ATS - Standard for Acceptance Testing Specifications for Electrical Power Equipment And Systems; 2025.
- H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- I. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- J. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- K. UL 67 - Panelboards; Current Edition, Including All Revisions.
- L. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.
- M. UL 869A - Reference Standard for Service Equipment; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 2. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
 - 3. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for panelboards, enclosures, overcurrent protective devices, and other installed components and accessories.
- C. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, overcurrent protective device arrangement and sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.

SECTION 26 2416 PANELBOARDS

- D. BABA compliance certificate(s).
- E. Project Record Documents: Record actual installed locations of panelboards and actual installed circuiting arrangements.
- F. Maintenance Data: Include information on replacement parts and recommended maintenance procedures and intervals.
- 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. Panelboard Keys: Two of each different key.

1.06 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 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

2.01 MANUFACTURERS

- A. ABB: www.electrification.us.abb.com/#sle.
- B. Eaton Corporation: www.eaton.com/#sle.
- C. Schneider Electric: www.se.com/#sle.
- D. Siemens Industry, Inc: www.new.siemens.com/#sle.
- E. Substitutions: See Section 01 6000 - Product Requirements.
- F. Source Limitations: Provide panelboards and associated components produced by same manufacturer as other electrical distribution equipment used for project and obtained from a single supplier.

2.02 PANELBOARDS - GENERAL REQUIREMENTS

- A. Provide products listed, classified, and labeled as suitable for the purpose intended.
- B. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
 - 1. Altitude: Less than 6,600 feet.
 - 2. Ambient Temperature: as appropriate for outdoor location in Detroit, Michigan.
- C. Short Circuit Current Rating:
 - 1. Provide panelboards with listed short circuit current rating not less than the available fault current at the installed location as determined by short circuit study performed in accordance with Section 26 0573.
 - 2. Listed series ratings are not acceptable.
- D. Panelboards Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.
- E. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.
- F. Barriers: For panelboards supplied by services, feeder taps, or transformers, provide barrier(s) so that no energized, uninsulated, or ungrounded busbar or terminal is exposed to inadvertent contact when the main breaker is in the open position.
- G. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.
- H. Bussing: Sized in accordance with UL 67 temperature rise requirements.

SECTION 26 2416 PANELBOARDS

1. Provide fully rated neutral bus unless otherwise indicated, with a suitable lug for each feeder or branch circuit requiring a neutral connection.
2. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.
- I. Conductor Terminations: Suitable for use with the conductors to be installed.
- J. Enclosures: Comply with NEMA EN 10250, and list and label as complying with UL 50 and UL 50E.
 1. Environment Type per NEMA EN 10250: Unless otherwise indicated, as specified for the following installation locations:
 - a. Outdoor Locations: Type 3R.
 2. Boxes: Galvanized steel unless otherwise indicated.
 - a. Provide wiring gutters sized to accommodate the conductors to be installed.
 3. Fronts:
 - a. Fronts for Surface-Mounted Enclosures: Same dimensions as boxes.
 4. Lockable Doors: All locks keyed alike unless otherwise indicated.
- K. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.
- L. Surge Protective Devices: Where factory-installed, internally mounted surge protective devices are provided in accordance with Section 26 4300, list and label panelboards as a complete assembly including surge protective device.
- M. Arc Flash Energy-Reducing Maintenance Switching: For circuit breakers rated 1200 A or higher, provide a local accessory switch with status indicator light that permits selection of a maintenance mode with alternate electronic trip unit settings for reduced fault clearing time.
- N. Provide products that are compliant with Build America, Buy America (BABA) Act requirements.
- O. Provide electric anti-condensation strip heater in outdoor enclosures.

2.03 POWER DISTRIBUTION PANELBOARDS

- A. Description: Panelboards complying with NEMA PB 1, power and feeder distribution type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.
- B. Conductor Terminations:
 1. Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
 2. Main and Neutral Lug Type: Mechanical.
- C. Bussing:
 1. Phase and Neutral Bus Material: Copper.
 2. Ground Bus Material: Copper.
- D. Circuit Breakers:
 1. Provide bolt-on type or plug-in type secured with locking mechanical restraints.
 2. Provide electronic trip circuit breakers where indicated.
- E. Enclosures:
 1. Provide surface-mounted enclosures unless otherwise indicated.
 2. Fronts: Provide lockable hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.
 3. Provide clear plastic circuit directory holder mounted on inside of door.

2.04 LIGHTING AND APPLIANCE PANELBOARDS

- A. Description: Panelboards complying with NEMA PB 1, lighting and appliance branch circuit type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.
- B. Conductor Terminations:
 1. Main and Neutral Lug Material: Copper suitable for terminating copper conductors only.
 2. Main and Neutral Lug Type: Mechanical.
- C. Bussing:

SECTION 26 2416 PANELBOARDS

1. Phase Bus Connections: Arranged for sequential phasing of overcurrent protective devices.
2. Phase and Neutral Bus Material: Copper.
3. Ground Bus Material: Copper.
- D. Molded Case Circuit Breakers: Thermal magnetic trip circuit breakers, bolt-on type, with common trip handle for all poles; UL listed.
 1. Type SWD for lighting circuits.
 2. Type HACR for air conditioning equipment circuits.
 3. Class A ground fault interrupter circuit breakers where scheduled.
 4. Do not use tandem circuit breakers.
- E. Enclosures:
 1. Provide surface-mounted enclosures as indicated.
 2. Fronts: Provide lockable hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.
 3. Provide clear plastic circuit directory holder mounted on inside of door.
- F. Each panel shall have 20 percent additional space for future use.

2.05 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. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
 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.
 5. Electronic Trip Circuit Breakers: Furnish solid state, microprocessor-based, true rms sensing trip units.
 6. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that the ratings and configurations of the panelboards and associated components are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive panelboards.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.
- C. Install panelboards in accordance with NECA 407 and NEMA PB 1.1.
- D. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- E. Provide required support and attachment in accordance with Section 26 0529.
- F. Install panelboards plumb.
- G. Install flush-mounted panelboards so that trims fit completely flush to wall with no gaps and rough opening completely covered.

SECTION 26 2416 PANELBOARDS

- H. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches above the floor or working platform.
- I. Provide minimum of six spare 1 inch trade size conduits out of each flush-mounted panelboard stubbed into accessible space above ceiling and below floor.
- J. Provide grounding and bonding in accordance with Section 26 0526.
- K. Install all field-installed branch devices, components, and accessories.
- L. Set field-adjustable circuit breaker tripping function settings as determined by overcurrent protective device coordination study performed according to Section 26 0573.
- M. Provide filler plates to cover unused spaces in panelboards.
- N. Identify panelboards in accordance with Section 26 0553.

3.03 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. 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 _____ amperes. Tests listed as optional are not required.
- D. Correct deficiencies and replace damaged or defective panelboards or associated components.

3.04 ADJUSTING

- A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.
- B. Adjust alignment of panelboard fronts.

3.05 CLEANING

- A. Clean dirt and debris from panelboard enclosures and components according to manufacturer's instructions.
- B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

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SECTION 26 4300 SURGE PROTECTIVE DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surge protective devices for service entrance locations.
- B. Surge protective devices for branch panelboard locations.

1.02 RELATED REQUIREMENTS

- A. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- B. Section 26 2416 - Panelboards.

1.03 ABBREVIATIONS AND ACRONYMS

- A. SPD: Surge Protective Device.

1.04 REFERENCE STANDARDS

- A. MIL-STD-220 - Method of Insertion Loss Measurement; 2009c (Validated 2024).
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- C. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- D. NETA ATS - Standard for Acceptance Testing Specifications for Electrical Power Equipment And Systems; 2025.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. UL 1283 - Standard for Electromagnetic Interference Filters; Current Edition, Including All Revisions.
- G. UL 1449 - Standard for Surge Protective Devices; Current Edition, Including All Revisions.

1.05 ADMINISTRATIVE REQUIREMENTS

1.06 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Include detailed component information, voltage, surge current ratings, repetitive surge current capacity, voltage protection rating (VPR) for all protection modes, maximum continuous operating voltage (MCOV), nominal discharge current (I-n), short circuit current rating (SCCR), connection means including any required external overcurrent protection, enclosure ratings, outline and support point dimensions, weight, service condition requirements, and installed features.
 - 1. SPDs with EMI/RFI filter: Include noise attenuation performance.
- C. Shop Drawings: Include wiring diagrams showing all factory and field connections with wire and circuit breaker/fuse sizes.
- D. Certificates: Manufacturer's documentation of listing for compliance with the following standards:
 - 1. UL 1449.
 - 2. UL 1283 (for Type 2 SPDs).
- E. BABA compliance certificate(s).
- F. 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.
- G. Operation and Maintenance Data: Include information on status indicators and recommended maintenance procedures and intervals.
- H. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.
- I. Project Record Documents: Record actual connections and locations of surge protective devices.

1.07 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

SECTION 26 4300 SURGE PROTECTIVE DEVICES

1.08 DELIVERY, STORAGE, AND PROTECTION

- A. Store in a clean, dry space in accordance with manufacturer's written instructions.

1.09 FIELD CONDITIONS

- A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.10 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Manufacturer's Warranty: Provide minimum five year warranty covering repair or replacement of surge protective devices showing evidence of failure due to defective materials or workmanship.
- C. Exclude surge protective devices from any clause limiting warranty responsibility for acts of nature, including lightning, stated elsewhere.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Field-Installed, Externally Mounted Surge Protective Devices:
 - 1. Current Technology; a brand of Thomas & Betts Power Solutions: www.tnbpowersolutions.com/#sle.
 - 2. nVent ERICO: www.nvent.com/#sle.
 - 3. Raycap.
- B. Factory-installed, Internally Mounted Surge Protective Devices:
 - 1. Same as manufacturer of equipment containing surge protective device, to provide complete listed assembly including SPD.
- C. Substitutions: See Section 01 6000 - Product Requirements.
- D. Source Limitations: Provide surge protective devices produced by single manufacturer and obtained from single supplier.

2.02 SURGE PROTECTIVE DEVICES - GENERAL REQUIREMENTS

- A. Description: Factory-assembled surge protective devices (SPDs) for 60 Hz service; listed, classified, and labeled as suitable for the purpose intended; system voltage as indicated on the drawings.
- B. Unless otherwise indicated, provide field-installed, externally-mounted or factory-installed, internally-mounted SPDs.
- C. List and label as complying with UL 1449, Type 1 when connected on line side of service disconnect overcurrent device and Type 1 or 2 when connected on load side of service disconnect overcurrent device.
- D. Protected Modes:
 - 1. Wye Systems: L-N, L-G, N-G, L-L.
 - 2. Delta Systems: L-G, L-L.
 - 3. Single Split Phase Systems: L-N, L-G, N-G, L-L.
- E. UL 1449 Voltage Protection Ratings (VPRs):
 - 1. 240/120V System Voltage: Not more than 1,000 V for L-N, L-G, and N-G modes and 1,200 V for L-L mode.
 - 2. 480Y/277V System Voltage: Not more than 1,500 V for L-N, L-G, and N-G modes and 2,000 V for L-L mode.
- F. UL 1449 Maximum Continuous Operating Voltage (MCOV): Not less than 115% of nominal system voltage.
- G. Enclosure Environment Type per NEMA EN 10250: Unless otherwise indicated, as specified for the following installation locations:
 - 1. Outdoor locations: Type 3R.
- H. Mounting for Field-installed, Externally Mounted SPDs: Unless otherwise indicated, as specified for the following locations:
 - 1. Provide surface-mounted SPD where mounted adjacent to surface-mounted equipment.

SECTION 26 4300 SURGE PROTECTIVE DEVICES

- I. Equipment Containing Factory-installed, Internally Mounted SPDs: Listed and labeled as a complete assembly including SPD.
 - 1. Panelboards: See Section 26 2416.
- J. Provide products that are compliant with Build America, Buy America (BABA) Act requirements.

2.03 SURGE PROTECTIVE DEVICES FOR SERVICE ENTRANCE LOCATIONS

- A. Surge Protective Device:
 - 1. Protection Circuits: Field-replaceable modular or non-modular.
 - 2. Surge Current Rating: Not less than 160 kA per mode/320 kA per phase.
 - 3. Repetitive Surge Current Capacity: Not less than 5,000 impulses.
 - 4. UL 1449 Nominal Discharge Current (I-n): 20 kA.
 - 5. UL 1449 Short Circuit Current Rating (SCCR): Not less than the short circuit current rating of the equipment the SPD is connected to, including any series ratings.
 - 6. EMI/RFI Filtering: Provide EMI/RFI filter to attenuate electrical noise; listed as complying with UL 1283 for Type 2 SPDs (UL 1283 listing not available for Type 1 SPDs).
 - 7. Diagnostics:
 - a. Protection Status Monitoring: Provide indicator lights to report the protection for each phase.
 - b. Alarm Notification: Provide indicator light and audible alarm to report alarm condition. Provide button to manually silence audible alarm.
 - c. Surge Counter: Provide surge event counter with manual reset button, surge count retention upon power loss, and six digit LCD display that indicates quantity of surge events.
 - 8. Provide surge rated integral disconnect switch for SPDs not connected to a dedicated circuit breaker or fused switch or not direct bus connected.

2.04 SURGE PROTECTIVE DEVICES FOR BRANCH PANELBOARD LOCATIONS

- A. Surge Protective Device:
 - 1. Protection Circuits: Field-replaceable modular or non-modular.
 - 2. Surge Current Rating: Not less than 60 kA per mode/120 kA per phase.
 - 3. UL 1449 Nominal Discharge Current (I-n): 20 kA.
 - 4. UL 1449 Short Circuit Current Rating (SCCR): Not less than the available fault current at the installed location as indicated on the drawings.
 - 5. EMI/RFI Filtering: Provide EMI/RFI filter to attenuate electrical noise; listed as complying with UL 1283 for Type 2 SPDs (UL 1283 listing not available for Type 1 SPDs).
 - 6. Diagnostics:
 - a. Protection Status Monitoring: Provide indicator lights to report the protection status for each phase.
 - b. Alarm Notification: Provide indicator light and audible alarm to report alarm condition. Provide button to manually silence audible alarm.
 - c. Surge Counter: Provide surge event counter with manual reset button, surge count retention upon power loss, and six digit LCD display that indicates quantity of surge events.
 - 7. Provide surge rated integral disconnect switch for SPDs not connected to a dedicated circuit breaker or fused switch or not direct bus connected.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that the service voltage and configuration marked on the SPD are consistent with the service voltage and configuration at the location to be installed.
- C. Verify that electrical equipment is ready to accept connection of the SPD and that installed overcurrent device is consistent with requirements of drawings and manufacturer's instructions.
- D. Verify system grounding and bonding is in accordance with Section 26 0526, including bonding of neutral and ground for service entrance and separately derived systems where applicable. Do not energize SPD until deficiencies have been corrected.
- E. Verify that conditions are satisfactory for installation prior to starting work.

SECTION 26 4300 SURGE PROTECTIVE DEVICES

3.02 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Install conductors between SPD and equipment terminations as short and straight as possible, not exceeding manufacturer's recommended maximum conductor length. Breaker locations may be reasonably rearranged in order to provide leads as short and straight as possible. Twist conductors together to reduce inductance.
- E. Do not energize SPD until bonding of neutral and ground for service entrance and separately derived systems is complete in accordance with Section 26 0526 where applicable. Replace SPDs damaged by improper or missing neutral-ground bond.
- F. Disconnect SPD prior to performing any high potential testing. Replace SPDs damaged by performing high potential testing with SPD connected.

3.03 FIELD QUALITY CONTROL

- A. See Section 01 4000 - 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 7.19.1.
- D. Procure services of a qualified manufacturer's representative to observe installation and assist in inspection, testing, and adjusting. Include manufacturer's reports with field quality control submittals.

3.04 CLEANING

- A. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

SECTION 31 2200 GRADING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Rough grading.
- B. Fine grading.

1.02 RELATED REQUIREMENTS

- A. Section 31 2316 - Excavation.

PART 3 EXECUTION

2.01 EXAMINATION

- A. Verify survey bench mark and intended elevations for grading areas are as indicated.
- B. Verify the absence of standing or ponding water.

2.02 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Stake and flag locations of known utilities.
- C. Locate, identify, and protect above- and below-grade utilities to remain.
- D. Notify utility company to remove and relocate utilities.
- E. Provide temporary means and methods to remove standing or ponding water from areas prior to grading.
- F. Protect site features to remain, including but not limited to bench marks, survey control points, and fences.

2.03 ROUGH GRADING

- A. Excavate and fill subgrade material to elevations indicated on plans.
- B. Remove and replace unsuitable materials as specified fill.

2.04 FINE GRADING

- A. Scrape and spread subgrade material uniformly smooth and without disruptions as indicated on drawings.

2.05 TOLERANCES

- A. Top Surface: Plus or minus 1/2 inch.

2.06 REPAIR AND RESTORATION

- A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.
- B. Trees to Remain: If damaged due to this work, trim broken branches and repair bark wounds; if root damage has occurred, obtain instructions from Architect as to remedy.
- C. Other Existing Vegetation to Remain: If damaged due to this work, replace with vegetation of equivalent species and size.

2.07 FIELD QUALITY CONTROL

- A. See Section 31 2323 for compaction density testing.
- B. All excavated or cut areas shall be proof rolled and the top 12 inches of finished subgrade shall be compacted to 95 percent of maximum density in accordance with ASTM D1557.

2.08 CLEANING

- A. See Section 01 7000 - Execution and Closeout Requirements for additional requirements.
- B. Leave site clean and raked, ready to receive work.

END OF SECTION

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SECTION 31 2316.13 TRENCHING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Trench excavation.
- B. Utility bedding and cover.
- C. Backfill and compaction.

1.02 RELATED REQUIREMENTS

- A. Section 31 2200 - Grading.
- B. Section 31 2316 - Excavation.

1.03 REFERENCE STANDARDS

- A. 29 CFR 1926 - Safety and Health Regulations for Construction; Current Edition.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Project Record Documents: Record drawings at project closeout according to 01 7000 - Execution and Closeout Requirements. Show locations of installed support materials left in place, including referenced locations and depths, on drawings.
- C. Field Quality Control Submittals:
 - 1. Results of compaction density tests.

PART 2 PRODUCTS

2.01 FILL MATERIALS

- A. Bedding and Fill to Correct Over-Excavation:
 - 1. See Section 31 2323 for bedding and corrective fill materials at general excavations.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify survey benchmarks and intended elevations for work are as indicated on drawings.
- B. Determine the prevailing groundwater level prior to excavation. If dewatering is necessary, submit dewatering plan to control groundwater intrusion with comprehensive dewatering procedures for review by Architect.

3.02 PREPARATION

- A. Identify required lines, levels, contours, and datum locations.
- B. Protect survey benchmarks, control points, and monuments from excavating equipment and vehicular traffic.
- C. Protect existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- D. Protect plants, lawns, rock outcroppings, and other features to remain.
- E. Locate and identify existing utilities to remain as indicated on drawings and protect from damage.
- F. Grade top perimeter of excavation to prevent surface water from draining into excavation. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by Architect.

3.03 SUPPORT AND PROTECTION

- A. Excavation Safety: Comply with OSHA's Excavation Standard, 29 CFR 1926, Subpart P.

3.04 TRENCH EXCAVATION

- A. Grade top perimeter of excavation to prevent surface water collection.
- B. General: Cut trenches neat and clean.
 - 1. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.
 - 2. Cut trenches wide enough to allow inspection of installed utilities.
 - 3. Hand trim excavations and remove loose matter.
 - 4. Remove large stones and other hard matter that could damage piping or impede consistent backfilling or compaction.
- C. Utility Preparation: Rake trench bottom to uniform grade.
 - 1. Remove unsuitable subgrade and backfill.

SECTION 31 2316.13 TRENCHING

2. Compact subgrade to density equal to or greater than subsequent fill material requirements.

- D. Maintain trenches and prevent loose soil or rocks from entering.

3.05 UTILITY BEDDING AND COVER

- A. Crushed Stone: Compact to 95 percent of maximum dry density.
 1. Bedding: Fill to subgrade elevation; rake smooth.
 2. Cover: Completely cover utility.
- B. Sand: Compact in maximum 8-inch lifts to 95 percent of maximum dry density.
 1. Bedding: Fill to subgrade elevation; rake smooth.

3.06 BACKFILL AND COMPACTION

- A. Fill to subgrade elevations unless otherwise indicated on drawings.

3.07 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for general requirements for field inspection and testing.

3.08 CLEANING

- A. See Section 01 7000 - Execution and Closeout Requirements for additional requirements.
- B. Stockpile excavated material re-used in area designated on-site; see Section 31 2200.
- C. Remove excavated material that is not required or unsuitable for re-use from site.

3.09 PROTECTION

- A. Divert surface water away from excavations.
- B. Keep excavations free of standing water.
- C. Maintain stability of banks and loose soils; prevent from falling into excavations.
- D. Maintain excavations in neat and square, undisturbed condition.

SECTION 31 2316 EXCAVATION

PART 3 EXECUTION

1.01 EXCAVATION

- A. General Excavation:
 - 1. Excavate to indicated contours, elevations, and grades.
- B. Excavation to accommodate foundations, underground tanks, and underground utilities.
 - 1. Excavate to specified elevations.
- C. Notify Architect of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.

END OF SECTION

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SECTION 32 1123 AGGREGATE BASE COURSES

1.01 SECTION INCLUDES

- A. Aggregate base course.

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

- A. AASHTO M 147 - Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base, and Surface Courses; 2017 (Reapproved 2021).
- B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)); 2012 (Reapproved 2021).
- C. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method; 2015, with Editorial Revision (2016).
- D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)); 2012 (Reapproved 2021).
- E. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2015.
- F. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2017 (Reapproved 2025).
- G. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils; 2017, with Editorial Revision (2018).
- H. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2017a, with Editorial Revision (2021).
- I. MDOT Standard Specifications for Construction, 2012.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Materials Sources: Submit name of imported materials source.
- C. Aggregate Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
 - 1. Test Reports provided are to be done within 12 months prior to the project bid date.
- D. Compaction Density Test Reports.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Aggregate Storage, General:
 - 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
 - 2. Prevent contamination.
 - 3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Dense Aggregate Type 21AA, Modified: Coarse aggregate, conforming to State of Michigan Highway Department standard.
 - 1. Graded in accordance with the following limits:
 - a. 1 1/2 inch: 100 percent passing.
 - b. 1 inch: 85 to 100 percent passing.
 - c. 1/2 inch: 50 to 70 percent passing.
 - d. No. 8: 20 to 35 percent passing.
 - e. No. 30: 8 to 22 percent passing.
 - f. Loss by Wash: 0 to 7 percent passing.
 - 2. Crushed material, 95% minimum.
 - 3. Loss, Los Angeles Abrasion (MTM 102), 50% maximum.

2.02 SOURCE QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for general requirements for testing and analysis of aggregate materials.
- B. Where aggregate materials are specified using ASTM D2487 classification, test and analyze samples for compliance before delivery to site.
- C. If tests indicate materials do not meet specified requirements, change material and retest.

SECTION 32 1123 AGGREGATE BASE COURSES

- D. Provide materials of each type from same source throughout the Work.

2.03 EXAMINATION

- A. Verify that survey bench marks and intended elevations for the work are as indicated.
- B. Verify substrate has been inspected, gradients and elevations are correct, and is dry.

2.04 PREPARATION

- A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.
- B. Do not place aggregate on soft, muddy, or frozen surfaces.
- C. Under Bituminous Concrete Paving:
 - 1. Place aggregate to a total compacted thickness as shown on the drawings.
 - 2. Compact to 95 percent of maximum modified proctor, dry density.

2.05 TOLERANCES

- A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.
- B. Scheduled Compacted Thickness: Within 1/4 inch.
- C. Variation From Design Elevation: Within 1/2 inch.

2.06 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements for general requirements for field inspection and testing.
- B. Compaction density testing will be performed on compacted aggregate base course in accordance with ASTM D1557 or ASTM D6938.
- C. If tests indicate work does not meet specified requirements, remove work, replace and retest.
- D. Frequency of Tests: as required to ensure properly compacted aggregate base.
- E. Proof roll compacted aggregate at surfaces that will be under paving.

2.07 CLEANING

- A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

SECTION 32 1216 ASPHALT PAVING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Double course bituminous concrete paving.

1.02 RELATED REQUIREMENTS

- A. Section 31 2200 - Grading: Preparation of site for paving and base.
- B. Section 31 2323 - Fill: Compacted subgrade for paving.
- C. Section 32 1123 - Aggregate Base Courses: Aggregate base course.

1.03 REFERENCE STANDARDS

- A. AI MS-2 - Asphalt Mix Design Methods; 2015.
- B. MDOT Standard Specifications for Construction; 2012.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Design Mix: Submit actual design mix to the Engineer for review and/or approval. Do not place any asphaltic concrete paving until receipt of Engineer's approval.
 - 1. Design mix submittal shall follow the format as indicated in the Asphalt Institute Manual MS-2, Marshall Stability Method.
 - 2. Include the type/name of the mix, gradation analysis, asphalt cement grade used, Marshall Stability (lbs.), flow, effective asphalt content (percent), and direct references to the applicable highway department specification sections for each material.
 - 3. Design shall be for a mixture listed in the most recent edition of roadway specifications of the state in which the project is to be constructed.
- C. Written Warranty.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with Michigan Department of Transportation standards.
- B. Mixing Plant: Complying with Michigan Department of Transportation standards.
- C. Obtain materials from same source throughout.

1.06 FIELD CONDITIONS

- A. Do not place asphalt when ambient air or base surface temperature is less than 40 degrees F, or surface is wet or frozen.
- B. Applicable weather and seasonal limitation of MDOT standards apply.

1.07 WARRANTY

- A. Furnish written warranty, executed by Contractor, for quality of paving. Contractor shall make necessary repairs to asphalt due to defects or faulty materials or workmanship, which may appear within the warranty period. This shall include but is not limited to asphalt cracking, water ponding, subgrade failures, and separation of longitudinal construction joints.
- B. Warranty Period: 2 years from date of Substantial Completion. The Owner, Engineer and Paving Contractor, prior to the expiration of the warranty, shall make a review of the asphalt areas.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

- A. Comply with applicable code for paving work on public property.

2.02 MATERIALS

- A. Sand Subbase: Class II sand conforming to MDOT standard.
- B. Aggregate Base: Per Section 32 1123.
- C. Aggregate for Binder Course: State of Michigan Department of Transportation standards.
- D. Aggregate for Wearing Course: State of Michigan Department of Transportation standards.
- E. Tack Coat: In accordance with State of Michigan Highways standards.
- F. Hot Poured Rubber Joint Sealer: Provide one of the following or approved equal.
 - 1. Roadsaver 221: Crafcro Inc.
 - 2. Product #9005 or #9030: Koch Material Company
 - 3. Sealtight Hi-SpecL W.R. Meadows, Inc.

SECTION 32 1216 ASPHALT PAVING

2.03 ASPHALT PAVING MIXES AND MIX DESIGN

Criteria	minimu m	maximu m	minimu m	maximu m					
Asphalt Content (%)	4.5	8.0	5.0	8.0					
Air Void Content Target (%)	3.0	3.5	3.0	3.0					
VMA (%)	15.0	15.5	15.5	16.5					
RAP (%)	0	17	0	17					
Crushed Aggregate (%)	60	90	60	---	MDO T Mixtur e Type	Levelin g Course	Levelin g Course	Wearin g Course	Wearin g Course

- A. Parking lots and access drives:
 - 1. Asphalt Binder Course: State of Michigan Highways standards.
 - 2. Leveling Course Gradation: Michigan DOT 13A
 - 3. Wearing Course Gradation: Michigan DOT 36A
- B. Asphalt Wearing Course: 5 to 7 percent of asphalt cement by weight in mixture in accordance with AI MS-2.
- C. Performance Grade Binder: PG 58-28
- D. Submit proposed mix design for review prior to beginning of work.

2.04 SOURCE QUALITY CONTROL

- A. Test mix design and samples in accordance with current Michigan Department of Transportation Standards.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that compacted subgrade is dry and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.

3.02 AGGREGATE BASE COURSE

- A. See Section 32 1123.
- B. Proof-Rolling and Inspection.
 - 1. Examine subgrade, surface, and elevations to which base materials and hot mix asphalt pavement will be installed. Proof-rolling will be required for acceptance of final structural sub-grade, prior to start of pavement operations.
 - 2. Notify the Engineer in writing of the conditions detrimental to the completion of the work.
 - 3. Do not proceed with the work until unsatisfactory conditions have been corrected, and acceptable to the Engineer.
- C. Surface Preparation.
 - 1. Schedule paving operations so that aggregate base is not exposed longer than a maximum of 7 days. Contractor responsible for any rework required due to exposure to weather.
 - a. Application of bituminous materials shall avoid smearing of adjoining concrete surfaces. Remove and clean damaged surfaces.

3.03 PREPARATION - TACK COAT

- A. Apply tack coat in accordance with manufacturer's instructions.
- B. Apply tack coat on asphalt or concrete surfaces over subgrade surface at uniform rate of 1/10 gal/sq yd.

SECTION 32 1216 ASPHALT PAVING

- C. Apply tack coat to contact surfaces of curbs and gutters.
- D. Coat surfaces of manhole frames with oil to prevent bond with asphalt pavement. Do not tack coat these surfaces.

3.04 PLACING ASPHALT PAVEMENT - DOUBLE COURSE

- A. General: Place hot mix asphalt mixture on prepared surface, spread and strike off. Spread mixture at a minimum temperature of 275 degrees F. Maximum temperature shall not exceed 325 degrees F.
 - 1. Loads will be rejected that have a temperature either below 250 degrees F or greater than 20 degrees F above the recommended maximum mixing temperature specified by the binder producer at time of discharge.
 - 2. Place each course to required grade, cross section, and compacted thickness.
- B. Pavement Placement: Place in strips not less than 10 feet wide, unless otherwise acceptable to the Engineer. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips.
- C. Joints: Make joints between old and new pavements, or between successive days' work, to insure continuous bond between adjoining work. Construct joints to have same texture, density and smoothness as other sections of hot mix asphalt course. Clean contact surfaces and apply tack coat.
 - 1. Ensure a smooth transition where asphalt pavement abuts building concrete, with special attention at front building sidewalks. Asphalt pavement must be flush with concrete.
- D. Place asphalt binder course within 24 hours of applying primer or tack coat.
- E. Place asphalt wearing course within two hours of placing and compacting binder course.
- F. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.
- G. Perform rolling with consecutive passes to achieve even and smooth finish, without roller marks.

3.05 TOLERANCES

- A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.
- B. Variation from True Elevation: Within 1/2 inch.
- C. Check surface areas at intervals as directed by Engineer. Areas of ponding or standing water in excess of 1/8 inch will not be acceptable. Defective portions of the pavement will be removed and replaced as directed by the Engineer.

3.06 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for quality control.
- B. Provide field inspection and testing. Take samples and perform tests in accordance with AI MS-2.
- C. All bituminous material shall be compacted to a density of 94 to 97 percent of the theoretical maximum density as determined by the Rice Method.

3.07 PROTECTION

- A. Immediately after placement, protect pavement from mechanical injury for 2 days or until surface temperature is less than 140 degrees F.

3.08 REPAIR AND REPLACEMENT

- A. Sawcutting and Patching:
 - 1. Remove and replace leveling and/or wearing course areas mixed with foreign materials and defective areas.
 - 2. Sawcut full depth of existing pavement in perpendicular and parallel directions to adjoining surfaces to ensure a quality and aesthetically pleasing repair. Replacement may need to extend beyond the area of repair.
 - 3. Cut out areas and fill with fresh, hot mix asphalt.
 - 4. Compact by rolling to specified density and smoothness.
 - 5. Sawcut or route new joint and fill with hot poured rubber joint sealer.

3.09 CLEAN-UP

- A. For duration of work, maintain work area free from waste material, debris, and the similar items.

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- B. Remove all excess material, debris and equipment.

END OF SECTION