PROJECT MANUAL

New Maintenance Building Quincy Park District 1231 Bonansinga Drive, Quincy, IL

A/E Project No. 19-0363

Design Firm No. 184-2738

Klingner & Associates, P.C. 616 N. 24th St. Quincy, IL 62301 (217) 223-3670 Engineers Architects

June 2020



SECTION 000103 PROJECT DIRECTORY

OWNER:

Quincy Park District 1231 Bonansinga Drive Rome Frericks, Executive Director Matt Higley, Director of Parks (217)223-7703

ENGINEER:

KLINGNER & ASSOCIATES, P.C.

616 North 24th Street Quincy, IL 62301 *D. Cullan Duke, P.L.A* (217) 223-3670

SECTION 000107 SEALS PAGE

1.1 DESIGN PROFESSIONALS OF RECORD

- A. Licensed Architect:
 - 1. Christina R. Cane
 - 2. #001-022919

- B. Mechanical Engineer:
 - 1. Joel Knochel, P.E.
 - 2. #062-062983

- C. Civil Engineer:
 - 1. Curt Wavering, P.E.
 - 2. #062-059250

- D. Structural Engineer
 - 1. Alan D, Lukens, S.E.
 - 2. #081-005167





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SECTION 001113

ADVERTISEMENT FOR BIDS

QUINCY PARK DISTRICT

Time and place of opening bids: Sealed proposals for a **New Maintenance Building** in Quincy, Adams County, Illinois, described herein will be received at the office of the Quincy Park District, 1231 Bonansinga Drive, Quincy, Illinois 62301 until **10:00 A.M. on July 2, 2020** and at that time publicly opened and read at Quincy Park District.

Description of work: Construction of a new maintenance building with associated site work.

A Pre-bid conference will be held at 10:00 a.m. on June 25, 2020 at the Park District Office, 1231 Bonansinga Drive, Quincy, IL.

Plans and specifications prepared by Klingner & Associates, PC are available through the Quincy Park District, 1231 Bonansinga Drive, Quincy, IL 62301, Telephone: (217-223-7703).

Prospective Bidders may examine the Bidding Documents at the Issuing Office Monday through Friday between the hours of 8:00 am and 5:00 pm, and may obtain copies of the Bidding Documents from the Issuing Office as described below.

Complete Digital Contract Documents, including Drawings and Technical Specifications, are available in PDF format from the Quincy Park District. Paper sets are the responsibility of the Contractor.

All proposals shall be accompanied by either a bid bond on the "Proposal Bid Bond" form contained in the proposal, executed by a corporate surety company satisfactory to the Quincy Park District, or a bank cashier's check, an irrevocable letter of credit or a properly certified check payable to the Quincy Park District, for not less than 5 percent (5%) of the amount bid, or for the amount listed in the specifications.

The Quincy Park District reserves the right to reject any or all proposals and to waive technicalities, and reserves the right to determine the qualifications of any and all contractors to perform the work required under this contract.

No bid may be withdrawn after the time for opening of the bids is past.

The Quincy Park District is an Equal Opportunity Employer and encourages minority group participation in the bidding and construction process.

Bidders are notified that not less than the prevailing wage rate as determined by the Illinois Department of Labor shall be paid to all workmen performing work under this contract.

BY ORDER OF: Matt Higley Director of Parks

SECTION 002113 INSTRUCTIONS TO BIDDERS

1.0 DEFINED TERMS

1.01 Terms used in these Instructions to Bidders will have the meanings indicated in the General Conditions (C-700 2013 Edition) and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below which are applicable to both the singular and plural thereof:

- A. **Bidder**--The individual or entity who submits a Bid directly to OWNER.
- B. **Issuing Office-**-The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.
- C. **Successful Bidder**--The lowest responsible Bidder submitting a responsive Bid to whom OWNER (on the basis of OWNER's evaluation as hereinafter provided) makes an award.

2.0 COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents in the number and for the deposit sum, if any, stated in the Advertisement for Bids, may be obtained from the Quincy Park District as stated in the Advertisement for Bids.

2.02 Complete sets of Bidding Documents must be used in preparing Bids; neither OWNER nor ENGINEER/ARCHITECT assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.03 OWNER and ENGINEER/ARCHITECT in making copies of Bidding Documents available on the above terms do so only for the purpose of obtaining Bids on the Work and do not confer a license or grant for any other use.

3.0 QUALIFICATIONS OF BIDDERS

3.01 To demonstrate Bidder's qualifications to perform the Work, within five days of OWNER's request, Bidder shall submit written evidence such as financial data, previous experience, present commitments, and other such data as may be requested.

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

3.03 Bidder is advised to carefully review those portions of the Bid Form requiring Bidder's representations and certifications.

4.0 SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OTHER WORK AT THE SITE

4.01 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.

4.02 Reports of explorations and tests of subsurface conditions at or contiguous to the Site may have been used by the ENGINEER/ARCHITECT in preparing the Bidding Documents. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in the General Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws form any "technical data" or any other data, interpretations, opinions or information contained in such reports or shown or indicated in such drawings.

4.03 Information and data shown or indicated in the Bidding Documents with respect to Underground Facilities at or contiguous to the Site is based upon data and information furnished to the OWNER and ENGINEER/ARCHITECT by owners of such Underground Facilities, including OWNER, or others.

5.0 BIDDER'S REPRESENTATIONS

It is the responsibility of each Bidder before submitting a Bid to:

- A. Examine and carefully study the Bidding Documents and any data and reference items identified in the Bidding Documents;
- B. Visit the Site to become familiar with local and Site conditions that may affect cost, progress, performance or furnishing of the Work;
- C. Become familiar with and satisfy itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work;
- D. Carefully study all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site.
- E. Become aware of the general nature of the work to be performed by OWNER and others at the Site that relates to the Work as indicated in the Bidding Documents;
- F. Promptly give ENGINEER/ARCHITECT written notice of all conflicts, errors, ambiguities or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder;
- G. Determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work; and
- H. Agree that the submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

6.0 PREBID CONFERENCE

6.01 A Pre-bid conference will be held at 10:00 a.m. on June 25, 2020 at the Park District Office. Representatives of OWNER and ENGINEER/ARCHITECT will be present to discuss the Project. Bidders are encouraged to attend and participate in the conference. ENGINEER/ARCHITECT will transmit to all prospective Bidders of record such Addenda as ENGINEER/ARCHITECT considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

7.0 INTERPRETATIONS AND ADDENDA

7.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to ENGINEER/ARCHITECT in writing. Interpretations or clarifications considered necessary by the ENGINEER/ARCHITECT in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by the ENGINEER/ARCHITECT as having received the Bidding Documents. Questions received less than ten days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

7.02 Addenda may also be issued to clarify, correct, or change the Bidding Documents as deemed advisable by OWNER or ENGINEER/ARCHITECT.

8.0 BID SECURITY

8.01 A Bid must be accompanied by Bid security made payable to OWNER in an amount of five percent (5%) of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a certified check, bank money order, or a Bid bond (on the form included in the Bidding Documents) issued by a surety meeting the requirements of Paragraphs 6.01 and 6.02 of the General Conditions

8.02 The Bid security of the apparent Successful Bidder will be retained until OWNER awards the contract to such Bidder, and such Bidder has executed the Contract Documents, furnished the required contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, OWNER may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited. Such forfeiture shall be OWNER's exclusive remedy if Bidder defaults.

8.03 The Bid security of other Bidders that OWNER believes to have a reasonable chance of receiving the award may be retained by OWNER until the earlier of seven days after the Effective Date of the Contract or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released

8.04 Bid security of other Bidders whom OWNER believes do not have a reasonable chance of receiving the award will be returned within seven (7) days after the Bid opening.

9.0 CONTRACT TIME

9.01 The number of days within which, or the dates by which, the Work is to be substantially completed and completed and ready for final payment, are set forth in the Agreement.

10.0 LIQUIDATED DAMAGES

10.01 Provisions for liquidated damages, if any, for failure to timely attain Substantial Completion, or completion of the Work in readiness for final payment, are set forth in the Agreement.

11.0 SUBSTITUTE OR "OR-EQUAL" ITEMS

11.01 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, and those "or-equal" or substitute or materials and equipment subsequently approved by ENGINEER/ARCHITECT prior to the submittal of Bids and identified by Addendum. No item of material or equipment will be considered by ENGINEER/ARCHITECT as an "or-equal" or substitute unless written request for approval has been submitted by Bidder and has been received by ENGINEER/ARCHITECT at least 15 days prior to the date for receipt of Bids. Each such request shall comply with the requirements of Paragraphs 7.04 and 7.05 of the General Conditions. The burden of proof of the merit of the proposed item is upon Bidder. ENGINEER/ARCHITECT's decision of approval or disapproval of a proposed item will be final. If ENGINEER/ARCHITECT approves any such proposed item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner.

11.02 All prices that Bidder sets forth in its Bid shall 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.

12.0 SUBCONTRACTORS, SUPPLIERS AND OTHERS

12.01 If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers and individuals, or entities to be submitted to OWNER in advance of the specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within five days after the Bid opening submit to OWNER a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual, or entity if requested by OWNER. If OWNER or ENGINEER/ARCHITECT, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, OWNER may before the Notice of Award is given, request apparent Successful Bidder to submit a substitute in which case the apparent Successful Bidder shall submit an acceptable 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.

12.02 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, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which OWNER or ENGINEER/ARCHITECT makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to OWNER and ENGINEER/ARCHITECT subject to revocation of such acceptance after the Effective Date of the Agreement as provided in Paragraph 7.06 of the General Conditions.

12.03 CONTRACTOR shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom CONTRACTOR has reasonable objection.

13.0 PREPARATION OF BID

13.01 The Bid form is included with the Bidding Documents; additional copies may be obtained from the ENGINEER/ARCHITECT. Only specific portions of the Bidding Documents are required to be submitted with the Bid. These documents shall at minimum include:

• Bid Proposal, with Bidding Signature & Certification Form

• Bid Security (as specified)

For the convenience of the Bidder, the sheets to be returned are marked "Return with Bid". The Bidder may return the entire project manual if desired.

13.02 All blanks on the Bid Form shall be completed in ink and the Bid Form signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each section, Bid item, alternate, unit price item, or other items listed therein.

13.03 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."

13.04 A Bid by a corporation shall 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 shall be shown.

13.05 A Bid by a partnership shall 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 partnership's address for receiving notices shall be shown.

13.06 A Bid by a limited liability company shall 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 firm's address for receiving notices shall be shown.

13.07 A Bid by an individual shall show the Bidder's name and address for receiving notices.

13.08 A Bid by a joint venture shall be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture's address for receiving notices shall be shown.

13.09 All names shall be printed in ink below the signatures.

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

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

14.0 BASIS OF BID

14.01 Lump Sum

A. Bidders shall submit a Bid on a lump sum basis as set forth in the Bid Form.

15.0 SUBMITTAL OF BID

15.01 A Bid shall be submitted no later than the date and time prescribed and the place indicated in the Advertisement or Invitation to Bid and shall be enclosed in an opaque sealed envelope plainly marked with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of the Bidder, and accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate envelope plainly marked on the outside with the notation "BID ENCLOSED."

15.02 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.

16.0 MODIFICATION AND WITHDRAWAL OF BID

16.01 A 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.

16.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 16.01 and submit a new Bid prior to the date and time for the opening of Bids.

16.03 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, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work.

17.0 OPENING OF BIDS

17.01 Bids will be opened at the time and place indicated in the advertisement or invitation to bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

18.0 BIDS TO REMAIN SUBJECT TO ACCEPTANCE

18.01 All Bids will remain subject to acceptance for forty-five (45) days after the day of the bid opening, but OWNER may, in its sole discretion, release any Bid and return the Bid security prior to that date.

19.0 EVALUATION OF BIDS AND AWARD OF CONTRACT

19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. OWNER will reject the Bid of any Bidder that OWNER finds, after reasonable inquiry and evaluation, to not be responsible. 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, then the OWNER will reject the Bid as nonresponsive; provided that OWNER also reserves the right to waive all minor informalities not involving price, time, or changes in the Work. If OWNER awards the contract for the Work, such award shall be to the responsible Bidder submitting the lowest responsive Bid.

19.02 Evaluation of Bids

A. In evaluating Bids, OWNER will consider whether or not 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.

19.03 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.

19.04 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.

20.0 BONDS AND INSURANCE

20.01 Article 6 of the General Conditions, as may be modified, sets forth OWNER's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the executed Agreement to the OWNER, it must be accompanied by required bonds and insurance documentation.

21.0 SIGNING OF AGREEMENT

21.01 When OWNER issues a Notice of Award to the Successful Bidder, it shall be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder shall 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 ten days thereafter, OWNER shall deliver one fully executed counterpart of the Agreement to Successful Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

22.0 SALES AND USE TAXES

22.01 The Quincy Park District is exempt from Illinois State Sales and Use taxes on materials and equipment to be incorporated in the Public Owned Work, Exemption NO. E-9998-9603-03. Said taxes shall not be included in the Bid.

23.0 RETAINAGE

23.01 Provisions concerning retainage during the progress of the Work are set forth in the Agreement.

24.0 CONTRACT ADMINISTRATION

24.01 For the purposes of administering this contract, the authorized representative of the OWNER will be Matt Higley, Director of Parks.

SECTION 004200 BID PROPOSAL

TO:	Quincy Park District Hereinafter Called "OWNER"
PROF	POSAL OF:(Name and Address of Bidder)
FOR	New Maintenance Building
1.	The plans for the proposed improvement are those prepared by KLINGNER & ASSOCIATES, P.C., ENGINEERS/ARCHITECTS, 616 NORTH 24TH STREET, QUINCY, IL 62301.
2.	In submitting this proposal, the undersigned declares that the only persons or parties interested in the proposal as principals are those named herein; and that the proposal is made without collusion with any other person, firm, or corporation.
3.	The undersigned further declares that the Bidding and Contract Documents, and the following

3. The undersigned further declares that the Bidding and Contract Documents, and the following Addenda, receipt of all which is hereby acknowledged,

Addendum No.	Addendum Date

have been carefully examined, the site(s) of the proposed work inspected in detail and the undersigned is familiar with all local conditions affecting the contract and the detailed requirements of construction, and understands that in making this proposal waives all right to plead any misunderstanding regarding the same.

- 4. The undersigned further understands and agrees, if this proposal is accepted, to furnish and provide all necessary machinery, tools, apparatus and other means of construction, and to do all of the work and to install all of the materials specified in the contract, in the manner and at the time prescribed, and in accordance with the requirements therein set forth.
- 5. The undersigned further understands and agrees that payment will be made on a **Lump Sum** bid basis for the work specified herein.
- 6. The undersigned further agrees to the fullest extent permitted by law, to waive any claim it has or may have against the OWNER, the Architect/Engineer, and their respective employees, arising out of or in connection with the administration, evaluation, or recommendation of any bid; wavier of any requirements under the Bid Documents; or the Contract Documents; acceptance or rejection of any bids; and award of the Contract.
- 7. The undersigned further agrees that the OWNER may at any time during the progress of the work covered by this contract order other work or materials incidental thereto and that all such work and materials as do not appear in the proposal or contract as a specific item and which are not included under the bid price for other items in this contract, shall be performed as extra work, in accordance with ARTICLE 10 of the General Conditions.

- 8. The undersigned further agrees to execute a contract for this work and present the same to the OWNER within fifteen (15) days after the date of notice of the award of the contract to him.
- 9. The undersigned further agrees to execute and present within fifteen (15) days after the date of Notice of the Award, a performance and payment Bond or other specified Security, satisfactory to and in the form prescribed by the OWNER, in the penal sum of the full amount of the contract, guaranteeing the faithful performance of the work in accordance with the terms of the contract.
- 10. The undersigned further agrees to begin work not later than ten (10) days after the execution and approval of the contract and performance and payment Bonds or specified Securities, unless otherwise provided, and to prosecute the work in such manner and with sufficient materials, equipment, and labor as will insure its completion within the time limit specified herein, it being understood and agreed that the completion within the time limit is an essential part of the contract. The undersigned agrees to complete the work on or before **March 1, 2021**, unless additional time shall be granted by the OWNER in accordance with the provisions of the specifications. In case of failure to complete the work within the time named herein or within such extra time as may have been allowed by extensions, the undersigned agrees that the OWNER shall withhold, from such sums as may be due under the terms of this contract, the costs set forth in the specifications, which costs shall be considered and treated not as a penalty but as damages due the OWNER from the undersigned by reason of inconvenience to the public, added cost of engineering, and other items which have caused an expenditure of public funds resulting from the failure of the undersigned to complete the work within the time specified in the contract.
- 11. Accompanying this proposal is a bid bond, bank cashier's check, or certified check, in the penal sum of five percent (5%) of the total bid price, as provided in paragraph 8.0 (Bid Security) of the Instructions to Bidders, made payable to the City Treasurer of Quincy, Illinois. The amount of the bid deposit is:

\$		DOLLARS (\$)
	Words		Figures

If this proposal is accepted and the undersigned shall fail to execute a contract and performance and payment Bond or other specified Security as required herein, it is hereby agreed that the amount of the bid deposit shall become the property of the OWNER, and shall be considered as payment of damages due to delay and other causes suffered by the OWNER because of the failure to execute said contract and contract bond; otherwise said check or draft, or bidder's bond substituted in lieu thereof shall be returned to the undersigned.

ATTACH BANK CASHIER'S CHECK, OR

CERTIFIED CHECK HERE - OR

INCLUDE BID BOND WITHIN PROPOSAL

FORM

12. The Contractor hereby provides the following Lump Sum bids. The project award will be based on the lump sum base bid. Additive alternate bids are being requested for non-essential work. If the Park District chooses to accept one or multiple alternate bids, the lump sum amount will be added to the sum of base bid amount.

BASE BID - The undersigned Contractor hereby proposes to furnish all labor, tools, materials, machinery and equipment necessary to complete the site work, foundations, wood & post frame building with metal siding, interior framing, toilet rooms, offices, foundations, slab, utilities, sanitary force main, package lift station, plumbing and water supply, gas & oil interceptor, floor drains & trench drain, HVAC, electric, lighting and all other related work in accordance with the Contract Documents for the following LUMP SUM PRICE:

\$	DOLLARS (\$	_)
Words	Figures	

ADDITIVE ALTERNATE BID #1 - The undersigned Contractor hereby proposes to furnish all labor, tools, materials, machinery and equipment necessary to complete the **natural gas service** and all other related work in accordance with the Contract Documents for the following **LUMP SUM PRICE**:

\$	DOLLARS (\$)
Words	Figures

ADDITIVE OR (DEDUCTIVE) ALTERNATE BID #2 - The undersigned Contractor hereby offers and proposes to furnish all labor, tools, materials, machinery and equipment necessary to provide and install **the following alternate building type in lieu of the base bid post and frame building** and all other related work in accordance with the Contract Documents for the following **LUMP SUM PRICE** (list deduct in parenthesis):

\$	DOLLARS (\$)	
Words	Figures	

List Alternate Building Type _____ (i.e. pre-engineered steel)

Note: Additive Alternate Bid #2 shall include fees for any redesign and/or plan changes required to accommodate the alternate building type.

BIDDING SIGNATURE & CERTIFICATION FORM

The completion of this form is required when bids are presented to the City of Quincy, Illinois. Complete this form and submit with the bid documents. This certification is required under Section 33E-11 of Public Act 85-1295 as adopted by the State of Illinois.

By signing this "BIDDING SIGNATURE AND CERTIFICATION FORM" the undersigned Prime Contractor certifies that it is not barred from contracting with the City of Quincy, Illinois as a result of a violation of either Section 33E-3 or 33E-4 of the Criminal Code of 1961 (Illinois Revised Statutes - Chapter 38) or is not barred from bidding on this contract as a result of a conviction for the violation of State laws prohibiting bid-rigging or bid-notation.

ALSO, pursuant to III. Rev. Stat., ch. 24, sec. 11-42.1-1, the undersigned Contractor or duly authorized agent of the Contractor, certifies, under oath, that the Contractor is not delinquent in the payment of any tax administered by the Illinois Department of Revenue, unless the Contractor is contesting the Contractor's liability for the tax or the amount thereof, in accordance with the procedures established by the appropriate revenue act.

Failure to complete this notarized certification will result in the bid not being read at the bid opening and thereby rejected.

***************************************	***************************************	*************
(If an individual)	Signature of Bidder	(SEAL)
	Business Address	
*****		*****
(If a co-partnershi	p)	
、 ·	Firm Name	
	Signed by	(SEAL)
	Business Address	
(Insert Names and	d	
Addresses of all _		
Members of the		
Co-Partnership _		
*****	****	**********

*****	*****	F	RETURN WITH BID
Bidding Signature	and Certification Form (Cont'd.)		
(If a Corporation)	Corporate Name		
(Corporate (SEAL)	Signed by		
	Business Address		
(Insert Names of			President
Officers)			Secretary
********	***************************************	*****	Treasurer
SIGNED and SWC	RN to before me		
this(NOTARY	_day of	, 20	
			SEAL)
	Notary Public		

SECTION 004313 BID SECURITY FORM QUINCY PARK DISTRICT

Project:

WE_____

as PRINCIPAL, and _____

as SURETY, are held and firmly bound unto the Quincy Park District in the penal sum of 5% of the total bid price, or for the amount specified in the "Bid Proposal" in effect on the date of invitation for bids. We bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly to pay to the Quincy Park District this sum under the conditions of this instrument.

WHEREAS THE CONDITION OF THE FOREGOING OBLIGATION IS SUCH that, said PRINCIPAL is submitting a written proposal to the City of Quincy for the construction of the work designated as the above section.

THEREFORE, if the proposal is accepted and a contract awarded to the PRINCIPAL by the **Quincy Park District** for the above-designated project, and the PRINCIPAL shall within fifteen (15) days after award enter into a formal contract, furnish surety or cash bond guaranteeing the faithful performance of the work, and furnish evidence of the required insurance coverage, all as provided in the "General Conditions" and applicable Supplemental Conditions, then this obligation shall become void; otherwise it shall remain in full force and effect.

IN THE EVENT the **Quincy Park District** determines the PRINCIPAL has failed to enter into a formal contract in compliance with any requirements set forth in the preceding paragraph, then the **Quincy Park District** shall immediately be entitled to recover the full penal sum set out above together with all court costs, all attorney fees, and any other expense of recovery.

IN TESTIMONY WHEREOF, the said PRINCIPAL and the said SURETY have caused this instrument to be signed by their respective officers and their corporate seals to be hereunto affixed this ______

day of	AD, 20	
	PRINCIPAL	
(Company Name)	(Company Name)	
By:	By:	
(Signature & Title)	(Signature & Title)	
signatures of each contractor must b	affixed.)	
	By:	
(Name of Surety)	(Signature of Attorney-in-Fact)	
STATE OF ILLINOIS,		
COUNTY OF		

I, ____, a Notary Public in and for said County, do hereby certify that ______

(Insert names of individuals signing on behalf of PRINCIPAL & SURETY)

who are each personally known to me to be the same persons whose names are subscribed to the foregoing instrument on behalf of PRINCIPAL and SURETY, appeared before me this day in person and acknowledged respectively, that they signed, sealed, and delivered said instrument as their free and voluntary act for the uses and purposes therein set forth.

Given under my hand and notarial seal this _____ day of _____ A.D. 20____.

My Commission expires _____

Notary Public

SECTION 004325 SUBSTITUTION/EQUIVALENT PRODUCT REQUEST FORM

TO: Klingner & Associates, P.C.

Project: New Maintenance Building, Quincy Park District

We hereby submit for your consideration the following product instead of the specified item for the above project:

Section Paragraph Specified Item

Proposed Substitution or Equivalent Product:

Attach complete technical data including laboratory test if applicable. Include complete information changes to Drawings and/or Specifications which proposed equivalent product require for proper installation.

Fill in blanks below, use additional sheets if necessary:

A. Does the proposed substitution or equivalent product affect dimensions shown on Drawings?

B. Will the undersigned pay for changes to building design, including engineering and detailing costs caused by proposed substitution or equivalent product, if any?

C. What effect does proposed substitution or equivalent product have on other trades?

D. Differences between proposed substitution or equivalent product and specified item?

E. Manufacturer's guarantees of proposed and specified items are: _____Same _____ Different

Explain:_____

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

Submitted by:

For use by Architect/Engineer:

	Accepted: Accepted as Noted
Signature	
Title:	Not Accepted: Received to Late:
Firm:	By
Address:	Date
	Remarks
Telephone:	
Email:	

SECTION 004336 PROPOSED SUBCONTRACTORS FORM

TO: ______hereinafter called "Owner"

1. Pursuant to bidding requirements for the Work Titled: <u>New Maintenance Building</u>

for portions of the Work equaling or exceeding 1/2 of 1% of the total proposed Contract sum the undersigned proposes to use the following subcontractors. Except as otherwise approved by the Owner, the undersigned proposes to perform all other Work with his (her) own forces.

2.	PORTION OF THE WORK:	SUBCONTRACTOR NAME AND ADDRESS:

USE ADDITIONAL SHEETS
IF REQUIRED

Provide Signature Identical to that shown on Bid Form BIDDER:

by: _____

SECTION 004550 ILLINOIS EMPLOYMENT PRACTICES

PART 1 - GENERAL

1.1 SUMMARY

A. In addition to all other labor requirements set forth in this proposal and in the Standard Specifications, during the performance of this contract, the Contractor for itself, its assignees, and successors in interest (hereinafter referred to as the "Contractor") agrees as follows:

1.2 SELECTION OF LABOR

A. The Contractor shall comply with all Illinois statutes pertaining to the selection of labor. If, at the time this contract is executed, or if during the term of this contract, there is excessive unemployment in Illinois as defined in the employment of Illinois Workers on Public Works Acts, 30 ILCS 570-0.01et seq., as two consecutive months of unemployment exceeding 5%, the Contractor is required to employ Illinois laborers. An "Illinois laborer" is defined as any person who has resided in Illinois for at least thirty (30) days and intends to become or remain an Illinois resident. This section placed on hold March 19, 2003, contractor to verify status for compliance.

1.3 EQUAL EMPLOYMENT OPPORTUNITY

- A. In the event of the Contractor's non-compliance with the provisions of the Equal Employment Opportunity Clause, the Illinois Human Right's Act, or the Rules and Regulations of the Illinois Department of Human Rights ("Department"), the Contractor may be declared ineligible for future contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations, and the contract may be cancelled or voided in whole or in part, and such other sanctions or penalties may be imposed or remedies invoked as provided by statute or regulation. During the performance of this contract, the Contractor agrees as follows:
 - 1. That it will not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, ancestry, age, marital status, physical or mental handicap unrelated to ability, or unfavorable discharge from military service, and further that it will examine all job classifications to determine if minority persons or women are underutilized and will take appropriate affirmative action to rectify any such under utilization.
 - 2. That, if it hires additional employees in order to perform this contract or any portion hereof, it will determine the availability of minorities and women in the area(s) from which it may reasonably recruit and it will hire for each job classification for which employees are hired in such a way that minorities and women are not underutilized.
 - 3. That, in all solicitations or advertisements for employees placed by it or on its behalf, it will state that all applicants will be afforded equal opportunity without discrimination because of race, color, religion, sex, national origin, ancestry, age, marital status, physical or mental handicap unrelated to ability or unfavorable discharge from military service.
 - 4. That it will send to each labor organization or representative of workers with which it has or is bound by a collective bargaining or other agreement or understanding, a notice

advising such labor organization or representative of the Contractor's obligations under the Illinois Human Rights Act and the Department's Rules and Regulations. If any such labor organization or representative fails or refuses to cooperate with the Contractor in its efforts to comply with such Act and Rules and Regulations, the Contractor will promptly so notify the Illinois Department of Human Rights and the Local Contracting Agency and will recruit employees from other sources when necessary to fulfill its obligations thereunder. That it will submit reports as required by the Department of Human Rights Rules and Regulations, furnish all relevant information as may from time to time be requested by the Department or the Local Contracting Agency, and in all respects comply with the Illinois Human Rights Act and the Department's Rules and Regulations.

- 5. That it will permit access to all relevant books, records, accounts and work sites by personnel of the Local Contracting Agency and the Illinois Department of Human Rights for purposes of Investigation to ascertain compliance with the Illinois Human Rights Act and the Department's Rules and Regulations.
- 6. That it will include verbatim or by reference the provision of this clause in every subcontract so that such provisions will be binding upon every such subcontractor. In the same manner as with other provisions of this contract, the Contractor will be liable for compliance with applicable provisions of this clause by all its subcontractors; and further it will promptly notify the Local Contracting Agency and the Illinois Department of Human Rights in the event any subcontractor fails or refuses to comply therewith. In addition, the Contractor will not utilize any subcontractor declared by the Illinois Human Rights Commission to be ineligible for contracts or subcontracts with the State of Illinois or any of its political subdivisions or municipal corporations.

SECTION 005100 NOTICE OF AWARD

	Dated
то:	
	(Bidder)
ADDRESS:	
Phone:	
Email:	
Contract:	New Maintenance Building
	(Insert name of Contract as it appears in the Bidding Documents)
Project Location: 1231 Bonansinga Drive, Quincy, Illinois	
Project No.:	19-0363
Owner:	Quincy Park District
Architect/Eng	gineer (A/E): Klingner & Associates, P.C.

NOTICE OF AWARD OF CONTRACT

You are hereby notified that your Bid dated ______for the above Contract has been considered. You are the apparent Successful Bidder and have been awarded a contract for:

Ben Bumbry Riverview Park Shelter Replacement

(Indicate total Work, alternates or sections of Work awarded)

The Contract Lump Sum of your contract is

Dollars (\$ ______)

Three (3) copies of the proposed Contract Documents will be made available to you immediately. You must comply with the following conditions precedent within ten (10) days of the date on this Notice of Award.

- 1. You must deliver to the OWNER Two (2) fully executed counterparts of the Contract Documents.
- 2. Deliver with the executed Contract Documents Bonds as specified in the Instructions to Bidders, [and] General Conditions [and] Supplementary Conditions.

3. (List other conditions/precedents).

Failure to comply with these conditions within the time specified will entitle OWNER to consider your Bid in default, to annul this Notice of Award and to declare your Bid Security forfeited.

Within ten days after you comply with the above conditions, OWNER will return to you one (1) fully signed counterpart of the Contract Documents.

Quincy Park District (OWNER)

(-

By:

(AUTHORIZED SIGNATURE)

(TITLE)
SECTION 005200 CONTRACT AGREEMENT

This CONTRACT made and entered into thisday of	, 2019by_and
between	hereinafter called the
CONTRACTOR and <u>Quincy Park District</u>	_, hereinafter called the
OWNER, WITNESSETH, that the CONTRACTOR and the OWNER for the	consideration hereinafter
named therefore contract and agree as follows:	

1. <u>Scope of Work:</u>

The CONTRACTOR shall furnish all labor, equipment, and machinery and perform all of the work necessary to complete the specified, New Maintenance Building dated February 2020 all as shown on the plans and as described in the specifications, as prepared by Klingner and Associates, P.C., Engineers, all in accordance with the terms of the Contract Documents.

2. <u>Time of Completion and Liquidated Damages:</u>

The work as shown on the Plans and described in the Specifications shall be substantially completed as defined in Article 15 of the EJCDC General Conditions, on or before **March 1, 2021**.

3. <u>Contract Sum:</u>

The OWNER shall pay the CONTRACTOR for the performance of the Contract the sum of

DOLLARS

CENTS (\$)

4. <u>Progress Payment: Retainage:</u>

The OWNER shall make progress payments on the amount or percentage of Work completed to date, as requested on the basis of CONTRACTOR's Applications for Payment and in accordance with Article 15 of the General Conditions.

There shall be retained from the amount so determined, for the first 50% of the total Work, a sum of 10% until issuance of Substantial Completion. After 50% or more of the Work, the Owner may at his/her discretion reduce the retainage to 5% of the amount of Work completed. Upon issuance of Substantial Completion, the retainage shall be reduced to an amount equal to a maximum of 5% of the Work completed.

5. <u>Acceptance and Final Payment:</u>

Final Payment shall be due thirty (30) days after completion and acceptance of the work, provided the contract be then fully performed, subject to the provisions of Article 15 of the General Conditions.

6. <u>Contract Documents:</u>

Contract Documents are as noted in the General Conditions.

In Witness Whereof, the parties hereto execute this Contract this

day of _			A.D., 20				
(I	(If an individual, partnership, or non-incorporated organization)						
S	Signature of Contractor						
	Ву						
		Title					
		Address					
Names	and Addresses of N	lembers of the Firm _					
(1	If a Corporation)						
S	Signature of Contrac	tor					
	Ву						
	Title						
В	Business Address _						
Ir	ncorporated under t	he laws of the State o	f				
P	President						
		Name	Address				
S	Secretary	Name	Address				
т	reasurer						
******	*****	Name	Address	*****			
OWNEF	R:						
В	By		Titlo	(SEAL)			
ATTEST	r:		1 lite				
E	Зу		(Clerk or Notary Public)				

END OF SECTION 005200

SECTION 005500

NOTICE TO PROCEED

		Dated
то:		
ADDRESS:	(CONTRACTOR)	
Contract: New Main	tenance Building	
	(Insert name of Contract a	is it appears in the Contract Documents)
Project: New Main	tenance Building and S	Site Work
	tenance building and c	DIE WORK
OWNER'S CONTRAC	T NO: 19-0363	
	Quincy Park Distric	ct, New Maintenance Building
	(Insert name of project a	s it appears in the Bidding Documents)
You are notified that the 20 <u>20</u> . By that dat date of Substantial Compayment is Before you may start a each deliver to the oth certificates of insurance Contract Documents. Also before you may s	e Contract Time under the e, you are to start perform mpletion is any Work at the Site, the her (with copies to the E be which each is required tart any Work at the site,	 and the date of readiness for final General Conditions provides that you and the Owner must ngineer/Architect and other identified additional insured's) b to be purchased and maintained in accordance with the you must:
	(add oth	er requirements)
		Quincy Park District
	Byr	(OWNER)
	Бу	(AUTHORIZED SIGNATURE)
Convito Engineer/Architect		(11126)
Copy to Engineer/Architect		
¹ (Use Certified Mail, Return	Receipt Requested)	
END OF SECTION 00	5500	

THIS PAGE INTENTIONALY LEFT BLANK

SECTION 006113 PERFORMANCE AND PAYMENT BOND

KNOW ALL BY THESE PRESENTS:

That we	_of
hereinafter called PRINCIPAL, and	of
	hereinafter called the SURETY,
are held and firmly bound unto	
hereinafter called OWNER, and unto all pers or	ons, firms, and corporations who may furnish materials for,
perform labor on the	, dated
hereinafter referred to, in the penal sum of	
DOLLARS	CENTS (\$) paid in Quincy, Adams County, Illinois, for the payment of

in lawful money of the United States, to be paid in Quincy, Adams County, Illinois, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal entered into a certain contract, dated ______ 20 ____ with _____,

the OWNER, a copy of which is attached and hereby is referred to and made a part hereof, as if written herein at length, and whereby the said Principal has promised and agreed to perform said work in accordance with the terms of said contract, provisions guaranteeing faithful performance under the Prevailing Wage Act and has promised to pay all sums of money due for labor, materials, apparatus, fixtures, or machinery furnished to such Principal for the purpose of performing such work and has further agreed to pay all direct and indirect damages to any person, firm, company, or corporation suffered or sustained on account of the performance of such work during the time thereof and until such work is completed and accepted, and has further agreed that this bond shall inure to the benefit of any person, firm, company or corporation, to whom any money may be due from the Principal, subcontractor or otherwise, for any such labor, materials, apparatus, fixtures or machinery so furnished and that suit may be maintained on such bond by any such person, firm, company, or corporation, for the recovery of any such money.

NOW THEREFORE, if the said Principal shall well and truly perform said work in accordance with the terms of said contract, and shall pay all sums of money due or to become due for any labor, materials, apparatus, fixtures or machinery furnished to him for the purpose of constructing such work, and shall commence and complete the work within the time prescribed in said contract, and shall pay and discharge all damages, direct and indirect, that may be suffered or sustained on account of said work during the time of the performance thereof and until the said work shall have been accepted, and shall hold the aforesaid Owner and its or his agents harmless on account of any such damages, and shall in all respects fully and faithfully comply with all the provisions, conditions, and requirements of said contract, then this obligation to be void; otherwise to remain in full force and effect.

IN WITNESS WHEREOF, th	nis instrument is execut	ed this day	y of	A.D. 20
In the presence of:		Distant		
		Principal		
		(Address)		
By:				
ATTEST:				
SURETY:				
By:				
		Attorney-in-F	act	
ATTEST:				
***************************************	*****	******	******	*****
STATE OF ILLINOIS)				
) 55	6.			
COUNTY OF ADAMS)				
On this	_ day of	20	_before me personally a	appeared
				_ Principal, and
				Surety,
all personally known to maseverally and individually ac	e to be the persons d knowledged to me that	escribed in and they executed th	I who executed the ab he same.	ove bond, and
Given under my hand and notary seal, this		day of	A.	D., 20
			Notary Public	
My commission expires				

NOTE: DATE OF BOND MUST NOT BE PRIOR TO DATE OF CONTRACT

END OF SECTION 006113

SECTION 007200 GENERAL CONDITIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. EJCDC C-700 Standard General Conditions of the Construction Contract is the General Conditions of the Contract.
- B. A copy of this document is included herein.

END OF SECTION 007200

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by



Issued and Published Jointly by



American Council of Engineering Companies





These General Conditions have been prepared for use with the Agreement Between Owner and Contractor for Construction Contract (EJCDC[®] C-520, Stipulated Sum, or C-525, Cost-Plus, 2013 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other.

To prepare supplementary conditions that are coordinated with the General Conditions, use EJCDC's Guide to the Preparation of Supplementary Conditions (EJCDC[®] C-800, 2013 Edition). The full EJCDC Construction series of documents is discussed in the Commentary on the 2013 EJCDC Construction Documents (EJCDC[®] C-001, 2013 Edition).

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 Defined Terms

- A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
 - 1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 - 2. Agreement—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.
 - 3. Application for Payment—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 - 4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 - 5. Bidder—An individual or entity that submits a Bid to Owner.
 - 6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.
 - 7. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.
 - 8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.
 - 9. Change Proposal—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.
 - 10. *Claim*—(a) A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein: seeking an adjustment of Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer

has declined to address. A demand for money or services by a third party is not a Claim.

- 11. Constituent of Concern—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. ("CERCLA"); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5101 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. ("RCRA"); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.
- 12. *Contract*—The entire and integrated written contract between the Owner and Contractor concerning the Work.
- 13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.
- 14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents.
- 15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.
- 16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.
- 17. *Cost of the Work*—See Paragraph 13.01 for definition.
- 18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.
- 19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.
- 20. *Engineer*—The individual or entity named as such in the Agreement.
- 21. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.
- 22. Hazardous Environmental Condition—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.
- 23. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

- 24. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.
- 25. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.
- 26. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.
- 27. Notice to Proceed—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.
- 28. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.
- 29. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.
- 30. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.
- 31. *Project Manual*—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.
- 32. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative or "RPR" includes any assistants or field staff of Resident Project Representative.
- 33. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
- 34. Schedule of Submittals—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals and the performance of related construction activities.
- 35. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.
- 36. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

- 37. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands furnished by Owner which are designated for the use of Contractor.
- 38. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.
- 39. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.
- 40. Substantial Completion—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.
- 41. *Successful Bidder*—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.
- 42. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.
- 43. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.
- 44. Technical Data—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.
- 45. Underground Facilities—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
- 46. *Unit Price Work*—Work to be paid for on the basis of unit prices.
- 47. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

48. Work Change Directive—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

1.02 Terminology

- A. The words and terms discussed in the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. Intent of Certain Terms or Adjectives:
 - 1. The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.
- C. Day:
 - 1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.
- D. Defective:
 - 1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - a. does not conform to the Contract Documents; or
 - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 - c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or 15.04).
- E. Furnish, Install, Perform, Provide:
 - 1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
 - 2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

- 3. The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
- 4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words "furnish," "install," "perform," or "provide," then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.
- F. Unless stated otherwise in the Contract Documents, words or phrases that have a wellknown technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

- 2.01 Delivery of Bonds and Evidence of Insurance
 - A. *Bonds*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
 - B. *Evidence of Contractor's Insurance*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor in accordance with Article 6.
 - C. *Evidence of Owner's Insurance*: After receipt of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or otherwise), the certificates and other evidence of insurance required to be provided by Owner under Article 6.
- 2.02 *Copies of Documents*
 - A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.
 - B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.
- 2.03 Before Starting Construction
 - A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), Contractor shall submit to Engineer for timely review:
 - 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;
 - 2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 Initial Acceptance of Schedules

- A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.03.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.
 - 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
 - 2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
 - 3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.

2.06 Electronic Transmittals

- A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.
- B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.
- C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or

computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 Intent

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents.
- C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.
- D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.
- E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.
- 3.02 *Reference Standards*
 - A. Standards Specifications, Codes, Laws and Regulations
 - Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
 - 2. No provision of any such standard specification, manual, reference standard, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

- A. *Reporting Discrepancies*:
 - 1. Contractor's Verification of Figures and Field Measurements: Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict,

error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

- 2. Contractor's Review of Contract Documents: If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.
- 3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.
- B. *Resolving Discrepancies*:
 - 1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:
 - a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or
 - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Requirements of the Contract Documents*

- A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.
- B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.
- C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly give written notice to Owner and Contractor that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

- A. Contractor and its Subcontractors and Suppliers shall not:
 - have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or
 - 2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

- 4.01 Commencement of Contract Times; Notice to Proceed
 - A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Contract, whichever date is earlier.
- 4.02 *Starting the Work*
 - A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to such date.
- 4.03 *Reference Points*
 - A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.04 Progress Schedule

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.
 - 1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

- 2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 11.
- B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 Delays in Contractor's Progress

- A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.
- C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:
 - 1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
 - 2. abnormal weather conditions;
 - acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and
 - 4. acts of war or terrorism.
- D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.
- E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.
- F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.

G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.
- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.
- 5.02 Use of Site and Other Areas
 - A. Limitation on Use of Site and Other Areas:
 - 1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.
 - If a damage or injury claim is made by the owner or occupant of any such land or area 2. because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part

by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

- B. *Removal of Debris During Performance of the Work*: During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.
- C. *Cleaning*: Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.
- D. Loading of Structures: Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 Subsurface and Physical Conditions

- A. *Reports and Drawings*: The Supplementary Conditions identify:
 - 1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;
 - 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); and
 - 3. Technical Data contained in such reports and drawings.
- B. Reliance by Contractor on Technical Data Authorized: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:
 - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
 - 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
 - 3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 Differing Subsurface or Physical Conditions

- A. *Notice by Contractor*: If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site either:
 - 1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or
 - 2. is of such a nature as to require a change in the Drawings or Specifications; or
 - 3. differs materially from that shown or indicated in the Contract Documents; or
 - 4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

- B. *Engineer's Review*: After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- C. Owner's Statement to Contractor Regarding Site Condition: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.
- D. Possible Price and Times Adjustments:
 - Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. such condition must fall within any one or more of the categories described in Paragraph 5.04.A;
 - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,

- c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- 2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
 - a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or
 - b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or
 - c. Contractor failed to give the written notice as required by Paragraph 5.04.A.
- 3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
- 4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

5.05 Underground Facilities

- A. *Contractor's Responsibilities*: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:
 - 1. Owner and Engineer do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; and
 - 2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
 - a. reviewing and checking all information and data regarding existing Underground Facilities at the Site;
 - b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;
 - c. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
 - d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.
- B. *Notice by Contractor*: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after

becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.

- C. Engineer's Review: Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the Underground Facility in question; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer's findings, conclusions, and recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
- D. Owner's Statement to Contractor Regarding Underground Facility: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question, addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.
- E. *Possible Price and Times Adjustments*:
 - Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;
 - b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;
 - c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times; and
 - d. Contractor gave the notice required in Paragraph 5.05.B.
 - 2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
 - 3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

5.06 Hazardous Environmental Conditions at Site

- A. *Reports and Drawings*: The Supplementary Conditions identify:
 - 1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
 - 2. Technical Data contained in such reports and drawings.
- B. Reliance by Contractor on Technical Data Authorized: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
 - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
 - 2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
 - 3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.
- D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.
- E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

- F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.
- G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.
- H. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.
- I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.I shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6 – BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of all of Contractor's obligations under the Contract. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the Supplementary Conditions, or other specific provisions of the Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions or other specific provisions of the Contract.
- B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.
- C. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.
- D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the bond and surety requirements above.
- E. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.
- F. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.
- 6.02 Insurance—General Provisions
 - A. Owner and Contractor shall obtain and maintain insurance as required in this Article and in the Supplementary Conditions.
 - B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.
 - C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is

maintaining the policies, coverages, and endorsements required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

- D. Owner shall deliver to Contractor, with copies to each named insured and additional insured (as identified in this Article, the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.
- E. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.
- F. If either party does not purchase or maintain all of the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.
- G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 16.
- H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.
- I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.
- J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner and other individuals and entities in the Contract.
- 6.03 *Contractor's Insurance*
 - A. *Workers' Compensation*: Contractor shall purchase and maintain workers' compensation and employer's liability insurance for:
 - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts.
 - 2. United States Longshoreman and Harbor Workers' Compensation Act and Jones Act coverage (if applicable).
 - 3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees (by stop-gap endorsement in monopolist worker's compensation states).

- 4. Foreign voluntary worker compensation (if applicable).
- B. *Commercial General Liability—Claims Covered*: Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:
 - 1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees.
 - 2. claims for damages insured by reasonably available personal injury liability coverage.
 - 3. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.
- C. *Commercial General Liability—Form and Content*: Contractor's commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:
 - 1. Products and completed operations coverage:
 - a. Such insurance shall be maintained for three years after final payment.
 - b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.
 - 2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.
 - 3. Broad form property damage coverage.
 - 4. Severability of interest.
 - 5. Underground, explosion, and collapse coverage.
 - 6. Personal injury coverage.
 - Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.
 - 8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.
- D. *Automobile liability*: Contractor shall purchase and maintain automobile liability insurance against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.
- E. Umbrella or excess liability: Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.
- F. *Contractor's pollution liability insurance*: Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result

of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.

- G. Additional insureds: The Contractor's commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Supplementary Conditions; include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.
- H. *Contractor's professional liability insurance*: If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.
- I. *General provisions*: The policies of insurance required by this Paragraph 6.03 shall:
 - 1. include at least the specific coverages provided in this Article.
 - 2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, or required by Laws or Regulations, whichever is greater.
 - 3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 10 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.
 - 4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.
 - 5. be appropriate for the Work being performed and provide protection from claims that may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable.
- J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.
6.04 Owner's Liability Insurance

- A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.
- B. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

6.05 *Property Insurance*

- A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:
 - include the Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as "insureds."
 - 2. be written on a builder's risk "all risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.
 - 3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.
 - 4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).

- 5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).
- 6. extend to cover damage or loss to insured property while in transit.
- 7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
- 8. allow for the waiver of the insurer's subrogation rights, as set forth below.
- 9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.
- 10. not include a co-insurance clause.
- 11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.
- 12. include performance/hot testing and start-up.
- 13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.
- B. Notice of Cancellation or Change: All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.
- C. *Deductibles*: The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.
- D. Partial Occupancy or Use by Owner: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
- E. *Additional Insurance*: If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor's expense.
- F. *Insurance of Other Property*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

6.06 Waiver of Rights

- A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder's risk policy, shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for:
 - loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
 - 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.
- D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by builder's risk insurance and any other property insurance applicable to the Work.

6.07 Receipt and Application of Property Insurance Proceeds

A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the

policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

- B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.
- C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

7.01 Supervision and Superintendence

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.
- 7.02 Labor; Working Hours
 - A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
 - B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.
- 7.03 Services, Materials, and Equipment
 - A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.
 - B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and

guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

7.04 "Or Equals"

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.
 - If Engineer in its sole discretion determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer shall deem it an "or equal" item. For the purposes of this paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that:
 - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
 - it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
 - 3) it has a proven record of performance and availability of responsive service; and
 - 4) it is not objectionable to Owner.
 - b. Contractor certifies that, if approved and incorporated into the Work:
 - 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.
- B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.
- C. Engineer's Evaluation and Determination: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal", which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

- D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request shall result in any change in Contract Price. The Engineer's denial of an "or-equal" request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.
- E. *Treatment as a Substitution Request*: If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer considered the proposed item as a substitute pursuant to Paragraph 7.05.

7.05 Substitutes

- A. Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment under the circumstances described below. To the extent possible such requests shall be made before commencement of related construction at the Site.
 - 1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of material or equipment from anyone other than Contractor.
 - 2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.
 - 3. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
 - a. shall certify that the proposed substitute item will:
 - 1) perform adequately the functions and achieve the results called for by the general design,
 - 2) be similar in substance to that specified, and
 - 3) be suited to the same use as that specified.
 - b. will state:
 - 1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times,
 - 2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and
 - 3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.
 - c. will identify:
 - 1) all variations of the proposed substitute item from that specified, and

- 2) available engineering, sales, maintenance, repair, and replacement services.
- d. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.
- B. Engineer's Evaluation and Determination: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.
- C. *Special Guarantee*: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- D. Reimbursement of Engineer's Cost: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.
- F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

7.06 Concerning Subcontractors, Suppliers, and Others

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.
- B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.
- C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.
- D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within five days.

- E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.
- F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.
- G. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.
- H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.
- I. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions.
- J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.
- K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.
- L. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.
- N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.

- O. Nothing in the Contract Documents:
 - 1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier, or other individual or entity; nor
 - 2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

7.07 Patent Fees and Royalties

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.
- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.08 Permits

A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work

7.09 Taxes

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

7.10 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It shall not be Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Owner or Contractor may give notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.11 Record Documents

A. Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during construction. These record documents, together with all approved Samples, will be available to Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer.

7.12 Safety and Protection

- A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:
 - 1. all persons on the Site or who may be affected by the Work;

- 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
- 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.
- C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.
- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- F. Contractor's duties and responsibilities for safety and protection shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).
- G. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.
- 7.13 Safety Representative
 - A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.
- 7.14 Hazard Communication Programs
 - A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or

exchanged between or among employers at the Site in accordance with Laws or Regulations.

- 7.15 Emergencies
 - A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.
- 7.16 Shop Drawings, Samples, and Other Submittals
 - A. Shop Drawing and Sample Submittal Requirements:
 - 1. Before submitting a Shop Drawing or Sample, Contractor shall have:
 - reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
 - b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
 - c. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
 - d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.
 - 2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that submittal, and that Contractor approves the submittal.
 - 3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.
 - B. *Submittal Procedures for Shop Drawings and Samples*: Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals. Each submittal will be identified as Engineer may require.
 - 1. Shop Drawings:
 - a. Contractor shall submit the number of copies required in the Specifications.
 - b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to

provide and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.D.

- 2. Samples:
 - a. Contractor shall submit the number of Samples required in the Specifications.
 - b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.
- 3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.
- C. *Other Submittals*: Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.
- D. Engineer's Review:
 - 1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
 - 2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.
 - 3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
 - 4. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.
 - 5. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.
 - 6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.
 - 7. Neither Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.

- 8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.D.4.
- E. Resubmittal Procedures:
 - 1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.
 - 2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.
 - 3. If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.
- 7.17 Contractor's General Warranty and Guarantee
 - A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor's warranty and guarantee.
 - B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
 - 1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 - 2. normal wear and tear under normal usage.
 - C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
 - 1. observations by Engineer;
 - 2. recommendation by Engineer or payment by Owner of any progress or final payment;
 - 3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 - 4. use or occupancy of the Work or any part thereof by Owner;
 - 5. any review and approval of a Shop Drawing or Sample submittal;
 - 6. the issuance of a notice of acceptability by Engineer;
 - 7. any inspection, test, or approval by others; or
 - 8. any correction of defective Work by Owner.

D. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 Indemnification

- A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.
- B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- C. The indemnification obligations of Contractor under Paragraph 7.18.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:
 - 1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
 - 2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

7.19 Delegation of Professional Design Services

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.
- B. If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop

Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this paragraph, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 7.16.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

ARTICLE 8 – OTHER WORK AT THE SITE

- 8.01 Other Work
 - A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.
 - B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.
 - C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.
 - D. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 8, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

8.02 Coordination

- A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:
 - 1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;
 - 2. an itemization of the specific matters to be covered by such authority and responsibility; and
 - 3. the extent of such authority and responsibilities.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 Legal Relationships

- If, in the course of performing other work at or adjacent to the Site for Owner, the Owner's A. employees, any other contractor working for Owner, or any utility owner for whom the Owner is responsible causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment shall take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract. When applicable, any such equitable adjustment in Contract Price shall be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.
- C. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.

D. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9 – OWNER'S RESPONSIBILITIES

- 9.01 *Communications to Contractor*
 - A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.
- 9.02 Replacement of Engineer
 - A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents shall be that of the former Engineer.
- 9.03 Furnish Data
 - A. Owner shall promptly furnish the data required of Owner under the Contract Documents.
- 9.04 Pay When Due
 - A. Owner shall make payments to Contractor when they are due as provided in the Agreement.
- 9.05 Lands and Easements; Reports, Tests, and Drawings
 - A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.
 - B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.
 - C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.
- 9.06 Insurance
 - A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.
- 9.07 Change Orders
 - A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

- 9.08 Inspections, Tests, and Approvals
 - A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.
- 9.09 *Limitations on Owner's Responsibilities*
 - A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- 9.10 Undisclosed Hazardous Environmental Condition
 - A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.
- 9.11 Evidence of Financial Arrangements
 - A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents (including obligations under proposed changes in the Work).
- 9.12 Safety Programs
 - A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.
 - B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

- 10.01 Owner's Representative
 - A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract.
- 10.02 Visits to Site
 - A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.
 - B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.08. Particularly, but without limitation, during

or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 Project Representative

A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 10.08. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent, or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

10.04 Rejecting Defective Work

- A. Engineer has the authority to reject Work in accordance with Article 14.
- 10.05 Shop Drawings, Change Orders and Payments
 - A. Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.
 - B. Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, are set forth in Paragraph 7.19.
 - C. Engineer's authority as to Change Orders is set forth in Article 11.
 - D. Engineer's authority as to Applications for Payment is set forth in Article 15.
- 10.06 Determinations for Unit Price Work
 - A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.
- 10.07 Decisions on Requirements of Contract Documents and Acceptability of Work
 - A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.08 Limitations on Engineer's Authority and Responsibilities

A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 15.06.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 10.08 shall also apply to the Resident Project Representative, if any.
- 10.09 Compliance with Safety Program
 - A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs (if any) of which Engineer has been informed.

ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

- 11.01 Amending and Supplementing Contract Documents
 - A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.
 - 1. Change Orders:
 - a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.
 - b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.
 - 2. Work Change Directives: A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an

adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

3. *Field Orders*: Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.02 Owner-Authorized Changes in the Work

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Such changes shall be supported by Engineer's recommendation, to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work shall be performed under the applicable conditions of the Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.03 Unauthorized Changes in the Work

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.

11.04 Change of Contract Price

- A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.
- B. An adjustment in the Contract Price will be determined as follows:
 - 1. where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or
 - 2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or
 - 3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on

the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).

- C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit shall be determined as follows:
 - 1. a mutually acceptable fixed fee; or
 - 2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. for costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;
 - b. for costs incurred under Paragraph 13.01.B.3, the Contractor's fee shall be five percent;
 - c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.04.C.2.a and 11.04.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;
 - d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
 - e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
 - f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

11.05 Change of Contract Times

- A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.
- B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

11.06 Change Proposals

A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under

the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

- 1. *Procedures*: Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal.
- 2. Engineer's Action: Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.
- 3. *Binding Decision*: Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.
- B. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

11.07 Execution of Change Orders

- A. Owner and Contractor shall execute appropriate Change Orders covering:
 - 1. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;
 - 2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;
 - 3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and
 - 4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

- B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.
- 11.08 Notification to Surety
 - A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

ARTICLE 12 – CLAIMS

- 12.01 Claims
 - A. *Claims Process*: The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:
 - 1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;
 - 2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and
 - 3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.
 - B. Submittal of Claim: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.
 - C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.
 - D. Mediation:
 - 1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.
 - 2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim

submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.

- 3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.
- E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.
- F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.
- G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

- 13.01 Cost of the Work
 - A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:
 - 1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or
 - 2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.
 - B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include only the following items:
 - 1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work. Payroll costs of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable

thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

- 2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
- 3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.
- 4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
- 5. Supplemental costs including the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
 - c. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
 - d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
 - e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
 - f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes

other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.
- C. *Costs Excluded*: The term Cost of the Work shall not include any of the following items:
 - 1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.
 - 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
 - 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
 - 4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
 - 5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.
- D. *Contractor's Fee*: When the Work as a whole is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 11.04.C.
- E. *Documentation*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

13.02 Allowances

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

- B. Cash Allowances: Contractor agrees that:
 - 1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
 - 2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.
- C. *Contingency Allowance*: Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

13.03 Unit Price Work

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of the following paragraph.
- E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:
 - 1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;
 - 2. there is no corresponding adjustment with respect to any other item of Work; and
 - 3. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price, and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 14 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

- 14.01 Access to Work
 - A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.
- 14.02 Tests, Inspections, and Approvals
 - A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.
 - B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.
 - C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
 - D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:
 - 1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
 - 2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
 - 3. by manufacturers of equipment furnished under the Contract Documents;
 - 4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
 - 5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

- E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.
- F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to

cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 Defective Work

- A. *Contractor's Obligation*: It is Contractor's obligation to assure that the Work is not defective.
- B. *Engineer's Authority*: Engineer has the authority to determine whether Work is defective, and to reject defective Work.
- C. *Notice of Defects*: Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
- D. *Correction, or Removal and Replacement*: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.
- E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.
- F. *Costs and Damages*: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 Acceptance of Defective Work

A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 Uncovering Work

A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

- B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.
- C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.
 - If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.
 - 2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 Owner May Stop the Work

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.
- 14.07 *Owner May Correct Defective Work*
 - A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.
 - B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.
 - C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will

include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

- 15.01 *Progress Payments*
 - A. *Basis for Progress Payments*: The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.
 - B. Applications for Payments:
 - 1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.
 - 2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
 - 3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.
 - C. *Review of Applications*:
 - 1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
 - 2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

- a. the Work has progressed to the point indicated;
- b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and
- c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
- 3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or
 - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
- 4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work, or
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
 - d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
- 5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.
- 6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:
 - a. the Work is defective, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

- e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.
- D. Payment Becomes Due:
 - 1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.
- E. Reductions in Payment by Owner:
 - 1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
 - a. claims have been made against Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;
 - b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
 - c. Contractor has failed to provide and maintain required bonds or insurance;
 - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
 - e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
 - f. the Work is defective, requiring correction or replacement;
 - g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
 - h. the Contract Price has been reduced by Change Orders;
 - i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;
 - j. liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;
 - k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
 - I. there are other items entitling Owner to a set off against the amount recommended.
 - 2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount

remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 15.01.C.1 and subject to interest as provided in the Agreement.

15.02 Contractor's Warranty of Title

A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than seven days after the time of payment by Owner.

15.03 Substantial Completion

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.
- E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.
- F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 Partial Use or Occupancy

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:
 - 1. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through E for that part of the Work.
 - 2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
 - 3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
 - 4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.05 regarding builder's risk or other property insurance.

15.05 Final Inspection

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 Final Payment

- A. Application for Payment:
 - 1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of

inspection, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.

- 2. The final Application for Payment shall be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents;
 - b. consent of the surety, if any, to final payment;
 - c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.
 - d. a list of all disputes that Contractor believes are unsettled; and
 - e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.
- 3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.
- B. Engineer's Review of Application and Acceptance:
 - If, on the basis of Engineer's observation of the Work during construction and final 1. inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to the provisions of Paragraph 15.07. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.
- C. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.
- D. *Payment Becomes Due*: Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation,

including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

15.07 Waiver of Claims

- A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.
- B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

15.08 Correction Period

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
 - 1. correct the defective repairs to the Site or such other adjacent areas;
 - 2. correct such defective Work;
 - 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
 - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).
- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

- 16.01 Owner May Suspend Work
 - A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 Owner May Terminate for Cause

- A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:
 - 1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);
 - 2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;
 - 3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or
 - 4. Contractor's repeated disregard of the authority of Owner or Engineer.
- B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:
 - 1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and
 - 2. enforce the rights available to Owner under any applicable performance bond.
- C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.
- D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.
- E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses,

and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

- F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.
- G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.
- 16.03 Owner May Terminate For Convenience
 - A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 - 1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 - 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and
 - 3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.
 - B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

16.04 Contractor May Stop Work or Terminate

- A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for

expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

- A. *Disputes Subject to Final Resolution*: The following disputed matters are subject to final resolution under the provisions of this Article:
 - 1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and
 - 2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.
- B. *Final Resolution of Disputes*: For any dispute subject to resolution under this Article, Owner or Contractor may:
 - 1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or
 - 2. agree with the other party to submit the dispute to another dispute resolution process; or
 - 3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18 – MISCELLANEOUS

- 18.01 Giving Notice
 - A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:
 - 1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or
 - 2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

18.02 *Computation of Times*

- A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.
- 18.03 Cumulative Remedies
 - A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

18.04 Limitation of Damages

A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 No Waiver

- A. A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.
- 18.06 Survival of Obligations
 - A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

18.07 Controlling Law

- A. This Contract is to be governed by the law of the state in which the Project is located.
- 18.08 Headings
 - A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

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SECTION 007300 SUPPLEMENTARY CONDITIONS

These SUPPLEMENTARY CONDITIONS amend or supplement the EJCDC - STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT (No. C-700, 2013 Edition) and other provisions of the Project Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added thereto.

SC-1 DEFINED TERMS

The terms used in these Supplementary Conditions which are defined in the General Conditions should be used with exactly the same meanings. This is true for all of the Contract Documents.

SC-1.01: The word "CONTRACTOR" shall be held to mean any CONTRACTOR, FIRM OR CORPORATION, or any member of a firm or corporation contracting to do the work herein specified.

The word "ENGINEER/ARCHITECT" shall be held to mean the Firm of Klingner and Associates, P.C., Engineers, Quincy, Illinois, or a duly authorized representative of the OWNER.

The word "CITY ENGINEER" shall be held to mean the Director of Parks, or his authorized representative.

The word "SPECIFICATIONS" shall be held to mean the enclosed Specifications.

SC-2 PRELIMINARY MATTERS

SC-2.02.A. Amend the first sentence of Paragraph 2.02.A. to read as follows:

Owner shall furnish to Contractor up to **three** (3) copies of the Contract Documents (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF).

SC-5 AVAILABILITY OF LANDS

SC-5.05 Add the following new subparagraph immediately after paragraph 5.05 A.2.

For the location of UTILITIES, the CONTRACTOR at minimum shall notify the Joint Utility Locating Information for Excavations (*J.U.L.I.E*) at telephone number **811** or 1-800-892-0123, 48 hours in advance of the start of any construction in the area. In an emergency call **911**. Additional information on gas and electric facilities may be obtained by calling AmerenCIPS at 217-221-0816, for telephone lines call AT&T engineering at 217-789-8367; sewer, water and traffic signals lines within the city of Quincy call 217-228-4527, and for cablevision lines call ComCast at 888-736-6695.

Amend the first sentence to read OWNER shall provide engineering surveys to establish reference points and grade stakes for the construction, which in the DIRECTOR OF PARKS judgment are necessary to enable the CONTRACTOR to proceed with the Work.

SC-6 BONDS AND INSURANCE

- SC-6.01 Performance, Payment, and Other Bonds:
 - (1) A Performance and Payment Bond <u>will</u> be required for any City of Quincy public works or facility remodeling/construction project that exceeds \$100,000 in cost.
 - (2) For contracts less than \$10,000 no Performance and Payment Bond, cash bond, cashier's check, certified check or irrevocable letter of credit for the full amount of the bid will be required after the award of the contract. These bid documents may still require a Bid Security to be submitted.
 - (3) For any contract between \$10,000 and \$100,000 the City of Quincy will accept in lieu of a Performance and Payment Bond, cash bond, certified check, or cashier's check; an irrevocable letter of credit issued by good and sufficient sureties and financial institutions in an amount equal to or greater than One Hundred and Ten Percent (110%) of the bid amount.
- SC 6.03 Add the following new paragraph immediately after Paragraph 6.03.J:
 - K. The limits of liability for the insurance required by Paragraph 6.03 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:
 - 1. Workers' Compensation, and related coverages under Paragraphs 6.03.A.1 and A.2 of the General Conditions:

State:	Statutory
Federal, if applicable (e.g., Longshoreman's):	Statutory
Employer's Liability:	
Bodily injury, each accident	\$ 500,000
Bodily injury by disease, each employee	<u>\$ 500,000</u>
Bodily injury/disease aggregate	\$ 500,000

2. Contractor's Commercial General Liability under Paragraphs 6.03.B and 6.03.C of the General Conditions:

\$ 2,000,000
\$ 2,000,000
\$ 1,000,000

3. Automobile Liability under Paragraph 6.03.D. of the General Conditions:

Bodily Injury:	
Each person	\$ 1,000,000

	Each accident	\$ 1,000,000
	Property Damage:	
	Each accident	\$ 1,000,000
4.	Excess or Umbrella Liability:	
	Each Occurrence	\$ 2,000,000
	General Aggregate	\$ 2,000,000

SC-6.05: Per paragraph 6.05.A. the Contractor and <u>NOT</u> the Owner shall maintain builder's risk insurance.

SC - 7 CONTRACTOR'S RESPONSIBILITIES

SC-7.03 Services, Materials, and Equipment

D. All iron and steel products which are to be incorporated into the work shall be domestically manufactured or produced and fabricated. (*per 30 ILCS 565*) The Contractor shall obtain from the iron or steel producer and/or fabricator, in addition to the mill analysis, a certification that all iron or steel materials meet these domestic source requirements.

SC-10 ENGINEER'S STATUS DURING CONSTRUCTION

SC-10.01 thru 10.09 Replace the term "ENGINEER" with "QUINCY PARK DISTRICT".

SC-14 TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

- SC-14.01 thru 14.07 Replace the term "ENGINEER" with "QUINCY PARK DISTRICT".
- SC 14.02 Add the following new paragraph immediately after Paragraph 14.02.C:

The Contractor shall notify the QUINCY PARK DISTRICT at least 48 hours in advance of the start of project construction or start-up after a suspension of work.

Add the following new paragraph immediately after Paragraph 14.02.F:

G. The work will be subject to the approval of the QUINCY PARK DISTRICT during construction and prior to final acceptance.

SC - 15 PAYMENTS TO THE CONTRACTOR

SC-15.05 The term "ENGINEER" shall also mean "QUINCY PARK DISTRICT".

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SECTION 007334

REQUIREMENT FOR SUBSTANCE ABUSE PREVENTION PROGRAM

In addition to any and all other labor requirements set forth in this request for bids or proposals, the Quincy Park District requires:

Before any contractor commences work on a public works program, the contractor shall have in place a written program that meets or exceeds the requirement in "820 ILCS 265, Public Act 095-0635, Substance Abuse Prevention on Public Works Projects Act", or shall have a collective bargaining agreement in effect dealing with the subject matter in the above Act.

The prime contractor and all subcontractors shall file with the Quincy Park District, 1231 Bonansinga Drive, Quincy, Illinois 62301, a copy of the "Substance Abuse Prevention Program" along with a cover letter certifying their program meets or exceeds the requirements of the Act, or a letter certifying that the prime contractor and subcontractors have a collective bargaining agreement in effect dealing with the subject matter of the above Act.

With reference to the above, all programs or letters received shall be retained on file in the office of the Quincy Park District, and shall be available to the general public.

SECTION 007343 WAGE RATE REQUIREMENTS

The successful bidder and his subcontractors will be required to pay not less than the Prevailing Wage Rate for workmen engaged in work under this contract, with the provisions of an act of the General Assembly of the State of Illinois entitled "An Act Regulating the Wage of Laborers, Mechanics, and other workmen employed in any public works by the State, County, City or any Public Body, or any Political Subdivision or by any one under contract for public works," by act approved July 11, 1957, as amended. Attached to and made part of these Contract Documents is the current prevailing wage rate decision.

It shall be the responsibility of the Contractor and any subcontractors to allow the Quincy Park District, the Illinois Department of Labor, and any authorized representative of any government agency involved in the funding of this project, access to and the right to examine all records, books, papers, payrolls, or documents related to this construction project. This right shall extend from the time of execution of the contract through the entire time period of the work, and ending three (3) years after the final pay estimate is disbursed.

Certified payroll records shall be submitted on a monthly basis to the public body in charge of the construction project, along with a statement affirming that such records are true and accurate, that the wages paid to each worker are not less than the required prevailing rate and that the contractor is aware that filing records he or she knows to be false is a Class B misdemeanor.

Failure to submit the required information may, in addition to such other penalties as may be prescribed by contract or law, is grounds for being barred from bidding upon construction projects using city funds for a period of two (2) years.

If the Illinois Department of Labor revises during the term of this contract the prevailing rate of hourly wages to be paid in the City of Quincy in Adams County, the revised rate shall apply to this contract. It is the responsibility of the Contractor to obtain current wage rates during the term of this contract. <u>http://labor.illinois.gov/</u>

SECTION 007344 ILLINOIS LABOR PROVISIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. The following special provisions shall provide guidance on:
 - 1. The Selection of Labor.
 - 2. Equal Opportunity.
 - 3. Subletting or Assignment of the Contract.
 - 4. Statement and Payrolls.
 - 5. Nonsegregated Facilities.

1.2 REQUIRED PROVISIONS

- A. Selection of Labor:
 - 1. The Contractor shall comply with all Illinois statutes pertaining to the selection of labor.
- B. Equal Employment Opportunity:
 - 1. In the event of the contractor's noncompliance with any provision of this Equal Employment Opportunity Clause, the Illinois Fair Employment Practices Act or the Fair Employment Practices Commission's Rules and Regulations for Public Contracts, the contractor may be declared nonresponsible and therefore ineligible for future contracts or subcontracts with the Quincy Park District or any of its political subdivisions or municipal corporations, and the contract may be canceled or avoided in whole or in part, and such other sanctions or penalties may be imposed or remedies invoked as provided by statute or regulation.
 - 2. During the performance of this contract, the contractor agrees as follows:
 - a. That it will not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin or ancestry; and further that it will examine all job classifications to determine if minority persons or women are underutilized and will take appropriate affirmative action to rectify any such underutilization.
 - b. That, if it hires additional employees in order to perform this contract or any portion hereof, it will determine the availability (in accordance with the Commission's Rules and Regulations for Public Contracts) of minorities and women in the area(s) from which it may reasonably recruit and it will hire for each job classification for which employees are hired in such a way that minorities and women are not underutilized.
 - c. That, in all solicitations or advertisements for employees placed by it or on its behalf, it will state that all applicants will be afforded equal opportunity without discrimination because of race, color, religion, sex, national origin or ancestry.
 - d. That it will send to each labor organization or representative of workers with which it has or is bound by a collective bargaining or other agreement or understanding, a notice advising such labor organization or representative of the contractor's obligations under the Illinois Fair Employment Practices Act and the Commission's

Rules and Regulations for Public Contracts. If any such labor organization or representative fails or refuses to cooperate with the contractor in its efforts to comply with such Act and Rules and Regulations, the contractor will promptly so notify the Illinois Fair Employment Practices Commission and the contracting agency and will recruit employees from other sources when necessary to fulfill its obligations thereunder.

- e. That it will submit reports as required by the Illinois Fair Employment Practices Commission's Rules and Regulations for Public Contracts, furnish all relevant information as may from time to time be requested by the Commission or the contracting agency, and in all respects comply with the Illinois Fair Employment Practices Act and the Commission's Rules and Regulations for Public Contracts.
- f. That it will permit access to all relevant books, records, accounts and work sites by personnel of the contracting agency and the Illinois Fair Employment Practices Commission for purposes of investigation to ascertain compliance with the Illinois Fair Employment Practices Act and the Commission's Rules and Regulations for Public Contracts.
- That it will include verbatim or by reference the provisions of paragraphs 1 through g. 7 of this clause in every performance sub-contracts as defined in Section 2.10 (b) of the Commission's Rules and Regulations for Public Contracts so that such provisions will be binding upon every such subcontractor; and that it will also so include the provisions of paragraphs 1, 5, 6 and 7 in every supply subcontract as defined in Section 2.10 (a) of the Commission's Rules and Regulations for Public Contracts so that such provisions will be binding upon every such subcontractor. In the same manner as with other provisions of this contract, the contractor will be liable for compliance with applicable provisions of this clause by all its subcontractors; and further it will promptly notify the contracting agency and the Illinois Fair Employment Practices Commission in the event any subcontractor fails or refuses to comply therewith. In addition, no contractor will utilize any subcontractor declared by the Commission to be non-responsible and therefore ineligible for contracts or subcontracts with the Quincy Park District or any of its political subdivisions or municipal corporations.

SECTION 011100 SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Contract description.
 - 2. Work by Owner or other Work at the Site.
 - 3. Owner-furnished products.
 - 4. Contractor's use of Site and premises.
 - 5. Owner occupancy.
 - 6. Permits.
 - 7. Specification conventions.

1.2 CONTRACT DESCRIPTION

- A. Work of the Project includes construction of a new 50' x 70' maintenance building. The work includes site work (grading, utilities and concrete pavement), electrical, HVAC, plumbing, foundations, concrete floor, maintenance building and other associated work.
- B. Perform Work of Contract under lump sum Contract with Owner according to Conditions of Contract.
- C. Site demolition is NOT part of this contract except for select items not being demolished by the Park District.
- 1.3 WORK BY OWNER OR OTHERS
 - A. Coordinate Work with utilities of Owner and public or private agencies.
 - B. Demolition of existing curb and sidewalks.
- 1.4 OWNER-FURNISHED PRODUCTS
 - A. Owner's Responsibilities:
 - 1. Arrange for and deliver Owner-reviewed Shop Drawings, Product Data, and Samples to Contractor.
 - 2. Upon delivery, inspect products jointly with Contractor.
 - 3. Submit claims for transportation damage and replace damaged, defective, or deficient items.
 - 4. Arrange for manufacturers' warranties, inspections, and service.
 - B. Contractor's Responsibilities:

- 1. Review Owner-reviewed Shop Drawings, Product Data, and Samples.
- 2. Receive and unload products at Site; inspect for completeness or damage jointly with Owner.
- 3. Handle, store, install, and finish products.
- 4. Repair or replace items damaged after receipt.
- C. Items furnished and installed by the owner:
 - 1. Tree stump removal, sidewalk removal and curb removal.
 - 2. Toilet room paper towel and toilet paper dispensers.
 - 3. Curtain wall between maintenance area and wash bay.
 - 4. Work benches
 - 5. Tool cage fencing
 - 6. Seeding

1.5 CONTRACTOR'S USE OF SITE [AND PREMISES]

- A. Limit use of Site and premises to allow:
 - 1. Owner occupancy.
 - 2. Use of Site and premises by the public.
- B. Construction Operations: Limited to areas indicated on Drawings.
- C. Utility Outages and Shutdown:
 - 1. Coordinate and schedule electrical and other utility outages with Owner.
 - 2. Outages: Allowed only at previously agreed upon times. In general, schedule outages at times when facility is not being used.
 - 3. At least one week before scheduled outage, submit Outage Request Plan to Owner itemizing the dates, times, and duration of each requested outage.
- D. Construction Plan: Before start of construction, **submit three copies** of construction plan regarding access to Work, use of Site, and utility outages for acceptance by Owner. After acceptance of plan, construction operations shall comply with accepted plan unless deviations are accepted by Owner in writing.
- 1.6 OWNER OCCUPANCY
 - A. Owner will occupy the site and premises upon final completion of the work.
- 1.7 PERMITS
 - A. Furnish all necessary permits for construction of Work including the following:
 - 1. Building permit.

1.8 SPECIFICATION CONVENTIONS

A. These Specifications are written in imperative mood and streamlined form. This imperative language is directed to Contractor unless specifically noted otherwise. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

PART 2 – PRODUCTS – Not Used

PART 3 – EXECUTION – Not Used

SECTION 011419 USE OF SITE

PART 1 - GENERAL

1.1 SUMMARY

- A. Work included: This Section applies to situations in which the Contractor or his representatives including, but not necessarily limited to, suppliers, subcontractors, employees, and field engineers, enter upon the Owner's property.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

- A. Promptly upon award of the Contract, notify all pertinent personnel regarding requirements of this Section.
- B. Require that all personnel who will enter upon the Owner's property certify their awareness of and familiarity with the requirements of this Section.

1.3 TRANSPORTATION FACILITIES

- A. Truck and equipment access:
 - 1. To avoid traffic conflict with vehicles of the Owner's employees and customers, and to avoid over-loading of streets and driveways elsewhere on the Owner's property, limit the access of trucks and equipment to the minimum required to complete the work.
- B. Contractor's vehicles:
 - 1. Require Contractor's vehicles, vehicles belonging to employees of the Contractor, and all other vehicles entering upon the Owner's property in performance of the Work of the Contract, to use only the designated Contractor's Access Route to be approved by the Owner prior to construction.
 - 2. Do not permit such vehicles to park on any street or other area of the Owner's property except in areas approved by the Owner.

1.4 SECURITY

A. Restrict the access of all persons entering upon the Owner's property in connection with the Work to the Access Route and to the actual site of the Work.

SECTION 012500 SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Quality assurance.
- B. Product options.
- C. Product substitution procedures.

1.2 QUALITY ASSURANCE

- A. Contract is based on products and standards established in Contract Documents without consideration of proposed substitutions.
- B. Products specified define standard of quality, type, function, dimension, appearance, and performance required.
- C. Substitution Proposals: Permitted for specified products except where specified otherwise. Do not substitute products unless substitution has been accepted and approved in writing by Owner.

1.3 PRODUCT SUBSTITUTION PROCEDURES

- A. Document 002113 Instructions to Bidders specifies time restrictions for submitting requests for substitutions during Bidding period.
- B. A request constitutes a representation that Bidder:
 - 1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
 - 2. Will provide same warranty for substitution as for specified product.
 - 3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
 - 5. Will coordinate installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.
 - 6. Will reimburse Owner for review or redesign services associated with reapproval by authorities having jurisdiction.
- C. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals without separate written request or when acceptance will require revision to Contract Documents.
- D. Substitution Submittal Procedure:

- 1. Submit digital [.pdf] or three (3) hard copies of Request for Substitution for consideration. *Limit each request to one proposed substitution.*
- 2. Submit Shop Drawings, Product Data, and certified test results attesting to proposed product equivalence. Burden of proof is on proposer.
- 3. Architect/Engineer will notify Bidder in writing of decision to accept or reject request.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

SECTION 012900 PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values to Architect/Engineer at earliest possible date, but no later than seven (7) days before the date scheduled for submittal of initial Applications for Payment.
 - 3. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values coordinated with each phase of payment.
 - 4. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values coordinated with each element.
 - 5. Subschedules for Separate Design Contracts: Where the Owner has retained design professionals under separate contracts who will each provide certification of payment requests, provide subschedules showing values coordinated with the scope of each design services contract as described in Section 011000 "Summary."

- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one-line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Architect/Engineer.
 - c. Architect/Engineer's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 - 2. Arrange schedule of values consistent with format of AIA Document G703 or EJCDC Document C-620 as applicable.
 - 3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value of the following, as a percentage of the Contract Sum to nearest onehundredth percent, adjusted to total 100 percent.
 - 1) Labor.
 - 2) Materials.
 - 3) Equipment.
 - 4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of <five (5)> percent of the Contract Sum.
 - a. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five (5) percent of the Contract Sum and subcontract amount.
 - 5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 - 6. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
 - 7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 - 8. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.

- 9. Purchase Contracts: Provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate owner payments or deposits, if any, and balance to be paid by Contractor.
- 10. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
- 11. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect/Engineer and paid for by Owner.
 - 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment Application Times: Submit Application for Payment to Architect/Engineer by the <Insert day> of the month. The period covered by each Application for Payment is one month, ending on the <Insert specific day of the month>.
 - 1. Submit draft copy of Application for Payment <seven (7)> days prior to due date for review by Architect/Engineer.
- D. Application for Payment Forms: Use the AIA Document G702 and AIA Document G703 or EJCDC Document C-620 form as applicable for Applications for Payment.
- E. Application for Payment Forms: Use forms provided by Owner for Applications for Payment. Sample copies are included in Project Manual.
- F. Application for Payment Forms: Use forms acceptable to Architect/Engineer and Owner for Applications for Payment. Submit forms for approval with initial submittal of schedule of values.
- G. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect/Engineer will return incomplete applications without action.
 - 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.

- 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
- 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- H. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
 - 1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
 - 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 - 3. Provide summary documentation for stored materials indicating the following:
 - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
 - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
 - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- I. Transmittal: Submit <three (3)> signed and notarized original copies of each Application for Payment to Architect/Engineer by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
 - 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- J. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
 - 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 - 2. When an application shows completion of an item, submit conditional final or full waivers.
 - 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 - 4. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- K. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
 - 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 - 2. When an application shows completion of an item, submit conditional final or full waivers.
 - 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.

- 4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
- 5. Waiver Forms: Submit executed waivers of lien on forms, acceptable to Owner.
- L. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
 - 1. List of subcontractors.
 - 2. Schedule of values.
 - 3. Contractor's construction schedule (preliminary if not final).
 - 4. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
 - 5. Products list (preliminary if not final).
 - 6. Schedule of unit prices.
 - 7. Submittal schedule (preliminary if not final).
 - 8. List of Contractor's staff assignments.
 - 9. List of Contractor's principal consultants.
 - 10. Copies of building permits.
 - 11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 - 12. Initial progress report.
 - 13. Report of preconstruction conference.
 - 14. Certificates of insurance and insurance policies.
 - 15. Performance and payment bonds.
 - 16. Data needed to acquire Owner's insurance.
- M. Application for Payment at Substantial Completion: After Architect/Engineer issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
 - 1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 - 2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- N. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
 - 1. Evidence of completion of Project closeout requirements.
 - 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 - 3. Updated final statement, accounting for final changes to the Contract Sum.
 - 4. AIA Document G706 or equal, "Contractor's Affidavit of Payment of Debts and Claims."
 - 5. AIA Document G706A or equal, "Contractor's Affidavit of Release of Liens."
 - 6. AIA Document G707 or equal, "Consent of Surety to Final Payment."
 - 7. Evidence that claims have been settled.
 - 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 - 9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

SECTION 013100 PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

- A. A preconstruction conference will be scheduled prior to actual start of work to establish construction contract administration procedures and other items outlined below. Attendance by authorized representatives of the Contractor and major subcontractors will be required. The Owner will advise other interested parties, including the Engineer/Architect, and request their attendance. Data will be distributed and discussed as follows:
 - 1. Organizational arrangement of Contractor's forces and personnel, and those of subcontractors, materials suppliers, and the Engineer/Architect.
 - 2. Channels and procedures for communication.
 - 3. Construction schedule as provided by the Contractor, including sequence of critical work.
 - 4. Contract Documents, including distribution of required copies of Drawings and revisions.
 - 5. Schedule of specific target dates for the submission and return of Shop Drawings as provided by the Contractor.
 - 6. Processing of field decisions and Change Orders.
 - 7. Rules and regulations governing performance of the Work.
 - 8. Procedures for safety and first aid, security, quality control, housekeeping, and related matters.
 - 9. Other items as may be considered relevant.
- B. The Owner will compile minutes of the Conference, and will furnish copies of the minutes to the Contractor, Engineer/Architect, and other interested parties.
- C. Coordination is required with the Owner, Engineer/Architect, and utility companies. It shall be the responsibility of the Contractor to provide for this coordination and for the protection of the utilities' underground and overhead construction.
- D. The Owner shall be notified at least two days prior to significant construction events.
- E. Progress/coordination meetings between the Contractor and the Owner shall be held as needed during construction. Time and locations of meetings shall be coordinated at the preconstruction conference by the Owner.

SECTION 013219 SUBMITTALS SCHEDULE

PART 1 - GENERAL

1.1 SUMMARY

- A. Work included:
 - 1. Provide submittals required by the Contract Documents, and revise and resubmit as necessary to establish compliance with the specified requirements.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Individual requirements for submittals also may be described in pertinent Sections of these Specifications.

1.2 SUBMITTALS

- A. Make submittals of Construction Progress Schedules; Schedule of Values; Shop Drawings, Samples, substitution requests, and other items in accordance with the provisions of this Section and as specified in Related Documents.
- B. Format for Submittals: Submit required submittals in the following format:
 - 1. Working electronic copy of schedule file, where indicated.
 - 2. PDF electronic file.
 - 3. Paper copies and number where indicated.
- C. All submittals shall be accompanied by transmittal document, containing:
 - 1. Date.
 - 2. Project title and number.
 - 3. Contractor's name and address.
 - 4. Notification of deviations from Contract Requirements.
 - 5. Other pertinent information or data.
- D. Submittals shall include:
 - 1. Date and any revision date.
 - 2. Project title and number.
 - 3. Names of:
 - a. Engineer/Architect.
 - b. Contractor.
 - c. Subcontractor when applicable.
 - d. Supplier.

- e. Manufacturer.
- f. Separate detailer when pertinent.
- g. Engineer for design when pertinent.
- 4. Complete identification of product or material.
- 5. Field dimensions or measurements clearly identified as such.
- 6. Specification section and page number.
- 7. Specified standards, such as ASTM number or Fed. Spec. number.
- 8. A blank space suitable for Contractor's or Architect's/Engineer's stamps.
- 9. Contractor's approval stamp, initialed or signed, certifying to review and approval, verification of field measurements, etc.

1.3 QUALITY ASSURANCE

- A. Coordination of submittals:
 - 1. Prior to each submittal, carefully review and coordinate all aspects of each item being submitted.
 - 2. Verify that each item and the submittal for it conform in all respects with the specified requirements.
 - 3. By affixing the Prime Contractor's Approval Stamp and signature to each submittal, certify that this coordination has been performed. Submittals <u>not</u> bearing Prime Contractor's approval stamp and signature will be rejected.
- B. Substitutions:
 - 1. The Contract is based on the standards of quality established in the Contract Documents. Substitutions will be considered only when approved at time of bidding by addendum, on the form provided therefore in the bidding documents, and when substantiated by the Contractor's submittal of required data within 35 calendar days after award of the Contract.
 - 2. The following products do not require further approval except for interface within the Work:
 - a. Products specified by reference to standard specifications such as ASTM and similar standards.
 - 3. Do not substitute materials, equipment, or methods unless such substitution has been specifically approved in writing for this Work by the Engineer/Architect.
- C. "Or equal":
 - 1. Where the phrase "or equal," occurs in the Contract Documents, do not assume that the materials, equipment, or methods will be approved as equal unless the item has been specifically so approved for this Work by the Engineer/Architect.
 - 2. The decision of the Engineer/Architect shall be final.

1.4 RESUBMISSION REQUIREMENTS

- A. Shop drawings
 - 1. Revise initial drawings as directed and resubmit in accordance with submittal procedures.

- 2. Indicate on drawings all changes which have been made in addition to those requested by the Engineer/Architect.
- B. Product data and samples
 - 1. Submit new data and samples as specified for initial submittal.

PART 2 - PRODUCTS

2.1 SHOP DRAWINGS

- A. Scale and measurements: Make Shop Drawings accurately to a scale sufficiently large to show all pertinent aspects of the item and its method of connection to the Work.
 - 1. Prepared by qualified detailer.
 - 2. Identify details by reference to sheet and detail numbers shown on contract drawings or pertinent specification section numbers.
- B. Types of documents permitted:
 - 1. Electronically submitted in a .pdf format
 - 2. Hardcopy submittals; unless noted otherwise, submit a minimum of five (5) copies.

2.2 MANUFACTURERS' LITERATURE

- A. Manufacturer's standard schematic drawings, catalog sheets, brochures, diagrams, schedules, performance charts, illustrations, and other standard descriptive data.
 - 1. Modify to delete information which is not applicable.
 - 2. Supplement standard information to provide additional information applicable to project.
 - 3. Clearly mark each copy to identify pertinent materials, products, or models.
 - 4. Identify specific fixtures per schedule on drawings or schedule in specifications as appropriate.
 - 5. Show dimensions and clearances.
 - 6. Show performance characteristics and capacities.
 - 7. Show wiring diagrams and controls.
- B. Unless noted otherwise, submit as necessary to define proposed shop drawing for review.

2.3 SAMPLES

- A. Samples:
 - 1. Physical samples to illustrate materials, equipment, or workmanship. Approved samples established standards by which complete work will be judged.
 - a. Of sufficient size to clearly illustrate functional characteristics of product or material.
 - b. Color samples shall be of full range available.

PART 3 - EXECUTION

3.1 TIMING OF SUBMITTALS

- A. Submit initial progress schedules and schedule of values in duplicate within 15 days after date of Owner-Contractor Agreement. After review by Architect/Engineer revise and resubmit as required. Submit revised schedules with each Application for Payment, reflecting changes since previous submittal.
- B. Make submittals far enough in advance of scheduled dates for installation to provide time required for reviews, for securing necessary approvals, for possible revisions and resubmittals, and for placing orders and securing delivery.
- C. In scheduling, allow at least ten working days for review by the Engineer/Architect following his receipt of the submittal.

3.2 CONTRACTOR RESPONSIBILITIES

- A. Thoroughly review shop drawings, product data, and samples prior to submitting them to Engineer/Architect for his review. Verify all field dimensions, connections, etc.
- B. Notify Engineer/Architect in writing prior to submission, of proposed deviations in submittals from contract requirements.
- C. Contractor's responsibility for errors and omissions and for deviations in submittals from the contract requirements is not relieved by Engineer/Architect's review of submittals.
- D. Do not begin work which requires submittals without having Engineer/Architect's review stamp and initials or signature.
- E. Make distribution of copies as required.

3.3 ENGINEER/ARCHITECT'S REVIEW

- A. Review by the Engineer/Architect does not relieve the Contractor from responsibility for errors which may exist in the submitted data.
- B. Revisions:
 - 1. Make revisions required by the Engineer/Architect.
 - 2. If the Contractor considers any required revision to be a change, he (she) shall so notify the Engineer/Architect as provided for in the General Conditions.
 - 3. Make only those revisions directed or approved by the Engineer/Architect.

SECTION 013300 SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Action Submittals: Information that requires Architect/Engineer's responsive action.
- B. Informational Submittals: Information that does not require Architect/Engineer's approval. Submittals may be rejected for not complying with requirements.

1.2 PROCEDURES

- A. Electronic copies of CAD Drawings of the Contract Documents will **NOT** be provided by Architect/Engineer for Contractor's use.
- B. Processing Time:
 - 1. Initial Review: 10 days.
 - 2. Resubmittal Review: 10 days.
 - 3. Sequential Review: 21 days.
 - 4. Concurrent Consultant Review: 15 days.
- C. Transmittal Form: AIA Document G810 or Architect/Engineer approved form.
- D. Action Submittals:
 - 1. Number of Copies: One (1) Digital.
 - 2. Action Submittals:
 - a. Product Data.
 - b. Shop Drawings.
 - c. Samples.
 - d. Product schedule or list.
 - e. Contractor's Construction Schedule.
 - f. Submittals Schedule.
 - g. Application for Payment.
 - h. Schedule of Values.
 - i. Subcontract list.
- E. Informational Submittals:
 - 1. Number of Copies: One (1) Digital.
 - 2. Informational Submittals:
 - a. Coordination Drawings.
 - b. Contractor's Construction Schedule.
 - c. Qualification data.
 - d. Welding certificates.

- e. Installer certificates.
- f. Manufacturer certificates.
- g. Product certificates.
- h. Material certificates.
- i. Material test reports.
- j. Product test reports.
- k. Research/evaluation reports.
- I. Schedule of tests and inspections.
- m. Preconstruction test reports.
- n. Compatibility test reports.
- o. Field test reports.
- p. Maintenance data.
- q. Design data.
- r. Manufacturer's instructions.
- s. Manufacturer's field reports.
- t. Insurance certificates and bonds.
- u. Material Safety Data Sheets: Submitted directly to Owner.
- F. Delegated-design submittals.
- G. Contractor's Review:
 - 1. Submittals: Marked with approval stamp before submitting to Architect/Engineer.
- H. Architect/Engineer's Action:
 - 1. Action Submittals: Stamped with an action stamp and returned.
 - 2. Informational Submittals: Reviewed but not returned, or rejected if it does not comply with requirements.
 - 3. Submittals Not Required: May not be reviewed and may be discarded.

SECTION 014000 QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Work included:
 - 1. The Contractor is responsible to provide the quality of materials and workmanship normally associated with this type of work and as set forth in these Contract Documents including Addenda and Change Orders.
 - 2. Substitutions to the materials, equipment, or manner of construction specified will be allowed if in the opinion of the Owner and Engineer/Architect the substitution fully provides essentially the same quality and functions as the specified item. NO SUBSTITUTIONS WILL BE ALLOWED EXCEPT IN WRITING BY ADDENDUM OR CHANGE ORDER! No oral communications by the Owner, Engineer/Architect, or any Contractor may alter this provision. The Contractor takes full responsibility for any substitutions the Contractor may make for the Contractor's bidding or other purposes until the substitution is formally accepted by Addenda or Change Order. Documentation on previous successful usage of the substitute elsewhere may be required.
SECTION 014100 REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Work included:
 - 1. The Contractor shall comply with applicable provisions of the:
 - a. Local Building, Electrical, and Plumbing Codes.
 - b. "The Flammable and Combustible Liquids Code" NFPA 30/30A, National Fire Protection Association.
 - c. State of Illinois State Fire Marshall rules and regulations.
 - d. Illinois Environmental Protection Agency rules and regulations.
 - 2. The Contractor shall include all items of labor and materials required to meet such codes, regardless of the failure to mention in the Specifications, or to show on the Plans. Where the plans or specifications are in excess of the corresponding requirements, the specifications and plans shall govern.
- B. Permits:
 - 1. The Contractor will be responsible for all permits required to perform the work.

SECTION 014529 TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Work includes
 - 1. Contractor shall employ and pay for an independent testing laboratory to perform testing as specified.
 - a. Testing laboratory and procedures shall be as approved by the Engineer/Architect.
 - 2. Contractor shall fully cooperate with the Owner and/or Engineer/Architect for additional testing required as determined by the Engineer/Architect.

1.2 QUALITY ASSURANCE

A. Testing shall be in accordance with all pertinent codes and regulations and with selected standards of the American Society for Testing and Materials (ASTM).

1.3 PAYMENT FOR TESTING

- A. Contractor shall pay for all testing specified in the contract documents.
- B. Payment for additional testing, not specified in original contract documents, but required as determined by the Engineer/Architect, shall be as follows:
 - 1. The Owner will pay for initial testing.
 - 2. When initial tests indicate noncompliance with the contract documents, the costs of initial tests associated with that noncompliance will be deducted from the contract sum.
 - 3. Retesting: When initial tests indicate noncompliance with the contract documents, subsequent retesting occasioned by the noncompliance shall be performed by the same testing agency and costs thereof will be deducted from the contract sum.

SECTION 015000 TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Work included: Provide temporary facilities and controls needed for the Work including, but not necessarily limited to:
 - 1. Sanitary facilities
 - 2. Enclosures such as tarps, plastic sheets, etc. for the protection of the uncompleted construction.
 - 3. Security for the Contractor's equipment and materials.
 - 4. Traffic Control and Safety Provisions.
- B. Temporary power and water:
 - 1. The Contractor shall make arrangements for and pay for any temporary power needed during construction.
 - 2. The Owner shall provide potable water to the Contractor for such uses as pipeline filling and flushing, watering of new seed beds, earthwork moisture content adjustment, and other project justified purposes providing that the water is used in a manner that does not place the Owner's water system in jeopardy.

1.2 REMOVAL

A. Temporary provisions shall be promptly removed as soon as their use is no longer necessary.

SECTION 017400 CLEANING AND WASTE MANAGEMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Work includes:
 - 1. General Contractor:
 - a. Throughout the construction period, maintain the building and site in a standard of cleanliness as hereinafter specified.
 - 2. Each Contractor:
 - a. Cooperate fully with the General Contractor

1.2 BUILDING AND/OR STRUCTURES

- A. General Contractor:
 - 1. Weekly, and more often if necessary, inspect the building structure and pick up all scrap, debris, and waste materials. Dispose of same in a lawful manner.
 - 2. Weekly, and more often if necessary, sweep interior spaces broom clean.
- B. Each Contractor:
 - 1. Cooperate fully with the General Contractor.

1.3 CONSTRUCTION SITE

- A. General Contractor:
 - 1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste materials. Dispose of same in a lawful manner.
 - 2. Weekly, and more often if necessary, inspect all arrangements of materials stored on site, restack, tidy, or otherwise service the arrangements to provide clean orderly storage.
 - 3. Maintain the site in a neat and orderly condition at all times.
- B. Each Contractor:
 - 1. Cooperate fully with the General Contractor.
 - 2. Retain stored items in an orderly arrangement, provided with proper and adequate protection.
 - 3. Do not allow accumulation of scrap, debris, waste materials, and other items not required in the construction work.

SECTION 017424 FINAL CLEANING

PART 1 - GENERAL

1.1 SUMMARY

- A. Work includes:
 - 1. General Contractor:
 - a. Just prior to delivery of project area and site to Owner:
 - 1) Thoroughly broom clean spaces.
 - 2) Visually inspect all surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.
 - 3) Visually inspect site and remove all debris and excess construction materials, tools, and equipment.
 - 4) Clean all windows and interior surfaces.

1.2 CLEANING MATERIALS

A. Use only the cleaning materials and equipment which are fully compatible with the surfaces being cleaned, as recommended by the manufacturer of the material.

1.3 SCHEDULE

A. Schedule final cleaning operations as approved by the Architect to enable the Owner to accept a clean, finished project.

SECTION 017516 STARTUP PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Work included:
 - 1. The Contractor shall be responsible for the successful start-up of all equipment installed on this Project.
 - 2. The start-ups shall be performed in the presence of the Owner and Engineer/Architect who shall be notified by the Contractor at least two days prior to the date of the intended start-up. In addition, representatives of the manufacturers of the equipment involved shall be in attendance to certify that their equipment is installed correctly, ready for start-up, and operating properly.

SECTION 017700 CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Inspection procedures.
- B. Warranties.
- C. Final cleaning.
- 1.2 PROCEDURES
 - A. Substantial Completion: Before inspection by Architect:
 - 1. Provide a list of incomplete items (punch list).
 - 2. Owner advised of insurance changeover.
 - 3. Warranties submitted.
 - 4. Releases, occupancy permits, and operating certificates obtained.
 - 5. Project Record Documents submitted.
 - 6. Spare parts and extra materials delivered.
 - 7. Startup testing completed.
 - 8. Temporary facilities removed.
 - 9. Owner advised of utility changeover.
 - 10. Final cleaning performed.
 - 11. Touchup performed.
 - B. Final Completion: Before final inspection by Architect:
 - 1. Final Application for Payment submitted.
 - 2. List of incomplete items (punch list) endorsed by Architect as completed.
 - 3. Evidence of continuing insurance coverage submitted.
 - 4. Final pest-control inspection report and warranty submitted.
 - 5. Owner's personnel instructed in operation, adjustment, and maintenance of equipment and systems.
 - C. Warranties: Submitted within **15** days for areas of partial occupancy.
 - 1. Organized and bound in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, with paper dividers. Binder front and spine identified with title, Project name, and name of Contractor.
 - D. Final Cleaning: Each surface or unit cleaned to condition expected in an average commercial building cleaning and maintenance program.

SECTION 017823 OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

- A. Work included:
 - 1. Provide three copies of equipment manufacturers' operational and maintenance data to the Owner.
 - 2. The information shall be bound in a booklet with a table of contents which allows for information to be taken from or added to the booklet in the future.
 - 3. Operational and maintenance data to be furnished shall include but not be limited to:
 - a. Design criteria, rated capacity, model number, serial number and other related statistical information.
 - b. Complete dimensional information.
 - c. Installation instructions.
 - d. Maintenance instructions and schedule.
 - e. Operating instructions.
 - f. Complete parts list.
 - g. Name, address, and telephone number of manufacturer's service representative.
 - h. Warranty.

SECTION 017839 PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Work included:
 - 1. Throughout progress of the Work, maintain an accurate record of changes in the Contract Documents, as described in Article 3.1 below.
 - 2. Upon completion of the Work, transfer the recorded changes to a set of Record Documents, as described in Article 3.2 below.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Other requirements affecting Project Record Documents may appear in pertinent other Sections of these Specifications.

1.2 SUBMITTALS

- A. Comply with pertinent provisions of Section 013219.
- B. The Engineer/Architect's approval of the current status of Project Record Documents may be a prerequisite to the Engineer/Architect's approval of requests for progress payment and request for final payment under the Contract.
- C. Prior to submitting each request for progress payment, secure the Engineer/Architect's approval of the current status of the Project Record Documents.
- D. Prior to submitting request for final payment, submit the final Project Record Documents to the Engineer/Architect and secure his approval.

1.3 QUALITY ASSURANCE

- A. Delegate the responsibility for maintenance of Record Documents to one person on the Prime Contractor's staff as approved by the Engineer/Architect.
- B. Accuracy of records:
 - 1. Thoroughly coordinate changes within the Record Documents, making adequate and proper entries on each page of Specifications and each sheet of Drawings and other Documents where such entry is required to show the change properly.
 - 2. Accuracy of records shall be such that future searches for items shown in the Contract Documents may rely reasonably on information obtained from the approved Project Record Documents.

C. Make entries within 24 hours after receipt of information that the change has occurred.

1.4 PRODUCT HANDLING

- A. Maintain the job set of Record Documents completely protected from deterioration and from loss and damage until completion of the Work and transfer of all recorded data to the final Project Record Documents.
- B. In the event of loss of recorded data, use means necessary to again secure the data to the Engineer/Architect's approval.
 - 1. Such means shall include, if necessary in the opinion of the Engineer/Architect, removal and replacement of concealing materials.
 - 2. In such case, provide replacements to the standards originally required by the Contract Documents.

PART 2 - PRODUCTS

2.1 RECORD DOCUMENTS

- A. Job set: Promptly following receipt of the Owner's Notice to Proceed, secure from the Engineer/Architect at no charge to the Prime Contractor one complete set of all Documents comprising the Contract.
- B. Final Record Documents: At a time nearing the completion of the Work, secure from the Engineer/Architect at no charge to the Prime Contractor one complete set of sepia transparencies of all Drawings in the Contract.

PART 3 - EXECUTION

3.1 MAINTENANCE OF JOB SET

- A. Immediately upon receipt of the job set described in Paragraph 2.1-A above, identify each of the Documents with the title, "RECORD DOCUMENTS JOB SET."
- B. Preservation:
 - 1. Considering the Contract completion time, the probable number of occasions upon which the job set must be taken out for new entries and for examination, and the conditions under which these activities will be performed, devise a suitable method for protecting the job set to the approval of the Engineer/Architect.
 - 2. Do not use the job set for any purpose except entry of new data and for review by the Engineer/Architect, until start of transfer of data to final Project Record Documents.
 - 3. Maintain the job set at the site of Work as that site is designated by the Engineer/Architect.
- C. Making entries on Drawings:

- 1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe the change by graphic line and note as required.
- 2. Date all entries.
- 3. Call attention to the entry by a "cloud" drawn around the area or areas affected.
- 4. In the event of overlapping changes, use different colors for the overlapping changes.
- D. Make entries in the pertinent other Documents as approved by the Engineer/Architect.
- E. Conversion of schematic layouts:
 - 1. In some cases on the Drawings, arrangements of conduits, circuits, piping, ducts, and similar items, is shown schematically and is not intended to portray precise physical layout.
 - a. Final physical arrangement is determined by the Contractor, subject to the Engineer/Architect's approval.
 - b. However, design of future modifications of the facility may require accurate information as to the final physical layout of items which are shown only schematically on the Drawings.
 - 2. Show on the job set of Record Drawings, by dimension accurate to within one inch, the centerline of each run of items such as is described in subparagraph 3.1-E-1 above.
 - a. Clearly identify the item by accurate note such as "cast iron drain," "galv. water," and the like.
 - b. Show, by symbol or note, the vertical location of the item ("under slab," "in ceiling plenum," "exposed," and the like).
 - c. Make all identification sufficiently descriptive that it may be related reliably to the Specifications.
 - 3. The Engineer/Architect may waive the requirements for conversion of schematic layouts where, in the Engineer/Architect's judgment, conversion serves no useful purpose. However, do not rely upon waivers being issued except as specifically issued in writing by the Engineer/Architect.

3.2 FINAL PROJECT RECORD DOCUMENTS

- A. The purpose of the final Project Record Documents is to provide factual information regarding all aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive site measurement, investigation, and examination.
- B. Approval of recorded data prior to transfer:
 - 1. Following receipt of the transparencies described in Paragraph 2.1-B above, and prior to start of transfer of recorded data thereto; secure the Engineer/Architect's approval of all recorded data.
 - 2. Make required revisions.
- C. Transfer of data to Drawings:
 - 1. Carefully transfer change data shown on the job set of Record Drawings to the corresponding transparencies, coordinating the changes as required.

- 2. Clearly indicate at each affected detail and other drawing a full description of changes made during construction, and the actual location of items described in subparagraph 3.1-E-1 above.
- 3. Call attention to each entry by drawing a "cloud" around the area or areas affected.
- 4. Make changes neatly, consistently, and with the proper media to assure longevity and clear reproduction.
- D. Transfer of data to other Documents:
 - 1. If the Documents other than Drawings have been kept clean during progress of the Work, and if entries thereon have been orderly to the approval of the Engineer/Architect, the job set of those Documents other than Drawings will be accepted as final Record Documents.
 - 2. If any such Document is not so approved by the Engineer/Architect, secure a new copy of that Document from the Engineer/Architect at the Engineer/Architect's usual charge for reproduction and handling, and carefully transfer the change data to the new copy to the approval of the Engineer/Architect.
- E. Review and submittal:
 - 1. Submit the completed set of Project Record Documents to the Engineer/Architect as described in Paragraph 1.3-D above.
 - 2. Participate in review meetings as required.
 - 3. Make required changes and promptly deliver the final Project Record Documents to the Engineer/Architect.

3.3 CHANGES SUBSEQUENT TO ACCEPTANCE

A. Prime Contractor has no responsibility for recording changes in the Work subsequent to Final Completion, except for changes resulting from work performed under Warranty.

SECTION 024120 SUBSURFACE CONDITIONS

PART 1 - GENERAL

1.1 SUMMARY

A. This section describes soils investigation at the site and use of data resulting from that investigation.

1.2 SOILS INVESTIGATION REPORT

- A. General:
 - 1. A soils investigation report has been prepared for the site by the soil investigation engineer/architect selected by the Owner.
- B. Use of Data:
 - 1. Information on the nature of the soil conditions previously encountered at the site, which may be shown on the drawings or contained in the *Soils Report*, has been provided for bidder's information and shall not be construed as a guarantee of the subsurface conditions.
 - 2. The Contractor should visit the site and shall be responsible for determining to his/her satisfaction, prior to bidding, the actual site conditions.
 - 3. A copy of the Geotechnical Investigation, *Quincy Park District Maintenance Building,* performed by Geotechnics Soil & Material Testing, a Division of Klingner & Associates, P.C., is attached at the end of this section, solely for the Contractor's information.

1.3 QUALITY ASSURANCE

A. Readjust work performed that does not meet technical or design requirements, but make no deviation from the Contract Documents without specific and written approval from the Owner.

1.4 UNDERGROUND UTILITIES

- A. The drawings indicate the best knowledge of the Owner and Engineer/Architect on the general location and nature of the existing and/or proposed underground utilities in the area of construction. Exploratory excavations at the site to determine insitu locations were not conducted. A utility locate was requested for this site on 01/17/2020.
- B. Quality Level "C" in accordance with CI/ASCE 38-02, "Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data", was utilized. Regardless of the level of investigation, the utilities shown should not be considered a warranty or guarantee of actual presence or location and the contractor remains responsible for the location, verification, and proper notification of potential utilities.
- C. Quality Levels:

- 1. Quality Level A provides the highest level of accuracy by locating or potholing utilities in addition to Quality Levels B, C, and D tasks. The located utility infrastructure is surveyed and mapped to develop plan and profile information.
- 2. Quality Level B involves designating the horizontal position of subsurface utilities through surface detection methods and recording the information through a survey method, in addition to Quality Level C and D tasks.
- 3. Quality Level C involves surveying visible subsurface utility structures such as manholes, hand-holes, utility valves and meters, fire hydrants, pedestals, and utility markers, and then correlating the information with existing utility records to create composite drawings, in addition to Quality Level D tasks.
- 4. Quality Level D involves collecting data from existing utility records that may include asbuilt drawings, distribution and service maps, existing geographic information system databases, construction plans, etc.
- D. The Contractor shall be responsible for locating all utilities on site prior to the start of construction. The Contractor shall contact the Joint Utility Locating Information for Excavation service (JULIE) at 1-800-892-0123, 48 hours before scheduled work.
- E. Damages to utilities caused by the Contractor's failure to properly investigate existence in the area shall be the sole responsibility of the Contractor.



A DIVISION OF KLINGNER

616 N. 24th Street • Quincy, IL 62301 • voice 217.223.4456 • fax 217.223.3603

February 7, 2020

19-0363

Quincy Park District 1231 Bonansinga Drive Quincy, IL 62301

Attn: Mr. Matt Higley

RE: Geotechnical Investigation-Quincy Park District Maintenance Building

Dear Mr. Higley:

At the Park District's request, we have conducted a geotechnical investigation for the proposed new maintenance building in Quincy, IL.

Scope of Services

The scope of our services for this project consisted of investigating the site's subsurface conditions by drilling two (2) test borings in and near the maintenance building footprint to a depth of 26½ feet (elev. 463.5 to 465.1). The borings were drilled at locations depicted on the test boring location sketch in the appendix to this report. Ground surface elevations were determined by our firm during the course of the project topographic survey. The scope of services also consisted of a laboratory testing program and an engineering analysis of the soil-structure interaction with subsequent foundation and earthwork recommendations.

Site Description

The new maintenance building will be situated north of the Park District office on Quinsippi Island Road, west of Bonansinga Drive. There is an existing asphalt surface parking lot just south of the proposed building. Most of the new building area is grass covered with scattered tress. Ground surface elevations within the building area vary from about 489 to 491 and at the borings they ranged from 489 to 491.6.

Proposed Development

The proposed maintenance building is to consist of a single-story, slab on grade structure with plan dimensions of 50 ft. x 70 ft. and it will be supported by isolated column footings and wood post and beam framing. Maximum column loads considered in our analyses were in the 25 to 40-kip range. The finished floor has been set at 491.4. Therefore, 1 to 2 feet of new structural fill will be necessary to establish final grades for the floor slab on grade.

Subsurface Conditions

The soil conditions at the ASC site consisted of recent fill overlying Mississippi River alluvium. Recent fill was encountered at the borings to depths of 14 to 20 feet (elev. 477.5 to 470±). The fill was composed of a wide variety of materials including lean clay and sandy lean clay (CL), sand (SP), silty sand, (SM), cinders and wood fragments. N values in the fill varied from 2 to 27 blows per foot.

Matt Higley February 7, 2020 Page 2

The alluvium below the recent, undocumented fill was composed of soft to medium lean clay and medium dense sand (SP) with N values of 4 to 25 blows per foot. The alluvial soils extended to boring termination at 26½ feet.

Groundwater Observations

Groundwater observations were made during drilling and at completion of the borings. Groundwater levels at the borings were:

Boring No.	Groundwater Depth/Elev. During Drilling	Groundwater Depth/Elev. @ Completion
1	Dry	16 ft./474
2	25 ft./466.6	-

Due to the proximity of the site to the Mississippi River and the direct connection with eh groundwater regimen, it is expected that groundwater levels will vary directly and fairly rapidly with changes in the Mississippi River stage.

Geotechnical Engineering Analyses and Foundation Recommendations

The recent fill materials are variable and weak. Therefore, allowable bearing pressures will be reduced and partial overexcavation/replacement will be necessary to provide increased uniformity of support and resulting decease in settlements. We recommend that isolated column footings be overexcavated at least 50% wider than the design width or to a depth of 3 feet below the design bottom elevation, whichever is greater. The overexcavated material should be replaced with compacted granular material with a gradation similar to IDOT CA6 aggregate base. Specific compaction recommendations are contained in the Floor Slabs and Site Earthwork section of this report. Reinforced concrete footings may then be designed using a maximum net allowable soil pressure of 2,000 PSF. Exterior footings should be based at least 36" below finished exterior grade.

Floor Slabs and Site Earthwork

We recommend that topsoil and unsuitable soft and/or unstable materials be stripped prior to placement of new structural fill. The subgrade should be proofrolled prior to placement new structural fill. It is expected that a portion of the recent fill will have to be removed and replaced with aggregate base material. In that case, aggregate base with a gradation similar to IDOT CA 6 may be used if compacted as recommended.

Aggregate base to replace soft/unstable areas, footing overexcavations and new structural fill should be compacted to a dry density of at least 95% of the standard proctor (ASTM D 698) maximum dry density and within a moisture range of \pm 3% of optimum. Field density tests in existing subgrades and new structural fills and backfills are recommended at the rate of one test per 2,500 square feet per lift.

Floor slabs should be provided with adequate crack control joints to accommodate vertical slab movements due to minor volume changes in the subgrade. The site grading plan should provide for positive surface water drainage away from the proposed structure and roof drains should connect to watertight lines that extend away from the building. All drain or utility lines beneath floors should have tight joints to prevent leakage.

Matt Higley February 7, 2020 Page 3

Seismicity

Based on the subsurface conditions encountered and areal geology, the site class would be closest to D in accordance with the provisions of ASCE7-16. The recommended short period spectral response acceleration, S_{MS} is 0.314 while the recommended 1-second spectral response acceleration, S_{M1} is 0.344. Liquefaction potential for the site is low, although some vertical and horizontal displacement should be expected during a major earthquake.

Conclusions

The geotechnical investigation, including exploration, testing and analyses has been completed for the proposed Quincy Park District Maintenance Building in Quincy, IL. Foundation and earthwork recommendations, based on the investigation, have been included in this report.

The analyses, conclusions and recommendations contained in this report are based on the site conditions and project descriptions presented in this report, and the subsurface conditions disclosed by the exploratory borings. The conclusions and recommendations presented are professional opinions based on the above conditions, professional judgment and experience. If during design and construction, changes occur, either in the proposed construction, due to natural causes or construction operations at the site, from a substantial lapse in time, or should subsurface conditions encountered during construction differ materially from those presented, we should be contacted to review any changes in circumstances and conditions to evaluate the effects on the analyses, conclusions and recommendations presented.

This report is intended to be used for this project and the recommendations are not applicable to other projects at this site or any other site at any other time. The borings were spaced to obtain a reasonably accurate picture of the subsurface conditions. However, variations in the subsurface conditions not indicated by the borings are always possible. These data are supplied for the benefit of the designers and owner and do not express or imply any warranty of the subsurface conditions. Completed foundation excavations, foundation construction, site grading, backfill and pavement construction should be observed and tested during the construction phase by a qualified professional to verify the subsurface conditions and the design assumptions.

The scope of our services does not include environmental assessment of investigation for the presence or absence of hazardous or toxic materials in the soil, groundwater or surface water within the site studied. Any statements in this report regarding odors, staining of soils, or other unusual conditions observed are strictly for the information of our clients. If you have any questions concerning this investigation, feel free to call.

Very truly yours,

GEOTECHNICS

Vould W. Women

Ronald W. Craven, P.E. Geotechnical Services Department Manager Illinois P.E. No. 062.040791



Encl.

APPENDIX

TEST BORING LOCATION SKETCH FIELD INVESTIGATION LABORATORY INVESTIGATION BORING LOGS - GENERAL INFORMATION BORING LOGS



FIELD INVESTIGATION

The field investigation consisted of a site inspection, subsurface exploration and sampling, as well as field testing and visual classification of the soils encountered. The site inspection provided information concerning existing topography and recent manmade alterations. During this inspection the locations and ground elevations for each of the borings were determined.

Subsurface exploration and sampling was conducted in an effort to define the soil profile and to obtain disturbed and/or undisturbed representative samples of the various soils encountered for the purposes of the laboratory investigation.

Test borings were completed with a CME 55/75 drill rig equipped with hollow stem augers or continuous flight solid stem augers. The hollow stem augers permit convenient access to the undisturbed soil below the auger bit which allows the driller to obtain a soil sample at any desired depth. Unless instructed otherwise, the boreholes upon completion were backfilled with auger cuttings (soil). Periodic observation and maintenance of the backfilled boreholes should be performed to monitor for subsidence at the ground surface as the borehole backfill could settle over time.

As the test borings were advanced, two methods of sampling were employed to recover soils from the undisturbed strata below the auger bit. Representative disturbed samples were obtained from a standard Split Spoon. These samples were recovered by driving a 2" O.D. (1%" I.D.) Split Spoon sampler in accordance with ASTM D 1586-08. Relatively undisturbed samples were obtained in cohesive soils by hydraulically pushing a thin walled seamless tube sampler into the soil in accordance with ASTM D 1587-00 (2007). These Shelby Tubes were 3" in outside diameter. One or both of these methods may have been utilized based on site conditions and/or job specific requirements. Additionally, disturbed samples collected from auger cuttings may have been obtained as needed to further facilitate identification of the subsurface conditions.

The recovered samples were described in the field according to color, texture, grain size, plasticity and consistency, as recommended by ASTM D 2488-06, "Description and Identification of Soils (Visual-Manual Procedure)". Split Spoon samples when obtained were sealed in glass jars and labeled while Shelby Tube samples when obtained were sealed within the tubes and also labeled. Auger cuttings when obtained were sealed in an air tight container to preserve the natural moisture content. The samples were all carefully stored for later use in the laboratory testing program.

Field tests were conducted in an effort to establish the shearing strength of the soil. Though the results of these tests were not used alone as a basis for shearing strength determination, they were helpful in predicting the behavior of the soil mass and should be considered approximate. Where applicable, further laboratory testing and evaluation in conjunction with the field testing program was essential in determining the soil conditions.

The field testing program included the Standard Penetration Test conducted in accordance with ASTM D 1586-08. In this test, administered during the Split Spoon sampling procedure, a 2" O.D. (1 %" I.D.) 24" long standard Split Spoon was driven into the soil through a depth of 18" by a 140 pound weight dropped a distance of 30". The penetration resistance, "N", was recorded as the number of blows, from the falling weight, required to drive the sampler through the final 12 inches. This penetration resistance provided a measure of the relative density of cohesionless soils and an estimate of the consistency of cohesive materials.

Recovered cohesive samples were tested, when possible, by the use of a calibrated penetrometer. The values from this test were considered an approximate measure of the consistency of the cohesive soils. The penetrometer values as well as the measures of penetration resistance were later correlated with the results of the laboratory tests conducted on cohesive soil samples obtained from the Split Spoon and/or Shelby Tube samples.

The results of the field tests on each soil sample, as well as the soil descriptions, were recorded on field boring logs as the subsurface exploration progressed. These field boring logs were later modified to reflect the more elaborate analysis provided by the laboratory testing program. These modified field boring logs are the final boring logs that are attached to this report.

LABORATORY INVESTIGATION

The laboratory investigation involved the completion of classification tests on select undisturbed samples as well as select disturbed samples of the soils that were obtained from the various soil layers encountered beneath the site. Based on the field logs/records and our examination of the samples in the laboratory, a soil testing program was developed to acquire more information about the soil conditions at the site.

Representative samples from the various soil strata were tested (site specific determination) in accordance with ASTM Specifications for the natural moisture content (ASTM D 2216-05). These parameters were used in identifying the soils through the Unified Soil Classification System (ASTM D 2487-06). This System, which is standardized and widely accepted, enables the Geotechnical Engineer to classify a soil using quantitative test results. A brief description of this classification system is contained in this report. Predictions of the soil behavior during and after construction may readily be made through the use of this comparative type of classification.

Disturbed Split Spoon and/or relatively undisturbed Shelby Tube samples of the cohesive soils were tested to determine unit weight and an approximation of the unconfined compressive strength. These tests were conducted with controlled strain by the use of a hand-operated compression apparatus with a double proving ring in accordance with ASTM D 2166-06. The results of some of the tests must be considered cautiously, recognizing that Split Spoon samples are disturbed and that these samples, when tested, will provide slightly conservative values in relation to the probable conditions in the field. The relatively undisturbed Shelby Tube samples, however, should approach the condition of the soils in-situ and the results of unconfined compression tests on these samples should be fairly accurate.

Upon completion of the laboratory testing program the final boring logs were prepared utilizing the data obtained from the laboratory testing and the initial data/records contained on the field boring logs. The remaining soil samples after all testing is completed will be stored at our office(s) for a minimum period of two months. After 30 days, the samples may be discarded unless written notification is provided.

BORINGLOGS

GENERAL INFORMATION

I. DRILLING AND SAMPLING SYMBOLS:

- HA Hollow Continuous Flight Auger
- SS Split Spoon Sample (2" O.D. 1 3/8" I.D.) Obtained Following the Standard Penetration Test
- 2ST Shelby Tube Sample (2" O.D.)
- 3ST Shelby Tube Sample (3" O.D.)
- PST Piston sample using Shelby Tube (3" O.D.)

II. SOIL IDENTIFICATION:

The soils have been identified by Visual-Manual procedures in accordance with ASTM Standards (ASTM D 2488-06). Where specifically noted, the soils have been classified using the Unified Soil Classification System (ASTM D 2487-06). Classification estimates are in parentheses.

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of Components Present in Sample by Percent of Dry Weight

Trace< 15</th>With15-29Modifier> 30

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of Components Present in Sample by Percent of Dry Weight

Trace	< 5
With	5-12
Modifier	> 12

GRAIN SIZE TERMINOLOGY

Major Component of Sample and Size Range

Boulders	Over 12 in.
Cobbles	12 in. to 3 in.
Gravel	3 in. to #4 sieve
Sand	#4 sieve to #200 sieve
Silt or Clay	Passing #200 sieve

SOIL STRUCTURE TERMINOLOGY

Parting:	Paper Thin in Size
Seam:	1/8" to 3" in Thickness
Layer:	Greater than 3" in Thickness
Interbedded:	Alternating Soil Type Layers
Laminated:	Thin Layers of Varying Color and Texture, or Composition
Slickensided:	Having Inclined Planes of Weakness that are Slick and Glossy in Appearance
Fissured:	Containing Shrinkage Cracking, Frequently Filled with Fine Sand or Silt, Usually
	Vertical
Ferrous:	Containing Appreciable Iron
Desiccated:	Soil that has been Subjected to a Thorough Drying Process

III. SOIL PROPERTY SYMBOLS:

MC - Natural Moisture Content in %.

DRY WT.- Unit Dry Weight in Pounds per Cubic Foot.

- LL Liquid Limit in %.
- PL Plastic Limit in %.
- PI Plasticity Index in %
- Qp Unconfined Compressive Strength in Tons per Square Foot Calibrated Penetrometer Value
- Qu Unconfined Compressive Strength in Tons per Square Foot Obtained in Laboratory at Controlled Rate of Strain
- BLOWS The "blows" are the recorded results of the Standard Penetration Test (SPT). In this field test, a standard Split Spoon Sampler (2" O.D.- 1 3/8" I.D.) is driven into the soil for a total penetration of 18 inches by a 140-pound hammer which is repeatedly dropped freely for a distance of 30 inches.

The number of blows are recorded (field logs) for each 6 inches of penetration, and the penetration resistance, "N", is considered as the number of blows required for the last 12 inches of penetration.

EXAMPLE: 3-8-6 "N" = 14 blows/foot

The SPT "N" value for split-spoon refusal conditions is typically estimated as greater than 100 blows per foot. When split-spoon refusal occurs, often little or no sample is recovered. For our own in-house purposes, refusal is estimated at 50 blows per 6 inches. Where the sampler is observed not to penetrate after 50 blows, the "N" value is reported as 50/0". Otherwise, the depth of penetration after 50 blows is reported in inches (i.e. 50/5", 50/2"). Should the sampler not penetrate the full 18 inches, the results are recorded as follows:

EXAMPLE: 6-21-50/3"

This means that 6 blows were required for the first 6 inches of penetration, 21 blows were required for the second 6 inches of penetration, and 50 blows were required for the last 3 inches of penetration.

$\underline{\nabla}$ - Groundwater Level During Drilling

▼ - Groundwater Level at Indicated Hours Following Boring Completion

IV. APPROXIMATE RELATIVE DENSITY AND CONSISTENCY OF SOILS ON THE BASIS OF THE STANDARD PENETRATION TEST:

NONCOHESIV	E SOILS	COHESIVE SOILS*						
BLOWS/FT.**	RELATIVE DENSITY	BLOWS/FT	** CONSISTENCY					
0 - 4	Very Loose	0 - 2	Very Soft					
4 - 10	Loose	2 - 4	Soft					
10 - 30	Medium Dense	4 - 8	Medium					
30 - 50	Dense	8 - 15	Stiff					
50+	Very Dense	15 - 30	Very Stiff					
	-	30+	Hard					

* Use with caution

**Penetration Resistance "N"

V. QUANTITATIVE EXPRESSIONS FOR THE CONSISTENCY OF CLAYS:

UNCONFINED COMPRESSIVE STRENGTH		
CONSISTENCY 1	.S.F.	FIELD IDENTIFICATION
Very Soft	0.0 - 0.25	Easily penetrated several inches by fist.
Soft	0.25 - 0.5	Easily penetrated several inches by thumb.
Medium	0.5 - 1.0	Penetrated by thumb with moderate effort.
Stiff	1.0 - 2.0	Readily indented by thumb but penetrated only with great effort.
Very Stiff	2.0 - 4.0	Readily indented by thumbnail.
Hard	4.0+	Indented with difficulty by thumbnail.

MAJOR DIVISIONS			graph Symbol	group Symbol	TYPICAL DESCRIPTIONS			
	GRAVEL CLEAN GRAVELS		GW	Well-Graded Gravel, Gravel-Sand Mixture, Little or No Fines				
	GRAVELY SOILS	(Little or No Fines)		GP	Poorly-Graded Gravel, Gravel-Sand Mixtures, Little or No Fines			
COARSE GRAINED	More than 50% of Coarse Fraction RETAINED on	GRAVELS WITH FINES		GM	Silty Gravel, Gravel-Sand-Silt Mixtures			
SUILS	No. 4 Sieve	(Appreciable Amount of Fines)		GC	Clayey Gravel, Gravel-Sand-Clay Mixtures			
	SAND AND	CLEAN SAND	0 0 0 0 0	SW	Well-Graded Sand, Gravely Sands, Little or No Fines			
More than 50% of Material is LARGER than No.	SANDY SOILS	(Little or No Fines)		SP	Poorly-Graded Sand, Gravely Sands, Little or No Fines			
200 Sieve Size	More than 50% of Coarse Fraction PASSING on	SANDS WITH FINES		SM	Silty Sand, Sand-Silt Mixtures			
		(Appreciable Amount of Fines)		SC	Clayey Sand, Sand-Clay Mixtures			
				ML	Inorganic Silt and Very Fine Sand, Rock Flour, Silty or Clayey Fine Sand or Clayey Silt with Slight Plasticity			
FINE GRAINED	SILTS AND CLAYS	Liquid Limit LESS than 50%		CL	Inorganic Clay of Low to Medium Plasticity, Gravely Clay, Sandy Clay, Silty Clay, Lean Clay			
SOILS				OL	Organic Silt and Organic Silty Clay of Low Plasticity			
				MH	Inorganic Silt, Micaceous or Diatomaceous Fine Sand or Silty Soil, Elastic Silt			
More than 50% of Material is <u>SMALLER</u> than No. 200 Sieve Size	SILTS AND CLAYS	Liquid Limit <u>GREATER</u> than 50%		СН	Inorganic Clay of High Plasticity, Fat Clay			
					Organic Clay of Medium to High Plasticity, Organic Silt			
HIGHL	Y ORGANIC S	OILS		PT	Peat, Humus, Swamp Soils with High Organic Contents			
SOIL CLASSIFICATION CHART								
	NOTES: 1) DUAL SYMBOLS AI 2) IN THE CASE OF C	RE USED TO INDICAT	e Border Predomin/	LINE SOIL C	CLASSIFICATIONS. RIAL WILL BE IN HEAVY SYMBOL.			
EDTECHNICS OILS Material Testing of Mailane (May, L Procession - Reg17203400 The Gauge (May Graphics Reg1720400 The Gauge (May Graphics Reg1720400								

Project No.: 19-0363

Project: QPD New Maintenance Building

Boring Log

Rig: CME 55 (B-55)

Location: Quincy, IL

Driller: AJK

Client: Quincy Park District

Boring No.: 1

		SUBSURFACE PROFILE					SAI	MPLE										
Depth (ft.)	Symbol	Description	Qp, t.s.f.	Dry Density, P.C.F.	Depth/Elev.	Number	Type	Blows/ft.	Qu, TSF	Standard Penetration Test blows/ft.			n Water Content % Wp ├──● V					
0-		Ground Surface			490.0					10	2	03	0 40		10 2	03	04	.0
		_ Topsoil (±6") Fill: Lean Clay (CL), Brown, Silty, Moist			0.5													
						0	HA									20.4	t I	
_		Medium to Heavy Gravel/Drilling (1½ to 4 ft.)			487.5							07				\square		
-		Brown, Silty, With Concrete Pieces, Very Stiff,			2.0	1	SS	27						13.2	Í			
-		Moist										/			\vdash			
5 -		Fill: Sandy Lean Clay (CL), Gray mottled Yellow			485.0 5.0					$\vdash \not$	·			-	$\left \right\rangle$	\vdash		
-		Brown, Silty, With Brick, Soft, Moist				2	SS	2		4 2					22.2	<u>è</u>		
-		Light to Medium Gravel/Drilling (4 to 10 ft.)								\square						<u> _</u>		
		Fill: (CL), Silty, With Brick, Trace Gravel, Medium,								\square								
		Moist	0.25			3	SS	5		↑ 5					22.9	P		
										\square								
10 -		Fill: (CL), Gray, Silty, With Concrete, Stiff, Moist				4		0						12				
-						4	- 33	9						13.2				
-					477.5											\mathbb{H}		
-		Fill: Lean Clay (CL), Greenish Gray, Silty, With	0.50		12.5	5	ss	10		10				-		34.1		-
-						-				\vdash							\vdash	\vdash
15 -																		
VZ.		Fill. Wood Fleces				6	SS	14		14							102	9 →
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-					470.0							$\left \right $						\succ
20 -		Poorly Graded Sand (SP), Gray, Fine, Trace Silt,			20.0							+				\vdash	\vdash	
-		Medium Dense, Moist				7	SS	25			_2	5		2	20.0	\vdash	\vdash	-
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-											/					\square		
-	•••••										/					\square		
25 -					465.0													
25		Lean Clay (CL), Gray, Silty, Medium, Moist	0.25		25.0	8	ss	4		4						82.2		
_		End of Boring @ 261/ Et			463.5													
-					20.0													
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30 -										\vdash				-		\vdash		-
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Drill	Metho	d: 3 1/4" HSA and AW Rod						G	round	water	Fle	v r	Jurina	Drilli	ina	∇		_

Drill Method: <u>3 1/4" HSA and AW Roo</u> Boring Started: <u>1/21/2020</u> Boring Completed: <u>1/21/2020</u> Tested By: <u>AJK</u> Logging By: <u>MAS</u>



Groundwater Elev. During Drilling: Groundwater Elev. @ Comp.: ⊈ <u>474.0</u> Groundwater Elev. @ Hrs.: Boring Location: <u>See Location Sketch</u> Sheet 1 of 1

Project No.: 19-0363

Project: QPD New Maintenance Building

Boring Log

Rig: CME 55 (B-55)

Location: Quincy, IL

Driller: AJK

Client: Quincy Park District

Boring No.: 2

Logging By: MAS

		SUBSUBEACE PROFILE					SAI	MPI F		<u> </u>					_		
pth (ft.)	mbol	Description	o, t.s.f.	y Density, C.F.	pth/Elev.	mber	be	ows/ft.	ı, TSF	- Standard Penetration Test blows/ft.			n Water Content %				
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0 -		Topsoil (5")			491.6						20 3					<u>/ 40</u>	
-		Fill: Silty Sand (SM), Brown, Moist			489.1	0	HA						6.0				
-		Fill: Poorly Graded Sand (SP), Yellow Brown, Fine, Loose, Moist			2.5	1	SS	7		7			•	6.8			
5 -		Fill: (SP), Fine, Loose, Moist			494.1	2	SS	6		6				8.2			
-		Fill: Poorly Graded Sand (SP), Brown, With Cinders, Trace Clay, Loose, Moist			7.5	3	SS	5		45				24.4			
10 -		Fill: (SP), Greenish Gray mottled Yellow Brown/ Brown, With Cinders, With Silty Sand Seam, Medium Dense, Moist				4	SS	13	-	13			16	7•			
-		Fill: Cinders, Black, With Sand, Loose, Moist			479.1 12.5 477.6	5	SS	4		4			:	22.0			
15		Light Gravel (14 to 18 ft.)			14.0												
15-		Clayey Sand with Gravel (SC), Greenish Gray, Loose, Moist				6	SS	7		7			15.	5 🔶			
-					471.6												
- 20		Lean Clay (CL), Yellow Brown mottled Light Gray, Silty, Trace Sand, Soft, Moist	0.25		20.0	7	SS	3	-	3				24.9	, ●		
<u>¥</u> 25 −		Lean Clay with Sand (CL) Gray Silty Medium			466.6				-					\square	\rightarrow		
-		Wet	0.50	98.6	465.1	8	SS	5	0.75	▲5				27	.4 •	—	
-		End of Boring @ 26½ Ft.			26.5												
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Drill Bori Bori Test	Metho ng Sta ng Cor ed By:	d: <u>3 1/4" HSA and AW Rod</u> rted: <u>1/21/2020</u> npleted: <u>1/21/2020</u> <u>AJK</u>)TE Ma	IC			5	G G B	round round round oring	water E water E water E Locatio	Elev. I Elev. (Elev. (Elev. (on: <u>S</u> e	During D @ Comp @ F ee Locat	Drilli .: Irs.: ion	ng: ⊈ ¥ Ske	<u>₹4</u>	<u>66.6</u>	

Soil & Material Testing

Boring Location: See Location Sketch Sheet 1 of 1

SECTION 033000 CAST IN PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. Work included:
 - 1. Provide cast-in-place concrete, including formwork and reinforcement, as specified herein, and as needed for a complete and proper installation.

1.2 QUALITY ASSURANCE

A. Comply with "Specifications for Structural Concrete for Buildings," ACI 301, except as may be modified herein, and referenced ACI, ASTM, PCA and CRSI specifications and guidelines.

PART 2 - PRODUCTS

- 2.1 FORMS
 - A. Design, erect, support, brace, and maintain formwork in compliance with ACI 347 so it will safely support vertical and lateral loads which might be applied until such loads can be supported safely by the concrete structure.
 - B. Construct forms to the sizes, shapes, lines, and dimensions required.
 - C. Provide form ties with positive breakoff not less than 1/2 inch behind the finished surface.
 - D. Forms shall be wood, metal or other approved material free of defects or deformities which will adversely affect the finished concrete surface.
 - E. Coatings/Release agents: Compatible with finish requirements. Must not bond with, stain, or adversely affect concrete surfaces. Must not impede the wetting of surfaces to be cured with water or curing compounds.

2.2 GRANULAR DRAINAGE LAYER

A. Provide four (4) inches compacted granular drainage layer under the floor slab of buildings and structures. Material shall be well graded crushed stone, maximum size 1 inch; not over 6 percent by weight shall pass the No. 16 sieve. Compaction shall consist of consolidating material with a vibratory pan compactor after placement to grade.

2.3 REINFORCEMENT

A. Comply with the following as minimums

Yd

- Deformed Bars: ASTM A615, Grade 60; Mat Fabrication ASTM A184. 1.
- 2. Welded wire fabric: ASTM A185.
- Bending: ACI 318. 3.
- Β. Fabricate reinforcement to the required shapes and dimensions, within fabrication tolerances stated in the CRSI "Manual of Standard Practices".
- C. Do not use reinforcement having any of the following defects:
 - Bar lengths, depths, or bends exceeding the specified fabricating tolerances. 1.
 - Bends or kinks not required for this Work. 2.
 - 3. Bars with cross-section reduced due to excessive rust or other causes.

2.4 CONCRETE

- Α. Comply with the following as minimums:
 - Portland cement: ASTM C150, Type I. 1.
 - Aggregate: ASTM C33 uniformly graded and clean. 2.
 - 3. Aggregate, coarse: Crushed rock or washed gravel. (Max. Size 3/4" to 1 1/2", w/ 0 - 12% passing #4).
 - 4. Aggregate, fine: Natural washed sand. (Max. Size 3/8" with 3 - 30% passing #50).
 - 5. Water: Clean and potable.
 - Admixtures: Air entraining and/or water reducing agents of standard brand as approved. 6.
 - Fly Ash: ASTM C618, Class C or F. 7.

asse	es of conci	rete:		
	Class	Uses	Strength (28 days)	*Cement Content (min)
	S	Structure elements Slabs on Grade General Concrete	4,000 psi	571 - Ibs/Cu Yd
	М	Mass Concrete Seal Coat Concrete	3,000 psi	470 - Ibs/Cu Yd
	P	Precast Concrete	5.000 psi	564 - lbs/Cu Yd

Β. Cla

*Fly Ash may be substituted in accordance with Sec. 2.4 G.

C. Consistency shall be such that the mixture can be worked into all parts of the forms and around the reinforcing steel of the structure, without segregation of the materials or the appearance of free water on the surface of the concrete. Unless otherwise stated, the slump measured in accordance with ASTM C143 shall be within the following limits:

Floors, walks, and slabs	2" to 4"
Forms 9" wide or over	2" to 4"
Forms less than 9" wide	3" to 5"

- Α. Admixtures: Include admixture types and quantities indicated in concrete mix designs only when approved by Engineer.
 - Use accelerating admixtures in cold weather. Use of admixtures will not relax cold 1. weather placement requirements.
 - Do not use calcium chloride nor admixtures containing calcium chloride. 2.
 - 3. Use set retarding admixtures during hot weather.

- 4. Add air entrainment admixture to concrete mix for work exposed to freezing and thawing or deicing chemicals according to ASTM C260.
- B. Pumped concrete shall comply with ACI 304 and these specifications.
- C. Fly Ash shall not be used after October 15 and before April 1. The amount of fly ash shall not exceed 20% of cementitious material and the replacement ratio (fly ash: cement replaced) shall be a minimum of 1.5:1.

2.5 SEALANT

A. Concrete Sealant shall be a colorless transparent liquid which penetrates the concrete. The concrete sealant shall be "Ashford Formula" by Curecrete Chemical Company, Orem, Utah, or equal.

2.6 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Owner.
- B. Expansion joint filler:
 - 1. Provide preformed strips, non-extruding and resilient bituminous type, complying with ASTM D1751.
 - 2. If sealants are used in the joints built under this Section, provide filler complying with ASTM D1752.
- C. Curing materials.
 - 1. Curing paper: Comply with ASTM C171, type 1, regular.
 - 2. Liquid curing compounds:
 - a. Provide a standard brand, (clear w/fugitive dye) for the particular application, and complying with ASTM C309.
- D. Vapor barrier membrane:
 - 1. Provide polyethylene sheet, minimum 6 mil thickness, complying with ASTM D2103.
- E. Foundation Perimeter Insulation:
 - 1. Extruded polystyrene rigid foam insulation, 2" thick, placed inside foundation wall from top of footing to bottom of floor slab, equal to Styrofoam Type SM by Dow Chemical Co., or Foamular 400 by UC Industries, Inc.
- F. Grout:
 - 1. Provide grout for column base plates and securing anchor bolts and other items in concrete, as required.
 - Commercial non-shrink grout: ASTM C1107/C1107M; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2,400 psi in 48 hours and 7,000 psi in 28 days. Non-Shrink Grout manufacturers:

- a. Axpandcrete by Anti-Hydro Waterproofing Co.
- b. Burke Metallic Grout by The Burke Co.
- c. Halco Non-Shrink Grout by Hallemite Div.
- d. Embeco pre-mixed grout by Master Builders Co.
- e. Five Star Grout by U.S. Grout Corp.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 REINFORCING

- A. Comply with the following, as well as ACI 318, for details and methods of reinforcing placement and supports.
 - 1. Clean reinforcement and remove loose dust and mill scale, earth, and other materials which reduce bond or destroy bond with concrete.
 - Position, support, and secure reinforcement using reinforcing chairs, spacing support bars and bolsters in accordance with CRSI - 75 to prevent displacement by forms, construction, and the concrete placement operations. All such items in areas of exposed concrete shall be galvanized or plastic covered.
 - 3. Place reinforcement to obtain the required coverage for concrete protection.
 - 4. Install welded wire fabric in as long lengths as practicable, lapping adjoining pieces one full mesh minimum.
 - 5. Lap bars 30 diameters minimum.
- B. Clearances (face of conc. to near edge of rebar):
 - 1. Footings: 3 inches (from subgrade or unformed surface).
 - 2. Walls: 1-1/2 inches.
 - 3. Beams & Columns: 1-1/2 inches.
 - 4. Elevated Slabs: 1 inch.
 - 5. Slabs on Grade: Center of slab.
 - 6. Backfilled Surfaces: 2 inches.

3.3 EMBEDDED ITEMS

- A. Do not embed piping, except wall sleeves, other than electrical conduit, in structural concrete.
 - 1. Locate conduit to maintain maximum strength of the structure.
 - 2. Increase the thickness of the concrete if the outside diameter of the conduit exceeds 30% of the thickness of the concrete.
- B. Set bolts, inserts, and other required items in the concrete, accurately secured so they will not be displaced, and in the precise locations needed.

C. Where aluminum is embedded or in direct contact with concrete, provide a coating of zinc chromate primer between all contact surfaces.

3.4 CORNERS AND EDGES

A. All exposed corners shall be beveled, rounded, or chamfered by moldings placed in the forms. Unless otherwise noted, chamfers shall be 3/4".

3.5 MIXING

- A. Transit mix the concrete in accordance with provisions of ASTM C94 and ACI 304.
- B. If mixing water is added at the job site to meet required slump, mix not less than 25 revolutions at mixing speed after required water has been added.

3.6 PLACING

- A. Preparation:
 - 1. Bottom of footings must be firm and dry. Remove foreign matter accumulated in the forms.
 - 2. Rigidly close openings left in the formwork.
 - 3. Wet wood forms sufficiently to tighten up cracks. Wet other material sufficiently to maintain workability of the concrete.
 - 4. Use only clean tools.
 - 5. Reinforcement must be free of rust and dirt, and firmly secured in place.
- B. Conveying:
 - 1. Perform concrete placing at such a rate that concrete which is being integrated with fresh concrete is still plastic.
 - 2. Deposit concrete as nearly as practicable in its final location so as to avoid segregation due to re-handling and flowing.
 - 3. Do not use concrete which becomes non-plastic and unworkable, or does not meet required quality control limits, or has been contaminated by foreign materials.
 - 4. Remove rejected concrete from the job site.
- C. Placing concrete in forms:
 - 1. Deposit concrete in horizontal layers not deeper than 36", and avoid inclined construction joints.
 - 2. Remove temporary spreaders in forms when concrete has reached the elevation of the spreaders.
 - 3. Place concrete through a tremie where the free drop is five (5) feet or more.
- D. Placing concrete slabs:
 - 1. Prepare the subgrade as specified in other Sections.
 - 2. Dampen the subgrade prior to placing concrete.
 - 3. Provide the specified vapor barrier membrane beneath floor slabs on grade.

- a. Place the membrane in as large sheets as practicable, lapping 12", with the top lap placed in the direction concrete will be spread.
- b. Carefully cut, fit, and seal the membrane to all pipes and conduits projecting through the membrane, using small sheets, where necessary, and pressure-sensitive tape.
- 4. Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
- 5. Bring slab surfaces to the correct level with a straightedge, and then strike off.
- 6. Use bullfloats or darbies to smooth the surface, leaving the surface free from bumps and hollows.
- 7. Do not sprinkle water on the plastic surface. Do not disturb the slab surface prior to start of finishing operations.

3.7 COLD WEATHER REQUIREMENTS

- A. Comply with "Recommended Practice for Cold Weather Concreting," ACI 306, except as may be modified herein.
- B. Weather conditions are considered as cold weather when the ambient temperature is below 35°F or below 40°F when the temperature is falling at time of placement.
- C. Temperature of the concrete when placed shall not be less than 50°F nor more than 70°F. Heating of the mixing water and/or aggregates will be required as necessary to maintain the minimum temperature of 50°F and all methods and equipment for heating shall be subject to review by the Owner.
- D. Subgrade shall be prepared and protected so that it will be free from frost when the concrete is placed. Concrete shall not be placed on a frozen subgrade.
- E. Provide suitable covering and other means for maintaining the concrete at a temperature of at least 50°F for not less than 72 hours after placing, and at a temperature above freezing for the remainder of the curing period. Salt, chemicals, and other foreign materials shall not be mixed with the concrete to prevent freezing.
- F. Concrete damaged by freezing shall be removed and replaced at the expense of the Contractor.

3.8 HOT WEATHER REQUIREMENTS

- A. Comply with "Recommended Practice for Hot Weather Concreting," ACI 305, except as may be modified herein.
- B. Maximum allowable temperature of the concrete at the placing site shall be 90°F.
- C. Hot weather is defined as any combination of high air temperature, low relative humidity, and wind velocity tending to impair the quality of fresh or hardened concrete or otherwise resulting in abnormal properties.

3.9 CONSOLIDATION

A. General:

- 1. Comply with "Recommended Practice for Consolidating Concrete, ACI 309, except as may be modified herein.
- 2. Consolidate each layer of concrete immediately after placing, by use of internal concrete vibrators supplemented by hand spading, rodding, or tamping.
- 3. Do not vibrate forms or reinforcement.
- 4. Do not use vibrators to transport concrete inside the forms.

3.10 REMOVAL OF FORMS

- A. Forms shall be left in place until concrete has acquired adequate strength to safely support its own weight and the loads thereon.
 - 1. Wall forms shall be left in place a minimum of 24 hours. Such forms may be removed after cumulatively curing at not less than 10 deg. C (50 deg. F) for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations.
 - 2. Forms for columns, beams, elevated slabs, stairs, and other form supported concrete, shall be left in place a minimum of 7 days or until 75% of design strength is attained as evidenced by cylinder compressive strength test results.

3.11 JOINTS

- A. Construction joints:
 - 1. Do not use construction joints except as may be shown on the drawings.
 - 2. If additional construction joints are found to be required, secure the Owner's approval of joint design and location prior to start of concrete placement.
- B. Expansion joints:
 - 1. Do not permit reinforcement or other embedded metal items that are being bonded with concrete (except dowels in floors bonded on only one side of the joints) to extend continuously through any expansion joint.
 - 2. Fill expansion joints full depth with expansion joint material approved by the Owner.
- C. Contraction Joints:
 - 1. Shall be formed by cutting the surface by means of an approved saw, a minimum of 1/3 the slab thickness and 1/8" wide..
 - 2. Sawing shall commence as soon as possible without raveling, usually 4 to 24 hours after finishing.

3.12 FINISHING

- A. Apply a "Non-Slip" broom finish to exterior concrete.
- B. Apply a "Trowel Finish" on all interior floors, unless the finished floor requires a topping or mortar bed. Immediately after the surface moisture disappears, the surface shall be worked smooth with a steel trowel, free of trowel marks and other depressions. After having set sufficiently to ring the trowel, the surface of the slab shall be given a second steel troweling to produce a burnished finish.

- C. Formed surfaces shall have tie holes patched and surface irregularities (form marks) ground smooth.
- D. Apply Concrete Sealant to interior and exterior exposed to view concrete surfaces. Application shall be in strict accordance with manufacturer's recommendations. Concrete surface to be clean and free of all foreign materials prior to application of sealant.

3.13 CURING

- A. Comply with "Recommended Practice for Curing Concrete" ACI 308, except as may be modified herein.
- B. Curing shall be accomplished by preventing loss of moisture, rapid temperature change, and mechanical injury, or injury from rain or flowing water for a period of seven (7) days at a temperature above 50°F or attainment of 70% of the required 28 day compressive strength, whichever is less.
- C. Moist curing, sheet curing and membrane curing methods may be used, except membrane curing shall not be used on surfaces which are to receive liquid concrete sealant.

3.14 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- B. Inspections:
 - 1. Steel reinforcement placement.
 - 2. Steel Reinforcement welding.
 - 3. Headed bolts and studs.
 - 4. Verification of use of required design mixture.
 - 5. Concrete placement, including conveying and depositing.
 - 6. Curing procedures and maintenance of curing temperature.
 - 7. Verification of concrete strength before removal of shores and forms from beams and slabs.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
 - 1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 10 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
 - 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
 - 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173/C 173M, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - 4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.

- 5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
- 6. Compression Test Specimens: ASTM C 31/C 31M.
 - a. Cast and laboratory cure four standard cylinder specimens for each composite sample.
 - b. Field cure one of the standard cylinder specimens when the temperature during the first 7 days of cure will reach 90 deg F or will be below 32 deg F.
- 7. Compression Strength Tests: ASTM C 39/C 39M; test one of the three laboratory-cured specimens and the field cured specimen, if any, at 7 days and two specimens at 28 days.
 - a. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
- 8. When strength of field-cured cylinders is less than 85 percent of companion laboratorycured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
- 9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
- 10. Test results shall be reported in writing to Architect and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- 11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- 12. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
- 13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- 14. Correct deficiencies in the Work that test reports and inspections indicate does not comply with the Contract Documents.

3.15 REMEDIAL WORK

A. Repair or replace deficient work as directed by the Owner at no additional cost.
SECTION 055000 METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Shop-fabricated metal items.
 - 2. Structural supports for miscellaneous attachments.

1.2 SUBMITTALS

- A. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- 1.3 QUALITY ASSURANCE
 - A. Finish joints according to NOMMA Guideline 1.
- 1.4 DELIVERY, STORAGE, AND HANDLING
 - A. Inspection: Accept metal fabrications on-Site in labeled shipments. Inspect for damage.
 - B. Protect metal fabrications from damage by exposure to weather or by ground contact.

PART 2 - PRODUCT

- 2.1 ANCHORS
 - A. Anchor Rods: ASTM F1554; Grade 36 or Grade 55.
 - 1. Shape: Straight.
 - 2. Furnish with nut and washer; Hot dipped galvanized.
 - B. Epoxy Adhesive Anchors:
 - 1. Manufacturer List:
 - a. Hilti HIT-Hy 200 MAX
 - b. Substitutions: Permitted upon approval of Engineer.
 - 2. Grout: According to Section 051200 Structural Steel Framing: Grout.
 - 3. Threaded Rod: Galvanized.

2.2 MATERIALS

- A. Steel:
 - 1. Pipe Bollards and Handrail: Carbon Steel, ASTM A53 Gr. B (Fy=35 ksi).
- B. Aluminum:
 - 1. Extruded Aluminum: ASTM B221 Alloy 6063, Temper T5.
 - 2. Sheet Aluminum: ASTM B209 Alloy, Temper.
 - 3. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210 Alloy 6063, Temper T6.
 - 4. Aluminum-Alloy Bars: ASTM B211 Alloy 6063, Temper T6.
 - 5. Aluminum-Alloy Sand Castings: ASTM B26, Alloy.
 - 6. Aluminum-Alloy Die Castings: ASTM B85, Alloy as required to suit application.
 - 7. Bolts, Nuts, and Washers: Stainless steel.
 - 8. Welding Materials: AWS D1.1; type required for materials being welded.
- C. Bolts, Nuts, and Washers for Equipment and Piping:
 - 1. Carbon Steel:
 - a. Structural Connections: ASTM A325, hot-dip galvanized.
 - b. Anchor Bolts: ASTM F1554 Grade 36, hot-dip galvanized.
 - c. Pipe and Equipment Flange Bolts: ASTM A193, Grade B-7.
 - 2. Stainless Steel: Type 316 stainless steel, class 2; ASTM A193 for bolts; ASTM A194 for nuts.

2.3 FABRICATION

- A. Refer to drawings details for locations, member sizes, material weights, anchoring provisions, and specific fabrication and/or installation requirements.
- B. Exposed Welded Joints: NOMMA Guideline 1 Joint Finish.
- C. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- E. Fabrication Tolerances:
 - 1. Squareness: 1/8 in maximum difference in diagonal measurements.
 - 2. Maximum Offset between Faces: 1/16 in.
 - 3. Maximum Misalignment of Adjacent Members: 1/16 in.
 - 4. Maximum Bow: 1/8 inch in 48 in.
 - 5. Maximum Deviation from Plane: 1/16 inch in 48 in.

2.4 FINISHES

- A. Steel that is not galvanized shall be cleaned and primed. All exposed structural steel shall be primed and painted per Specification 099100.
- B. Steel:
 - 1. Prepare surfaces to be primed according to SSPC SP 2.
 - 2. Do not prime surfaces in direct contact with concrete or where field welding is required.
 - 3. Prime paint items with one coat except where galvanizing is specified.
 - 4. Galvanizing: ASTM A123; hot-dip galvanize after fabrication.
 - 5. Galvanizing for Fasteners, Connectors, and Anchors: Hot-Dip Galvanizing: ASTM A153.
 - 6. Bolts: Hot-dip galvanized.
 - 7. Nuts: Hot-dip galvanized.
 - 8. Washers: Hot-dip galvanized.
 - 9. Shop Primer: SSPC Paint 15, Type 1, red oxide.
 - 10. Touch-Up Primer for Galvanized Surfaces: SSPC Paint 20 Type II Organic.
- C. Aluminum:
 - 1. Prefinished extruded items finish:
 - a. Two-Coat Polyvinylidene fluoride (PVDF): AAMA 2605. Polyvinylidene fluoride finish containing not less than 70 percent PVDF resin (Kynar 500) by weight in color coat.
 - b. Color: As selected by Architect from manufacturer's full range
 - 2. Finish coatings to conform to AAMA 611. Comply with AA DAF-45.
 - 3. Exterior Aluminum Surfaces: AAMA A41 anodized, prepared with mechanical or chemical pretreatment, anodized to clear color.
 - 4. Interior Aluminum Surfaces: AAMA A41 anodized, prepared with mechanical or chemical pretreatment, anodized to clear color.
 - 5. Apply one coat of bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar materials.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 FABRICATION

A. Shop prefabricate in as large sections as practicable, and in strict accordance with the approved Shop Drawings and pertinent requirements of governmental agencies having jurisdiction.

3.3 INSTALLATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
- B. Install the work of this Section in strict accordance with the original design, the approved Shop Drawings, pertinent requirements of governmental agencies having jurisdiction, and the manufacturer's recommended installation procedures as approved by the Engineer, anchoring all components firmly into position for long life under hard use.

SECTION 061000 ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Framing with dimension lumber.
 - 2. Framing with engineered wood products.
 - 3. Wood blocking and nailers.

1.2 REFERENCE STANDARDS

- A. American National Standards Institute:
 - 1. ANSI A135.4 Basic Hardboard.
 - 2. ANSI A208.1 Mat-Formed Wood Particleboard.
- B. American Wood Protection Association:
 - 1. AWPA M4 Standard for the Care of Preservative-Treated Wood Products.
 - 2. AWPA U1 Use Category System: User Specification for Treated Wood.
- C. APA The Engineered Wood Association:
 - 1. APA PS1 Voluntary Product Standard for Construction and Industrial Plywood.
 - 2. APA Plywood Design Specification, including supplements.
- D. ASTM International:
 - 1. ASTM A153 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 2. ASTM B695 Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
 - 3. ASTM C1177 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
 - 4. ASTM C1280 Standard Specification for Application of Gypsum Sheathing.
 - 5. ASTM C1396 Standard Specification for Gypsum Board.
 - 6. ASTM D2559 Standard Specification for Adhesives for Bonded Structural Wood Products for Use Under Exterior Exposure Conditions.
 - 7. ASTM D5456 Standard Specification for Evaluation of Structural Composite Lumber Products.
 - 8. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 9. ASTM E119 Standard Test Methods for Fire Tests of Building Construction and Materials.
 - 10. ASTM F1667 Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.
- E. Forest Stewardship Council:

- 1. FSC Guidelines Forest Stewardship Council Guidelines.
- F. National Lumber Grades Authority:
 - 1. NLGA Standard Grading Rules for Canadian Lumber.
- G. Northeastern Lumber Manufacturers Association:
 - 1. NELMA Standard Grading Rules for Northeastern Lumber.
- H. The Redwood Inspection Service:
 - 1. RIS Standard Specifications for Grades of California Redwood Lumber.
- I. South Coast Air Quality Management District:
 - 1. SCAQMD Rule 1168 Adhesive and Sealant Applications.
- J. Southern Pine Inspection Bureau:
 - 1. SPIB Standard Grading Rules for Southern Pine Lumber.
- K. U.S. Department of Commerce National Institute of Standards and Technology:
 - 1. DOC PS 1 Construction and Industrial Plywood.
 - 2. DOC PS 2 Performance Standard for Wood-Based Structural-Use Panels.
 - 3. DOC PS 20 American Softwood Lumber Standard.
- L. West Coast Lumber Inspection Bureau:
 - 1. WCLIB Standard Grading Rules for West Coast Lumber.
- M. Western Red Cedar Association:
 - 1. WRCA Lumber Grades and Standards.
- N. Western Wood Products Association:
 - 1. WWPA 2011 Western Lumber Grade Rules, including supplements.

1.3 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
- B. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the American Lumber Standards Committee Board of Review.
- C. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:

- 1. Wood-preservative-treated wood.
- 2. Engineered wood products.
- 3. Power-driven fasteners.
- 4. Powder-actuated fasteners.
- 5. Expansion anchors.
- 6. Metal framing anchors.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. Provide dressed lumber, S4S, unless otherwise indicated.
- B. Engineered Wood Products: Provide engineered wood products acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
 - 1. Allowable Design Stresses: Provide engineered wood products with allowable design stresses, as published by manufacturer that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWPA C2.
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood sills, sleepers, blocking, and similar concealed members in contact with masonry or concrete.
 - 2. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 DIMENSION LUMBER FRAMING

A. Maximum Moisture Content: 19 percent.

- B. Non-Load-Bearing Interior Partitions: Construction or No. 2 grade of any species.
- C. Framing Other Than Non-Load-Bearing Interior Partitions: **Construction, Stud, or No. 1 grade** and of any of the following species:
 - 1. Hem-fir (north); NLGA.
 - 2. Southern pine; SPIB.
 - 3. Douglas fir-larch; WCLIB or WWPA.
 - 4. Mixed southern pine; SPIB.
 - 5. Spruce-pine-fir; NLGA.
 - 6. Douglas fir-south; WWPA.
 - 7. Hem-fir; WCLIB or WWPA.
 - 8. Douglas fir-larch (north); NLGA.
 - 9. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.

2.4 ENGINEERED WOOD PRODUCTS

- A. Laminated-Veneer Lumber: Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D 5456 and manufactured with an exterior-type adhesive complying with ASTM D 2559.
 - 1. Extreme Fiber Stress in Bending, Edgewise: 2600 psi for 11 7/8-inch nominal- depth members.
 - 2. Modulus of Elasticity, Edgewise: 2,000,000 psi.
- B. Wood I-Joists: Prefabricated units, I-shaped in cross section, made with solid or structural composite lumber flanges and wood-based structural panel webs, let into and bonded to flanges. Provide units complying with material requirements of and with structural capacities established and monitored according to ASTM D 5055.
 - 1. Web Material: Either oriented strand board or plywood, complying with DOC PS 1 or DOC PS 2, Exposure 1.
 - 2. Structural Properties: Provide units with depths and design values not less than those indicated.
 - 3. Provide units complying with APA PRI-400, factory marked with APA trademark indicating nominal joist depth, joist class, span ratings, mill identification, and compliance with APA standard.
- C. Rim Boards: Product designed to be used as a load-bearing member and to brace wood I-joists at bearing ends, complying with research/evaluation report for I-joists.
 - 1. Material: Product made from any combination solid lumber, wood strands and veneers.
 - 2. Thickness: 1¼ inches.
 - 3. Provide performance-rated product complying with APA PRR-401, rim board grade, factory marked with APA trademark indicating thickness, grade, and compliance with APA standard.

2.5 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
 - 2. Nailers.
- B. For items of dimension lumber size, provide Construction or No. 2 grade lumber with 19 percent maximum moisture content of any species.
- C. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:
 - 1. Mixed southern pine, No. [2] [3] grade; SPIB.
 - 2. Eastern softwoods, No. [2] [3] Common grade; NeLMA.
 - 3. Northern species, No. [2] [3] Common grade; NLGA.
 - 4. Western woods, [Construction or No. 2 Common] [Standard or No. 3 Common] grade; WCLIB or WWPA.

2.6 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified.
 - 1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.
- B. Power-Driven Fasteners: NES NER-272.
- C. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

2.7 METAL FRAMING ANCHORS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Alpine Engineered Products, Inc.
 - 2. Cleveland Steel Specialty Co.
 - 3. Harlen Metal Products, Inc.
 - 4. KC Metals Products, Inc.
 - 5. Simpson Strong-Tie Co., Inc.
 - 6. Southeastern Metals Manufacturing Co., Inc.
 - 7. USP Structural Connectors.
- B. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those [indicated] [of basis-of-design products] [of products of manufacturers listed]. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.
- C. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

2.8 MISCELLANEOUS MATERIALS

A. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1 inch nominal thickness, compressible to 1/32 inch; selected from manufacturer's standard widths to suit width of sill members indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- B. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- C. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.
- D. Metal Framing Anchors: Install metal framing to comply with manufacturer's written instructions.
- E. Do not splice structural members between supports, unless otherwise indicated.
- F. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
- G. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. NES NER-272 for power-driven fasteners.
 - 2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
 - 3. Table 23-II-B-1, "Nailing Schedule," and Table 23-II-B-2, "Wood Structural Panel Roof Sheathing Nailing Schedule," in ICBO's Uniform Building Code.
 - 4. Table 2305.2, "Fastening Schedule," in BOCA's BOCA National Building Code.
 - 5. Table 2306.1, "Fastening Schedule," in SBCCI's Standard Building Code.
 - 6. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
 - 7. Table 602.3(1), "Fastener Schedule for Structural Members," and Table 602.3(2), "Alternate Attachments," in ICC's International One- and Two-Family Dwelling Code.

3.2 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

SECTION 061600 SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:1. Subflooring.
- 1.2 QUALITY ASSURANCE
 - A. Forest Certification: For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria":
 - 1. Plywood.
 - 2. Oriented strand board.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Stack plywood and other panels flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

- 2.1 WOOD PANEL PRODUCTS, GENERAL
 - A. Plywood: Either DOC PS 1 or DOC PS 2, unless otherwise indicated.
 - B. Oriented Strand Board: DOC PS 2.

2.2 SUBFLOORING AND UNDERLAYMENT

- A. Plywood Combination Subfloor-Underlayment: DOC PS 1, Exposure 1, Underlayment singlefloor panels.
- B. Oriented-Stand-Board Combination Subfloor-Underlayment: Exposure 1 single-floor panels.
- C. Plywood Subflooring: Exposure 1 single-floor panels or sheathing.
- D. Oriented-Strand-Board Subflooring: Exposure 1 single-floor panels or sheathing.

2.3 FASTENERS

- A. General: Provide fasteners of size and type indicated.
 - 1. For wall and roof sheathing panels, provide fasteners with corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.

2.4 MISCELLANEOUS MATERIALS

- A. Adhesives for Field Gluing Panels to Framing: Formulation complying with ASTM D 3498 that is approved for use indicated by manufacturers of both adhesives and panels.
 - 1. Use adhesives that have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Securely attach to substrate by fastening as indicated, complying with the following:
 - 1. NES NER-272 for power-driven fasteners.
 - 2. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."
 - 3. Table 23-II-B-1, "Nailing Schedule," and Table 23-II-B-2, "Wood Structural Panel Roof Sheathing Nailing Schedule," in ICBO's "Uniform Building Code."
 - 4. Table 2305.2, "Fastening Schedule," in BOCA's "BOCA National Building Code."
 - 5. Table 2306.1, "Fastening Schedule," in SBCCI's "Standard Building Code."
 - Table R602.3 (1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's "International Residential Code for One- and Two-Family Dwellings."
 - 7. Table 602.3(1), "Fastener Schedule for Structural Members," and Table 602.3(2), "Alternate Attachments," in ICC's "International One- and Two-Family Dwelling Code."
- B. Coordinate sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that exclude exterior moisture.
- C. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30K, "APA Design/Construction Guide: Residential & Commercial."
 - 1. Comply with "Code Plus" installation provisions in guide referenced in paragraph above.
- B. Fastening Methods: Fasten panels as indicated below:
 - 1. Combination Subfloor-Underlayment:

- a. Nail to wood framing.
- 2. Subflooring:
 - a. Nail to wood framing.

SECTION 061733 WOOD I-JOISTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Wood chord and particleboard web joists for floor framing.
 - 2. Bridging, bracing, and anchoring.
 - 3. Framing for openings.

B. Related Requirements:

- 1. Section 061000 Rough Carpentry: Lumber for framing openings between joists.
- 2. Section 061600 Sheathing.
- 3. Section 061800 Glued Laminated Construction.

1.2 REFERENCE STANDARDS

- A. American National Standards Institute:
 - 1. ANSI/American Forest & Paper Association National Design Specification (NDS) for Wood Construction.
 - 2. ANSI A208.1 Particleboard.
- B. American Wood Preservers Association:
 - 1. AWPA M4 Standard for the Care of Preservative-Treated Wood Products.
 - 2. AWPA U1 Use Category System: User Specification for Treated Wood.
- C. APA The Engineered Wood Association:
 - 1. APA PS 1 Voluntary Product Standard, Structural Plywood.
 - 2. APA PS 2 Voluntary Product Standard: Performance Standard for Wood-Based Structural-Use Panels.
- D. ASTM International:
 - 1. ASTM A153 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 2. ASTM B695 Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
 - 3. ASTM D2559 Standard Specification for Adhesives for Bonded Structural Wood Products for Use under Exterior Exposure Conditions.
 - 4. ASTM D5055 Standard Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists.
 - 5. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.

- 6. ASTM E119 Standard Test Methods for Fire Tests of Building Construction and Materials.
- 7. ASTM F1667 Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.
- E. California Department of Health Services:
 - 1. CA/DHS/EHLB/R-174 Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.
- F. Forest Stewardship Council:
 - 1. FSC Guidelines Forest Stewardship Council Guidelines.
- G. ICC Evaluation Service:
 - 1. ICC-ES Evaluation Report.
- H. National Forest Products Association:
 - 1. NFPA Lumber Grading Rules.
- I. National Institute of Standards and Technology:
 - 1. NIST PS 20 Voluntary Product Standard: American Softwood Lumber Standard.
- J. National Lumber Grading Authority:
 - 1. NLGA Standard Grading Rules for Canadian Lumber.
- K. Northern Softwood Lumber Bureau:
 - 1. NSLB Standard Grading Rules.
- L. Redwood Inspection Service:
 - 1. RIS Standard Specifications for Grades of California Redwood Lumber.
- M. South Coast Air Quality Management District:
 - 1. SCAQMD Rule 1168 Adhesive and Sealant Applications.
- N. Southern Pine Inspection Bureau:
 - 1. SPIB Standard Grading Rules for Southern Pine Lumber.
- O. West Coast Lumber Inspection Bureau:
 - 1. WCLIB Standard Grading Rules for West Coast Lumber.
- P. Western Wood Products Association:
 - 1. WWPA G-5 Western Lumber Grading Rules.

1.3 COORDINATION

- A. Section 013000 Administrative Requirements: Requirements for coordination.
- B. Coordinate placement of sheathing with Work of this Section.
- C. Coordinate work of this section with work of related sections.

1.4 SUBMITTALS

- A. Section 013300 Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit joist configurations, bearing, hanger and anchor details, bridging and bracing.
- C. Shop Drawings: Indicate sizes and spacing of joists, fastener description and spacings, loads, deflections, and framed openings.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Manufacturer's Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.

1.5 QUALITY ASSURANCE

- A. Perform Work according to following:
 - 1. Lumber Grading Agency: Certified by NIST PS 20.
 - 2. Wood Structural Panels: APA PS 1 or PS 2.
- B. Joist Structural Capacities: Comply with ASTM D5055 and APA PS 2.
- C. Design, detail, and install joists according to current ICC-ES Evaluation Report, ANSI/AF&PA NDS, applicable code.
- D. Perform Work in accordance with specified building codes.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.
- B. Erector: Company specializing in performing Work of this Section with minimum three years' documented experience.
- 1.7 DELIVERY, STORAGE, AND HANDLING
 - A. Section 016000 Product Requirements: Requirements for transporting, handling, storing, and protecting products.

- B. Inspection: Accept materials on-Site and inspect for damage.
- C. Store materials according to manufacturer's instructions.
- D. Protect joists from warping or other distortion by stacking in vertical position, braced to resist movement.
- E. Deliver materials in manufacturer's packaging; include installation instructions.

PART 2 - PRODUCTS

- 2.1 PLYWOOD I-JOISTS
 - A. Manufacturer List:
 - 1. Georgia Pacific Building Products
 - 2. Louisiana Pacific Corporation
 - 3. Weyerhaeuser Company
 - 4. Substitutions: Specified in Section 01 60 00 Product Requirements.

2.2 PERFORMANCE AND DESIGN CRITERIA

- A. Design Floor Live Load: 90 psf, with **deflection limited to 1/480 of** span.
- B. Joist Opening to Accommodate Mechanical Ducts: See MEP drawings.

2.3 MATERIALS

- A. Particleboard Web:
 - 1. Comply with ANSI A208.1 or APA PS 2.
 - 2. Material: Oriented strand board.
 - 3. Faces: Sanded.
- B. Joist Bridging: Type, size, and spacing as recommended by joist manufacturer.

2.4 FABRICATION

- A. Fabricate joists to achieve specified structural requirements.
- B. Frame specially sized openings in web as indicated on Drawings.
- C. Moisture Content after Treatment:
 - 1. Redried Lumber: Maximum 19 percent.

2.5 ACCESSORIES

- A. Adhesive: Comply with ASTM D2559.
- B. Wood Blocking:
 - 1. As specified in Section 061000 Rough Carpentry.
- C. Fasteners and Nails:
 - 1. Fasteners:
 - a. High-Humidity and Treated-Wood Locations: ASTM A153, hot-dip galvanized steel.
 - b. Elsewhere: Unfinished steel.
 - 2. Nails: Comply with ASTM F1667.

2.6 SOURCE QUALITY CONTROL

- A. Section 014000 Quality Requirements: Requirements for testing, inspection, and analysis.
- B. Certificate of Compliance: When fabricator is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at fabricator's facility conforms to Contract Documents.
 - 1. Specified shop tests are not required for Work performed by approved fabricator.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 017000 Execution and Closeout Requirements: Requirements for erection examination.
- B. Verify that supports and openings are ready to receive joists.

3.2 PREPARATION

- A. Section 017000 Execution and Closeout Requirements: Requirements for erection preparation.
- B. Coordinate placement of bearing items with Work of this Section.
- C. Coordinate placement of sheathing with Work of this Section.

3.3 ERECTION

- A. Set structural members level, plumb, and in correct position.
- B. Make provisions for erection loads, for sufficient temporary bracing to maintain structure plumb, and for maintenance of alignment until completion of erection and installation of permanent bracing.
- C. Do not field-cut or alter structural members without approval of Architect/Engineer.
- D. Place headers and supports to frame openings.
- E. Frame openings between joists with lumber as specified in Section 061000 Rough Carpentry.

3.4 TOLERANCES

- A. Section 014000 Quality Requirements: Requirements for tolerances.
- B. Framing Members: Maximum ¹/₂ inch from indicated position.

3.5 ATTACHMENTS

A. Mezzanine Floor: 11 7/8-inch-deep joists, 16 inches o.c., special chord reinforcement for mechanical duct placement through joist as indicated on Drawings.

SECTION 061800 GLUED LAMINATED CONSTRUCTION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes framing using structural glued-laminated timbers.

1.2 SUBMITTALS

- A. Product Data: For structural glued-laminated timber and connectors.
- B. Shop Drawings: Show layout of structural glued-laminated timber system and full dimensions of each member. Indicate laminating combination.
- C. Certificates of Conformance: Issued by a qualified testing and inspecting agency indicating that structural glued-laminated timber complies with requirements in AITC A190.1.

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Provide factory-glued structural units produced by an AITC- or APA-licensed firm.
 - 1. Factory mark each piece of structural glued-laminated timber with AITC Quality Mark or APA trademark. Place mark on surfaces that will not be exposed in the completed Work.
- B. Quality Standard: Comply with AITC A190.1, "Structural Glued Laminated Timber."
- C. Forest Certification: Provide structural glued-laminated timber produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC 1.2, "Principles and Criteria."

1.4 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with provisions in AITC 111, "Recommended Practice for Protection of Structural Glued Laminated Timber during Transit, Storage, and Erection."
- B. Individually wrap members using plastic-coated paper covering with water-resistant seams.

PART 2 - PRODUCTS

2.1 STRUCTURAL GLUED-LAMINATED TIMBER

A. Species and Grades for Structural Glued-Laminated Timber: Provide structural glued-laminated timber made from any species that complies with structural properties indicated.

- B. Species and Grades for Beams and Purlins: Provide structural glued-laminated timber that complies with AITC 117--MANUFACTURING or research/evaluation reports acceptable to authorities having jurisdiction and the following:
 - 1. Species and Beam Stress Classification: Any species, 2.0E.
 - 2. Lay-up: Either balanced or unbalanced.
- C. Appearance Grade: Framing appearance grade, complying with AITC 110.
- D. Adhesive: Wet-use type complying with ASTM D 2559 that contains no urea-formaldehyde resins.
- E. End Sealer: Manufacturer's standard, transparent, colorless wood sealer that is effective in retarding the transmission of moisture at cross-grain cuts and is compatible with indicated finish.
- F. Penetrating Sealer: Manufacturer's standard, transparent, penetrating wood sealer that is compatible with indicated finish.
- G. Connectors, Anchors, and Accessories: Fabricate from structural-steel shapes, plates, and bars complying with ASTM A 36/A 36M; round steel bars complying with ASTM A 575, Grade M 1020; and hot-rolled steel sheet complying with ASTM A 1011/A 1011M, Structural Steel, Type SS, Grade 33.
 - 1. Finish steel assemblies and fasteners with rust-inhibitive primer, 2-mil dry film thickness.
 - 2. Hot-dip galvanize steel assemblies and fasteners after fabrication to comply with ASTM A 123/A 123M or ASTM A 153/A 153M.

2.2 FABRICATION

- A. Shop fabricate for connections to greatest extent possible, including cutting to length and drilling bolt holes.
- B. Camber: Fabricate horizontal and inclined members of less than 1:1 slope with either circular or parabolic camber equal to 1/500 of span.
- C. End-Cut Sealing: Immediately after end-cutting each member to final length, apply a saturation coat of end sealer to ends and other cross-cut surfaces, keeping surfaces flood-coated for not less than 10 minutes.
- D. Seal Coat: After fabricating, sanding, and end-coat sealing, apply a heavy saturation coat of penetrating sealer on surfaces of each unit.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Erect structural glued-laminated timber true and plumb, with uniform, close-fitting joints. Provide temporary bracing to maintain lines and levels until permanent supporting members are in place.
 - 1. Lift with padded slings and protect corners with wood blocking.

- B. Fit structural glued-laminated timber by cutting and restoring exposed surfaces to match specified surfacing.
 - 1. Predrill for fasteners using timber connectors as templates.
 - 2. Dress exposed surfaces to remove planing or surfacing marks and to provide a finish equivalent to that produced by machine sanding with No. 120 grit sandpaper.
 - 3. Coat crosscuts with end sealer.
- C. Cutting: Avoid extra cutting after fabrication. Where field fitting is unavoidable, comply with requirements for shop fabrication.
- D. Repair damaged surfaces after completing erection. Replace damaged structural gluedlaminated timber if repairs are not approved by Architect.
- E. Do not remove wrappings on individually wrapped members until they no longer serve a useful purpose including protection from weather, sunlight, soiling, and damage from work of other trades.

SECTION 062000 FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Work includes:
 - 1. Provide complete, in place, all finish carpentry required for the project, as shown, detailed, scheduled, or noted on the drawings and as specified herein, including:
 - a. FRP Wall Panels
 - 2. Work under this Section includes all finish carpentry not specifically included in other sections of the work.
- B. Related work
 - 1. Specified elsewhere
 - a. Rough Carpentry specified in Section 061000.
 - b. Painting and finishing specified in Section 099100.

1.2 SUBMITTALS

- A. Product Data: For panel products, solid-surfacing material, hardware and accessories, and finishing materials and processes.
- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
 - 1. Show dimensions for cutouts and holes for counter mounted devices.
- C. Samples: All items requiring finish selection.

1.3 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed and wet work is complete.
- B. Maintain temperature and humidity in installation area as required to maintain moisture content of installed woodwork within 1.0 percent tolerance of optimum moisture content, from date of installation through remainder of construction period. Require Woodwork Manufacturer to establish optimum moisture and required temperature and humidity conditions.
- C. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcement that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

- 2.1 MATERIALS
 - A. All materials shall be new and as hereinafter specified.
 - B. FRP Wall Panels Provide Basis-of-Design "Fiber-lite Liner Panels" #LP-F9 as manufactured by Nudo Products, Inc., Springfield, IL, .090 textured fire-rated, installed over previously installed gypsum board. Provide all accessories and moldings as necessary for a complete installation. Acceptable manufacturers: Crane Composites, Structoglass by Ridout Plastics
- 2.4 MISCELLANEOUS MATERIALS
 - A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.
 - B. Adhesives, General: Do not use adhesives that contain urea formaldehyde.
 - C. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

PART 3 - EXECUTION

3.1 FABRICATION

- A. General: Complete fabrication to maximum extent possible before shipment to Project site. Where necessary for fitting at site, provide allowance for scribing, trimming, and fitting.
- B. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.

3.3 INSTALLATION

- A. Before installation, condition trim work to average prevailing humidity conditions in installation areas. Examine shop-fabricated work for completion and complete work as required, including removal of packing.
- B. Trim and finish items shall be installed in longest lengths practicable and in one length where possible without use of finger jointing or scarfing, except miter or scarf end-to-end joints of individual pieces in long runs.

- C. Install trim work level, plumb, true, and straight to a tolerance of ½ inch in 96 inches. Shim as required with concealed shims. Firmly anchor all trim and finish items in place as directed by manufacturers.
- D. Where blocking or backing is required for proper installation of specific item or items, coordinate as necessary with other trades or sections as applicable to ensure installation of backing or blocking in a timely manner.
- E. Interior trim and finish shall be installed with proper size finish nails, well set for putty stopping.
- F. Scribe and cut trim work to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- G. Anchor trim work to anchors or blocking built in or directly attached to substrates as directed by manufacturer and with manufacturer provided fasteners.
- 3.5 ADJUSTING AND CLEANING
 - A. Repair damaged and defective trim work, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
 - C. Clean trim and finish work on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

SECTION 072100 THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Perimeter insulation under slabs-on-grade.
 - 2. Cavity-wall insulation.
 - 3. Vapor retarders.
 - 4. Foamed In-Place Insulation
- B. Refer to 133400 for insulation included in pre-engineered building system.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: Full-size units for each type of exposed insulation indicated.
- C. Product test reports.
- D. Research/Evaluation Reports: For foam-plastic insulation.

1.3 QUALITY ASSURANCE

A. Retain ASTM test method below based on product and kind of fire-resistance characteristic specified for each product in Part 2. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84 for surface-burning characteristics and other methods indicated with product, by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Products: Subject to compliance with requirements, provide one of the products specified.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 FOAM-PLASTIC BOARD INSULATION

- A. Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV, 1.60 lb/cu. ft., with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively:
 - 1. Available Manufacturers:
 - a. DiversiFoam Products.
 - b. Dow Chemical Company.
 - c. Owens Corning.
 - d. Pactiv Building Products Division.

2.3 GLASS-FIBER BLANKET INSULATION

- A. Available Manufacturers:
 - 1. CertainTeed Corporation.
 - 2. Johns Manville.
 - 3. Owens Corning.
- B. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- C. Where glass-fiber blanket insulation is indicated by the following thicknesses, provide blankets in batt or roll form with thermal resistances indicated:
 - 1. 6-1/4 inches thick (R-19) with a thermal resistance of 21 deg F x h x sq. ft./Btu at 75 deg F.

2.4 VAPOR RETARDERS

- A. Vapor barrier shall have all of the following qualities:
 - 1. Maintain permeance of less than 0.03 Perms [grains/(ft2 hr inHg)] as tested in accordance with mandatory conditioning test per ASTM eq745 Section 7.1 (7.1.1-7.1.5)
 - 2. Other performance criteria:
 - a. Strength: ASTM E1745 Class A.
 - b. Thickness: 10 mils minimum
 - 3. Provide third party documentation that all testing was performed on a single production roll per ASTM E1745 Section 8.1
- B. Vapor barrier products:
 - 1. Basis-Of-Design: Stego Wrap Class A Vapor Retarder (10-mil) by Stego Inductries LLC., (877) 464-7834 <u>www.stegoindustries.com</u>, or comparable product by one of the following:
 - a. Raven Industries Inc., DURA SKRIM.
 - b. Reef Industries Inc., Griffolyn.

- C. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.
- D. Vapor-Retarder Fasteners: Pancake-head, self-tapping steel drill screws; with fender washers.
- E. Single-Component Nonsag Urethane Sealant: ASTM C 920, Type I, Grade NS, Class 25, Use NT related to exposure, and Use O related to vapor-barrier-related substrates.
- F. Adhesive for Vapor Retarders: Product recommended by vapor-retarder manufacturer and with demonstrated capability to bond vapor retarders securely to substrates indicated.

2.5 FOAMED IN-PLACE INSULATION

- A. Basis-Of-Design: Fomo Products "Hando-Foam" two component low pressure E84 Class 1 spray foam or comparable product by one of the following:
 - 1. Dow Chemical
 - 2. Certainteed
- B. Materials spray foam two-component spay cellular plastic foam complying with the following methods and meeting the following physical properties:
 - 1. Core Density: Minimum 2pcf
 - 2. Thermal Resistance: 140 degree F/ 90 day aged R-Value, measured at 75F mean temp. Minimum R 6.0 per inch.
 - 3. Flame Spread: ASTM E84, Class A 20.
 - 4. Smoke Developed (ASTM E84, Class A) 400.
 - 5. Compressed strength minimum (ASTM 1621 D2842: 2.5 percent: perpendicular @ 10% 16 lb/in2; parallel @ 10% 26 ib/in2.
 - 6. Closed Cell Content (ASTM D2856): minimum 95 percent
 - 7. Water absorption by volume maximum (ASTM D2842): 2.9 percent.
 - 8. Water Absorption (ASTM D2842) 2.9%
 - 9. Fungi Resistance (ASTM G21) No Growth
- C. Primers: follow manufacturer's recommendations for surface conditions. For oily surfaces like roof deck, aluminum tube or Z-bar, etching or a primer may be needed before spraying polyurethane foam.

2.6 AUXILIARY INSULATING MATERIALS

- A. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by insulation manufacturers for sealing joints and penetrations in vapor-retarder facings.
- B. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.

2.7 INSULATION FASTENERS

A. Adhesively Attached, Spindle-Type Anchors: Plate formed from perforated galvanized carbonsteel sheet, 0.030 inch thick by 2 inches square, welded to projecting copper-coated steel spindle 0.105 inch in diameter and of length capable of holding insulation of thickness indicated securely in position with 1-1/2-inch- square or diameter self-locking washers complying with the following requirements:

- 1. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick galvanized steel sheet, with beveled edge for increased stiffness.
- B. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, and snow.
- C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Water-Piping Coordination: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.
- E. For preformed insulating units, provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.2 INSTALLATION OF PERIMETER AND UNDER-SLAB INSULATION

- A. On vertical surfaces, set insulation units in adhesive applied according to manufacturer's written instructions. Use adhesive recommended by insulation manufacturer.
 - 1. If not otherwise indicated, extend insulation a minimum of 24 inches below exterior grade line.
- B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.
- C. Protect below-grade insulation on vertical surfaces from damage during backfilling by applying protection course with joints butted. Set in adhesive according to insulation manufacturer's written instructions.
- D. Protect top surface of horizontal insulation from damage during concrete work by applying protection course with joints butted.

3.3 INSTALLATION OF GENERAL BUILDING INSULATION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Seal joints between foam-plastic insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.
- C. Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:
 - 1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application indicated.
 - 2. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation below indicated thickness.
 - 3. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.

3.4 INSTALLATION OF VAPOR RETARDERS

- A. General: Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as indicated.
- B. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarder.
- C. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarder.

3.5 INSTALLATION OF FOAMED IN-PLACE INSULATION

- A. Examination
 - 1. Verify existing conditions are ready to receive work.
 - 2. Beginning of application implies acceptance of existing conditions.
- A. Preparation
 - 1. Apply required primers for special conditions as recommended by manufacturer.
- C. Application
 - 1. Apply in accordance with ASTM C1029 and manufacturer's installation guidelines.

SECTION 079200 JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Work includes:
 - 1. Provide complete, in place, all sealants and caulking required for the project, as shown, noted, or scheduled on the drawings, and as specified herein, including:
 - a. Sealing and caulking around all new or altered existing window, door, louver, and other similar thru-the-wall frames for all types of walls, both interior and exterior.
 - b. Sealing and caulking required between dissimilar materials not specifically noted or specified to be sealed or caulked by others.
 - c. Sealing and caulking construction, expansion, and other joints where noted on the drawings.

1.2 SUBMITTALS

- A. Product Data/Samples
 - 1. Submit for Engineer/Architect's approval:
 - a. Manufacturer's data sheets/material description for all products specified, together with color chips of colors available for Engineer/Architect's selection.
 - b. Manufacturer's current printed installation instructions for each product.
 - 2. Upon request of Engineer/Architect, submit samples of each product.

1.3 QUALITY ASSURANCE

- A. Employ only skilled, experienced craftsmen (women) who are completely familiar with the specified products and manufacturer's application recommendations.
- B. References Manufacturer's recommended installation instructions for specific applications required.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver all products in manufacturer's original containers, with seals unbroken, labels, product, and manufacturer's names intact and legible.
- B. Store all products in a manner to prevent damage, in a secure place, out of the way of construction operations and in compliance with manufacturer's recommendations.
- C. Handle in accord with manufacturer's recommendations.

1.5 PROJECT/SITE CONDITIONS

- A. Environmental conditions:
 - 1. Weather: Do not install products during adverse weather conditions.
 - 2. Temperature: Do not install products unless surface and ambient temperatures are within the range recommended by the manufacturer.
 - 3. Lighting: Do not install products unless adequate lighting is provided.

PART 2 - PRODUCTS

- 2.1 MATERIALS
 - A. Provide sealants and caulking in manufacturer's standard colors as selected by the Engineer/Architect for specific locations.
 - B. Exterior Sealant/Caulking one part silicone type or one part urethane type.
 - 1. Acceptable materials:
 - a. Dow 790 or 795 Building Sealants.
 - b. G. E. 1000 or 1200 Silicone Construction Sealants.
 - c. Pecora 863 or 864 Construction Sealants.
 - d. Pecora Dynatrol I.
 - e. Tremco Dymonic.
 - C. Interior Sealant/Caulking one part butyl rubber type or one part acrylic latex type.
 - 1. Acceptable materials:
 - a. Bostik Chem-Calk 300 or 600.
 - b. DAP Butyl-Flex or Acrylic Latex Caulk.
 - c. Pecora BC-158 or AC-20.
 - d. Tremco Butyl Sealant or Acrylic Latex Caulk.
 - D. Surface Conditioners and Primers all as recommended by the manufacturer for specific materials and surfaces involved.
 - E. Backer Rod/Joint Filler Extruded polyethylene foam of proper diameter for joint size, Dow "Ethafoam SB" or equal. Provide for specific applications or locations as recommended by sealant manufacturer for optimum performance.

PART 3 - EXECUTION

3.1 APPLICATION AND WORKMANSHIP

- A. Sealing and caulking shall be performed by fully qualified, experienced workmen (women) in strict accordance with manufacturers application instructions and recommendations.
- B. Before sealing or caulking:

- 1. Thoroughly clean all joints free of dirt, dust, loose particles, and foreign matter.
- 2. Wipe joint surfaces with clean cloth moistened in approved cleaner.
- 3. Thoroughly pack joints requiring backer rod or filler with approved material of proper size to provide optimum cavity as recommended by manufacturer.
- 4. Prime or otherwise condition joints, using material as recommended by manufacturer.
- C. Do not apply sealants or caulking in damp, rainy weather, or when temperature is below 40°F.
- D. Apply sealants or caulking with pressure gun furnished with nozzle properly sized to fit joints. Fill all joints solidly and smoothly, without thin edges, for complete seal, and in a neat and workmanlike manner.
- 3.2 CLEANING, REPAIRS/REPLACEMENTS
 - A. At conclusion of the work, clean off all smears, spots, and excess material from all surfaces. Repair or replace defective work and materials. Make certain all joints are completely watertight and weathertight.

SECTION 081113 HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Interior Standard hollow metal doors and frames.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Include elevations, door edge details, frame profiles, metal thicknesses, preparations for hardware, and other details.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
- D. Samples for Verification: For each type of exposed finish required.
- E. Schedule: Prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings.

1.3 QUALITY ASSURANCE

A. Smoke-Control Door Assemblies: Comply with NFPA 105 or UL 1784.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Benchmark; a division of Therma-Tru Corporation.
 - 2. Ceco Door Products; an Assa Abloy Group company.
 - 3. Deansteel Manufacturing Company, Inc.
 - 4. Steelcraft; an Allegion company.
 - 5. Windsor Republic Doors.
 - 6. Mesker Doors
 - 7. Curries Manufacturing

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, CS, Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, CS, Type B.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum A40 metallic coating.
- D. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z coating designation; mill phosphatized.
 - 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- F. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.
- G. Mineral-Fiber Insulation: ASTM C 665, Type I.
- H. Glazing: Division 08 Section "Glazing."
- I. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat.

2.3 STANDARD HOLLOW METAL DOORS

- A. General: Comply with ANSI/SDI A250.8.
 - 1. Design: Flush panel.
 - 2. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core.
 - a. Thermal-Rated (Insulated) Doors: R-value of not less than 12.3 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.
 - 3. Vertical Edges for Single-Acting Doors: Square edge.
 - 4. Top and Bottom Edges: Closed with flush or inverted 0.042-inch- thick, end closures or channels of same material as face sheets.
 - 5. Tolerances: SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."
- B. Interior Doors: Face sheets fabricated from cold-rolled steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
 - 1. Level 2 and Physical Performance Level B (Heavy Duty), Model 1 (Full Flush). Provide insulated doors unless otherwise noted.
 - a. Width: 1-3/4 inches.

- b. Undercut: 3/4" undercut on all standard interior doors unless otherwise noted.
- C. Hardware Reinforcement: ANSI/SDI A250.6.
- 2.4 STANDARD HOLLOW METAL FRAMES
 - A. General: Comply with ANSI/SDI A250.8.
 - B. Interior Frames: Fabricated from cold-rolled steel sheet.
 - 1. Fabricate frames with mitered or coped corners.
 - 2. Fabricate frames as face welded unless otherwise indicated.
 - 3. Fabricate knocked-down, drywall slip-on frames for in-place gypsum board partitions.
 - 4. Frames for Level 2 Steel Doors: 0.053-inch thick steel sheet.
 - C. Hardware Reinforcement: ANSI/SDI A250.6.

2.5 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
 - 2. Compression Type for Drywall Slip-on Frames: Adjustable compression anchors.
 - 3. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inchdiameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.
- B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch thick, and as follows:
 - 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2.6 HOLLOW METAL PANELS

A. Provide hollow metal panels of same materials, construction, and finish as specified for adjoining hollow metal work.

2.7 STOPS AND MOLDINGS

- A. Moldings for Glazed Lites in Doors: Minimum 0.032 inch thick, same material as door face sheet.
- B. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch high unless otherwise indicated.
- C. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch thick, same material as frames.
D. Terminated Stops: Where indicated, terminate stops 6 inches above finish floor with a [45] [90]degree angle cut, and close open end of stop with steel sheet closure. Cover opening in extension of frame with welded-steel filler plate, with welds ground smooth and flush with frame.

2.8 ACCESSORIES

- A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.
- B. Ceiling Struts: Minimum 1/4-inch-thick by 1-inch- wide steel.
- C. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

2.9 FABRICATION

- A. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.
- B. Hollow Metal Doors:
 - 1. Provide weep-hole openings in bottom of doors. Seal joints in top edges of doors against water penetration.
 - 2. Glazed Lites: Factory cut openings in doors.
- C. Hollow Metal Frames: Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
 - 1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
 - 2. Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
 - 3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 - 4. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
 - 5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
 - 6. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
 - 1) Three anchors per jamb up to 60 inches high.
 - 2) Four anchors per jamb from 60 to 90 inches high.
 - 3) Five anchors per jamb from 90 to 96 inches high.
 - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
 - 5) Two anchors per head for frames more than 42 inches wide and mounted in metal-stud partitions.
 - b. Compression Type: Not less than two anchors in each jamb.
 - c. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.

- 7. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers.
 - a. Single-Door Frames: Three door silencers.
 - b. Double-Door Frames: Two door silencers.
- D. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
 - 1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
 - 2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.
 - 3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
 - 4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 electrical Sections.
- E. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
 - 1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
 - 2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
 - 3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
 - 4. Provide loose stops and moldings on inside of hollow metal work.
 - 5. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

2.10 STEEL FINISHES

- A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.
 - 1. Shop Primer: ANSI/SDI A250.10.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Hollow Metal Frames: Comply with ANSI/SDI A250.11.
 - 1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. At fire-protection-rated openings, install frames according to NFPA 80.
 - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - c. Install frames with removable glazing stops located on secure side of opening.
 - d. Install door silencers in frames before grouting.

- e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
- f. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
- g. Field apply bituminous coating to backs of frames that are filled with grout containing antifreezing agents.
- 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
- 3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.
- 4. In-Place Gypsum Board Partitions: Secure frames in place with postinstalled expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
- 5. Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.
- 6. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- B. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
 - 1. Non-Fire-Rated Standard Steel Doors:
 - a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
 - b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
 - c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
 - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
 - 2. Smoke-Control Doors: Install doors according to NFPA 105.
- C. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.
 - 1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

3.2 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
- B. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- C. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

SECTION 087100 DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Commercial door hardware.
 - 2. Cylinders for doors specified in other Sections.
- B. See Division 08 door sections for astragals and door silencers.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Details of electrified door hardware, including wiring diagrams.
- C. Samples: For each exposed finish.
- D. Product certificates.
- E. Other Action Submittals:
 - 1. Door Hardware Sets: Prepared by or under the supervision of **Architectural Hardware Consultant**, detailing fabrication and assembly of door hardware, as well as procedures and diagrams.
 - a. Format: Use same scheduling sequence and format **and use same door numbers** as in the Contract Documents.
 - b. Content: Include the following information:
 - 1) Identification number, location, hand, fire rating and material of each door and frame.
 - 2) Type, style, function, size, quantity, and finish of each door hardware item. Include description and function of each lockset and exit device.
 - 3) Complete designations of every item required for each door or opening including name and manufacturer.
 - 4) Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.
 - 2. Keying Schedule: Prepared by or under the supervision of **Architectural Hardware Consultant**, detailing Owner's final keying instructions for locks.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by lock manufacturer.

- 1. Installer's responsibilities include supplying and installing door hardware and providing a qualified Architectural Hardware Consultant available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
- B. Architectural Hardware Consultant Qualifications: A person who is currently certified by DHI as an Architectural Hardware Consultant and who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project.
- C. Keying Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system.
- D. Preinstallation Conference: Conduct conference at **Project site**.
- 1.4 DELIVERY, STORAGE, AND HANDLING
 - A. Deliver keys **and permanent cores** to Owner by registered mail or overnight package service.

1.5 COORDINATION

A. Templates: Distribute door hardware templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: **Three** years from date of Substantial Completion, except as follows:
 - a. Manual Closers: **10** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in this Section and door hardware sets indicated in Part 3 "Door Hardware Sets" Article. Door hardware for exterior doors provided by pre-engineered building manufacturer is noted on drawings and in section 133400.
 - 1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and **products** equivalent in function and comparable in quality to named products.

- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Sets" Article. Products are identified by using door hardware designations, as follows:
 - 1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in Part 3 "Door Hardware Sets" Article.
 - 2. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.

2.2 HINGES, GENERAL

- A. Template Requirements: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
- B. Hinge Base Metal: Unless otherwise indicated, provide the following:
 1. Interior Hinges: Stainless steel, with stainless-steel pin.
- C. Fasteners: Comply with the following:
 - 1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.
 - 2. Screws: Phillips flat-head; machine screws (drilled and tapped holes) for metal doors and frames. Finish screw heads to match surface of hinges.

2.3 HINGES

- A. Butts and Hinges: BHMA A156.1.
- B. Template Hinge Dimensions: BHMA A156.7.
- C. Manufacturers:
 - 1. Hager Companies.
 - 2. Ives, an Allegion Company.
 - 3. McKinney Products Company; an ASSA ABLOY Group company.
 - 4. Stanley Commercial Hardware; Div. of The Stanley Works.

2.4 LOCKS AND LATCHES, GENERAL

- A. Accessibility Requirements: Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
- B. Latches and Locks for Means of Egress Doors: Comply with NFPA 101. Latches shall not require more than 15 lbf to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.
- C. Lock Trim:
 - 1. Levers: Corbin Russwin "Newport"
 - 2. Dummy Trim: Match **lever** lock trim and escutcheons.

- D. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors.
- E. Backset: 2-3/4 inches, unless otherwise indicated.
- F. Strikes: Manufacturer's standard strike with strike box for each latchbolt or lock bolt, with curved lip extended to protect frame, finished to match door hardware set.

2.5 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: Function numbers and descriptions indicated in door hardware sets comply with the following:
 - 1. Bored Locks: BHMA A156.2.
- B. Bored Locks: BHMA A156.2, Grade 2.
 - 1. Manufacturers:
 - a. Corbin Russwin Hardware; an ASSA ABLOY Group company.
 - b. Schlage Commercial Lock Division; an Allegion Company.
 - c. Stanley Best.

2.6 LOCK CYLINDERS

- A. Standard Lock Cylinders: BHMA A156.5, Grade 2.
- B. Cylinders: Manufacturer's standard tumbler type, constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:
 - 1. Number of Pins: **Six**.
- C. Permanent Cores: Manufacturer's standard; finish face to match lockset; with **removable** cores.
- D. Construction Keying: Comply with the following:
 - 1. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.
 - 2. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.
 - a. Furnish permanent cores to Owner for installation.
- E. Manufacturer: Same manufacturer as for locks and latches.

2.7 KEYING

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference into existing **master** key system.
 - 1. Existing System: Master key or grand master key locks to Owner's existing system.

B. Keys: Nickel silver; permanently inscribed with a visual key control number and including the notation "DO NOT DUPLICATE."

1. Quantity: In addition to one extra key blank for each lock, provide three cylinder change keys and five **master** keys.

2.8 PROTECTIVE TRIM UNITS

- A. Size: 1-1/2 inches less than door width on push side and 1/2 inch less than door width on pull side, by height specified in door hardware sets.
- B. Metal Protective Trim Units: BHMA A156.6; beveled top and 2 sides; fabricated from the following material:
 - 1. Material: 0.050-inch- thick **stainless steel**.
 - 2. Manufacturers:
 - a. Hager Companies.
 - b. IVES Hardware; an Allegion Company.
 - c. Rockwood Manufacturing Company; an ASSA ABLOY Group company.

2.9 STOPS AND HOLDERS

- A. Stops and Bumpers: BHMA A156.16, Grade 2.
 - 1. Provide wall stops for doors unless wall or other type stops are scheduled or indicated. Do not mount floor stops where they will impede traffic. Where floor or wall stops are not appropriate, provide overhead holders.
- B. Silencers for Door Frames: BHMA A156.16, Grade 1; neoprene or rubber; fabricated for drilledin application to frame.
- C. Manufacturers:
 - 1. Hager Companies.
 - 2. IVES Hardware; an Allegion Company.
 - 3. Rockwood Manufacturing Company; an ASSA ABLOY Group company.

2.10 DOOR GASKETING

- A. Standard: BHMA A156.22.
- B. General: Provide continuous weather-strip gasketing on exterior doors and provide smoke, gasketing on interior doors. Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.
 - 1. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
 - 2. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
 - 3. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

- C. Smoke-Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke-control ratings indicated, based on testing according to UL 1784.
 - 1. Provide smoke-labeled gasketing on 20-minute-rated doors and on smoke-labeled doors.
- D. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- E. Gasketing Materials: ASTM D 2000 and AAMA 701/702.
- F. **Available** Manufacturers:
 - 1. Hager Companies.
 - 2. National Guard Products.
 - 3. Pemko Manufacturing Co.; an ASSA ABLOY Group company.
 - 4. Zero International; an Allegion Company.

2.11 FABRICATION

- A. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.
- B. Fasteners: Provide screws according to commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
- C. Finishes: BHMA A156.18, as indicated in door hardware sets.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Steel Doors and Frames: Comply with DHI A115 Series. Drill and tap doors and frames for surface-applied door hardware according to ANSI A250.6.
- B. Mounting Heights: Mount door hardware units at heights indicated **as follows** unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. Custom Steel Doors and Frames: DHI's "Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames."
 - 3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- C. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be

painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 09 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

- D. Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
- 3.2 DOOR HARDWARE SETS
 - A. REFER TO DOOR HARDWARE NOTES ON SHEET A601.

SECTION 088100 GLASS GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Work includes:
 - 1. Provide complete, in place, the glass and glazing not otherwise specified for the project, as shown, noted, or scheduled on the drawings and as specified herein.
 - 2. Location of Glass Types Refer to interior elevations, details, door and frame schedules on the drawings for exact locations and types of glass required.
- B. Related work:
 - 1. Specified elsewhere:
 - a. Hollow Metal Steel Door Frames specified in Section 081100.
 - b. Wood Doors specified in Section 081400.
 - c. Glazed Doors & Frames specified in Section 081116.

1.2 SUBMITTALS

- A. Product Data/Samples:
 - 1. Submit for Engineer/Architect's approval: (minimum 5 copies required)
 - a. Manufacturer's data and catalog sheets clearly indicating all types of glass and glazing materials to be used.
 - 2. Submit samples of each glass type for Engineer/Architect's approval.

1.3 QUALITY ASSURANCE

- A. Contractor shall employ only skilled and experienced workmen/workwomen who are fully qualified in the installation of specified materials and shall provide a fully qualified superintendent or foreman who shall be present at all times during execution of this work.
- B. In addition to complying with pertinent codes and regulations of governmental agencies having jurisdiction, comply with pertinent recommendations contained in:
 - 1. Flat Glass Marketing Association (FGMA):
 - a. "Glazing Sealing Systems Manual".
 - b. "Glazing Manual".
 - 2. Sealed Insulating Glass Manufacturer's Association.

PART 2 - PRODUCTS

2.1 GLASS

- A. All glass shall be new, up-to-grade requirements. Provide type and thickness indicated on the drawings or as specified herein.
- B. Plate or Float Glass: Fed. Spec. DD-G-451, Type I, Class 1, Quality q3.2. Where plate glass is called for, plate glass or float glass may be used.
- C. Tempered Glass: Fed Spec. DD-G-1403 and ANSI Z97.1.
 - 1. For plate glass or float glass use Type I, Class 1, Quality q3.
 - 2. For heat absorbing glass, if required, use Type I, Class 2.

2.2 OTHER MATERIALS

- A. Glazing Compounds Permanent elastic material of proper consistency for specific application. Compounds shall maintain a flexible, watertight seal. <u>Do not use putty</u>.
- B. Glazing Gaskets, Resilient Glazing Seals Provide size and type as recommended by frame and glass manufacturers for a complete watertight seal.
- C. Accessories Provide all accessories, including but not limited to, glazing clips, setting blocks, shims, and similar items required for proper installation of all materials.

2.3 GLAZING SCHEDULE

A. Refer to drawing interior elevations, details, door and frame schedules for locations of various glass types.

AS NOTED ON DRAWINGS	<u>GLASS TYPE</u>
PG	1/4" thick Clear Polished Plate Glass or Ar-
	chitectural Float Glass
TG	Same as above, but <u>Tempered</u> .
TIG	1" thick <u>Tempered Insulating Glass</u> panels consisting of outer and inner sheets of ¼" thick clear tempered plate or arch. float
	(TG) separated by ½" dehydrated air space. Provide manufacturer's standard 10 year warranty.
WG	¹ ⁄ ₄ " thick Clear Polished <u>Wire Glass</u> with ³ ⁄ ₄ " welded wire mesh (diamond pattern).

PART 3 - EXECUTION

3.1 INSTALLATION, WORKMANSHIP

- A. Glass shall be installed by competent, qualified workmen/workwomen, as recommended in the Flat Glass Glazing Manual, and as specifically recommended by glass and frame manufacturers.
- B. All glazing ledges, beads, and stops shall be clean, dry, free from dust, foreign matter, mortar, oil, grease, and rust before glazing. Do no glazing until all such items have been thoroughly cleaned.
- C. Properly prime or otherwise prepare all glazing ledges, beads, and stops prior to installation of glass.
- D. Do all glazing at job site. Set all glass so there is equal bearing for entire width of pane using proper size setting blocks. Set all glass accurately so it fits frame or opening.
- E. Allow for proper expansion as recommended by manufacturer.
- F. Completely bed all glass in glazing compound or proper size glazing seals, free from rattle or leakage for watertight and weathertight installation.
- G. Use proper lubricants and tools as recommended by manufacturer for installation of glazing gaskets and seals.

3.2 REPLACEMENTS, CLEANING

- A. At conclusion of the work, examine all glass and glazing work. Remove and replace all cracked, broken, discolored, or otherwise defective glass and unacceptable glazing compound or glazing seals and gaskets.
- B. Thoroughly remove all excess glazing compound from glass and stops.
- C. Wash all glass surfaces, inside and outside.

SECTION 092900 GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Interior gypsum board.

B. Related work

- 1. Specified elsewhere
 - a. Rough Carpentry specified in Section 092216.
 - b. Painting Section 099100.

1.2 SUBMITTALS

- A. Product Data/Samples
 - 1. Submit for Engineer/Architect's approval:
 - a. Manufacturer's data and/or catalog sheets clearly indicating products proposed for use.
 - b. Manufacturer's recommended installation instructions for each specific installation.

1.3 QUALITY ASSURANCE

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. Contractor shall employ only skilled and experienced workmen/workwomen who are fully qualified in the installation of specified materials and shall provide a fully qualified superintendent or foreman who shall be present at all times during execution of this work.
- C. Application and Finishing Standards:
 - 1. Gypsum Association File 216.
 - 2. ASTM C840.

1.4 DELIVERY, STORAGE, HANDLING

A. All materials shall be delivered in their original unopened packages, properly labeled; stored and handled at job site in a matter to prevent damage in accordance with manufacturer's recommendations.

1. Damaged or deteriorated materials shall not be used in the construction and shall be removed from the job site.

PART 2 - PRODUCTS

- 2.1 GENERAL
 - A. Provide in longest lengths practicable as will result in a minimum of joints.
 - B. Provide recessed or tapered edge type for single layer application and for face layer of double layer application. Use square edge type for back-up layer of double layer application.
 - 1. Provide in thickness indicated on the drawings.
 - C. General: Interior gypsum board complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.
- 2.2 Manufacturers
 - A. Acceptable Manufacturers:
 - 1. National Gypsum Company
 - 2. USG Corp.
 - 3. CertainTeed Corp.
 - 4. Georgia-Pacific Gypsum LLC
- 2.3 Standard Gypsum Board
 - A. Basis-of-Design: National Gypsum Gold Bond Brand Gypsum Board
 - 1. Panel Physical Characteristics
 - a. Core: Regular gypsum core
 - b. Surface Paper: 100 percent recycled content paper on front, back and long edges
 - c. Long Edges: Tapered
 - d. Overall thickness: As shown on drawings
 - e. Panel complies with requirements of ASTM C 1396
- 2.4 Moisture Resistant XP Type Gypsum Board
 - A. Basis-of-Design: National Gypsum Gold Bond Brand XP Gypsum Board
 - 1. Panel Physical Characteristics
 - a. Core: Mold and moisture resistant gypsum core
 - b. Surface paper: 100 percent recycled content moisture/mold/mildew resistant paper on front, back, and long edges Long Edges: Tapered
 - c. Overall thickness: As shown on drawings
 - d. Panel complies with requirements of ASTM C 1396

e. Mold/Mildew Resistance: 10 when tested in accordance with ASTM D 3273

2.5 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
 - 1. Material: Formed from zinc-coated steel not lighter than 26 ga., comply with Fed Spec. QQ-S-775, Type I, Class D or E, as approved by the Engineer/Architect.
 - 2. Shapes:
 - a. Cornerbead.
 - b. Bullnose bead.
 - c. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - d. L-Bead: L-shaped; exposed long flange receives joint compound.
 - e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
 - f. Expansion (control) joint.
 - g. Curved-Edge Cornerbead: With notched or flexible flanges.
- B. Exterior Trim: ASTM C 1047.
 - 1. Material: Hot-dip galvanized steel sheet, or rolled zinc.
 - 2. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening.

2.6 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape
 - 1. Interior Gypsum Wallboard: Paper.
 - 2. Exterior Gypsum Soffit Board: Paper.
 - 3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
 - 4. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 - 1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
 - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all purpose compound.
 - 3. Fill Coat: For second coat, use drying-type, all-purpose compound.
 - 4. Finish Coat: For third coat, use drying-type, all-purpose compound.
 - 5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.

2.7 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
 - 1. Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
 - 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
 - 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION AND WORKMANSHIP

- A. Comply with all pertinent recommendations of the applicable standards and manufacturer's installation recommendations for each specific type application.
- B. Installation of all materials shall be fully qualified, experienced workmen/workwomen, skilled in application of gypsum wallboard to metal framed and/or wood framed structures and skilled in the application and finishing of joint treatment specified.
- C. Panels shall be secured to framing members with screws of proper type and size spaced maximum of 10" o.c.; or by a combination of screw attachment and adhesive as may be recommended by the manufacturer and approved by the Engineer/Architect.
- D. Wallboard for ceiling shall be installed first and shall be installed in longest lengths practicable with long dimension perpendicular to framing members and with joints staggered a minimum of two framing spaces between adjacent panel rows.
 - 1. Where cross furring is indicated on the drawings, install wallboard with long dimension perpendicular to furring.
 - 2. For double layer application, reverse direction between layers.
- E. At junction of wallboard partitions with other type materials, provide continuous full height length acoustical sealant bead between wallboard edge trim and adjacent material.
- F. Neatly cut and fit wallboard to all electrical boxes and other penetrations through wallboard and provide compound filter and/or sealant bead around same to form and effective seal between wallboard surface and finishing plates.
- 3.2 APPLYING AND FINISHING PANELS, GENERAL
 - A. Comply with ASTM C 840.

- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Isolate perimeter of gypsum board applied to non-load bearing partitions at structural abutments, except floors. Provide ¼" wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- D. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members, or provide control joints to counteract wood shrinkage.
- E. Set gypsum board minimum 1/2" above concrete floors.

3.3 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints at locations indicated on drawings, and according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
 - 1. Cornerbead: Use at outside corners.
 - 2. Bullnose Bead: Use where indicated on drawings.
 - 3. LC-Bead: Use at exposed panel edges.
 - 4. L-Bead: Use where indicated.
 - 5. U-Bead: Use at exposed panel edges.
 - 6. Curved-Edge Cornerbead: Use at curved openings.
- D. Exterior Trim: Install in the following locations:
 - 1. Cornerbead: Use at outside corners.
 - 2. LC-Bead: Use at exposed panel edges.

3.4 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape. Tape and seal all joints and internal corners with reinforcing tape and joint compound. Apply tape and compound in strict accordance with manufacturer's directions and recommendations of the applicable standards.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.

- 2. Level 4: At panel surfaces that will be exposed to view, unless otherwise indicated.
- 3. Level 5: Where indicated on Drawings.
- 4. All taped and filled joints, filled depressions at screws, filled corner beads, and areas around electrical outlet boxes and other wall penetrations shall be expertly feathered out onto panel faces and sanded perfectly smooth, fully acceptable for final painting or other finish.
 - a. Careful attention shall be given to all internal corners and areas around electrical outlet boxes.
 - b. Joints shall be feathered out a minimum of 12" and further as necessary to render joints undetectable under finish painted surfaces.
- E. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- F. Remove and replace panels that are wet, moisture damages, and mold damaged.
 - 1. Indications that panels are we or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

SECTION 099100 PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Work included: Provide complete, in place, the painting and wall covering work for the project, as shown, noted, or scheduled on the drawings and as specified herein.

1.2 SUBMITTALS

- A. In accord with 013219:
 - 1. Product data:
 - a. Materials list of items proposed to be provided under this Section.
 - b. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
 - c. Color schedule for selection of colors.

1.3 RELATED WORK

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary conditions, and Sections in Division 1 of these Specifications.
- B. Priming or priming and finishing of certain surfaces may be specified to be factory-performed or installer-performed under pertinent other Sections.

1.4 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Paint coordination:
 - 1. Provide finish coats which are compatible with the prime coats actually used.
 - 2. Review other Sections of these Specifications as required, verifying the prime coat to be used and assuring compatibility of the total coating system for the various substrata.
 - 3. Upon request, furnish information on the characteristics of the specific finish materials to assure that compatible prime coats are used.
 - 4. Provide barrier coats over non-compatible primers, or remove the primer and reprime as required.
 - 5. Notify the Engineer/Architect in writing of anticipated problems in using the specified coating systems over prime-coatings supplied under other Sections.

1.5 PRODUCT STORAGE & PROTECTION

A. Comply with pertinent provisions of Section 016600.

1.6 JOB CONDITIONS

- A. Do not apply solvent-thinned paints when the temperature of surfaces to be painted and the surrounding air temperatures are below 45 degrees F, unless otherwise permitted by the manufacturers' printed instructions as approved by the Engineer/Architect.
- B. Weather conditions:
 - 1. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85%; or to damp or wet surfaces, unless otherwise permitted by the manufacturers' printed instructions as approved by the Engineer/Architect.
 - 2. Applications may be continued during inclement weather only within the temperature limits specified by the paint manufacturer as being suitable for use during application and drying periods.

PART 2 - PRODUCTS

2.1 PAINT MATERIALS

- A. Acceptable Materials: Paints, Stains and Coatings shall be first line products of Sherwin Williams, Tnemec, or other manufacturers approved by the Engineer/Architect.
- B. Undercoats and thinners:
 - 1. Provide undercoat paint produced by the same manufacturer as the finish coat.
 - 2. Use only the thinners recommended by the paint manufacturer, and use only to the recommended limits.
 - 3. Insofar as practicable, use undercoat, finish coat, and thinner material as parts of a unified system of paint finish.

2.2 APPLICATION EQUIPMENT

A. For application of the approved paint, use only such equipment as is recommended for application of the particular paint by the manufacturer of the particular paint, and as approved by the Engineer/Architect.

2.3 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer/Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 MATERIALS PREPARATION

A. General:

- 1. Mix and prepare paint materials in strict accordance with the manufacturers' recommendations as approved by the Engineer/Architect.
- 2. When materials are not in use, store in tightly covered containers.
- 3. Maintain containers used in storage, mixing, and application of paint in a clean condition, free from foreign materials and residue.
- 4. Do not stir into the material any film which may form on the surface, but remove the film and, if necessary, strain the material before using.

3.3 SURFACE PREPARATION

- A. General:
 - 1. Perform preparation and cleaning procedures in strict accordance with the paint manufacturers' recommendations as approved by the Engineer/Architect.
 - 2. Remove removable items, which are in place and are not scheduled to receive paint finish; or provide surface-applied protection prior to surface preparation and painting operations.
 - 3. Following completion of painting in each space or area, reinstall the removed items by using workers who are skilled in the necessary trades.
 - 4. Clean each surface to be painted prior to applying paint of surface treatment.
 - 5. Remove oil and grease with clean cloths and cleaning solvent of low toxicity and flash point in excess of 200 degrees F, prior to start of mechanical cleaning.
- B. Preparation of new metal surfaces noted to receive paint:
 - 1. Thoroughly clean surfaces until free from dirt, oil, and grease.
 - 2. On galvanized surfaces, use solvent for the initial cleaning and then treat the surface thoroughly with phosphoric acid etch. Remove etching solution completely before proceeding.
 - 3. Allow to dry thoroughly before application of paint.
- C. Preparation of new gypsum board surfaces noted to receive paint:
 - 1. Thoroughly examine surfaces prior to and again after prime coat is applied. Joints and holes shall be properly filled, feathered out and sanded perfectly smooth to prevent detection of same through specified finish paint.
 - a. Do not apply finish coats until all unsatisfactory conditions have been corrected.

3.4 PAINT APPLICATION

- A. General:
 - 1. Touchup shop-applied prime coats which have been damaged, and touchup bare areas prior to start of finish coats application.
 - 2. Slightly vary the color of succeeding coats.
 - a. Do not apply additional coats until the completed coat has been inspected and approved.
 - b. Only the inspected and approved coats of paint will be considered in determining the number of coats applied.
 - 3. Sand and dust between coats to remove defects visible to the unaided eye from a distance of five feet.

B. Drying:

- 1. Allow sufficient drying time between coats, modifying the period as recommended by the material manufacturer to suit adverse weather conditions.
- 2. Consider oil-base and oleo-resinous solvent-type paint as dry for recoating when the paint feels firm, does not deform or feel sticky under moderate pressure of the thumb, and when the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.
- C. Brush applications:
 - 1. Brush out and work the brush coats onto the surface in an even film.
 - 2. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, and other surface imperfections will not be acceptable.
- D. Spray application:
 - 1. Except as specifically otherwise approved by the engineer/architect, confine spray application to metal framework and similar surfaces where hand brush work would be inferior.
 - 2. Where spray application is used, apply each coat to provide the hiding equivalent of brush coats.
 - 3. Do not double back with spray equipment to build up film thickness of two coats in one pass.
- E. Miscellaneous surfaces and procedures:
 - 1. Exposed mechanical items:
 - a. Finish electric panels, access doors, conduits, outlet boxes, grilles, registers, vents, and items of similar nature to match the adjacent wall and ceiling surfaces, or as directed by the Engineer/Architect.
 - b. Wash metal with solvent, prime, and apply two coats of alkyd enamel.

3.5 PAINTING SCHEDULE

A. Provide the following paint finishes: Refer to 3.4.A.1. concerning specified prime coats.

- B. Interior unless noted otherwise:
 - 1. All exposed plain iron and steel.
 - a. Includes but not limited to:
 - 1) Handrails/Guards.
 - 2) Hollow Metal Door Frames.
 - b. Finish System:
 - 1) Sherwin Williams:
 - a) First/Prime Coat: DTM Acrylic Primer/Finish.
 - b) Second and Third Coat: ProMar 200 Latex Semi-Gloss Enamel.
 - 2. All exposed galvanized, aluminum, or copper metal.
 - a. Includes but not limited to:
 - 1) Exposed galvanized mechanical piping and electrical conduit.
 - 2) Metal doors and frames.
 - 3) Exposed copper piping or plumbing.
 - b. Finish System:
 - 1) Sherwin Williams:
 - a) First/Prime Coat: DTM Acrylic Primer/Finish.
 - b) Second and Third Coat: ProMar 200 Latex Semi-Gloss Enamel.
 - 3. Gypsum Board areas.
 - a. Finish system:
 - 1) Sherwin Williams:
 - a) First Coat: ProMar 200 Latex Wall Primer.
 - b) Second and Third Coats: ProMar 200 Interior Latex Eggshell Enamel.

SECTION 102813 TOILET ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Work includes
 - 1. Provide complete, in place, the toilet accessories for the project, as shown, noted, or scheduled on the drawings and as specified herein.

1.2 SUBMITTALS

- A. Product Data/Samples
 - 1. Submit for Engineer/Architect's approval: (minimum 5 copies required)
 - a. Manufacturer's catalog or data sheets on all specified products together with manufacturer's recommended installation instructions.

1.3 QUALITY ASSURANCE

A. Contractor shall employ only skilled and experienced workmen/workwomen who are fully qualified and familiar with the assembly and recommended installation procedures for specified products.

PART 2 - PRODUCTS

2.1 GRAB BARS

- A. 1¹/₂" OD, Type 304 Stainless Steel, 18 gauge, smooth satin finish, concealed mounting type. Provide in lengths and configurations indicated on the drawings.
 - 1. Acceptable Products
 - a. Bobrick "B-6806 Series".
 - b. Bradley "812 Series".
 - c. Approved equal.

2.2 MIRRORS

A. No. 1 quality ¼" plate/float glass, electrolytically copper backed, edges and back protected with shock absorbing material, heavy gauge galvanized steel back, concealed wall hangers slotted for concealed mounting with theft-resistant devices. Provide type 304 stainless steel square corner channel frames with polished finish. Provide mirrors in sizes noted or indicated on the drawings.

- 1. Acceptable products
 - a. Bradley "781 Series".
 - b. Bobrick "B-165 Series".
 - c. Approved equal.

2.3 MISCELLANEOUS MATERIALS / ACCESSORIES

A. Provide proper type anchoring devices for specific type wall construction or partition type involved for securing all items.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Coordinate as required with other trades to assure proper and adequate provisions in the work of those trades for interface with the work of this section, including proper wood backing in building partitions.
- B. Install each item in its proper location, firmly anchored into position, level and plumb, and in accordance with manufacturer's recommendations and proper installation templates.

SECTION 104414 FIRE EXTINGUISHERS AND CABINETS

PART 1 - GENERAL

1.1 SUMMARY

- A. Work includes
 - 1. Provide complete, in place, the fire extinguishers and cabinets for the project, as shown, noted, or scheduled on the drawings and as specified herein.
 - a. Refer to drawings for locations and for details of wall construction and conditions.

1.2 SUBMITTALS

- A. Product Data/Samples
 - 1. Submit for Engineer/Architect's approval: (minimum 5 copies required)
 - a. Manufacturer's catalog or data sheets on specified fire extinguishers and cabinets together with manufacturer's recommended installation instructions.

1.3 QUALITY ASSURANCE

A. Contractor shall employ only skilled and experienced workmen/workwomen who are fully qualified and familiar with the recommended installation procedures for the specified products and the wall construction involved.

PART 2 - PRODUCTS

- 2.1 EXTINGUISHERS AND CABINETS
 - A. Marked "FE" on Drawings:
 - 1. Multi-Purpose Dry Chemical Extinguisher, heavy duty steel cylinder, class A B & C fires, 10 lb. capacity, rated 4A-60BC. Provide wall mounting bracket and hardware.
 - B. Approved Products
 - 1. J. L. Industries "Cosmic 10E", "Ambassador 1017D10".
 - 2. Engineer/Architect approved equal.
 - C. Provide extinguishers fully charged, ready for service, and provide all accessories required for complete installation.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install wall hung units using proper mounting hardware as supplied with units, for rigid installation.
- B. Mounting Heights: As detailed on the drawings, or as directed by the Engineer/Architect.

SECTION 133400 PRE-ENGINEERED BUILDING SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes pre-engineered building systems, including but not limited to primary and secondary structural framing systems, roofing, siding, roof and wall insulation, personnel doors, windows and accessories. Basis of design is the following system by Lester Building Systems or Architect/Engineer approved equal:
 - 1. Uni-Frame II, clear span truss and above grade columns on concrete foundation.
- B. See Division 03 Section "Cast-in-Place Concrete" for concrete foundations, slabs, and anchorbolt installation.

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM A153 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - 2. ASTM A653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 3. ASTM C90 Standard Specification for Loadbearing Concrete Masonry Units.
 - 4. ASTM C523 Method of Test for Light Reflectance of Acoustical Materials by the Integrating Sphere Reflectometer.
 - 5. ASTM C665 Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - 6. ASTM C991 Standard Specification for Flexible Glass Fiber Insulation for Metal Buildings.
 - 7. ASTM C1036 Standard Specification for Flat Glass.
 - 8. ASTM C1048 Standard Specification for Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.
 - 9. ASTM D523 Standard Test Method for Specular Gloss.
 - 10. ASTM D3363 Standard Test Method for Film Hardness by Pencil Test.
 - 11. ASTM D3462 Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules.
 - 12. ASTM D3841 Standard Specification for Glass-Fiber-Reinforced Polyester Plastic Panels.
 - 13. ASTM D4145 Standard Test Method for Coating Flexibility of Prepainted Sheet.
 - 14. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 15. ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials.
- B. Other Standards:
 - 1. AWC (NDS) National Design Specification for Wood Construction
 - 2. IBC International Building Code (2006)
 - 3. ANSI/ASCE 7 Minimum Loads for Buildings and Other Structures

- 4. ANSI/TPI 1 National Design Standard for Metal Plate Connected Wood Truss Construction
- 5. ASAE EP 484 Diaphragm Design of Metal-Clad, Post-Frame Rectangular Buildings. ASABE Standards. Knox, IL.
- 6. ASAE EP 486. Post and Pole Foundation Design: Shallow Post Foundation Design. ASABE Standards. Knox, IL.
- 7. ASAE EP 559. Design Requirements and Bending Properties for Mechanically Laminated Columns. ASABE Standards. Knox, IL.
- 8. ASTM F 1667 Specification for Driven Fasteners: Nails, Spikes and Staples.
- 9. AWPA U1- USE CATEGORY SYSTEM: User Specification for Treated Wood Products.
- 10. BCSI. Building Component Safety Information. Guide for Good Practice for Handling, Installing, Restraining & Bracing of Metal Plate Connected Wood Trusses.
- 11. NFBA Accepted Practices for Post Frame Building Construction: Framing Tolerances.
- 12. NFBA Accepted Practices for Post-Frame Building Construction: Metal Panel and Trim Installation Tolerances.

1.3 SYSTEM DESCRIPTION

- A. The building shall be designed by the Designer of Record as a complete system. All structural members and connections shall be the responsibility of the Designer of Record. All components of the system shall be specified by the Designer of Record. This includes, but is not limited to, components such as foundations, primary framing, secondary framing, and lateral bracing.
- B. Design Requirements:
 - 1. Design load application shall be in accordance with IBC 2006, ASCE 7-05, and other applicable codes.
 - 2. Design shall be based on the building framing and enclosure as manufactured by Lester Building Systems.
 - a. Type: Clear span roof truss or rafter style roof framing without interior column lines.
 - b. Maximum Width: 50 feet.
 - c. Maximum Clear Height: 30 feet.
 - d. Columns: Embedded in ground or bolted to foundation.
 - e. Purlins: Recessed between trusses in galvanized steel joist hangers Or on-edge above truss, factory drilled and fastened with 3/16 inch x 6 inches screw.
- C. Dimensions:
 - 1. Nominal Width: 50 feet 0 inches, outside to outside of primary or secondary wall framing.
 - 2. Nominal Length: 70 feet 0 inches, outside to outside of primary or secondary wall framing.
 - 3. Wall Height: 16 feet 0 inches, clearance from top of floor to underside of truss or rafter.
 - 4. Roof Slope: 4:12 (units of rise per 12 units of run).
 - 5. Ceiling Slope: Flat Ceiling.
- D. Structural Requirements:
 - 1. Building Code: 2006 International building Code (IBC) and ASCE-7-05.
 - 2. Design Loads:
 - a. Ground Snow Load: 20 psf

- b. Roof Load, Live load: 20 psf
- c. Roof Dead Load: Weight of post-framed roof framing members and roofing.
- d. Wind Load: Wind speed (3 sec gust): 90 mph.
- e. Wind Exposure: C.
- f. Maximum Considered Earthquake 0.2 Second Spectral Response Acceleration: Sds=0.154.
- g. Maximum Considered Earthquake 1.0 Second Spectral Response Acceleration: Sd1=0.135.
- h. Collateral Loads: 5 psf (Additional loads imposed by contract documents other than weight of building systems specified in this section).
- i. Combination Loads: Comply with Building Code.
- 3. Structural Design:
 - a. Perform calculations using diaphragm and/or frame analysis. Incorporate bracing as required.
 - b. Comply with AF&PA "National Design Specification for Wood Construction (NDS)."
 - c. Trusses:
 - 1) Limit deflection for live or snow loads to L/240 for trusses supporting steel ceilings and to L/180 for overhangs and trusses not supporting ceilings.
 - Limit deflection for live or snow loads to L/360 for trusses supporting GWB or plaster ceilings and to L/180 for overhangs and trusses not supporting ceilings.
 - 3) Comply with appropriate NDS and Truss Plate Institute (TPI) standards.
 - d. Metal Wall and Roof Panels:
 - 1) Design in accordance with AISI "Specifications for the Design of Light-Gauge, Cold-Formed Steel Structural Members" and in accordance with sound engineering methods and practices.
 - e. Plywood or Oriented Strand Board Sheathing: Comply with APA "Plywood Design Specification."
 - f. Expansion/Contraction Provisions: Design roof attachment system to allow for expansion and contraction of metal roofing, due to seasonal temperature variations, without detrimental effect to the roof panels.

1.4 SUBMITTALS

- A. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Manufacturer's specifications and installation instructions for building components and accessories.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
- B. Shop Drawings: Showing roof framing, cross sections, roof and wall covering and trim details and accessory and component details clearly indicating proper assembly.
- C. Structural Engineer Certification: Letter signed by a Professional/Structural Engineer, registered to practice in the jurisdiction of the project, verifying compliance with Snow Design Requirements. Letter shall reference specific dead loads, live loads, wind loads, tributary area

load reductions (if applicable) collateral loads, seismic loads, end use categories, and governing building code including edition and load applications.

- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum ten years experience in producing pre-engineered wood buildings of the type specified.
- B. Installer Qualifications: Installer Qualifications: Minimum three years experience in erection of pre-engineered wood buildings of the type specified.
- C. Structural Engineer's Qualifications: Minimum of three years designing post frame structures; registered in the jurisdiction of the project.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation. Follow manufacturer's recommended storage procedures. Do not allow steel siding and roofing to contact the ground.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of authorities having jurisdiction.

1.7 PROJECT CONDITIONS

A. Anticipate environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 WARRANTY

- A. Structural Design Lifetime: Manufacturer warrants that the building designed by Lester will not experience an occurrence of structural failure or an occurrence of structural damage due to improper structural design (excepting ventilation systems) on account of weather conditions, such as wind, ice, and snow, as indicated on the Lester Sales Agreement, "Building Description Section". The foregoing warranty is limited to 50 years with respect to any Owner which is not an individual.
- B. Preservative Treated Materials: 50 years. Preservative treated lumber, including structural columns, are warranted by the original materials manufacturer against failures due to fungal decay and termite infestation.
- C. Roofing and Siding Finish, steel panel: Warranted by the original materials manufacturer for 40 years from the date of shipment. Refer to Warranty document for complete details.

- D. Individual Building Products: Manufacturer's standard warranty.
- E. Installation Warranty: One year general installation warranty, five years against roof leaks.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Base Bid Manufacturer: Lester Building Systems, which is located at: 1111 2nd Ave. S.; Lester Prairie, MN 55354; Toll Free Tel: 800-826-4439; Tel: 320-395-2531; Fax: 320-395-2969; Email: request info (sbeste@lesterbuildings.com); Web:www.lesterbuildings.com or as noted below:
 - 1. Architect/Engineer approved equal: Requests for substitutions will be considered in accordance with provisions of Section 004325 Substitution Equivalent Product Request Form.
 - 2. Morton Buildings 1825 E US Highway 136 Carthage, IL 62321 (217) 357-3713 joseph.zanger@mortonbuildings.com
 - Borkholder Building Systems 786 US 6 West, P.O. Box 32 Nappanee, IN 46550 (574) 773-3144

Acceptable building manufacturers shall meet all requirements of the specifications.

2.2 STRUCTURAL COMPONENTS

- A. Footings:
 - 1. Column Foundation: 10,000 psi precast and reinforced concrete Perma Column foundation system with integrated steel uplift anchors or approved equal. Only the concrete portion of the column shall extend below grade. Columns shall be accurately placed and shall extend a minimum of 3 feet below grade and set on a pre-cast or poured in place Readi-mix concrete pad.
 - 2. Foundations shall be down to frost protection depth = 36 inches below grade and sized as required to achieved adequate bearing based on the column loads. See the Geotechnical Investigation report for the allowable soil bearing pressure.
 - 3. Monolithic floating slab. Sized and reinforced as specified in the drawings.
 - 4. Cast in place frost wall: Sized and reinforced as specified in the drawings.
- B. Primary Framing:
 - 1. Columns:
 - a. Treated Lumber Section:
 - 1) Lumber: No. 1 or Better Southern Yellow Pine, pressure treated with Chromated Copper Arsenate, Type III, to a retention of 0.6 pcf (9.6 kg/m3) and kiln dried after treating to 19 percent maximum moisture content.

- Fabrication: Laminate individual pieces using ring shank feed nails per manufacturer's engineered nailing pattern. Fasteners shall have ASTM A153 galvanizing.
- b. Untreated Lumber Section:
 - 1) Lumber: Lumber: No. 1 or Better Southern Yellow Pine or Douglas Fir-Larch or other equivalent NDS approved species/grade kiln dried to 19 percent maximum moisture content.
 - 2) Fabrication: Laminate individual pieces using ring shank feed nails per manufacturer's engineered nailing pattern.
 - 3) Grade and size shall be selected to support imposed loads within deflection limits.
- c. End Joint Connection of Treated and Untreated Sections: Factory fabricated finger joint.
- d. Configuration:
 - Sidewall and Endwall Columns: 3 ply or 4 ply combining 2x4, 2x6, 2x8, or 2x10 dimension lumber as required by "Structural Design" requirements specified herein.
 - 2) Corner Columns: 2 ply or 3 ply 2x4, 2x6 or 2x8 dimension lumber as required by "Structural Design" requirements specified herein.
- e. Embedded Column Anchorage:
 - 1) Anchor blocks factory adhered to column base.
 - 2) Concrete collar pinned to column base with steel reinforcing rods.
- f. Column on Concrete Foundation:
 - The wood portion of the column shall be bracketed to a 10,000 psi precast and reinforced concrete Perma Column foundation system with integrated steel uplift anchors. Only the concrete portion of the column shall extend below grade.
 - 2) Columns shall be accurately placed and shall extend a minimum of 3 feet below grade and set on a pre-cast or poured in place Readi-mix concrete pad.
- 2. Trusses: Comply with "Structural Design" and "Quality Assurance" requirements as specified herein.
 - a. Comply with TPI "Design Specification for Metal Plate Connected Wood Trusses" and "Quality Standard for Metal Plate Connected Wood Trusses."
 - b. Design: Truss design shall be in accordance with applicable provisions of latest edition of National Design Specifications for Wood Construction (NDS) American Forest and Paper Association (AFPA), and Design Specifications for Metal Plate Connected Wood Trusses (ANSI/TPI 1), Truss Plate Institute (TPI), and code of jurisdiction.
 - c. Lumber: Lumber used for truss members shall be in accordance with published Values of lumber rules writing agencies approved by board of review of American Lumber Standards Committee. Lumber shall be identified by Grade mark of a lumber inspection bureau or agency approved by that Board, and shall be as shown on design drawings.

- d. Moisture content of lumber shall be no less than 7 percent nor greater than 19 percent at time of fabrication.
- e. Metal Plate Connectors: Metal connector plates shall be manufactured by ALPINE and shall be not less than .0356 inches in thickness (20 gage) and shall meet or exceed ASTM A653-94 grade 37, and shall be hot dipped galvanized according to ASTM A653-94, coating designation G60. Working stresses in steel are to be applied to effective ratios for plates as determined by test in accordance with Sections 5.3 and 5.4 of ANSI/TPI 1-2002.
- f. Assembly: Assemble trusses in a properly equipped manufacturing facility of a permanent nature. Trusses shall be manufactured by experienced workmen, using precision cutting, jigging and pressing equipment. Truss members shall be accurately cut to length angle and true to line to assure proper fitting joints within tolerances set forth in ANSI/TPI 1. Connect truss members by metal connector plates located and securely embedded simultaneously into both sides of wood members by air or hydraulic press.
- g. Manufacturer shall have a third party inspection program to verify compliance with requirements of TPI.
- h. Stamp trusses with inspection agency identification.
- C. Secondary Framing:
 - 1. Purlins and Girts:
 - a. Lumber: No. 2 or Better dimension lumber kiln dried to 19 percent maximum moisture content.
 - b. Configuration: 2x4 or 2x6 or 2x8 (50x100, 50x150, 50x200 mm) as required by "Structural Design" requirements specified herein.
 - 1) Girts: Size, grade and spacing to meet wind and deflection criterion.
 - a) Face mounted to exterior side of column.
 - b) Precision cut to fit between columns. Flush to exterior and interior faces.
 - 2) Purlins: Precision cut to fit between trusses flush with top of top chord. Provide 20 gauge galvanized purlin saddle hangers.
 - 3) Purlins: Factory drilled to accept 3/16 inch diameter x 6 inch screw fastener and ensure building modularity.
 - c. Spacing: As required by "Structural Design" requirements specified herein.
 - 2. Splashplank:
 - a. Lumber: No. 2 or Better Southern Yellow Pine, preservative treated, to a retention of 14 pcf (2.2 kg/m3) of micronized copper azole.
 - b. Configuration: 2x6 or 2x8 (50x 150 or 50x200 mm) dimension lumber. Milled S4S for single row and milled T&G for multiple rows.
 - 3. Sill Plate:
 - a. Lumber: No. 2 or Better Southern Yellow Pine, preservative treated, to a retention of 0.17 pcf (B2O3) borate (0.25 pcf disodium octaborate tetrahydrate DOT) and kiln dried after treating to 19 percent maximum moisture content.
- Configuration: 2x4 or 2x6 or 2x8 or 2x10 (50x100 or 50x150 or 50x200 or 50x250 mm) dimension lumber as required by "Structural Design" requirements specified herein.
- 4. Bracing, Wall and Lateral Truss Type (where required by "Structural Design"):
 - a. Lumber: No. 2 or Better dimension lumber.
 - b. Configuration:
 - 1) 2x4 or 2x6 as required by "Structural Design" requirements specified herein.

2.3 EXPOSED FASTENER, LAP-SEAM, METAL ROOF PANELS

- A. Metal Roofing: UNI-RIB panel as manufactured by Lester Building Systems.
 - 1. Material and Finish: 26 Gauge, ASTM A 653 (A 653 M), Structural Quality, Grade 80 (550) (formerly Grade E), AZ50 zinc coating both sides, Triple Spot Test.
 - a. Exterior Surface Finish:
 - 1) Bonderize and provide baked on primer and factory applied, baked-on 70% Kynar 500 or Hylar 5000 PVDF fluoropolymer resin based Fluropon paint coating as manufactured by Valspar, 0.9 mil (0.023 mm) minimum dry film thickness.
 - 2) Gloss (60 Degrees): ASTM D523, 20 to 80.
 - 3) Pencil Hardness: ASTM D3363, F to 2H.
 - 4) T-Bend: ASTM D4145: 2T to 4T.
 - 5) Color: As selected from Manufacturer's standard range
 - 2. Configuration:
 - a. Roll-formed; 36 inch (915 mm) coverage width. Provide panels covering up to 35 foot (10.5 m) lengths in single pieces.
 - b. Four major corrugations, 7/8 inch (22 mm) high, spaced 12 inches (305 mm) on center with 3 minor corrugations, 1/8 inch (3mm) high, spaced 3 inches (76 mm) on center between each major corrugation.
 - c. Form one outboard corrugation as overlapping corrugation.
 - d. Form opposite outboard corrugation as underneath corrugation with full return leg to support side lap and a continuous anti-siphon drain channel.
 - e. Factory cut to required length.
 - 3. Material and Finish: As shown on Erection Drawings, except as specified herein.
 - 4. Fasteners: Color coated No. 10 piercing screws with 1/4 inch (6 mm) hex head preassembled to 1/2 inch (13 mm) O.D. dome seal or bond seal galvanized steel and EPDM washers.

2.4 ROOFING ACCESSORIES

- A. Steel Ridge Cap:
 - 1. The cap materials and construction shall match the roof steel materials and construction.
- B. Vents: Ridge vent, and/or low profile ridge ventilator as shown on Shop Drawings.

- C. Eave Overhang Fascia Flashing:
 - 1. Size: 12 inches nominal.
 - 2. Fascia Flashing Color: Match Roof Panel
 - 3. Vented Soffit Color: Match Trim Color.
- D. End Overhang Fascia Flashing:
 - 1. Size: 12 inches nominal.
 - 2. Fascia Flashing Color: Match Roof Panel
 - 3. Vented Soffit Color: Match Trim Color.
- E. Gutters and Downspouts: Provide manufacturer's standard gutters and downspouts as shown on Drawings.
- F. Closure Strips: Closed cell, 2 pcf density polyethylene foam, premolded to match configuration of panels.
- G. Snow Guards: Install on both sides of roof in accordance with manufacturer's recommendations.
- 2.5 SIDING
 - A. Siding: UNI-RIB panel as manufactured by Lester Building Systems.
 - Material and Finish: 29 Gauge, ASTM A 653 (A 653 M), Structural Quality, Grade 80 (550) (formerly Grade E), galvanized steel with G90 (Z275) zinc coating both sides, Triple Spot Test.
 - a. Exterior Surface Finish:
 - 1) Bonderize and provide baked on primer and Valspar Weather-XL (silicone modified polyester) finish coat, 0.9 mil (0.023 mm) minimum dry film thickness.
 - 2) Gloss (60 Degrees): ASTM D523, 20 to 80.
 - 3) Pencil Hardness: ASTM D3363, F.
 - 4) Color: Two (2) colors as selected from Manufacturer's Full Range.
 - 2. Configuration:
 - a. Roll-formed; 36 inch (915 mm) coverage width. Provide panels covering up to 35 foot (10.5 m) lengths in single pieces.
 - b. Four major corrugations, 7/8 inch (22 mm) high, spaced 12 inches (305 mm) on center with 3 minor corrugations, 1/8 inch (3 mm) high, spaced 3 inches (76 mm) on center between each major corrugation.
 - c. Form one outboard corrugation as overlapping corrugation.
 - d. Form opposite outboard corrugation as underneath corrugation with full return leg to support side lap and a continuous anti-siphon drain channel.
 - e. Factory cut to required length.
 - f. Factory miter cut gable ends.
 - g. Material and Finish: As shown on Erection Drawings, except as specified herein.
 - h. Fasteners: Color coated No. 10 piercing screws with 1/4 inch (6 mm) hex head pre-assembled to 1/2 inch (13 mm) O.D. dome seal or bond seal galvanized steel and EPDM washers.

B. Siding Accessories:

- 1. Wall Trim and Flashings: Manufacturer's standard wall trim and flashings.
- 2. Louvers: Manufacturer's standard sheet metal unit with 1/2 inch (13 mm) hardware cloth screen, pre-finished enamel in color selected from Lester standard colors, 18 x 24 inch (457 x 610 mm) size.
- 3. Closure Strips: Closed cell, 2 pcf (32 kg/m3) density polyethylene foam, premolded to match configuration of panels.
- 4. Material and Finish: As shown on Erection Drawings, except as specified herein.

2.6 INSULATION

- A. Insulation not exposed to view: Blanket Insulation: ASTM C 665, Type II, Class C, Kraft Faced Fiberglass Blanket.
 - 1. Thermal Resistance: R-11 (R-1.94).
 - 2. Thermal Resistance: R-19 (R-3.34).
 - 3. Thermal Resistance: R-24 (R-4.22).
 - 4. Physical Properties:
 - 5. Water Vapor Transmission, ASTM E 96, 1.00 Perm (57.45 ng/(Pa*s*m^2) or less.
- B. Insulation Exposed to view: Blanket Insulation: ASTM C 991, Type II, Preformed Poly-Scrim-Kraft-Faced Fiberglass Blanket, located between framing and exterior sheathing:
 - 1. Thermal Resistance: R-6 (R-1.06).
 - 2. Facing: 0.0015 inch white polypropylene film, fiberglass scrim reinforcement, and 12 lb. craft paper. 3 mil cross laminated high density polyethylene.
 - 3. Physical Properties:
 - a. Flame Spread, ASTM E 84: Less than 25
 - b. Smoke Developed, ASTM E 84: Less than 50
 - c. Water Vapor Transmission, ASTM E 96: 0.02 Perms (1.15 ng/(Pa*s*m^2).
 - d. Light Reflectivity, ASTM C 523, illuminant D-6500: 87 percent.

2.7 INTERIOR FINISH - WALLS

- A. Steel Panel:
 - Type: Uni-Rib panel 30 Gauge, ASTM A 653 (A 653 M), Structural Quality, Grade 80 (550) (formerly Grade E), galvanized steel with G40 (Z120) zinc coating both sides, Triple Spot Test. Color: Lester Liner White.

2.8 PERSONNEL DOORS

- A. Provide Pre-Engineered Building Systems Manufacturer Commercial-rated Standard Insulated Steel Frame, Steel Clad, Hinged Doors.
 - 1. Thermally Broken, Insulated Doors and Steel Frame system.
 - a. Frame: 16 gauge galvanized A60 with welded corners; 14 gauge galvanized A60 top and bottom channels, 7 gauge hinge reinforcement.

- 1) Threshold: 5-3/4 inch full aluminum, ADA compliant.
- b. Door Panel: 20 gauge galvanized smooth skin, polystyrene core, beveled edge with interlocking seam.
- c. Weather Protection: Self-adhesive weather seal and U concealed sweep.
- d. Weatherstripping: Field-installed, frame-mounted, dual seal, bulb and leaf, extruded Santoprene sides and head; bulb and wand Alcryn sweep bottom rail.
- Door Panel: 1-3/4 inches thick, pressure injected, 2.2 pcf polyurethane foam insulation, R-12. 24 gauge, G60 galvanized steel skin, both sides, rolled edges wrap into the stiles and rails. No perimeter frame.
 - a. Rails and Stiles: Pultruded figerglass rails and tiles, painted to match skins.
 - b. Reinforcing: High density molded urethane reinforcing blocks at lock, deadbolt, panic hardware and closer locations.
 - c. Hardware Preparation: 2-3/4 inch backset with 2-1/8 inch diameter lock bore hole.
 - d. Finish: Factory-painted siliconized polyester.
 - 1) Color: As selected from Manufacturer's full range.
- 3. Grade 2 Commercial Hardware:
 - a. Lever-Lever Lockset: Entry, privacy and passage models as applicable, satin chrome finish, 1/2 inch stainless steel latch bolt, anti-lockout feature.
 - b. Hinges: Three 4-1/2"x4-1/2" stainless steel ball-bearing hinges with tamperproof pins.
- 4. Installation Accessories:
 - a. Corrugated Steel Siding:
 - 1) Steel J flashing at head, standard color.
 - 2) Steel C flashing at jambs, standard color.
 - 3) Sealant, Manus 75-A caulk, clear.
 - 4) Sealant, Manus 75-A caulk, color matched to siding.

2.9 WINDOWS

- A. Provide Pre-Engineered Building Systems Manufacturer Commercial-rated Standard Vinyl Single-Hung Window.
 - 1. Nominal size: As noted on Drawings
 - 2. Insect Screen: Manufacturer standard on operable portion of window
 - 3. Color: White
 - 4. Glazing: Manufacturer standard Low-E / Argon filled.

2.10 MOTORIZED OVERHEAD SECTIONAL DOORS

- A. Provide Pre-Engineered Building Systems Manufacturer Commercial-rated Insulated Steel Overhead Sectional Door and Electric Operators.
 - 1. DEEP RIBBED STEEL DOORS, POLYSTYRENE INSULATED

- a. Door Construction:
 - 1) Panel Sections: 2 inches (52 mm) thick roll formed commercial quality steel panel sections, hot-dip galvanized per ASTM A 924/A 924M and ASTM A 653/A 653M, phosphatized and prepainted with primer and baked-on polyester topcoat. Panel faces reinforced with two 1/2 inch (13 mm) deep ribs on 8 inches (200 mm) centers, complemented by six 1/8 inch (3 mm) beads on 2 inches (50 mm) centers. Sections formed to created weathertight tongue and groove meeting rail. Bottom panel section reinforced with continuous 0.050 inch (1.27 mm) aluminum astragal retainer with U-shaped flexible PVC astragal.
 - 2) Door Stiles: Galvanized, primed, and polyester top-coated turn-down steel end stiles; wrap face of panel sections a full 1-3/8 inches (35 mm); 0.049 inch (1.25 mm) minimum thickness up to 14 ft-2 inches (4.32 m), otherwise 0.61 inch (1.55 mm) thickness; engineered for easy hardware attachment through pre-punched holes.
 - 3) Insulation: 1-3/8 inches thick (35 mm) polystyrene insulation with fire retardant additive to meet requirements of UL R-1894A, covered by steel backers on interior for durability; thermal resistance (R-value), 6.83 hr sq ft deg F/BTU (1.2 K sq m/W); calculated door section R-value in accordance with DASMA TDS-163.
 - 4) Connections: Fasten panel sections and stiles with manufacturer's Tog-L-Loc joining system.
- b. Heavy-Duty Door: Nominal size as noted on Drawings
- c. View Windows: None
- d. Finish: Exterior 1 mil (.025 mm) coating; interior 0.5 mil (0.013 mm) coating; color as selected from Manufacturer's full range.
- e. Locking: No Lock.
- f. Weatherstripping: Provide complete perimeter seals selected from manufacturer's standard options. Provide flexible top seal, flexible jamb seal and U shaped bottom seal.
- g. Tracks: Vertical tracks minimum 0.061 inch (1.55 mm) galvanized steel tapered and mounted for wedge type closing. Horizontal tracks minimum 0.075 inch (1.91 mm) galvanized steel, reinforced with minimum 0.0897 inch (2.28 mm) galvanized steel angles as required:
 - 1) Track Width: 3 inches (75 mm).
 - 2) Provide standard high lift tracks with 15 inches (381 mm) radius track as appropriate for door location.
- h. Spring Counterbalance: Torsion spring counterbalance mechanism sized to weight of the door, with a helically wound, oil tempered torsion spring mounted on a steel shaft; cable drum of die cast aluminum with high strength galvanized aircraft cable with minimum 7 to 1 safety factor.
 - 1) Standard Cycle Spring: 10,000 cycle.

2. ELECTRIC DOOR OPERATORS

a. General: Provide electric door operator provided by door manufacturer for door with operational life specified complete with electric motor and factory pre-wired motor controls, starter, gear-reduction unit, clutch, remote-control stations, control devices, integral gearing for locking door, and accessories required for proper operation. Comply with NFPA 70.

- 1) Solenoid-operated brake.
- b. Disconnect Device: Provide hand-operated disconnect or mechanism for emergency manual operation while disconnecting motor, without affecting timing of limit switch. Mount disconnect and operator so they are accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
- c. Design operator so motor may be removed without disturbing limit switch adjustment and without affecting emergency auxiliary operator.
 - 1) Provide control equipment complying with NEMA ICS1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V, AC or DC.
- d. Electric Motors: Provide high-starting torque, reversible, continuous-duty, Class A insulated, electric motor, complying with NEMA MG 1, with overload protection, sized to start, accelerate, and operate door in either direction, from any position, at not less than 2/3 fps (0.2 m/s) and not more than 1 fps (.03m/s), without exceeding nameplate ratings or considering service factor.
- e. Remote Control Station: Provide momentary contact, 3-button control station with push button controls labeled "Open", "Close" and "Stop".
- f. Obstruction Detection Device: Provide each motorized door with indicated external automatic safety sensor able to protect full width of door opening. Activation of sensor immediately stops and reverses downward door travel.
- g. Limit Switches: Provide adjustable switches, interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
- h. Provide auxiliary chain hoist: for emergency manual operation while disconnecting motor, without affecting timing of limit switch. Mount disconnect and operator so they are accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

2.11 JOINT SEALANT MATERIAL

- A. Sealant: Manus 75-A for applications that will not be painted, contains no solvents or isocyanates, non-yellowing.
 - 1. Color: Manus Clear.
 - 2. Color: Manus White.
- B. Sealant: Manus 75-AM for applications that will be painted, contains no solvents or isocyanates, non-yellowing. Use white or bronze color for nearest match to adjacent substrate.
 - 1. Color: Manus Clear.
 - 2. Color: Manus White.
- C. Tape Sealant: Manus-Bond 64-A Polysul Grip tape.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that site conditions are acceptable for erection/installation of pre-engineered wood building system.
- B. Coordinate with responsible entity to perform corrective work on unsatisfactory conditions.
- C. Commencement of work by erector/installer is acceptance of site conditions.

3.2 ERECTION- STRUCTURAL FRAMING

- A. Erect in accordance with manufacturer's instructions and approved shop drawings.
- B. Provide temporary erection and wind load bracing to maintain structure plumb and in alignment until installation of permanent bracing and/or roofing and wall coverings are completed.
- C. Do not field cut or alter structural members without approval of Architect and manufacturer.

3.3 INSTALLATION

- A. Erect building per manufacturer's instructions and sequencing.
- B. Metal Roofing:
 - 1. General: Install in accordance with manufacturer's instructions. Secure to structural framing aligned, level and plumb. Space fasteners as shown on Erection Drawings.
 - 2. Sidelap: Minimum one full corrugation.
 - 3. Endlap: 8 inches (200 mm) for slopes 4 in 12 to 5 in 12. Secure together over and to structural members.
 - 4. Accessories: Install as shown on Erection Drawings.

SECTION 220000 PLUMBING

PART 1 - GENERAL

1.1 SUMMARY

- A. Base Bid: Plumbing contractor shall furnish and install all materials, accessories, tools, equipment, transportation, labor, services, and all operations required to complete the following:
 - 1. Plumbing fixtures and specialties.
 - 2. Sanitary sewers, waste, vent, and cleanouts.
 - 3. Water supply piping.
 - 4. Natural gas piping.

1.2 SUBMITTALS

- A. Shop Drawings Prior to purchase, submit for Engineer/Architect's review complete shop drawings for the following:
 - 1. Plumbing fixtures and specialties.

1.3 QUALITY ASSURANCE

- A. Standards: Any procedure, material or operation specified by reference to applicable standards or codes shall comply with the current or most recent edition. In conflicts between listed standards, the more stringent shall govern.
 - 1. Applicable Standards:
 - a. Illinois State Plumbing Code, latest edition.
 - b. Local plumbing code.
 - c. National Fuel Gas Code, latest edition.
- B. Contractor shall obtain all necessary permits and arrange for all inspections required by State or Local authorities.
- C. Materials must be new, in first class condition. Work must be done by trained, experienced, skilled journeyman (woman) under an approved full time supervisor, with every possible precaution taken by contractor to assure safety of all persons of all categories.

1.4 GUARANTEE

A. Each entire overall installation, including every special item, device, and part and every specialized system shall be fully guaranteed from standpoint of satisfactory performance, safety, workmanship and material for one year after formal written acceptance by Engineer/Architect, any unsuitable, unsatisfactory, noisy, ineffective, defective, improperly sized or applied equipment or material, or unacceptable workmanship shall be quickly replaced or

modified during guarantee period or any extension thereof, as directed and as approved by Engineer/Architect in writing.

B. Individual items and systems shall be guaranteed for the same period in addition to the above regardless of any limitations of manufacturer's guarantee period.

PART 2 - PRODUCTS

2.1 PLUMBING FIXTURES

- A. Fixtures, supplies, stops and traps first quality American Standard, Kohler or Eljer. Refer to drawings for schedule.
- B. Where manufacturer's number for a complete assembly is called for, such assembly shall be modified as called for or specified.
- C. Each water connection to fixtures provided with accessible loose key or screwdriver stop; supplies piping through walls chrome plated brass plates fastened in place; each fixture separate trap with cleanout; built-in stops arranged for front servicing.
- D. Each wall hung fixture shall have a suitable wall hanger, bolted to wall and/or fixture; exposed portions of hangers shall match fixture as to finish.
- E. Fixtures shall have water, drain, waste, soil, vent and other connections as called for.
- F. Each water connection to fixtures shall have an air gap or vacuum breaker as required by local or state departments of health. Water connection sizes are minimums and must be increased to correspond to manufacturer's standards.
- G. Each water connection to fixtures provided with a pipe air chamber, as close to fixture as possible, extending vertically up, with capped top, as follows:
 - 1. Fixtures Full size x 8" (min.).
 - 2. Mains Full size x 24" (min.).
- H. Provide additional air chambers, as may be required to assure quiet operation without increase in contract price.
- I. Verify fixture locations and coordinate them with architectural designs and other devices and equipment, as approved by the Engineer/Architect, before roughing in connections.
- 2.2 PIPE, TUBE, AND FITTINGS
 - A. Domestic Hot Water (HW), Hot Water Return (HWR) and Cold Water (CW):
 - 1. Type L, hard drawn copper tube conforming to ASTM B88 with cast or wrought copper fittings conforming to ASTM B16.18 and B16.22. Joints made from lead free solder. Piping sizes shown on the drawings are nominal pipe sizes.
 - 2. Type L, soft annealed where underground or where approved by Engineer/Architect, ASTM B88. With cast or wrought copper fittings conforming to ASTM B16.18 and B16.22. Joints made from lead free solder. Piping sizes shown on the drawings are nominal pipe sizes.

- B. Natural Gas (G) Piping:
 - 1. Pipe: Schedule 40, seamless or electric resistance welded (ERW) steel pipe A53 Grade B or seamless steel pipe A106, Grade B.
 - 2. Joints and Fittings:
 - a. 2-inch and under: Joints shall be threaded. Fittings shall be wrought-steel with dimensions and tolerances conforming to ANSI B16.11. Unions shall be wrought steel. Threaded joints shall be made up with thread compound suitable for use with natural gas.
 - b. 2 1/2-inch and larger: Joints shall be butt welded or flanged. Fittings shall be seamless wrought-steel butt weld type, ASTM A234, Grade WPB with dimensions, tolerances and pressure-temperature rating in accordance with ANSI/ASME B16.9. Flanges shall be steel (ASTM A105), Class 150, and manufactured in accordance with ANSI/ASME B16.5. Weld-o-let fittings may be used in lieu of tees for branch connections provided main is two sizes larger than takeoff. Couplings or half couplings are not acceptable except for non-flow connections such as thermometers or gauges.
- C. Soil and Waste Lines:
 - 1. All soil and waste pipe shall be no-hub cast iron or shall be manufactured from Type 1, Grade 1, Schedule 40 polyvinyl chloride (PVC) materials. The PVC materials shall be classified as self-extinguishing and have a flamespread rating of 0.25. Pipe shall meet the requirements of CS 272-65 of ASTM D2665 and shall be approved by NSF.
 - 2. All piping in HVAC plenums shall have a smoke-developed rating below 25 (no-hub cast iron) or shall be wrapped with fiberglass insulation to provide this rating (PVC). In general, all the spaces above the lay-in ceilings will be utilized as return air plenums and piping these spaces will be required to have this rating.
 - 3. The pipe shall be marked in accordance with the ASTM designation and show the symbols DWV NSF.
 - 4. Adapter fittings specifically manufactured for changing PVC DWV pipe to threaded, flanged or bell and spigot pipe shall be used where required. No other fittings shall be used for that purpose.
 - 5. Install new soil and waste lines as indicated and connect to sanitary system as required.
 - 6. Provide cleanout branched throughout the plumbing system where indicated or required by the nature of the work.
 - 7. Make changes in line or grade with the proper fitting.
 - 8. All exterior pipe shall be firmly and uniformly bedded throughout its total length on 3" minimum compacted sand or gravel.
 - 9. Backfill shall be 6" minimum compacted sand or gravel on sides and top.
 - 10. Exterior sewers shall have minimum 4'-0" cover, unless required otherwise.
 - 11. All interior pipe shall be firmly and uniformly supported throughout its total length using hangers as specified.
- D. Vent Piping:
 - 1. Vent piping shall be no-hub cast iron or PVC, same as specified for soil or waste lines.
 - 2. All piping in HVAC plenums shall have a smoke-developed rating below 25 or shall be wrapped with fiberglass insulation to provide this rating. In general, all the spaces above the lay-in ceilings will be utilized as return air plenums and piping these spaces will be required to have this rating.
 - 3. Minimum venting shall be as shown on the drawings; otherwise, all venting shall comply with the rules of the specified codes.

- 4. Vent all parts of the soil and waste system of piping to prevent all liability of siphonage of traps of plumbing fixtures.
- 5. Sizes may be increased at contractor's option.

2.3 JOINING MATERIALS

- A. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- B. Brazing Filler Metals: AWS A5.8, BCuP Series or BAg1, unless otherwise indicated.
- C. Welding Filler Metals: Comply with AWS D10.12.
- D. Solvent Cements for Joining Plastic Piping:
 - 1. ABS Piping: ASTM D 2235.
 - 2. CPVC Piping: ASTM F 493.
 - 3. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
 - 4. PVC to ABS Piping Transition: ASTM D 3138.

2.4 PIPE COVERING

- A. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Aeroflex USA Inc.; Aerocel.
 - b. Armacell LLC; AP Armaflex.
 - c. RBX Corporation; Insul-Sheet 1800 and Insul-Tube 180.
- B. Domestic Water (cold and hot): Insulate with ½" flexible elastomeric as herein described. All joints sealed with manufacturer's recommended adhesive or equivalent, with 100% coverage. Applied by slipping uncut sections over piping wherever possible. Use is permitted where allowed by applicable codes. All joints shall be taped to afford an effective vapor barrier. Insulation shall have a flame spread rating of 25 or less and a smoke developed rating as permitted by codes.
- C. Jackets exposed in finished rooms regardless of type or make of covering, all exterior jackets exposed in finished locations must be neat, taut, free of wrinkles, and similar in appearance to O-C laminated vinyl.
- D. Vapor Barrier covering guarantee covering on pipe, fittings, devices, unions, etc. must be unconditionally guaranteed to be free of condensation, water logging, water staining, water drip, water accumulation and mildew for one (1) full year after mechanical installation is accepted by Engineer/Architect. Any such defective work must be completely replaced and refinished when condition is reported to contractor within above guarantee period by Engineer/Architect without delay or cost to Owner, and guaranteed in same manner for another one (1) full year period.

2.5 VALVES AND COCKS

A. Valves shall be equal to Jenkins, Powell, Scott, Stockham, Lukenheimer, Nibco or Hammond.

- B. All Valves in copper piping shall be ball valves and shall have bronze ASTM B62 or copper bodies and bronze trim, unless otherwise noted. Valves shall have sweated ends in copper piping, without adjacent unions or flanges, unless otherwise noted.
- C. Gate Valves (GV) equal:
 - 1. Solid wedge disc valves with integral seats, may be used on all lines where valves W.P. is 125 psi or less
 - 2. Solid wedge disc valves, with expanded seats, of long wearing metal, may be used in all lines.
- D. Composition discs and trim for all valves shall be selected for intended service as recommended in writing by valve manufacturer.
- E. Natural Gas Valves: Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim: MSS SP-110. Comply with ASME B16.33.
 - 1. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction for valves 1 inch and smaller.
 - 2. Service Mark: Valves 1-1/4 inches to NPS 2 shall have initials "WOG" permanently marked on valve body.

2.6 PIPE HANGERS

A. Piping shall be supported independently of all connections and sleeves by pipe hangers (PH) of Modern, Grinnell, Fee & Mason, Auto-Grip, or Crane make, as follows:

Pipe Size	Distance From Sleeve In Wall End, Offset Or Corner to Hanger (Max.)	Hanger Spacing (Max.)
Up to 1¼"	2'-0"	8'-0"
1½ , 2"	3'-0"	10'-0"
21⁄2" & Up	3'-0"	12'-0"

- B. Hangers shall be arranged to permit free, unrestrained and noiseless expansion and contraction of piping, and must be adjustable.
- C. Hangers, associated equipment, etc. shall be of all steel construction, with a heavy prime coat, except that portions in contact with non-ferrous pipe shall be same construction as pipe, or plated with same metal as pipe, or covered with same metal as pipe, securely fastened in place.
- D. Hangers supporting piping covered with pipe insulation that has an exterior vapor barrier (Type IA) shall encircle pipe covering and shall bear on a tight fitting, exterior steel collar, completely encircling covering.
- E. Overhead hangers shall be of the solid ring, or clevis type, with adjustable steel rods, securely supported from inserts or bolted to structure.

2.7 DIELECTRIC FITTINGS

A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solderjoint, plain, or weld-neck end connections that match piping system materials.

- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.
- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig minimum working pressure as required to suit system pressures.
- E. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.
- F. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.

2.8 SLEEVES

- A. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- B. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
 - 1. Underdeck Clamp: Clamping ring with set screws.
- D. Molded PVC: Permanent, with nailing flange for attaching to wooden forms.
- E. PVC Pipe: ASTM D 1785, Schedule 40.
- F. Molded PE: Reusable, PE, tapered-cup shaped and smooth-outer surface with nailing flange for attaching to wooden forms.

2.9 FLASHING

A. Openings in roof shall be flashed as necessary to be compatible with roofing system using approved methods. Disturbed existing piping through roof shall be properly flashed and weather-tight.

2.10 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With set screw.
 - 1. Finish: Polished chrome-plated and rough brass.

- D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
 - 1. Finish: Polished chrome-plated and rough brass.
- 2.11 GROUT
 - A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
 - 1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.
 - 3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Quantities Required and Clarifications:
 - 1. Contractor shall determine quantities required from drawings and job conditions except that where specifications call for specific quantities, these quantities shall also govern. If there if conflict between quantities called for on drawings and in specifications, greater quantity shall govern.
 - 2. Where an item is specified by a manufacturer's number, such number is for general information only, and shall be modified by any additional data, size, etc., which may be shown and/or specified. Where there is conflict between number and other data, it shall be contractor's responsibility to request clarification from Engineer/Architect.
 - 3. Where clarification is required for any purpose, including discrepancies within written specifications on drawings, or between them, it shall be contractor's responsibility to request such clarification from Engineer/Architect at least 7 days before Bids are due and in all cases subsequent interpretations or clarifications made by Engineer/Architect shall be final.
- B. Identification:
 - 1. Every piece of equipment, disconnect, etc. which does not have and identifying name plate shall be stenciled to identify its use, by means of the abbreviations used in these specifications. Stencil shall be painted in approved colors, with letters at least ¼" high. Stencil shall be located as approved by the Engineer/Architect. At contractor's option, tags may be riveted or screwed to equipment, in place of stencils.
- C. Cleaning:
 - 1. Piping, conduit, equipment, devices, etc. shall be thoroughly cleaned before being offered for acceptance.
 - 2. The following shall be thoroughly cleaned, or finished out, or blown out before installation is offered for acceptance.
 - a. Plumbing equipment, fixtures, devices, etc.
 - 3. Labels, stickers, temporary protection, etc. shall be removed and work shall be provided contractor without increase in contract price.
- D. Permits, Fees, Enlargements, Extensions, Etc.:

- 1. Contractor shall secure and pay for all licenses, assessments, permits; shall pay for inspections required by county, state, and local utilities; and shall replace new or present paving etc. as approved by Engineer/Architect and all governmental bodies having jurisdiction. All without increase in contract price.
- E. Verification of Points of Connection:
 - 1. Before submitting his bid, contractor shall visit site to verify all exposed, concealed, and buried points of connection as to locations, flow, size, type, depth, pressure, elevation, operating characteristics, etc., including but not limited to the following:
 - a. Water service and shut-offs.
 - b. Sanitary sewer connections.
 - c. Storm sewer connections.
 - 2. If contractor finds that any present point or points of connection to existing facilities are incorrectly shown on plans or incorrectly specified, he (she) shall notify Engineer/Architect in writing at least 7 days before bids are due to be submitted. Engineer/Architect will issue as addendum to all contractors, calling their attention to revised point or points of connection.
 - 3. If contractor fails to notify Engineer/Architect in writing as outlined above, it will be assumed that his bid includes everything required to provide proper connections to all present points of connections as they actually exist and will pay for all relocations, replacements, additional runs and extensions, without increase in contract price.

3.2 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- B. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping to permit valve servicing.
- F. Install piping at indicated slopes.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Install piping to allow application of insulation.
- J. Select system components with pressure rating equal to or greater than system operating pressure.

- K. Install escutcheons for penetrations of walls, ceilings, and floors.
- L. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
- M. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 Section "Penetration Firestopping" for materials.
- N. Verify final equipment locations for roughing-in.
- O. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.3 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 22 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using leadfree solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F 402, for safe-handling practice of cleaners, primers, and solvent cements.
 - 2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 Appendixes.
 - 3. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.

- 4. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
- 5. PVC Nonpressure Piping: Join according to ASTM D 2855.
- 6. PVC to ABS Nonpressure Transition Fittings: Join according to ASTM D 3138 Appendix.

3.4 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
 - 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
 - 3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
 - 4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.5 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install plumbing equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

3.6 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment.

3.7 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

- A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor plumbing materials and equipment.
- B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.
- C. Attach to substrates as required to support applied loads.

3.8 GROUTING

- A. Mix and install grout for plumbing equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

3.9 EXCAVATION AND BACKFILLING

- A. Depth of bury of cover over exterior underground construction shall not be less than the following, unless otherwise noted or required.
 - 1. Sewers: 4'-0".
 - 2. Water pipes: 4'-0".
- B. Contractor shall do excavation required to install his (her) work, including pockets as required for fittings, etc., and after same are in place and tested and approved, he (she) shall replace drives, curbs and remove surplus earth and debris from the premises as directed by Architect. Backfill under concrete or asphalt and within 5'-0" of same shall be thoroughly compacted small size gravel. Sand may be used for bedding the pipe, but shall be free of debris, rock, concrete, etc. and settled with water in layers as directed by Engineer/Architect. No materials except clean sand shall be placed within 6" of any pipe, sewer, conduit, cable or metal part.
- C. Excessive excavations, excavations required to reach undisturbed soil, lower trenches, etc., shall be filled with thoroughly compacted small sized gravel to provide adequate bedding and support. Lines shall be bedded on materials at least 2" thick.
- D. No trenches shall be filled until work has been inspected and approved by Engineer/Architect.

3.10 PRESSURE TESTS

A. Test shall be applied in Engineer/Architect's presence to all equipment, valves, devices, and piping, in groups or sections as work progresses. Unless otherwise noted, tests shall be made with water, after piping and equipment have been completely vented. Pressure shall be maintained for at least four hours without drop or visible leak. If leaks appear, they shall be repaired by replacing defective material or workmanship (peining, swaging or caulking will not permitted), refill system with water, completely vented, and repeat test as often as necessary to show no drop in 2 hours. After tests, systems shall be completely drained. Precautions shall be taken to prevent freezing of test water and to protect or remove devices or equipment, or parts thereof, controls, gauges, thermometers, etc. which may be harmed by test pressures. Tests shall be made before painted and before covering.

- B. Piping etc. shall be tested to at least 125 psi.
- C. After pressure test, each complete system, piping and equipment shall be tested for complete drainage by opening unions, caps, plugs, faucets, or hose valves at low points. If system does not drain completely, piping shall be regraded and/or drain points added until complete drainage is demonstrated to Engineer/Architect. Systems shall be left dry in freezing weather.

SECTION 233423 HVAC POWER VENTILATORS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Bathroom exhaust fans.
 - 2. Propeller fans.

1.2 SUBMITTALS

- A. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated and include the following:
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
- C. Field quality-control test reports.
- D. Operation and maintenance data.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. NEMA Compliance: Motors and electrical accessories shall comply with NEMA standards.
- C. UL Standard: Power ventilators shall comply with UL 705.

PART 2 - PRODUCTS

2.1 BATHROOM EXHAUST FANS

A. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or engineer approved equal:

2.2 PROPELLER FANS

A. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings.

- B. Description: Direct- or belt-driven propeller fans consisting of fan blades, hub, housing, orifice ring, motor, drive assembly, and accessories.
- C. Housing: Galvanized-steel sheet with flanged edges and integral orifice ring with baked-enamel finish coat applied after assembly.
- D. Fan Wheel: Replaceable, extruded-aluminum, airfoil blades fastened to cast-aluminum hub; factory set pitch angle of blades.
- E. Belt-Driven Drive Assembly: Resiliently mounted to housing, statically and dynamically balanced and selected for continuous operation at maximum rated fan speed and motor horsepower, with final alignment and belt adjustment made after installation.
 - 1. Service Factor Based on Fan Motor Size: 1.4.
 - 2. Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
 - 3. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.
 - 4. Pulleys: Cast iron with split, tapered bushing; dynamically balanced at factory.
 - 5. Motor Pulleys: Adjustable pitch for use with motors through **5** hp; fixed pitch for use with larger motors. Select pulley so pitch adjustment is at the middle of adjustment range at fan design conditions.
 - 6. Belts: Oil resistant, nonsparking, and nonstatic; matched sets for multiple belt drives.
 - 7. Belt Guards: Fabricate of steel for motors mounted on outside of fan cabinet.
- F. Accessories:
 - 1. Gravity Shutters: Aluminum blades in aluminum frame; interlocked blades with nylon bearings.
 - 2. Motor-Side Back Guard: Galvanized steel, complying with OSHA specifications, removable for maintenance.
 - 3. Wall Sleeve: Galvanized steel to match fan and accessory size.
 - 4. Weathershield Hood: Galvanized steel to match fan and accessory size.
 - 5. Weathershield Front Guard: Galvanized steel with expanded metal screen.
 - 6. Disconnect Switch: Nonfusible type, with thermal-overload protection mounted inside fan housing, factory wired through an internal aluminum conduit.
- G. Vibration Isolators:
 - 1. Type: Elastomeric hangers

2.3 MOTORS

- A. Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment."
- B. Enclosure Type: Totally enclosed, fan cooled.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install power ventilators level and plumb.

- B. Support units using restrained elastomeric mounts or spring isolators having a static deflection of 1 inch.
- C. Support suspended units from structure using threaded steel rods and spring hangers with vertical-limit stops having a static deflection of 1 inch. Vibration-control devices are specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."
- D. Install units with clearances for service and maintenance.
- E. Install ducts adjacent to power ventilators to allow service and maintenance.
- F. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- G. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

SECTION 235523 GAS FIRED RADIANT HEATERS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes gas-fired, tubular infrared radiant heaters.

1.2 SUBMITTALS

- A. Product Data: For each type of gas-fired radiant heater indicated. Include rated capacities, operating characteristics, and accessories.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
- C. Operation and maintenance data.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

PART 2 - PRODUCTS

2.1 TUBULAR INFRARED HEATERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings.
- B. Description: Factory assembled, piped, and wired, and complying with ANSI Z83.20/CSA 2.34.
- C. Fuel Type: Design burner for natural gas having characteristics same as those of gas available at Project site.
- D. Combustion Tubing: 4-inch- diameter steel with high-emissivity, high-temperature, corrosion-resistant external finish.
- E. Tubing Connections: Stainless-steel couplings or flared joints with stainless-steel draw bolts.
- F. Reflector: Polished aluminum, 97 percent minimum reflectivity, with end caps. Shape to control radiation from tubing for uniform intensity at floor level with 100 percent cutoff above centerline of tubing. Provide for rotating reflector or heater around a horizontal axis for minimum 30-degree tilt from vertical.

- 1. Include hanger kit.
- G. Thermostat: Single-stage, wall-mounting type with 50 to 90 deg F operating range and fan on switch.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install and connect gas-fired radiant heaters and associated fuel and vent features and systems according to NFPA 54, applicable local codes and regulations, and manufacturer's written installation instructions.
- B. Suspended Units: Suspend from substrate using chain hanger kits and building attachments.
- C. Maintain manufacturers' recommended clearances to combustibles.
- D. Install piping adjacent to gas-fired radiant heaters to allow service and maintenance.
- E. Gas Piping: Connect gas piping to gas train inlet; provide union with enough clearance for burner removal and service.
- F. Electrical Connections: Comply with applicable requirements in Division 26 Sections.
 - 1. Install electrical devices furnished with heaters but not specified to be factory mounted.
- G. Adjust initial temperature set points.
- H. Adjust burner and other unit components for optimum heating performance and efficiency.

SECTION 238113 PACKAGED TERMINAL AIR CONDITIONERS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes packaged terminal air conditioners and their accessories and controls.

1.2 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Shop Drawings: Include details of installation and wiring diagrams.
- C. Operation and maintenance data.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Energy-Efficiency Ratio: Equal to or greater than prescribed by ASHRAE/IESNA 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings."
- C. Coefficient of Performance: Equal to or greater than prescribed by ASHRAE/IESNA 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings."
- D. Units shall be designed to operate with HCFC-free refrigerants.

1.4 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of packaged terminal air conditioners that fail in materials or workmanship within specified warranty period.
- B. Warranty Period: Manufacturer's standard, but not less than one year from date of Substantial Completion, including components and labor.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Amana
 - 2. Carrier Corp.
 - 3. Climate Master, Inc.
 - 4. GE Co.; GE Appliances.
 - 5. Daikin
 - 6. Trane Company (The); North American Commercial Group.

2.2 MANUFACTURED UNITS

- A. Description: Factory-assembled and tested, self-contained, packaged terminal air conditioner with room cabinet, electric refrigeration system, electric resistance heat, and temperature controls; fully charged with refrigerant and filled with oil.
 - 1. Power Supply: Cord-connected chassis for 230/208-V units.
- B. Filters: Washable polyurethane in molded plastic frame.
- C. Electric-Resistance Heating Coil: Nickel-chromium-wire, electric-resistance heating elements with contactor and high-temperature-limit switch.

2.3 CONTROLS

- A. Control Module: Unit-mounted adjustable thermostat with heat anticipator, off-heat-auto-cool switch, and high-low fan switch.
- B. Fan-Cycle Switch: Allows fan operating mode to be either continuous or cycled on and off by thermostat.
- C. Sound-Power Level Ratings: Factory test to comply with ARI 270, "Sound Rating of Outdoor Unitary Equipment."
- D. Unit Performance Ratings: Factory test to comply with ARI 310/380, "Packaged Terminal Air-Conditioners and Heat Pumps."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install units level and plumb, maintaining manufacturer's recommended clearances and tolerances.
- B. Install wall sleeves in finished wall assembly; seal and weatherproof. Joint-sealant materials and applications are specified in Division 07 Section "Joint Sealants."
- C. Install wall sleeves to withstand, without damage to equipment and structure, seismic forces required by building code.

3.2 CONNECTIONS

- A. Electrical System Connections: Comply with applicable requirements in Division 26 Sections for power wiring, switches, and motor controls.
- B. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

SECTION 260500 COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor for this work is referred to the Drawings, Bidding Requirements, General Conditions, Special Conditions, Temporary Services and other pertinent Sections of these Specifications. These sections describe work which is a part of this Contract. The following General Provisions amplify and supplement these Sections of Specifications. In cases of conflicting requirements, the stipulations set forth in Division 1 supersede and must be satisfied by the Contractor.

1.2 SUMMARY

- A. Section Includes:
 - 1. Electrical equipment coordination and installation.
 - 2. Common electrical installation requirements.

1.3 COORDINATION

- A. Contractor must read the entire Specifications covering other branches of Work. Contractor is responsible for coordination of his (her) work with work performed by other trades.
- B. Consult all Contract Documents which may affect the location of any equipment or apparatus furnished under this Work and make minor adjustments in location as necessary to secure coordination.
- C. System layout is schematic and exact locations shall be determined by structural and other conditions. This shall not be construed to mean that the design of the system may be arbitrarily changed. The equipment layout is to fit into the building as constructed and to coordinate with equipment included under other Divisions of Work.
- D. Contractor shall contact the Owner's Representative immediately if he (she) notices any discrepancies or omissions in either the Drawings or Specifications, or if there are any questions regarding the meaning or intent thereof.
- E. Submit all changes, other than minor adjustments, to the Engineer/Architect for approval before proceeding with the work.
- F. The Contractor is required to visit the site and fully familiarize himself or herself concerning all conditions affecting the scope of work. Failure to visit the site shall not relieve the Contractor from any responsibility in the performance of his or her Work.
- G. All workmanship to be of the highest quality in accordance with the best practices of the trade by craftsmen/ craftswomen skilled in this particular work.
- H. Coordinate arrangement, mounting, and support of electrical equipment:

- 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
- 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
- 3. To allow right of way for piping and conduit installed at required slope.
- 4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.
- I. All buried conduits passing from below the proposed building to the exterior shall pass below the proposed structural footing.
- J. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed.

1.4 PERMITS, INSPECTIONS AND CODES

- A. File all drawings, pay all fees, and obtain permits and certificate of inspection relative to this Work.
- B. Complete installation shall conform with all applicable Federal, State and Local laws, Codes and Ordinances including, but not limited to the latest approved editions of the following:
 - 1. State Building Codes.
 - 2. Specific Construction Safety Requirements, State Industrial Commission.
 - 3. National Electrical Code (NFPA-70).
 - 4. Life Safety Code, NFPA-101.
 - 5. Occupational Safety and Health Act (OSHA) of 1971 and all amendments thereto.
- C. Nothing contained in the drawings and specifications shall be construed to conflict with these laws, codes, and ordinances and they are hereby included in these specifications.

1.5 RECORD DRAWINGS

- A. Record all deviations from the Drawings, on a set of prints and deliver them to the Owner and Owner's Representative upon completion of the work. Special attention to record the location of concealed boxes, service runs shall be made at the point of installation to maintain accuracy.
 - 1. Sufficient dimensional tie points to permanent building features shall be provided for all buried conduits to facilitate future location.

1.6 INSPECTION

A. Contractor shall arrange for and include in his (her) bid, inspection of this work by the appropriate stator or local code authority having jurisdiction.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Furnish new, undeteriorated materials of a quality not less than what is specified.
- B. Contractor to furnish and install only those brands of equipment mentioned specifically or accepted as substitutes.

2.2 EQUIPMENT SELECTION AND APPROVAL

- A. The selection of materials and equipment to be furnished shall be governed by the following:
 - 1. Where trade names, brands of manufacturer of equipment or materials are listed in the specification, the exact equipment listed shall be used in the bid or the contractor shall submit the necessary literature to show the alternative product meets the performance characteristics of that which has been called for. Where more than one name is listed, Contractor may select any one of the various brands specified.

2.3 SUBSTITUTIONS

- A. Contractor <u>must</u> base his (her) bid on furnishing the brands of material and equipment listed in the Specifications or their approved equals.
- B. The Contractor is entitled to bid on any other equal or similar brands of material and equipment he (she) may desire to substitute. In order to be considered, the Contractor <u>must</u> request approval to bid the substitution <u>in writing</u> no later than ten (10) days prior to the Bid Date. If permitted the substitutes will be approved by addendum.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

- A. Furnish all materials, labor, tools, transportation, incidentals, and appurtenances to complete in every detail and leave in working order all items of work called for herein or shown on the accompanying Drawings.
- B. Include any minor items of work necessary to provide a complete and fully operative electrical system which meets all required codes.
- C. Comply with NECA 1.
- D. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
- E. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

- F. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- G. Right of Way: Give to piping systems installed at a required slope.

3.2 PROTECTION AND CLEANING

- A. Protect all fixtures and equipment against damage from leaks or abuse and pay the cost of repair or replacement of fixtures or equipment made necessary by failure to provide suitable safeguards or protection.
- B. After all fixtures and equipment have been set, thoroughly clean all fixtures and equipment with manufacturers recommended cleaning agents, removing stickers and other foreign matter and leave every part in acceptable condition, clean and ready for use.
- C. Repair all dents and scratches in factory prime or finish coats on all electrical equipment. If damage is excessive, replacement may be required.

SECTION 260519

LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Building wires and cables rated 600 V and less.
 - 2. Connectors, splices, and terminations rated 600 V and less.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 STANDARDS

- A. Insulation types, ratings and usage shall be in accordance with the National Electrical Code requirements.
- B. All conductors shall be copper
- C. Unless otherwise noted, minimum wire size for lighting and power branch circuits shall be No. 12 AWG. For control and auxiliary systems the minimum size shall be No. 14 AWG.
- D. Conductors for emergency power and exit wiring shall be a minimum No. 12 AWG.

2.2 CONDUCTORS AND CABLES

- A. All wire and cable shall be UL listed.
- B. Copper Conductors: Comply with NEMA WC 70.
- C. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN, XHHW, and SO.

- 1. THHN-THWN- 90 degree C temperature rating in dry or wet locations.
- D. Multiconductor Cable: Comply with NEMA WC 70 for metal clad cable, Type MC and Type SO with ground wire.
- 2.3 CONNECTORS AND SPLICES
 - A. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.
 - B. All components used at wiring terminations, connections and splices shall be UL listed.

PART 3 - EXECUTION

- 3.1 CONDUCTOR MATERIAL APPLICATIONS
 - A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
 - B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- 3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS
 - A. Service Entrance: Type THHN-THWN, single conductors in raceway or Type XHHW, single conductors in raceway.
 - B. Feeders and Branch Circuits: Type THHN-THWN, single conductors in raceway.
 - C. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainlesssteel, wire-mesh, strain relief device at terminations to suit application.
 - D. Concealed light fixture whips: Metal clad cable (Type MC) limited to six feet in length.
 - E. Class 1 Control Circuits: Type THHN-THWN, in raceway.
 - F. Class 2 Control Circuits: Power-limited cable, concealed in building finishes.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.
- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

- D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- E. Support cables according to Division 26 Sections "Hangers and Supports for Electrical Systems."
- F. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems."
- G. Tighten electrical connectors and terminals according to manufacturer's published torquetightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- H. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
 - 1. Use oxide inhibitor in each splice, tap conductor and equipment termination for aluminum conductors.
- I. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

SECTION 260526 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes methods and materials for grounding systems and equipment.
- B. Grounding system shall be in compliance with all requirements of the National Electrical Code.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field Quality Report
 - 1. Photo Report
 - 2. Dimensioned as-built locations of grounding features

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Stranded Conductors: ASTM B 8.
 - 3. Tinned Conductors: ASTM B 33.
 - 4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.

- 5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
- 6. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
- 7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
- C. Grounding Bus: Rectangular bars of annealed copper, 1/4 by 2 inches in cross section, unless otherwise indicated; with insulators.

2.2 CONNECTORS

- A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.
 - 1. Pipe Connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.3 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel; 5/8 inch in diameter by10 feet or as noted on the Drawings.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger, unless otherwise indicated.
- B. Underground Grounding Conductors: Install bare tinned copper conductor. Bury at least 24 inches below grade.
- C. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
 - 1. Install bus on insulated spacers 1 inch, minimum, from wall 6 inches above finished floor, unless otherwise indicated.
- D. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
 - 3. Connections to Ground Rods at Test Wells: Bolted connectors.
 - 4. Connections to Structural Steel: Welded connectors.
3.2 EQUIPMENT GROUNDING

- A. A separate equipment grounding conductor, minimum size per NEC, shall be installed in each feeder, branch circuit, and control circuit conduit. Conductor insulation shall be green. DO NOT use conduit as a means for grounding of receptacles or any other such devices.
- B. Conduit system shall be electrically continuous. All enclosures and non-current carrying metals to be grounded. All locknuts must cut through enameled or painted surfaces on enclosures. Where enclosures and non-current carrying metals are isolated from the conduit system, use bonding jumpers with approved clamps.
- C. All new receptacles shall be bonded to a ground conductor using a #12 AEG min. bonding jumper between receptacle terminal and ground conductor. Metal-to-metal contact between the device yoke and the outlet box is not acceptable for either surface mounted boxes or flush type boxes.
- D. Junction boxes and pull boxes shall be bonded by the use of UL listed ground screws or lugs.
- E. Lighting fixtures shall be grounded by the use of a pigtail fastened on bare metal that is free of paint.
- F. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.
- G. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.
- H. Signal and Communication Equipment: For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
 - 1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch grounding bus.
 - 2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.
- I. Metal Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

3.3 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade, unless otherwise indicated.

- 1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating, if any.
- C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.
 - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
 - 3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.
- D. Grounding and Bonding for Piping:
 - 1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
 - 2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
 - 3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
- E. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.

3.4 FIELD QUALITY CONTROL

- A. Provide a photo report consisting of labeled pictures of all of the following grounding features:
 - 1. Ground rods
 - 2. Intersystem bonding termination
 - 3. Grounding arrangements and connections for separately derived systems
 - 4. Grounding connection to rebar in footing/floor
 - 5. Grounding connection to building steel
 - 6. Grounding connection to metallic water pipe
- B. Dimensioned as-built plans showing the locations of the key grounding features contained in the photo report shall be submitted concurrently with the photo report.

SECTION 260529 HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

- 1.1 SUMMARY
 - A. Section includes:
 - 1. Hangers and supports for electrical equipment and systems.
- 1.2 PERFORMANCE REQUIREMENTS
 - A. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
 - B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- 1.3 QUALITY ASSURANCE
 - A. Comply with NFPA 70.

PART 2 - PRODUCTS

- 2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS
 - A. Aluminum Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Allied Tube & Conduit.
 - b. Cooper B-Line, Inc.; a division of Cooper Industries.
 - c. ERICO International Corporation.
 - d. GS Metals Corp.
 - e. Thomas & Betts Corporation.
 - f. Unistrut; Tyco International, Ltd.
 - g. Wesanco, Inc.
 - 1. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 - 2. Channel Dimensions: Selected for applicable load criteria.
 - B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

- C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
- E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
 - 1. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
 - 2. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
 - 3. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
 - 4. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
 - 5. Toggle Bolts: All-steel springhead type.
 - 6. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as scheduled in NECA 1, where its Table 1 lists maximum spacings less than stated in NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 - 1. Secure raceways and cables to these supports with two-bolt conduit clamps.

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Wood: Fasten with lag screws or through bolts.
 - 2. To New Concrete: Bolt to concrete inserts.
 - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 4. To Existing Concrete: Expansion anchor fasteners.
 - 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
 - 6. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
 - 7. To Light Steel: Sheet metal screws.
 - 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Division 05 Section "Metal Fabrications" for sitefabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

SECTION 260533 RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.3 SUBMITTALS

- A. Product Data: For surface raceways and floor boxes.
- 1.4 QUALITY ASSURANCE
 - A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
 - B. Comply with NFPA 70.

PART 2 - PRODUCTS

- 2.1 METAL CONDUIT AND TUBING
 - A. Rigid Steel Conduit: ANSI C80.1.
 - B. EMT: ANSI C80.3.
 - C. FMC: Zinc-coated steel.
 - D. LFMC: Flexible steel conduit with PVC jacket.
 - E. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.
 - 1. Fittings for EMT: Steel, set-screw or compression type. Die cast fittings are not acceptable.

F. LFMC: Flexible steel conduit with PVC jacket. Made from a continuous length of galvanized cold rolled steel strip, spirally wound. Adjacent strips shall have locked typed construction with all the edges turned in. With an extruded PVC jacket.

2.2 NONMETALLIC CONDUIT AND TUBING

- A. PVC conduit shall be heavy wall, Schedule 40 ultra-violet resistant, UL listed under Standard 651. Conduit shall be suitable for use with 90 degree C insulated wire. Conduit fittings and cement shall be of the same manufacturer.
- B. Fittings for Schedule 40 PVC: Match to conduit or tubing type and material.

2.3 METAL WIREWAYS

- A. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 1, unless otherwise indicated.
- B. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, holddown straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- C. Wireway Covers: Screw-cover type.
- D. Finish: Manufacturer's standard enamel finish.

2.4 BOXES AND ENCLOSURES

- A. Sheet Metal Outlet and Device Boxes: NEMA OS 1,
- B. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
- C. Metal Floor Boxes: Cast metal, fully adjustable, rectangular.
- D. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- E. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, cast aluminum with gasketed cover.

2.5 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

- A. Description: Comply with SCTE 77.
 - 1. Color of Frame and Cover: Green.
 - 2. Configuration: Units shall be designed for flush burial and have open bottom, unless otherwise indicated.
 - 3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.
 - 4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
 - 5. Cover Legend: Molded lettering, "ELECTRIC.", "TELEPHONE.", "COMMUNICATIONS as appropriate for services contained.

B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel or fiberglass or a combination of the two.

2.6 SLEEVES FOR RACEWAYS

- A. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- B. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch thickness as indicated and of length to suit application.
- C. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:
 - 1. Exposed Conduit: Rigid Steel Conduit.
 - 2. Concealed Conduit: EMT.
 - 3. Underground Conduit: Schedule 40 PVC, direct buried.
 - 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 - 5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
- B. Comply with the following indoor applications, unless otherwise indicated:
 - 1. Exposed, Not Subject to Physical Damage: EMT.
 - 2. All other exposed areas: RMC.
 - 3. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 - 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC
 - 5. Damp or Wet Locations: RMC.
 - 6. Raceways for Optical Fiber or Communications Cable: EMT.
 - 7. Boxes and Enclosures: NEMA 250, Type 1, except as noted on the Drawings.
- C. Minimum Raceway Size: 3/4-inch trade size Raceway Fittings: Compatible with raceways and suitable for use and location.
 - 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

3.2 INSTALLATION

A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.

- B. In finished areas, conduit must be concealed above accessible ceilings, within the building structure, or within chases. Exposed conduits to be run tight to wall or ceiling and installed in a neat workmanlike manner, ready for painting.
- C. Install conduit parallel or perpendicular to building lines (except where run in or below floor slabs). Keep conduit runs as closed to underside of structure as possible.
- D. Exercise necessary precautions to prevent accumulation of water, dirt, or concrete in conduits during execution of electrical work. Conduit in which water or foreign material has been permitted to accumulate shall be thoroughly cleaned, or replaced where such accumulations cannot be removed.
- E. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- F. Complete raceway installation before starting conductor installation.
- G. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems."
- H. Arrange stub-ups so curved portions of bends are not visible above the finished slab.
- I. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.
- J. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.
- K. Raceways Embedded in Slabs:
 - 1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
 - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 - 3. Change from ENT rigid steel conduit before rising above the floor.
- L. Raceways below slabs:
 - 1. Minimum conduit size shall be 1".
 - 2. Change from PVC conduit to rigid steel conduit before rising above floor.
- M. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.
- N. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 240-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.
- O. Raceways for Optical Fiber and Communications Cable: Install as follows:
 - 1. 3/4-Inch Trade Size and Smaller: Install raceways in maximum lengths of 50 feet.
 - 2. 1-Inch Trade Size and Larger: Install raceways in maximum lengths of 75 feet.
 - 3. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.

- P. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where otherwise required by NFPA 70.
- Q. Covers for all junction boxes containing emergency circuits shall be red and labeled according to "260553 Identification for Electrical Systems."
- R. Flexible Conduit Connections: Use maximum of 72 inches of flexible conduit for recessed and semi-recessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
- S. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.
 - 1. Wall boxes in tile, marble, brick or other finished masonry wall shall be of welded construction and designed for installation within masonry.
- T. Set metal floor boxes level and flush with finished floor surface.
- U. Metal boxes cast in concrete shall be designed for concrete installation.
- V. Weather-proof boxes shall be die cast aluminum.
- W. Boxes for exposed work in finished area to be Type FS with threaded hubs and rigid conduit risers.
- X. Install expansion fittings at all locations where conduits cross building expansion joints.
- Y. Secure rigid conduit at cabinets and boxes using insulated throat type grounding and bonding bushings. Locknuts shall be tightened to cut through painted surfaces.
- Z. Where a number of conduits are to be run exposed and parallel, one with another, they shall be grouped and supported by trapeze hangers or unistrut racks tight to the building structure.
- AA. Mount junction and pull boxes securely to building structure in a location that meets the requirements of the National Electrical Code for accessibility and work space clearance. Coordinate exact locations of work with other trades. Unless noted otherwise, mounting heights shall be (all measurements are to the top of the box):

Switches, receptacles, or telephone/data	12" above countertop
shown above a countertop	
Dedicated receptacles	To suit equipment (see equipment/cabinetry
(i.e. refrigerator, microwave, etc.)	elevation drawings where applicable)
Other interior receptacles	16" AFF
Exterior receptacles	20" above finished grade
Other switches	48" AFF
Telephone/data shown next to a doorway	56" AFF
Other telephone/data	16" AFF

3.3 INSTALLATION OF UNDERGROUND CONDUIT

- A. Direct-Buried Conduit (not concrete encased):
 - 1. Install direct buried conduit according to Division 31 requirements for conduit installation.
 - 2. Absent Division 31 requirements or if the following is more stringent, install direct buried conduit as follows:
 - a. Excavate by open cut unless otherwise directed on the Drawings.
 - b. Excavate to the depths necessary to provide at least the NEC required minimum burial depths upon project completion.
 - c. Over-excavate organic, soft, spongy, or otherwise unsuitable soils found at or below the bottom of the trench to meet firm subsoil.
 - d. Trenches in non-pavement and non structure areas:
 - After installing conduit, backfill and compact utilizing native backfill material. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction leaving a mound on the surface to accommodate future settling.
 - e. Trenches under pavement or structures and within 5'-0" of same:
 - After installing conduit, backfill with compacted aggregate to 95% standard proctor density in 8" maximum lifts. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling.
 - 3. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.
 - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete.
 - b. For stub-ups at equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.
 - 4. Warning Planks: Bury warning tape approximately 12 inches above direct-buried conduits.

3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.
- B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.

3.5 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Rectangular Sleeve Minimum Metal Thickness:
 - 1. For sleeve cross-section rectangle perimeter less than 50 inches and no side greater than 16 inches, thickness shall be 0.052 inch.
 - 2. For sleeve cross-section rectangle perimeter equal to, or greater than, 50 inches and 1 or more sides equal to, or greater than, 16 inches, thickness shall be 0.138 inch.
- E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- F. Cut sleeves to length for mounting flush with both surfaces of walls.
- G. Extend sleeves installed in floors 2 inches above finished floor level.
- H. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway unless sleeve seal is to be installed.
- I. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.
- J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway, using joint sealant appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.
- K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway penetrations. Install sleeves and seal with firestop materials. Comply with Division 07 Section "Penetration Firestopping."
- L. Roof-Penetration Sleeves: Seal penetration of individual raceways with flexible, boot-type flashing units applied in coordination with roofing work.
- M. Aboveground, Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

SECTION 260553 IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Underground-line warning tape.
 - 2. Warning labels and signs.
 - 3. Instruction signs.
 - 4. Equipment identification labels.

1.3 QUALITY ASSURANCE

- A. Comply with NFPA 70.
- B. Comply with 29 CFR 1910.145.

1.4 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in the Contract Documents, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual, and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.

PART 2 - PRODUCTS

2.1 UNDERGROUND-LINE WARNING TAPE

- A. Description: Permanent, bright-colored, continuous-printed, polyethylene tape.
 - 1. Not less than 6 inches wide by 4 mils thick.
 - 2. Compounded for permanent direct-burial service.
 - 3. Embedded continuous metallic strip or core.
 - 4. Printed legend shall indicate type of underground line.

- 2.2 WARNING LABELS AND SIGNS
 - A. Comply with NFPA 70 and 29 CFR 1910.145.
 - B. Self-Adhesive Warning Labels: Factory printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment, unless otherwise indicated.
 - C. Color Scheme
 - 1. Emergency Warning labels: White background with red letters
 - 2. All other warning labels: Yellow background with black letters
 - D. Warning label and sign shall include, but are not limited to, the following legends:
 - 1. Multiple Power Source Warning: "DANGER ELECTRICAL SHOCK HAZARD EQUIPMENT HAS MULTIPLE POWER SOURCES."
 - 2. Workspace Clearance Warning: "WARNING OSHA REGULATION AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."
 - Service Equipment emergency sources warning: "CAUTION TWO SOURCES OF SUPPLY- EMERGENCY POWER SOURCE LOCATED IN GENERATOR ROOM 207 ON NORTH SIDE OF BUILDING."
 - 4. Generator Warning Label: "EMERGENCY GENERATOR"
 - 5. Automatic Transfer Switch Warning Label: "EMERGENCY TRANSFER SWITCH"
 - 6. Emergency Panel Warning Label: "EMERGENCY PANEL"
 - 7. Junction boxes containing emergency circuits: "EMERGENCY CIRCUITS- PANEL insert name"
 - 8. As noted on drawings.

2.3 INSTRUCTION SIGNS

- A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. in. and 1/8 inch thick for larger sizes.
 - 1. Engraved legend with black letters on white face. (White letters on red background for emergency information)
 - 2. Punched or drilled for mechanical fasteners.
 - 3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.4 EQUIPMENT IDENTIFICATION LABELS

- A. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for fasteners, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch.
- B. Fasteners for Labels: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable. Install underground-line warning tape for both direct-buried cables and cables in raceway.
- B. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Comply with 29 CFR 1910.145 and apply self-adhesive warning labels. Identify system voltage with black letters on an orange background. Apply to exterior of door, cover, or other access.
 - 1. Equipment with Multiple Power or Control Sources: Apply to door or cover of equipment including, but not limited to, the following:
 - a. Power transfer switches.
 - b. Controls with external control power connections.
 - 2. Equipment Requiring Workspace Clearance According to NFPA 70: Unless otherwise indicated, apply to door or cover of equipment but not on flush panelboards and similar equipment in finished spaces.
- C. Instruction Signs:
 - 1. Emergency Operating Instructions: Install instruction signs with white legend on a red background with minimum 3/8-inch- high letters for emergency instructions at equipment used for emergency shut down of generator or remote operation of main switch.
- D. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
 - 1. Labeling Instructions:
 - a. Indoor Equipment: Engraved, laminated acrylic or melamine label, drilled for screw attachment. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label; where 2 lines of text are required, use labels 2 inches high.
 - b. Outdoor Equipment: Engraved, laminated acrylic or melamine label, drilled for screw attachment.
 - c. Elevated Components: Increase sizes of labels and legend to those appropriate for viewing from the floor.
 - 2. Equipment to Be Labeled:
 - a. Panelboards, electrical cabinets, and enclosures.
 - b. Electrical switchgear and switchboards.
 - c. Transformers.
 - d. Generators

- e. Disconnect switches.
- f. Power transfer equipment.
- g. Contactors.
- h. Timeclocks
- i. Fire alarm control panel and annunciators
- j. Motor control switches including Hand/Off/Auto switches

3.2 INSTALLATION

- A. Verify identity of each item before installing identification products.
- B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- C. Apply identification devices to surfaces that require finish after completing finish work.
- D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
- E. Attach non-adhesive signs and plastic labels with screws and auxiliary hardware appropriate to the location and substrate.
- F. Color-Coding for Phase and Voltage Level Identification, 600 V and Less: Use the colors listed below for ungrounded feeder, and branch-circuit conductors.
 - 1. Color shall be factory applied or for sizes larger than No. 10 AWG field applied
 - 2. Colors for 208/120-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
 - 3. Colors for 480/277-V Circuits:
 - a. Phase A: Brown.
 - b. Phase B: Orange.
 - c. Phase C: Yellow.
 - 4. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
- G. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench exceeds 16 inches overall.

SECTION 260923 LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following lighting control devices:
 - 1. Wall-box occupancy sensors
 - 2. Ceiling Mounted occupancy sensors.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Operation and Maintenance Data: Provide (3) hard copies in separate 3-ring binders and an electronic copy.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.5 COORDINATION

A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

- 2.1 WALL BOX OCCUPANCY SENSOR
 - A. Line voltage PIR wall mounted occupancy sensor.
 - B. Approved Manufacturers:
 - 1. Greengate

- 2. Sensor Switch
- 3. Watt Stopper

2.2 INDOOR CEILING MOUNT OCCUPANCY SENSORS

- A. Low Voltage duel-technology ceiling mounted occupancy sensor with 1000sf coverage and associate power pack.
- A. Approved Manufacturers:
 - 1. Greengate
 - 2. Sensor Switch
 - 3. Watt Stopper

2.3 SENSOR INSTALLATION

A. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

2.4 WIRING INSTALLATION

- A. Wiring Method: Comply with Division 26 Section "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size shall be 3/4 inch.
- B. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.
- C. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.
- D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

2.5 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
 - 1. After installing time switches and sensors, and after electrical circuitry has been energized, adjust and test for compliance with requirements.
 - 2. Operational Test: Verify operation of each lighting control device, and adjust time delays.
- B. Lighting control devices that fail tests and inspections are defective work.

SECTION 262416 PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes:
 - 1. Distribution panelboards.
 - 2. Lighting and appliance branch-circuit panelboards.

1.3 SUBMITTALS

- A. Product Data: For each type of panelboard, switching and overcurrent protective device, transient voltage suppression device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For each panelboard and related equipment.
 - 1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
 - 2. Detail enclosure types and details for types other than NEMA 250, Type 1.
 - 3. Detail bus configuration, current, and voltage ratings.
 - 4. Short-circuit current rating of panelboards and overcurrent protective devices.
 - 5. Include evidence of NRTL listing for series rating of installed devices.
 - 6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
 - 7. Include wiring diagrams for power, signal, and control wiring.
 - 8. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with NEMA PB 1.

D. Comply with NFPA 70.

1.5 COORDINATION

A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PANELBOARDS

- A. Enclosures: Flush- and surface-mounted cabinets.
 - 1. Rated for environmental conditions at installed location.
 - a. Indoor Dry and Clean Locations: NEMA 250, Type 1.
 - b. Outdoor Locations: NEMA 250, Type 3R.
 - c. Kitchen Areas: NEMA 250, Type 4X, stainless steel.
 - d. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.
 - e. Or as noted on the plans
 - 2. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
 - 3. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.
 - 4. Finishes:
 - a. Panels and Trim: Steel and galvanized steel factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
 - b. Back Boxes: Galvanized steel.
 - 5. Directory Card: Inside panelboard door, mounted in transparent card holder.
- B. Incoming Mains Location: Top and bottom.
- C. Phase, Neutral, and Ground Buses:
 - 1. Hard-drawn copper, 98 percent conductivity.
 - 2. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
- D. Conductor Connectors: Suitable for use with conductor material and sizes.
 - 1. Material: Hard-drawn copper, 98 percent conductivity.
 - 2. Main and Neutral Lugs: Mechanical type.
 - 3. Ground Lugs and Bus Configured Terminators: Mechanical type.

- 4. Feed-Through Lugs (When required): Mechanical type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
- 5. Subfeed (Double) Lugs (When required): Mechanical type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.
- E. Service Equipment Label (When applicable): NRTL labeled for use as service equipment for panelboards with one or more main service disconnecting and overcurrent protective devices.
- F. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.
- G. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.

2.2 DISTRIBUTION PANELBOARDS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - 2. General Electric Company; GE Consumer & Industrial Electrical Distribution.
 - 3. Square D; a brand of Schneider Electric.
- B. Panelboards: NEMA PB 1, power and feeder distribution type.
- C. Doors: Secured with vault-type latch with tumbler lock; keyed alike.
- D. Mains: Circuit breaker or main lugs only as noted on Drawings.
- E. Branch Overcurrent Protective Devices: For Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers.
- F. Branch Overcurrent Protective Devices: For Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers; plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.

2.3 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - 2. General Electric Company; GE Consumer & Industrial Electrical Distribution.
 - 3. Square D; a brand of Schneider Electric.
- B. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.
- C. Mains: Circuit breaker or main lugs only as noted on Drawings

- D. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.
- E. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

2.4 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
 - 2. General Electric Company; GE Consumer & Industrial Electrical Distribution.
 - 3. Square D; a brand of Schneider Electric.
- B. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with interrupting capacity to meet available fault currents.
 - 1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
 - 2. GFCI Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).
 - 3. Molded-Case Circuit-Breaker (MCCB) Features and Accessories:
 - a. Standard frame sizes, trip ratings, and number of poles.
 - b. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
 - c. Shunt Trip (When indicated): 120-V trip coil energized from separate circuit, set to trip at 55 percent of rated voltage.
 - d. Multipole units enclosed in a single housing or factory assembled to operate as a single unit.
 - e. Handle Padlocking Device (When indicated): Fixed attachment, for locking circuitbreaker handle in on or off position.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Receive, inspect, handle, store and install panelboards and accessories according to NEMA PB 1.1.
- B. Mount top of trim 90 inches Insert height above finished floor unless otherwise required keep the distance from the floor to top most circuit breaker within the height limitation contained in the NEC.
- C. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.

- D. Install overcurrent protective devices and controllers not already factory installed.
 - 1. Set field-adjustable, circuit-breaker trip ranges.
- E. Install filler plates in unused spaces.
- F. Recessed panels: Stub four 1-inch empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future.
- G. Arrange conductors in gutters into groups and bundle and wrap with wire ties.
- H. Comply with NECA 1.

3.2 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Division 26 Section "Identification for Electrical Systems."
- B. Create a directory to indicate installed circuit loads and incorporating Owner's final room designations. Use a computer or typewriter to create directory; handwritten directories are not acceptable.
- C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

SECTION 262726 WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Receptacles, receptacles with integral GFCI, and associated device plates.
 - 2. Snap switches.
 - 3. Pendant cord-connector devices.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single manufacturer and one source.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:
 - 1. Cooper Wiring Devices; a division of Cooper Industries, Inc. (Cooper).
 - 2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
 - 3. Leviton Mfg. Company Inc. (Leviton).
 - 4. Pass & Seymour/Legrand; Wiring Devices & Accessories (Pass & Seymour).

2.2 STRAIGHT BLADE RECEPTACLES

- A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 2. Products: Subject to compliance with requirements, provide one of the following:
 - a. Cooper; 5351 (single), 5352 (duplex).
 - b. Hubbell; HBL5351 (single), CR5352 (duplex).
 - c. Leviton; 5891 (single), 5352 (duplex).
 - d. Pass & Seymour; 5381 (single), 5352 (duplex).

2.3 GFCI RECEPTACLES

- A. General Description: Straight blade, feed-through type. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped.
- B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 2. Products: Subject to compliance with requirements, provide one of the following:
 - a. Cooper; GF20.
 - b. Pass & Seymour; 2084.

2.4 PENDANT CORD-CONNECTOR DEVICES

- A. Description: Matching, locking-type plug and receptacle body connector; NEMA WD 6 configurations L5-20P and L5-20R, heavy-duty grade.
 - 1. Body: Nylon with screw-open cable-gripping jaws and provision for attaching external cable grip.
 - 2. External Cable Grip: Woven wire-mesh type made of high-strength galvanized-steel wire strand, matched to cable diameter, and with attachment provision designed for corresponding connector.

2.5 SNAP SWITCHES

- A. Comply with NEMA WD 1 and UL 20.
- B. Switches, 120/277 V, 20 A:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 2. Products: Subject to compliance with requirements, provide one of the following:
 - a. Cooper; 2221 (single pole), 2222 (two pole), 2223 (three way), 2224 (four way).

- b. Hubbell; CS1221 (single pole), CS1222 (two pole), CS1223 (three way), CS1224 (four way).
- c. Leviton; 1221-2 (single pole), 1222-2 (two pole), 1223-2 (three way), 1224-2 (four way).
- d. Pass & Seymour; 20AC1 (single pole), 20AC2 (two pole), 20AC3 (three way), 20AC4 (four way).
- C. Key-Operated Switches, 120/277 V, 20 A:

2.6 WALL PLATES

- A. Single and combination types to match corresponding wiring devices.
 - 1. Plate-Securing Screws: Metal with head color to match plate finish.
 - 2. Material for Finished Spaces: Thermoplastic nylon, white
 - 3. Material for Unfinished Spaces: Thermoplastic Nylon or Galvanized steel.
- B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with type 3R weatherresistant, die-cast aluminum with lockable cover.

2.7 FINISHES

- A. Color: Wiring device catalog numbers in Section Text do not designate device color.
 - 1. Wiring Devices Connected to Normal Power System: White, unless otherwise indicated or required by NFPA 70 or device listing.

PART 3 - EXECUTION

3.1 RECEPTACLE APPLICATION

A. Where required by the most recent version of the NEC and as indicated on the plan sheets: GFCI receptacles

3.2 INSTALLATION

- A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.
- B. Coordination with Other Trades:
 - 1. Take steps to insure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.
 - 2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
 - 3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.

- 4. Install wiring devices after all wall preparation, including painting, is complete.
- C. Conductors:
 - 1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
 - 2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
 - 3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
 - 4. Existing Conductors:
 - a. Cut back and pigtail, or replace all damaged conductors.
 - b. Straighten conductors that remain and remove corrosion and foreign matter.
 - c. Pigtailing existing conductors is permitted provided the outlet box is large enough.
- D. Device Installation:
 - 1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
 - 2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
 - 3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
 - 4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
 - 5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
 - 6. Use a torque screwdriver when a torque is recommended or required by the manufacturer.
 - 7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
 - 8. Tighten unused terminal screws on the device.
 - 9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.
- E. Receptacle Orientation:
 - 1. Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to the right.
- F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.
- G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.
- H. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

SECTION 262816 ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following individually mounted, enclosed switches and circuit breakers:
 - 1. Fusible switches.
 - 2. Nonfusible switches.
 - 3. Enclosures.

1.3 SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
 - 1. Enclosure types and details for types other than NEMA 250, Type 1.
 - 2. Current and voltage ratings.
 - 3. Short-circuit current rating.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

1.5 COORDINATION

A. Coordinate layout and installation of switches, circuit breakers, and components with other construction, including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 FUSIBLE AND NONFUSIBLE SWITCHES

- A. Manufacturers:
 - 1. Eaton Corporation; Cutler-Hammer Products.
 - 2. General Electric Co.; Electrical Distribution & Control Division.
 - 3. Square D/Group Schneider.
- B. Fusible Switch, 600 A and Smaller: NEMA KS 1, Type Heavy Duty, with clips or bolt pads to accommodate specified fuses, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.
- C. Non-fusible Switch, 600 A and Smaller: NEMA KS 1, Type Heavy Duty Duty, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.
- D. Accessories:
 - 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 - 2. Neutral Kit: Internally mounted; insulated, capable of being grounded, and bonded; and labeled for copper and aluminum neutral conductors. (If required)

2.3 ENCLOSURES

- A. NEMA AB 1 and NEMA KS 1 to meet environmental conditions of installed location.
 - 1. Outdoor Locations: NEMA 250, Type 3R.
 - 2. Kitchen Areas: NEMA 250, Type 4X, stainless steel.
 - 3. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.
 - 4. As noted in the drawings.

PART 3 - EXECUTION

- 3.1 INSTALLATION
 - A. Comply with applicable portions of NECA 1, NEMA PB 1.1, and NEMA PB 2.1 for installation of enclosed switches and circuit breakers.

- B. Mount individual wall-mounting switches and circuit breakers with tops at uniform height, unless otherwise indicated. Anchor floor-mounting switches to concrete base.
- C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

3.2 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 26 Section "Identification for Electrical Systems."
- B. Enclosure Nameplates: Label each enclosure with engraved metal or laminated-plastic nameplate as specified in Division 26 Section "Identification for Electrical Systems."

3.3 CLEANING

- A. On completion of installation, vacuum dirt and debris from interiors; do not use compressed air to assist in cleaning.
- B. Inspect exposed surfaces and repair damaged finishes.

SECTION 265100 INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Interior lighting fixtures.
 - 2. Exit signs.
 - 3. Lighting fixture supports.

1.3 SUBMITTALS

- A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:
 - 1. Physical description of lighting fixture including dimensions.
 - 2. Emergency lighting units including battery and charger.
 - 3. Energy-efficiency data.
 - 4. Life, output, and energy-efficiency data for lamps.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

1.5 COORDINATION

A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. See lighting schedule on Drawings.

2.2 LIGHTING FIXTURES AND COMPONENTS, GENERAL REQUIREMENTS

- A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.
- B. Metal Parts: Free of burrs and sharp corners and edges.
- C. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging.

2.3 EXIT SIGNS

- A. Description: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.
- B. Internally Lighted Signs:
 - 1. Lamps for AC Operation: LEDs, 70,000 hours minimum rated lamp life.
 - 2. Self-Powered Exit Signs (Battery Type): Integral automatic charger in a self-contained power pack.
 - a. Battery: Sealed, maintenance-free, nickel-cadmium type.
 - b. Charger: Fully automatic, solid-state type with sealed transfer relay.
 - c. Operation: Relay automatically energizes lamp from battery when circuit voltage drops to 80 percent of nominal voltage or below. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
 - d. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
 - e. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
 - f. Integral Self-Test: Factory-installed electronic device automatically initiates coderequired test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and flashing red LED.

2.4 LIGHTING FIXTURE SUPPORT COMPONENTS

- A. Comply with Division 26 Section "Hangers and Supports for Electrical Systems" for channeland angle-iron supports and nonmetallic channel and angle supports.
- B. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Lighting fixtures: Set level, plumb, and square with ceilings and walls. Install lamps in each fixture.
- B. Support for Lighting Fixtures in or on Grid-Type Suspended Ceilings: Use grid as a support element.
 - 1. Install a minimum of four ceiling support system rods or wires for each fixture. Locate not more than 6 inches from lighting fixture corners.
 - 2. Support Clips: Fasten to lighting fixtures and to ceiling grid members at or near each fixture corner with clips that are UL listed for the application.
 - 3. Fixtures of Sizes Less Than Ceiling Grid: Install as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently with at least two 3/4-inch metal channels spanning and secured to ceiling tees.
- C. Suspended Lighting Fixture Support:
 - 1. Pendants and Rods: Where longer than 48 inches brace to limit swinging.
 - 2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
 - 3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.
- D. Adjust aimable lighting fixtures to provide required light intensities.
- E. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.2 FIELD QUALITY CONTROL

A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.

SECTION 265600 EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Exterior luminaires.
 - 2. Poles and accessories.

1.3 SUBMITTALS

- A. Product Data: For each luminaire, pole, and support component, arranged in order of lighting unit designation. Include data on features, accessories, finishes, and the following:
 - 1. Physical description of luminaire, including materials, dimensions, effective projected area, and verification of indicated parameters.
 - 2. Details of installation and construction.
 - 3. Luminaire materials.
 - 4. Lamps, including life, output, and energy-efficiency data.
 - 5. Materials, dimensions, and finishes of poles.
 - 6. Means of attaching luminaires to supports, and indication that attachment is suitable for components involved.
 - 7. Anchor bolts for poles.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.
- 1.5 DELIVERY, STORAGE, AND HANDLING
 - A. Store poles on decay-resistant-treated skids at least 12 inches above grade and vegetation. Support poles to prevent distortion and arrange to provide free air circulation.
 - B. Retain factory-applied pole wrappings on metal poles until right before pole installation. For poles with nonmetallic finishes, handle with web fabric straps.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. See lighting schedule on Drawings.

2.2 LUMINAIRES, GENERAL REQUIREMENTS

- A. Luminaires shall comply with UL 1598 and be listed and labeled for installation in wet locations by an NRTL acceptable to authorities having jurisdiction.
- B. Comply with IESNA RP-8 for parameters of lateral light distribution patterns indicated for luminaires.
- C. Metal Parts: Free of burrs and sharp corners and edges.
- D. Sheet Metal Components: Corrosion-resistant aluminum, unless otherwise indicated. Form and support to prevent warping and sagging.
- E. Housings: Rigidly formed, weather- and light-tight enclosures that will not warp, sag, or deform in use. Provide filter/breather for enclosed luminaires.
- F. Exposed Hardware Material: Stainless steel.
- G. Plastic Parts: High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
- H. Lenses and Refractors Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.
- I. Luminaire Finish: Manufacturer's standard paint applied to factory-assembled and -tested luminaire before shipping. Where indicated, match finish process and color of pole or support materials.

2.3 POLES AND SUPPORT COMPONENTS, GENERAL REQUIREMENTS

- A. Structural Characteristics: Comply with AASHTO LTS-4.
- B. Luminaire Attachment Provisions: Comply with luminaire manufacturers' mounting requirements. Use stainless-steel fasteners and mounting bolts, unless otherwise indicated.
- C. Mountings, Fasteners, and Appurtenances: Corrosion-resistant items compatible with support components.
 - 1. Materials: Shall not cause galvanic action at contact points.
 - 2. Anchor Bolts, Leveling Nuts, Bolt Caps, and Washers: Hot-dip galvanized after fabrication, unless stainless-steel items are indicated.
 - 3. Anchor-Bolt Template: Plywood or steel.
D. Concrete Pole Foundations: Cast in place, with anchor bolts to match pole-base flange. Concrete, reinforcement, and formwork are specified in Division 03 Section "Cast-in-Place Concrete."

PART 3 - EXECUTION

- 3.1 LUMINAIRE INSTALLATION
 - A. Fasten luminaire to indicated structural supports.
 - B. Adjust luminaires that require field adjustment or aiming.

3.2 POLE INSTALLATION

- A. Align pole foundations and poles for optimum directional alignment of luminaires and their mounting provisions on the pole.
- B. Clearances: Maintain the following minimum horizontal distances of poles from surface and underground features, unless otherwise indicated on Drawings:
 - 1. Fire Hydrants and Storm Drainage Piping: 60 inches.
 - 2. Water, Gas, Electric, Communication, and Sewer Lines: 10 feet .
 - 3. Trees: 15 feet.
- C. Concrete Pole Foundations: Set anchor bolts according to anchor-bolt templates furnished by pole manufacturer. Concrete materials, installation, and finishing requirements are specified in Division 03 Section "Cast-in-Place Concrete."
- D. Foundation-Mounted Poles: Mount pole with leveling nuts, and tighten top nuts to torque level recommended by pole manufacturer.
 - 1. Grout void between pole base and foundation. Use nonshrink or expanding concrete grout firmly packed to fill space.
 - 2. Install base covers, unless otherwise indicated.
 - 3. Use a short piece of 1/2-inch- diameter pipe to make a drain hole through grout. Arrange to drain condensation from interior of pole.
- E. Raise and set poles using web fabric slings (not chain or cable).

3.3 BOLLARD LUMINAIRE INSTALLATION

- A. Align units for optimum directional alignment of light distribution.
- B. Install on concrete base with top 4 inches above finished grade or surface at bollard location. Cast conduit into base, and shape base to match shape of bollard base. Finish by troweling and rubbing smooth. Concrete materials, installation, and finishing are specified in Division 03 Section "Cast-in-Place Concrete."

3.4 CORROSION PREVENTION

- A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.
- B. Steel Conduits: Comply with Division 26 Section "Raceway and Boxes for Electrical Systems." In concrete foundations, wrap conduit with 0.010-inch- thick, pipe-wrapping plastic tape applied with a 50 percent overlap.

3.5 GROUNDING

- A. Ground metal poles and support structures according to Division 26 Section "Grounding and Bonding for Electrical Systems."
 - 1. Install grounding electrode for each pole, unless otherwise indicated.
 - 2. Install grounding conductor pigtail in the base for connecting luminaire to grounding system.

3.6 FIELD QUALITY CONTROL

- A. Inspect each installed fixture for damage. Replace damaged fixtures and components.
- B. Illumination Observations: Verify normal operation of lighting units after installing luminaires and energizing circuits with normal power source.

END OF SECTION 265600

SECTION 311600 SITE PREPARATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Protecting existing plants and grass to remain
 - 2. Removing and disposing of existing trees, shrubs, plants, and grasses
 - 3. Clearing and grubbing
 - 4. Stripping and stockpiling topsoil
 - 5. Removing and disposing of above and below grade site structures and appurtenances
 - 6. Removing and disposing of pavements and sidewalks
 - 7. Disconnecting and capping or sealing site utilities
 - 8. Temporary traffic control measures
 - 9. Salvaging of specified materials for the Owner

1.2 MATERIAL OWNERSHIP

A. Except indicated items to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from or when applicable incorporated into the Project site.

1.3 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.
- C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.
- D. Do not commence site clearing operations until Erosion Control Measures and any required Storm Water Pollution Prevention Plans (SWPPP) provisions are in place.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. Satisfactory Soil Materials: Requirements for satisfactory soil materials are specified in Section 312300 "Excavation and Fill".
 - 1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Locate and clearly flag trees and vegetation to remain or to be relocated.
- C. Provide to the Owner digital photography of existing site conditions prior to start of work including pavements to remain and which will be used during construction.
- D. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary and applicable permanent erosion and sedimentation control measures to per Section 312513 "Erosion Control" and the Storm Water Pollution Protection Plan (SWPPP), including but not limited to prevention of soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties, streets and walkways.
- B. Inspect, repair, and maintain and remove erosion and sedimentation control measures during construction until permanent vegetation has been established per the SWPPP.

3.3 TREE PROTECTION

- A. Erect and maintain temporary fencing around tree protection zones before starting site clearing. Remove fence when construction is complete.
- B. Do not excavate within tree protection zones, unless otherwise indicated.
- C. Repair or replace trees and vegetation indicated to remain that are damaged by construction operations, in a manner approved by Architect.

3.4 UTILITIES

- A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
 - 1. Arrange with utility companies to shut off indicated utilities.
- B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Architect not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Owner's/Architect's written permission.
- C. Utilities by Others: Coordinate with others installing utilities on site or relocating and adjusting utilities offsite for the project. Schedule and arrange for necessary tie-ins and connections.

3.5 CLEARING AND GRUBBING

- A. Clear the site by removing and disposing of all obstructions such as fences, walls, foundations, buildings, accumulations of rubbish of whatever nature, shrubs, bushes, saplings, grass, weeds, stumps and other vegetation to a depth of at least 12" below proposed ground surface or proposed subgrade, whichever is lower. Removed materials shall be properly disposed offsite.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
- C. Tree removal:
 - 1. October 1 through March 31: No restrictions on tree cutting.
 - 2. April 1 through September 30: Cut trees only after authorized by the Engineer and upon receiving a copy of the Determination of Effect indicating no affect to threatened or endangered species is expected within the work area.
 - 3. Cut off trees and stumps at the existing ground level. Remove stumps and roots as needed.
 - 4. Remove trees and stumps within 2 feet of the proposed structures and underground piping to a depth of not less than 12 inches below the base elevation of proposed structures or underground piping.
- D. Protection of persons and property:
 - 1. Barricade open depressions and holes occurring as part of this Work, and post warning lights on property adjacent to or with public access.
 - 2. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
 - 3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by operations under this Section.
 - 4. Provide traffic control items in accordance with the Manual of Uniform Traffic Control Devices (MUTCD), and the requirements of the governmental agency having jurisdiction, when work is being complete on or adjacent to public streets and/or Right-of-ways.

3.6 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip and stockpile topsoil materials per Section 312300 "Excavation and Fill".

3.7 SITE IMPROVEMENTS

- A. Remove existing above and below grade structures, foundations, pavements and improvements as indicated and as necessary to facilitate new construction.
- B. Pavements to be removed adjacent to pavement or structures to remain shall be saw cut to provide a uniform edge.
- C. Below grade structures to be removed shall be removed to a minimum of three (3) feet below proposed grade unless in conflict with proposed improvements which may require full removal and disposal.

3.8 DISPOSAL

- A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
- B. Do not burn debris at the site.
- C. Do not conduct any generation, transportation, or recycling of construction or demolition debris, clean or general or uncontaminated soil generated during construction, remodeling, repair, and demolition of utilities, structures, and roads that is not commingled with any waste, without the maintenance of documentation identifying the hauler, generator, place of origin of the debris or soil, the weight or volume of the debris or soil, and the location, owner, and operator of the facility where the debris or soil was transferred, disposed, recycled or treated. Maintain documentation for three years.

END OF SECTION 311600

SECTION 312300 EXCAVATION AND FILL

PART 1 - GENERAL

1.1 SUMMARY

- A. Excavate, fill, compact, and grade the site to the elevations shown on the Drawings, as specified herein, and as needed to meet the requirements of the construction shown in the Contract Documents.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

- A. Use equipment adequate in size, capacity, and numbers to accomplish the work in a timely manner.
- B. Perform excavation and embankment work in compliance with applicable rules and regulations of IEPA and OSHA.
- C. Perform Field Quality Controls Testing as specified herein.

PART 2 - PRODUCTS

2.1 TOPSOIL

- A. Topsoil shall consist of friable, fertile soil of a loamy character. Use suitable topsoil of uniform quality, free from hard clods, roots, sod, stiff clay, hard pan, stones larger than 1 inch (1/2 inch for turfgrass seeding), lime cement, ash, slag, concrete, tar residue, tarred paper, boards, chips, sticks, or any undesirable material.
- B. Use on-site topsoil from sources within the project limits, unless compost-amended or off-site topsoil is specified.
 - 1. **On-site Topsoil:** On-site topsoil material is material excavated from the top 12 inches of the site. Use of on-site topsoil material is subject to the Engineer's approval.
 - 2. **Compost-amended On-site Topsoil:** Amend low-quality on-site topsoil, not meeting the requirements specified for off-site topsoil, with a minimum of 1 inch of compost for every 3 inches of topsoil. Use compost meeting the requirements of mulch for pneumatic seeding in Section 329219 "Seeding".
- 2.2 **Off-site Topsoil:** Contains at least 3% organic matter, according to ASTM D 2974, has a high degree of fertility, is free of herbicides that prohibit plant growth, has a pH level between 5.5 and

7.5, and meets the following mechanical analysis of at least 90 percent must pass the No. 10 sieve. The Engineer will approve the source of off-site topsoil. Surface soils from ditch bottoms, drained ponds, and eroded areas, or soils that are supporting growth of noxious weeds or other undesirable vegetation, will not be accepted. The Engineer will determine if testing is necessary. The Contractor will be responsible for payment of the testing if the off-site topsoil does not meet the above requirements. If the testing verifies the off-site topsoil does meet the above requirements, payment for the testing will be the responsibility of the Jurisdiction.

2.3 SOIL MATERIALS

- A. General embankment and fill materials:
 - 1. Predominately granular or non-expansive soils, free from organic matter and deleterious substances, containing no rocks over 3" in greatest dimension and having a minimum Standard Proctor Density of not less than 100 lbs/cu ft.
 - 2. Material is subject to the approval of the A/E, and may be removed from onsite excavations or imported from off-site borrow areas.
 - 3. The upper 12" of fill or embankment shall not have rocks greater than 1" in dimension.
 - 4. For soils to be placed below water, use clean granular material.
- B. Structure embankment and fill materials:
 - 1. In addition to the General embankment requirements, soils placed beneath and within 10 feet structures or pavements shall have the following the requirements:
 - a. Cohesive soils must meet all of the following:
 - 1) Liquid limit of less than 45% and a plasticity index greater than 10 and less than or equal to 25%.
 - Density of 110 pcf or greater according to ASTM D 698 or AASHTO T 99 (Standard Proctor Density).
 - b. Granular soils must meet all of the following:
 - 1) Density of 110 pcf or greater according to ASTM D 698 or AASHTO T 99 (Standard Proctor Density).
 - 2) no more than 20% or less of fines passing the 200 sieve
 - 3) Plasticity index of 3 or less
 - c. Drainage Layers:
 - 1) Material consisting of clean crushed stone or gravel graded from 1" to no more than 5% passing the 200 sieve.
 - d. Crushed stone, crushed PCC, crushed composite pavement, or RAP; mixtures of gravel, sand, and soil; or uniformly-blended combinations of the above; as approved by the Engineer.
 - 2. Subgrade Treatment (if necessary):
 - a. Cement: Meet the requirements of AASHTO M 85 for portland cement.
 - b. Fly ash: Provide Class C meeting the requirements of ASTM C 618 with a minimum of 22% CaO; the Loss of Ignition requirements in Table 1 will not apply. Approval of source required.

- c. Lime: Hydrated lime should meet requirements of ASTM C 207, Type N or AASHTO M 216, and others.
- C. Geotextile Materials:
 - 1. Geotextile Fabric: Consisting of woven or non-woven filaments of polypropylene, polyester or polyethylene meeting the following minimums:
 - a. Weight (oz/sy): 4 minimum.
 - b. Grab tensile Strength (lbs): 200 ASTM D 4632.
 - c. Elongation (%): 15 ASTM D 4632.
 - d. Trapezoidal Tear Strength (lbs): 75 ASTM D 4533.

PART 3 - EXECUTION

- 3.1 SURFACE CONDITIONS
 - A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 FINISH ELEVATIONS AND LINES

- A. Finish grading shall be worked to contours or elevations indicated on the drawings. Rocks and other debris unearthed during finish grading operations shall be removed from immediate construction area and disposed of elsewhere on site as approved by Owner and Engineer/Architect.
- B. Final disking, harrowing, raking etc. and other preparations for seeding, sod or landscaping will covered in subsequent specification sections.
- C. The Contractor shall provide field engineering services as required but not limited to:
 - 1. Establish and maintain lines and levels.
 - 2. Structural design of shores, forms, and similar items as part of his/her means and methods of construction.

3.3 PROCEDURES

- A. Utilities:
 - 1. Unless shown to be removed, protect active utility lines shown on the Drawings or otherwise made known to the Contractor prior to excavating. If damaged, repair or replace at no additional cost to the Owner.
 - 2. If active lines are encountered, and are not shown on the Drawings or otherwise made known to the Contractor, promptly take necessary steps to assure that service is not interrupted.
 - 3. If service is interrupted as a result of work under this Section, immediately restore service by repairing the damaged utility at no additional cost to the Owner.
 - 4. Where existing underground utilities are in actual contact with the new work, so that such utilities cannot be replaced as originally found prior to excavation, and where relocation

and changes are required, then the work shall be replaced or relocated by "others" at no cost to the Contractor. The Contractor shall so coordinate his work as to allow a reasonable time for such replacement or relocation and in no event shall extra compensation be allowed for such coordination or any reasonable delay occasioned there from. Should it be found necessary or desirable by the Owner for the Contractor to perform the work of replacement or relocation, the Engineer/Architect will issue in writing a field order defining the extent of the additional work and instructing the Contractor to proceed with such construction. Compensation for such work shall be determined as set forth in the General Conditions.

- B. Protection of persons and property:
 - 1. Furnish, install and maintain barricades, warning lights, and/or warning tape at open holes and depressions or other potential hazards occurring as part of this Work.
 - 2. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
 - 3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, and other hazards created by operations under this Section.
 - 4. Provide traffic control items in accordance with the Manual of Uniform Traffic Control Devices (MUTCD), and the requirements of the governmental agency having jurisdiction, when work is being complete on or adjacent to public streets and/or Right-of-ways.
- C. Dewatering:
 - 1. Remove all water, including rainwater, encountered during trench and substructure work to an approved location by pumps, drains, and other approved methods.
 - 2. Keep excavations and site construction area free from water.
- D. IEPA Storm Water Permit:
 - 1. The project **will not** result in disturbance of one (1) or more acres of land and **will not** require compliance with the National Pollutant Discharge Elimination System (NPDES) Storm Water Permit.
 - 2. The Contractor shall be responsible for developing and implementing storm water pollution prevention measures in accordance with good engineering practice, as shown on the plans and in compliance with state and local regulations.

3.4 TOPSOIL STRIPPING

- A. Stripping and Salvaging Topsoil:
 - 1. Mow all weeds, grass, and growing crops or other herbaceous vegetation close to the ground and remove from the site. Shred sod by shallow plowing or blading and thorough disking. Thoroughly shred to allow the soil to be easily spread in a thin layer over areas to be covered. If allowed by the Engineer, herbicides may be applied, and vegetation may be incorporated into the topsoil.
 - 2. Remove an adequate amount of topsoil from the upper 6 inches of existing on-site topsoil to allow finish grading with a finished grade of 6 inches of salvaged or amended topsoil. The topsoil may be moved directly to an area where it is to be used, or may be stockpiled for future use.
- B. Preparation for Topsoil Placement:

- 1. Finish excavation and embankment work according to the specified grades and cross cross-sections; grade and slope all surfaces to drain away from buildings and prevent ponding. Conform to the grading plan within ± 2 inches.
- 2. Loosen surface to a minimum depth of 4 inches to reduce compaction.
- C. Topsoil Spreading and Finish Grading:
 - 1. Place the topsoil after all grading and trenching activities in the area have been completed.
 - 2. Place topsoil at least 8 inches deep; smooth and finished grade according to the contract documents. If topsoil is being amended with compost, thoroughly blend compost with on onsite topsoil at the rate specified
 - 3. After finish grading the topsoil, remove clods, lumps, roots, litter, other undesirable material, or stones larger than 1 inch (1/2 inch for turfgrass).
 - 4. Excess topsoil shall be removed offsite or incorporated into the embankment, if acceptable, in areas not requiring structural fill.

3.5 EXCAVATING

- A. Perform excavation within the project limits to the lines, grades, and elevations indicated and specified herein.
- B. Excavated Materials:
 - 1. Satisfactory materials shall be used for fill or embankments within the project limits.
 - 2. Unsatisfactory materials shall be excavated to a depth below grade sufficient to provide a suitable subgrade support, and fill and compact with satisfactory materials.
- C. Surplus materials:
 - 1. Dispose of unsatisfactory excavated materials, and surplus excavated material, offsite at disposal areas arranged and paid for by the Contractor.
- D. Drainage:
 - 1. Provide temporary drainage facilities to prevent damage to public or private interests when necessary to interrupt natural drainage or flow of artificial drains.
 - 2. Excavate and fill in a manner and sequence that will provide proper drainage at all times.
 - 3. Restore original drainage as soon as work allows.
- E. Off-site Borrow:
 - 1. Obtain material required for fill or embankment in excess of that produced within the grading limits of the project from borrow areas selected and paid for by the Contractor and approved by the Owner or his/her representative. The Contractor shall obtain written agreements from the property owners for the removal of the materials.
- F. Stability of Excavations:
 - 1. Perform excavations in accordance with OSHA excavating rules and regulations.
 - 2. Slope sides or shore and brace where sloping is not possible because of space restrictions of stability of the materials being excavated.

- 3. Maintain sides and slopes of excavations in a safe condition until completion of filling.
- G. Excavating for Structures:
 - 1. Excavate to elevations and dimensions shown for building pad within a tolerance of 0.05ft., and extending a sufficient distance from footings and foundations to permit placing and removing concrete formwork, installation of services and for inspection.
 - 2. Excavation for footings and foundations shall not disturb the bottom of the excavation:
 - a. Excavate and trim with hand tools as necessary to final grade just before concrete is placed.
- H. Excavating for pavements:
 - 1. Excavate subgrade under pavements to within 0.05 ft of the proposed subgrade.
 - 2. Prepare subgrade as specified herein.
- I. Cold weather protection:
 - 1. Protect excavation surfaces from freezing when an atmospheric temperature is less than 35 degrees F.

3.6 EMBANKMENT

- A. Fill excavations as promptly as progress of the Work permits, but not until:
 - 1. Acceptance of construction below finish grade.
 - 2. Concrete formwork is removed.
 - 3. Shoring and bracing are removed, and voids have been backfilled with satisfactory materials.
 - 4. Trash and debris have been removed.
- B. Subgrade Preparation:
 - 1. Remove vegetation, topsoil, obstructions, and deleterious materials from the ground surface prior to placement of embankment per Section 3.4 of this specification.
 - 2. Disk excavated area to a depth of 8", unless sand or aggregate. Proof roll and prepare the surface per Section 3.8-D of this specification. Unsuitable material or material not achieving the specified stability, density and moisture requirements after three consecutive good drying days of moisture conditioning and compaction, consisting of at least two processing's utilizing discs or tillers, shall be removed and/or replaced, or shall be further treated per instructions of the soils engineer. Additional work or materials required after the three day conditioning period to stabilize the material, when approved in writing by the Owner or his/her representative, shall be performed and paid for in accordance with the General Conditions.
- C. Subgrade Treatment:
 - 1. Lime, Cement, or Fly Ash:
 - a. Incorporate the subgrade treatment material uniformly during subgrade preparation to the depth and rate specified in the contract documents.
 - b. Place subgrade treatment in the areas as specified or as directed by the Engineer.

- 2. Geogrid or Geotextiles:
 - a. Install according to manufacturer's recommendations, on top of the prepared subgrade.
 - b. Geogrid shall only be utilized when the aggregate base thickness will have a minimum of six (6) inches thick in order to prevent it from popping through the aggregate base. Minimum lap shall be 12" and minimum sewn lap shall be 4" or as specified by the manufacturer.
 - c. Place subgrade treatment in the areas as specified or as directed by the Engineer.
- D. Placing and compacting:
 - 1. Place fill materials in layers not more than 8" in loose depth, unless otherwise approved by the A/E.
 - 2. Before compacting, moisten or aerate each layer as necessary to provide the specified moisture content.
 - 3. Compact each layer to required percentage of maximum density for the area.
 - 4. Do not place backfill or fill material on surfaces that are muddy, frozen, or containing frost or ice.
 - 5. Place backfill and fill materials evenly adjacent to structures, to required elevations.
 - 6. Prevent wedging action of backfill against structures by carrying the material uniformly around the structures to approximately the same elevation in each lift.
 - 7. The building embankment shall be constructed at minimum 5 feet beyond the proposed building line and pending approval of the compacted fill, shall be cut back at a 1:1 slope extending from the top of the proposed footing to 4 feet inside the building wall.
 - 8. Placement of granular drainage material beneath the floor slab will be completed by the Building Contractor.

3.7 GRADING

- A. General:
 - 1. Uniformly grade the areas within project limits under this Section, including adjacent transition areas.
 - 2. Finished surfaces within specified tolerance.
 - 3. Compact with uniform levels or slopes between points where elevations are shown on the Drawings, or between such points and existing grades.
 - 4. Where a change of slope is indicated on the Drawings, construct a rolled transition section having a minimum radius of approximately 8'-0", unless adjacent construction will not permit such a transition, or if such a transition defeats positive control of drainage.
- B. Grading inside building lines:
 - 1. Provide drainage away from structures during construction of the embankments to prevent ponding.
 - 2. Finish surface within 0.05 foot of the proposed subbase elevation.
- C. Grading outside building lines:
 - 1. Provide drainage in areas adjacent to buildings away from the structures, and to prevent ponding.
 - 2. Finish areas under walks and pavements to within 0.05 ft above or below the required subgrade elevation.

3.8 COMPACTING

- A. Control material compaction during construction to provide the minimum Standard Proctor Density (SPD) specified, within moisture requirements, for each area as determined according to (ASTM D 698).
- B. Provide not less than the following minimum densities for layer or lift of material placed:
 - 1. Backfill or embankment under buildings, structures or within a 1:1 projected slope outside the finish structure grade @ 95% of Standard Proctor Density.
 - 2. Backfill or embankment under pavements, walks, slabs or within a 1:1 projected slope outside the finish grade @ 98% of Standard Proctor Density.
 - 3. All other backfill or embankment areas @ 85% of Standard Proctor Density.
 - 4. Fills or embankments under buildings, structures, pavements, walks, slabs, and the projected slopes:
 - a. Prepared existing surface @ 90% of Standard Proctor Density.
 - b. The lower 1/4 of embankments greater than 4 ft in height but not exceeding the lower 2 ft. @ 90% of Standard Proctor Density.
 - c. Remainder as specified above.
- C. Moisture control:
 - 1. Moisture content for compaction purposes shall be within the range of 1% below to 4% above optimum moisture as established by ASTM D 698.
 - 2. Existing ground surface or embankment layer of material if necessary shall be moistureconditioned before compacting by:
 - a. For material below specified moisture parameters, uniformly apply water to surface of the material and incorporate with a disk or tiller.
 - b. For material above the specified moisture parameters, air dry with disks and tillers or replaced with acceptable onsite soils at the Contractors expense. If moisture reduction is unable to be achieved after multiple attempts, due to temperature or excessive weather conditions the A/E may approve another method.
 - 3. Process material to provide uniform moisture and clod reduction throughout.
 - 4. Unsuitable material removed due to high moisture may be spread and allowed to dry until suitable.
- D. Proof roll:
 - Prior to placement of granular subbase material on building and pavement areas, the subgrade shall be "proof rolled" with a minimum 25 ton gross vehicle weight (G.V.W.) truck to identify areas of soft or unstable subgrade. Permanent rutting in excess of 1" should be considered failure. Elastic (rebound) movement or rutting in excess of 1" with substantial cracking or substantial lateral movement should be considered failure. Rutting and cracking greater than detailed above is considered "pronounced elasticity." Elastic, rebound, or rolling movement is always associated with excess water in the subgrade system. Failing areas detected by proofrolling should be immediately repaired and retested or removed and replaced with suitable material.

3.9 FIELD QUALITY CONTROL

- A. The Contractor shall provide testing services of a soils engineer and/or independent laboratory approved by the Owner.
- B. Upon completion of each test and/or inspection, promptly distribute copies of test or inspection reports to the A/E.
- C. Testing Requirements:
 - 1. Pentrometer Tests:
 - a. 1 per each spread footing.
 - b. 1 per 25' of lineal footing.
 - 2. Standard Proctor Density/Moisture (ASTM D 698):
 - a. 1 per the insitu fill material.
 - b. 1 per each source of offsite fill material.
 - 3. Field density/moisture tests ASTM D 2922 and ASTM D 3017 (nuclear) or ASTM D 1556 (sand cone) and ASTM D 2216 (moisture content):
 - a. Paved Areas: 1 per 3000 sq ft per 8" lift.
 - b. Building Area: 1 per 2500 sq ft per 8" lift.
 - 4. Liquid Limit and Plasticity Index
 - a. Building Area: 1 per each source of offsite fill material.

3.10 MAINTENANCE

- A. Protection of newly graded areas:
 - 1. Protect newly graded areas from traffic and erosion, and keep free from trash and weeds;
 - 2. Repair and reestablish grades in settled, eroded, and rutted areas to the specified tolerances.
- B. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, reshape, and compact to the required density prior to further construction.

3.11 CERTIFICATION

A. Upon completion of this portion of the work, and as a condition of its acceptance, deliver to the Owner or his/her site representative a written report from the independent soils engineer or testing laboratory certifying that the compaction requirements have been obtained. Include in the report the soil classification, standard proctor density, optimum moisture content and plasticity index of the onsite and borrow materials used in the areas of embankment,

END OF SECTION 312300

SECTION 312333 TRENCHING AND BACKFILLING

PART 1 - GENERAL

1.1 SUMMARY

- A. Trench, backfill, compact, as specified herein, and as needed for installation of underground utilities associated with the work.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
 - 2. Information Available to Bidders: Geotechnical Investigation report; bore hole locations and findings of subsurface materials, is attached for reference only.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Use equipment adequate in size, capacity, and numbers to accomplish the work in a timely manner.
- C. Perform Field Quality Controls Testing as specified herein.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. Standard Trench Excavation: All materials encountered during trench excavation, except rock and over-excavation.
 - 1. Suitable Backfill Material: Class II, Class III, Class IVA, or Class IVB as defined by ASTM D2321.
 - 2. Unsuitable Backfill Material: Includes, but is not limited to, the following materials:
 - a. Soils not classified as suitable backfill material
 - b. Individual stones or concrete chunks larger than 6 inches and averaging more than one per each cubic foot of soil.
 - c. Frozen materials.
 - d. Stumps, logs, branches, and brush.
 - e. Trash, metal, or construction waste.
 - f. Soil in clumps or clods larger than 6 inches, and without sufficient fine materials to fill voids during placement.
 - g. Environmentally contaminated soils.
 - h. Materials removed as rock excavation or over-excavation.

- 3. Rock Excavation: Boulders or sedimentary deposits that cannot be removed in trenches without continuous use of pneumatic tools or blasting.
- 4. Over-excavation: Excavation of unsuitable or unstable material in trenches below the pipe zone
- B. Bedding Materials:
 - 1. Aggregate materials in accordance with Class II Material: Manufactured and nonmanufactured open-graded (clean) or dense-graded (clean) processed aggregate, clean sand, or coarse-grained natural soils (clean) with little or no fines.
- C. Trench backfill materials:
 - 1. General: Soil materials removed from excavations or imported from off-site borrow areas free from organic matter and deleterious substances, and containing no rocks, stone or broken concrete over 4" in greatest dimension. No rocks larger than 1" diameter shall be permitted in the upper 12" of fill.
 - 2. Non-expansive Soils: Soil or granular materials free from organic matter and deleterious substances having a Standard Proctor Density greater than 100 pcf and a plastic limit less than 22 percent.
 - 3. Structural Fill: Cohesionless granular materials free from organic material and other foreign matter, complying with the requirements of Class III materials
 - 4. Clean Granular Materials: Class II Material: Manufactured and non-manufactured opengraded (clean) or dense-graded (clean) processed aggregate, or coarse-grained natural soils (clean) with little or no fines.

2.2 TOPSOIL

- A. Where and if shown on the Drawings of otherwise required, provide topsoil consisting of friable, fertile soil of a loamy character. It shall be relatively free from large roots, sticks, weeds, brush, or stones larger than 1 inch in diameter, or other litter and waste products. At least 90 percent must pass the No. 10 sieve and the pH must be between 5.0 and 8.0.
- B. Obtain topsoil from sources within the project limits, or provide imported topsoil obtained from sources outside the project limits, or from both sources

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 FINISH ELEVATIONS AND LINES

A. Finish grading shall be worked to contours or elevations indicated on the drawings. Rocks and other debris unearthed during finish grading operations shall be removed from immediate construction area and disposed of elsewhere on site as approved by Owner and Engineer/Architect.

- B. Final disking, harrowing, raking etc. and other preparations for seeding, sod or landscaping will covered in subsequent specification sections.
- C. The Contractor shall provide field engineering services as required but not limited to:
 - 1. Establish and maintain lines and levels.
 - 2. Structural design of shores, forms, and similar items as part of his/her means and methods of construction.

3.3 PROCEDURES

- A. Utilities:
 - 1. No attempt is made to indicate or show accurate location of all underground utilities in the line of, or crossing the proposed work. In general, wherever record information was available of locations and wherever field location was possible during surveys, the approximate position of utilities is shown on the Drawings. These are primarily for the purpose of indicating the approximate position of the underground lines with respect to the proposed sewer lines.
 - 2. The determination of the exact location of all existing facilities, and all other pipes, services and structures, and their proper protection, support and maintenance during all construction operations, is the expressed responsibility of the Contractor in the performance of his contract. Contractors are advised to secure any additional information, relative to the underground utility lines, by consulting with proper private and public officials, under whose jurisdiction the maintenance and operation of the utility lines lie, and/or by field investigations at his own expense.
 - 3. Wherever underground utilities are disturbed or damaged as a result of the construction work proposed herein and such utilities can be replaced at their original locations and grades with all costs in connection with such replacement work to be borne by the Contractor and no separate or extra payment will be made therefore.
 - 4. Where existing underground utilities are in actual contact with the new work, so that such utilities cannot be replaced as originally found prior to excavation, and where relocation and changes are required, then the work shall be replaced or relocated by "others" at no cost to the Contractor. The Contractor shall so coordinate his work as to allow a reasonable time for such replacement or relocation and in no event shall extra compensation be allowed for such coordination or any reasonable delay occasioned there from. Should it be found necessary or desirable by the Owner for the Contractor to perform the work of replacement or relocation, the Engineer/Architect will issue in writing a field order defining the extent of the additional work and instructing the Contractor to proceed with such construction. Compensation for such work shall be determined as set forth the General Conditions.
- B. Protection of persons and property:
 - 1. Furnish, install and maintain barricades, warning lights, and/or warning tape at open holes and depressions or other potential hazards occurring as part of this Work.
 - 2. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
 - 3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, and other hazards created by operations under this Section.
 - 4. Provide traffic control items in accordance with the Manual of Uniform Traffic Control Devices (MUTCD), and the requirements of the governmental agency having jurisdiction, when work is being complete on or adjacent to public streets and/or Right-of-ways.

C. Dewatering:

- 1. Remove all water, including rain water, encountered during trench and substructure work to an approved location by pumps, drains, and other approved methods.
- 2. Keep excavations and site construction area free from water.

3.4 EXCAVATING

- A. Perform excavating within the limits of the Work to the lines, grades, and elevations indicated and specified herein.
- B. Surplus materials:
 - 1. Dispose of unsatisfactory excavated materials, and surplus excavated material.
- C. Excavate and backfill in a manner and sequence that will provide proper drainage at all times.

3.5 PIPE BEDDING

- A. Place bedding material in the bottom of the trench in lifts no greater than 6 inches thick. Consolidate and moderately compact bedding material.
- B. Shape bedding material to evenly support pipe at the proper line and grade, with full contact under the bottom of the pipe. Excavate for pipe bells.
- C. Install pipe and system components.
- D. Place, consolidate, and moderately compact additional bedding material adjacent to the pipe to a depth equal to 1/6 the outside diameter of the pipe.

3.6 HAUNCH SUPPORT

- A. Granular Material:
 - 1. Place aggregate material in lifts no greater than 6 inches thick.
 - 2. Consolidate and moderately compact by slicing with a shovel or using other approved techniques.
- B. Suitable Backfill Material:
 - 1. Place in lifts no greater than 6 inches thick.
 - 2. For suitable backfill materials, compact to at least 90% of Standard Proctor Density. Obtain required compaction within a soil moisture range of optimum moisture of -2% to 4% above optimum moisture content.

3.7 FILLING AND BACKFILLING

- A. Backfill excavations as promptly as progress of the Work permits, but not until:
 - 1. Acceptance of construction below finish grade.

- 2. Shoring and bracing are removed, and voids have been backfilled with satisfactory materials.
- 3. Trash and debris have been removed.
- B. Placing and compacting:
 - 1. Place backfill materials in layers not more than 8" in loose depth.
 - 2. Before compacting, moisten or aerate each layer as necessary to provide the optimum moisture content.
 - 3. Compact each layer to required percentage of maximum density for the area.
 - 4. Do not place backfill or fill material on surfaces that are muddy, frozen, or containing frost or ice.
 - 5. Hydraulic compaction (flooding with water) is not allowed unless authorized by the Engineer.
 - 6. Place backfill and fill materials evenly adjacent to structures, to required elevations.
 - 7. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around the structures to approximately the same elevation in each lift.

3.8 COMPACTING

- A. Control soil compaction during construction to provide the minimum percentage of density specified for each area as determined according to Standard Proctor Density (ASTM D 698).
- B. Provide not less than the following maximum density of soil material compacted at optimum moisture content for the actual density of each layer of soil material in place.
 - 1. Backfill under buildings or structures @ 95% of maximum density (compact to at least 80% relative density for clean aggregates).
 - 2. Backfill under pavements and walks @ 98% of maximum density (compact to at least 80% relative density for clean aggregates)
 - 3. All other backfill @ 90% of maximum density (compact to at least 65% relative density for clean aggregates).

3.9 FIELD QUALITY CONTROL

A. Trench compaction testing is the Contractor's responsibility and they shall provide testing of trench backfill material using the services of an independent testing laboratory approved by the Engineer.

B. Soil Testing:

1.

- Cohesive Soils:
 - a. Determine moisture-density relationships by ASTM D 698 (Standard Proctor). Perform at least one test for each type of cohesive soil used.
 - b. Determine in-place density and moisture content. Use ASTM D 1556 (sand-cone method) and ASTM D 2216 (laboratory moisture content), or use ASTM D 6938 (nuclear methods for density and moisture content).
- 2. Cohesionless Soils:
 - a. Determine maximum and minimum index density and calculate relative density using ASTM D 4253 and ASTM D 4254.
 - b. For clean aggregate granular bedding material and backfill, determine gradation according to ASTM C 136.
- C. Field Testing:

- 1. Testing Frequency and Locations: Perform testing of the final trench backfill, beginning at a depth of 2 feet above the top of the pipe, as follows:
 - a. Coordinate the timing of testing with the Engineer.
 - b. The Engineer/Inspector will determine the location of testing.
 - c. For each 2 vertical feet of consolidated fill, provide tests at a maximum horizontal spacing of 200 feet and at all street crossings.
 - d. Additional testing may be required by the Engineer in the event of non-compliance or if conditions change.
 - e. If necessary, excavate to the depth and size as required by the Engineer to allow compaction tests. Place backfill material and recompact.
- 2. Test Failure and Retesting: Rework, recompact, and retest as necessary until specified compaction and moisture content is achieved in all areas of the trench. In the event of failed tests, the Engineer may require retesting as deemed necessary.

3.10 MAINTENANCE

- A. Protection of newly trenched areas:
 - 1. Repair and reestablish grades in settled, eroded, and rutted areas to the specified tolerances.
- B. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, reshape, and compact to the required density prior to further construction.

END OF SECTION 312333

SECTION 312513

EROSION CONTROL

PART 1 - GENERAL

1.1 SUMMARY

- A. Furnish all materials; install, construct, maintain, and remove specified erosion control devices; at locations specified in the contract documents, or where specified by the Engineer.
- B. Complete the required construction work on this project, while minimizing soil erosion and controlling water pollution. Maintain these features as specified, from initial construction stages to final completion of the project
- C. Other related documents.

1.2 GENERAL

- A. The Contractor shall manage his operations to control water pollution in accordance with this specification and applicable State regulations. Construction of permanent drainage facilities and other contract work, contributing to control of erosion, shall be scheduled at the earliest practicable time.
- B. The Contractor shall furnish, install, maintain, and remove temporary erosion control measures. The Contractor shall prevent silt or polluted storm water discharge from the site.
- C. The Owner's Representative may require installation of additional erosion control facilities, by the Contractor, if in the sole opinion of the Owner's Representative, the Contractor's efforts are inadequate.

1.3 DEFINITIONS

- A. General Permit: The General Permit for storm water discharges associated with construction activity shall be followed if the construction disturbs more than one (1) acre in accordance with the Illinois Environmental Protection Agency (IEPA) Division of Water Pollution Control.
- B. Storm Water Pollution Prevention Plan (SWPPP): If required, a plan required by the General Permit that includes site map(s), an identification of construction/contractor activities that could cause pollutants in the storm water, and a description of measures or practices to control these pollutants.
- C. Best Management Practice (BMP): Any program, technology, process, siting criteria, operating method, measure, or device that controls, prevents, removes, or reduces pollution.

1.4 SUBMITTALS

A. Product data: If requested by the Engineer/Architect (A/E), within 15 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

- 1. Materials list of items proposed to be provided under this Section;
- 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
- B. The Contractor shall submit his proposed "Erosion Control Plan" for review and approval by the Owner's Representative. Approval of the plan does not relieve the Contractor of his contractual responsibility to prevent the discharge of pollutants into the receiving drainage ways.
- C. The Contractor shall review the Storm Water Pollution Prevention Plan (SWPPP) provided in these plans and make appropriate field corrections to the document, and submit final corrected copies of the SWPPP to the Owner and facility.

1.5 RELATED SECTIONS

A. Section 312300 – Excavation and Fill.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Wattles:
 - 1. Netting: Open weave, degradable netting. Nominal diameter of 9 inches, or as specified.
 - 2. Fill Material: Straw, wood excelsior, coir, or other natural materials approved by the Engineer.
 - 3. Stakes: 1 inch by 1 inch (minimum) wooden stakes, or stakes of equivalent strength.
- B. Erosion Control Blankets
 - 1. Short Term Erosion Control Blanket, Functional longevity of between 3 and 12 months and classified as follows:
 - a. Single-net erosion control blankets and open weave textiles, consisting of an erosion control blanket composed of processed degradable natural or polymer fibers, mechanically bound together by a single degradable synthetic or natural fiber netting to form a continuous matrix, or an open weave textile composed of processed degradable natural or polymer yarns or twines woven into a continuous matrix.
 - 2. Long Term Erosion Control Blanket, Functional longevity of 36 months and classified as follows:
 - a. Erosion control blankets and open weave textiles, consisting of processed slow-degrading natural or polymer fibers, mechanically bound together between two slow degrading synthetic or natural fiber nettings to form a continuous matrix, or an open weave textile composed of processed slow-degrading natural or polymer yarns or twines woven into a continuous matrix.
- C. Riprap:
 - 1. Riprap Class B material conforming to Standard Specifications Section1005.01 with size and locations as noted in the construction documents.

- D. Temporary Pipe:
 - 1. PVC, HDPE, and metal pipes as specified in Standard Specifications Section 1040
- E. Temporary Seeding:
 - 1. December 1 to March 1: 50 lbs oats/acre.
 - 2. March 1 to December 1: 50 lbs cereal rye or wheat.
 - 3. Mulch shall be wheat straw.
- 2.2 CERTIFICATION AND SAMPLING:
 - A. The Contractor shall furnish a manufacturer's certification, stating the material conforms to the requirements of these specifications.
 - B. The certification shall include, or have attached, typical results of tests for the specified properties, representative of the materials supplied.
 - C. The Owner's Representative reserves the right to sample and test any material offered for use.

PART 3 - EXECUTION

- 3.1 GENERAL REQUIREMENTS
 - A. The Owner's Representative may limit the surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow, or fill operations.
 - B. The Owner's Representative may direct the Contractor to provide immediate permanent or temporary pollution control measures to prevent contamination of adjacent streams, other watercourses, lakes, ponds, or other areas of water impoundment. Work may involve the construction of temporary berms, dikes, dams, sediment basins, slope drains, use of temporary mulches, seeding or other control devices or methods to control erosion.
 - C. The Contractor shall incorporate permanent erosion control features at the earliest practicable time.
 - D. The Contractor at no additional cost shall provide temporary pollution control measures needed to control erosion during normal construction practices to the Owner.
 - E. Contractor shall designate trained and knowledgeable personnel to coordinate all SWPPP activities, inspections and identify these personnel to the Owner's Representative during construction, if required by the storm water pollution prevention plan.
 - F. The SWPPP is a living document. As the conditions of the site changes, the SWPPP should be updated by the Contractor, as applicable.
 - G. The SWPPP is subject to random inspection by the Owner. The SWPPP should be kept up to date by the Contractor and available for inspection at any time, as applicable.

- H. If Contractor determines that any BMP should need modification, the changes shall be dated and documented, and all necessary field changes performed.
- I. Perform inspections according to and at frequency required by the General Permit and local governing agencies
- 3.2 LIMITATION OF AREA DISTURBED:
 - A. The Contractor's operations shall be scheduled to install permanent erosion control features immediately after clearing and grubbing, and grading.
 - B. The surface area of erodible earth material exposed at one time by clearing and grubbing, excavating, fill, or borrow shall not exceed 200,000 square feet without written approval of the Owner's Representative.
 - C. The Owner's Representative may limit the area of clearing and grubbing, excavation, borrow, and embankment operations commensurate with the Contractor's capability and progress in completing the finish grading, mulching, seeding, and other such permanent pollution control measures current.
 - D. The Contractor shall respond to seasonal variations. If required by weather, temporary erosion control measures shall be taken immediately.

3.3 BORROW AND WASTE AREAS

- A. Material pits other than commercially operated sources and material spoil areas shall be subject to pollution control measures of this specification. An offsite location does not relieve the Contractor of his contractual obligation to prevent the introduction of silt or other pollutants into receiving waterways.
- 3.4 CONFLICT WITH FEDERAL, STATE OR LOCAL LAWS, RULES OR REGULATIONS
 - A. In case of conflict between these requirements and pollution control laws, rules, or regulations or other Federal, State or local agencies, the more restrictive laws, rules, or regulations shall apply.

3.5 WATTLES:

- A. Installation:
 - 1. Construct a shallow trench, 2 to 4 inches deep, matching the width and contour of the wattle.
 - 2. Install wattle along contour of slope.
 - 3. Turn ends of wattle uphill to prevent water from flowing around ends.
 - 4. Place and compact excavated soil against the wattle, on the uphill side.
 - 5. Drive stakes through the center of the wattle, into the ground at a maximum spacing of 4 feet along the length of the wattle, and as needed to secure the wattle and prevent movement.
 - 6. Abut ends of adjacent wattles tightly. Wrap joint with a 36 inch wide section of silt fence and secure with stakes.
- B. Maintenance:

- 1. When accumulated sediment reaches a level one-half the height of the wattle, or when the wattle becomes clogged with sediment and no longer allows runoff to flow through, remove the wattle as described above, and replace according to the installation instructions above.
- C. Removal:
 - 1. When specified in the contract documents, or as directed by the Engineer, remove the wattle upon completion of the project, and after final stabilization is achieved; or as indicated in the SWPPP, if applicable.
 - 2. Completely remove the wattle netting, filler material, and stakes.
 - 3. Spread the accumulated sediment to match finished grade and to ensure proper drainage.
 - 4. When allowed by the Engineer, the wattle netting may be sliced open and the filler material spread out over the ground. Removal of netting and stakes and spreading of sediment is still required.

3.6 EROSION CONTROL BLANKET

- A. Slope Application
 - 1. Grade and smooth surface. Remove all rocks, clods, vegetation, or other obstructions that will prevent direct contact between the erosion control blanket and the soil surface.
 - 2. When specified, prepare seedbed and place seed and fertilizer according with these specifications prior to placing erosion control blanket.
 - 3. Install anchor trench at top of slope. Seed and fertilize trench after backfill and compaction, if seeding is specified.
 - 4. Unroll the erosion control blanket down or horizontally across the slope.
 - 5. Place consecutive blankets down the slope end-over-end, shingle style.
 - 6. Overlap ends of consecutive rolls a minimum of 3 inches, and install anchors at a maximum spacing of 18 inches along all overlaps.
 - 7. Overlap edges of adjacent rolls a minimum of 2 inches.
 - 8. Install anchors at edge seams between rows.
- B. Channel/Ditch Application:
 - 1. When specified, prepare seedbed and place seed and fertilizer according with these specifications prior to placing erosion control blanket.
 - 2. Place end of first roll in the anchor slot at the center of the upstream channel and secure with anchors.
 - 3. Position adjacent rolls in the anchor slot, overlapping adjacent rolls a minimum of 3 inches.
 - 4. Place backfill material in anchor slot and compact. Unroll erosion control blanket over compacted slot and secure with anchors.
 - 5. Unroll erosion control blanket downstream. Maintain a minimum 3 inch overlap between adjacent rolls. Secure edge lap with anchors.

- 6. Install intermittent staple check slots every 30 feet.
- 7. Construct end lap at end of roll and beginning of new roll. Overlap roll ends with upstream erosion control blanket on top.
- 8. Excavate longitudinal trench along both sides of the channel at the outside edges of installation. Place outer edges of erosion control blanket into longitudinal slot. Install anchors, place backfill material, and compact.
- 9. Terminate installation at downstream end with staple check.
- 10. Install anchors in a regular pattern over entire area covered according to manufacturer's published recommendations (minimum three anchors per square yard).

3.7 RIP RAP:

A. Install rip rap in accordance with the drawing details in these construction documents.

3.8 TEMPORARY PIPE

- A. Installation:
 - 1. All temporary pipes shall be installed in the same manner as permanent pipe is installed on the project to assure that the water does not cause erosion around the pipe.
 - 2. Material to backfill the pipe should be placed in 6" lifts and mechanically compacted. Compaction testing will not be required.
 - 3. Discharge slope drain to a stable outlet or to a sediment retention device.

3.9 TEMPORARY SEEDING AND MULCHING

- A. Installation:
 - 1. Permanent seeding and mulching following temporary seeding will be performed during the favorable seeding seasons only.
 - 2. Temporary seeding mixtures and planting season:
 - a. December 1 to March 1: 50 lbs. oat grain per acre
 - b. March 1 to December 1: 50 lbs. (cereal rye or wheat) per acre
 - 3. Temporary mulch, fertilizer, and lime for seeding:
 - a. Fertilizer and mulch for temporary seed mixtures shall be applied in accordance with Section 329219.
 - b. Fertilizer shall be applied at the rate specified for permanent seeding.
 - c. Lime will not be required for temporary seeding.

3.10 SEDIMENT REMOVAL

A. Sediment deposits shall be removed when:

- 1. The deposits reach approximately one-half the height of a ditch check, straw bale barrier or silt fence.
- 2. The sediments have reduced the ponded volume of sediment basins to one-third of the original volume.
- 3. Requested by the Owner's Representative.
- B. Sediment removed from erosion control features shall be deposited in a location where it will not erode into construction areas or watercourses.

END OF SECTION 312513

SECTION 321123 AGGREGATE BASE COURSES

PART 1 - GENERAL

1.1 SUMMARY

A. Provide aggregate base courses on a prepared subbase where shown on the Drawings, and as specified herein.

1.2 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 32 19.
- B. If requested by the Engineer/Architect (A/E), within 15 calendar days after the Contractor has received the Owner's Notice Award, submit:
 - 1. Certifications of material compliance for:
 - a. Aggregate base course
 - b. Geotextile fabric
 - c. Geogrid materials

1.3 REFERENCES

A. Standard Specifications for Road and Bridge Construction, January 1, 2016, Illinois Department of Transportation (IDOT) herein noted as the Standard Specifications.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Geotextile Fabric: Consisting of woven or non-woven filaments of polypropylene, polyester or polyethylene meeting the following minimums:
 - 1. Weight (oz/sy): 4 minimum.
 - 2. Grab tensile Strength (lbs): 200 ASTM D 4632.
 - 3. Elongation (%): 15 ASTM D 4632.
 - 4. Trapezoidal Tear Strength (lbs): 75 ASTM D 4533.
- B. Aggregate Base Course:
- C. Article 1004.04 (CA-6), Type A or B.

PART 3 - EXECUTION

3.1 SUBGRADE PREPARATION

A. Subgrade preparation shall be in accordance with Section 3.6 of 31 23 00 Excavation and Fill of these specifications.

3.2 GEOTEXTILE FABRIC

- A. Geotextile fabric when specified shall be placed on the prepared subbase prior to placement of the aggregate base course. Fabric of insufficient width or length to fully cover the specified area shall be lapped or sown. Minimum lap shall be 12" and minimum sewn lap shall be 4".
- B. Placement of the base course on the fabric shall be accomplished in a manner as to prevent tearing or shoving of the material. Fabric damaged shall be repaired or replaced prior to placement of the base course.

3.3 GEOGRID

A. Geogrid when specified shall be placed on the prepared subbase prior to placement of the aggregate base course. When geogrid is used for stabilization, the aggregate base thickness shall be a minimum of six (6) inches thick in order to prevent it from popping through the aggregate base. Minimum lap shall be 12" or as specified by the manufacturer.

3.4 AGGREGATE PLACEMENT

- A. General: The aggregate shall be uniform in gradation. The base course shall be constructed in layers not more than four (4) inches thick when compacted, except that if tests indicate that the desired results are being obtained, the compacted thickness of any layer may be increased to a maximum of eight (8) inches. When placed, it shall be free from segregation and shall require minimum blading or manipulation. Immediately after the material has been placed, it shall be compacted with a tamping roller, a vibratory machine or combination of the two.
- B. Compaction: Before the aggregate is deposited on the subgrade, it shall contain the amount of moisture required for compaction. The granular material shall be compacted to not less than 95 percent of the Standard Laboratory Density, determined in accordance with AASHTO T 99 (method A or C). If test indicate that the base course does not comply with the density requirements, additional wetting, if necessary, and rolling will be required until the density is obtained. Moisture shall be added to the material during compaction only when it is necessary to increase the percentage of moisture to obtain the required density.
- C. Staging: The aggregate base shall initially be placed and compacted to 90% of the design thickness shown on the Drawings. The remaining 10% of the aggregate base and final finishing shall be completed after the curbs and driveways are installed. The final surface shall be within + or -0.5".
- D. Proof roll: After the Contractor has finish graded the base course, the subgrade shall be "proof rolled" with a minimum 25 ton gross vehicle weight (G.V.W.) truck to identify areas of soft or unstable subgrade. Permanent rutting in excess of 1" should be considered failure. Elastic (rebound) movement or rutting in excess of 1" with substantial cracking or substantial lateral movement should be considered failure. Rutting and cracking greater than detailed above is

considered "pronounced elasticity." Elastic, rebound, or rolling movement is always associated with excess water in the subgrade system. Failing areas detected by proofrolling should be immediately repaired and retested.or removed and replaced with suitable material.

E. Flatness: Maximum variation of 1/2 inch measured with 10-foot straight edge.

3.5 FIELD QUALITY CONTROL

- A. The Contractor will provide testing services of a soils engineer and/or independent laboratory for this project.
- B. Upon completion of each test and/or inspection, promptly distribute copies of test or inspection reports to the A/E.
- C. Testing Requirements:
 - 1. Determine moisture-density relationships by ASTM D 698 (Standard Proctor). Perform at least one test for each type of material used.
 - 2. Provide not less 98% of maximum density of material compacted at optimum moisture content for the actual density of each layer of material in place.
 - 3. Field density/moisture tests (ASTM D 6938):
 - a. Aggregate Base: 1 per 3000 sq ft.

END OF SECTION 321123

SECTION 321313 CONCRETE PAVING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes exterior Portland cement concrete (PCC) pavement and appurtenances for the following:
 - 1. Driveways
 - 2. Parking lots
 - 3. Curbs and Gutters.
 - 4. Sidewalks
 - 5. Site Lighting, Bollard and misc. foundations

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete pavement mixture.
- C. Pavement Jointing Plan

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- B. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by requirements in the Contract Documents.

1.4 REFERENCES

A. Standard Specifications for Road and Bridge Construction, January 1, 2016, Illinois Department of Transportation (IDOT) herein noted as the Standard Specifications.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

- A. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.
- B. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.

- C. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed, epoxy coated.
- D. Plain Steel Wire: ASTM A 82, as drawn.
- E. Deformed-Steel Wire: ASTM A 496.
- F. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice."

2.2 CONCRETE MATERIALS

- A. Comply with the following as minimums:
 - 1. Portland cement: ASTM C150, Type I.
 - 2. Aggregate: ASTM C33, uniformly graded and clean.
 - 3. Aggregate, coarse: Crushed rock or washed gravel. (Max. Size 3/4" to 1 1/2", w/ 0 12% passing #4)
 - 4. Aggregate, fine: Natural washed sand. (Max. Size 3/8" with 3 30% passing #50)
 - 5. Water: Clean and potable.
 - 6. Admixtures: Air entraining and/or water reducing agents of standard brand as approved.
 - 7. Fly Ash: ASTM C618, Class C or F.
- B. At least six test cylinders shall be made from trial batches of the design proposed. Two of these shall be broken at 7 days, two at 14 days, and two at 28 days. In lieu of test cylinders the Contractor may furnish a certificate from the concrete supplier that the proposed mix design has been satisfactorily used on other work and that it will meet the requirements of the specifications.
- C. Classes of concrete:

Class	Uses	Strength (14 days)	*Cement Content (min)
"SI" per Std. Specs	Exterior Structural elements, Slabs on Grade, General Concrete	3,500 psi	571 - Ibs/Cu Yd

*Fly Ash may be substituted in accordance with Sec. 2.2 G.

D. Consistency shall be such that the mixture can be worked into all parts of the forms and around the reinforcing steel of the structure, without segregation of the materials or the appearance of free water on the surface of the concrete. Unless otherwise stated, the slump measured in accordance with ASTM C143 shall be within the following limits.

1.	Floors, walks, and slabs	2" to 4"
2.	Forms 9" wide or over	2" to 4"

- 3. Forms less than 9" wide 3" to 5"
- E. All concrete be air entrained, containing between 4% and 7% entrained air, after mixing is complete and just prior to placement.

- F. Pumped concrete shall comply with ACI 304 and these specifications.
- G. Fly Ash shall not be used after October 15 and before April 1. The amount of fly ash shall not exceed 20% of cementitious material and the replacement ratio (fly ash to cement replaced) shall be a minimum of 1.5:1.
- 2.3 CURING MATERIALS
 - A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth.
 - B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
 - C. Water: Potable.
 - D. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.
 - E. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
 - F. White Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 2, Class B.

2.4 CONCRETE PROTECTION

A. All concrete pavements, sidewalk and curb and gutters shall be treated with a penetrating permanent concrete protection treatment at its time of placement. Acceptable products include Aquron 2000 Cure & Seal, DRYCRETE Cure Shield or Spray-Lock SCP 327. If the contractor chooses to not treat the concrete at the time of placement acceptable penetrating permanent concrete protection products are Aquron CPT-2000, DRYCRETE Moisture Stop or Spray-Lock SCP 578

2.5 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.
- B. Pavement-Marking Paint: Latex, waterborne emulsion, lead and chromate free, ready mixed, complying with FS TT-P-1952, with drying time of less than 45 minutes. The Architect/Engineer shall approve the paint manufacturer.
 - 1. Color: Yellow for Accessibility Parking stripes and hatching. White for all other stripes, symbols, words, and hatching.

2.6 DETECTABLE WARNING PANELS

- A. Detectable Warnings.
 - 1. Detectable Warnings shall consist of a surface of truncated domes meeting the requirements of the ADAAG and the details show on the plans. The installation shall be an integral part of the walking surface and only the domes shall project above the walking surface. The panel shall be available in standard colors to allow a contrasting

appearance. Panel color shall be throughout the entire thickness. The panels shall carry a minimum five (5) year manufacturer's warranty.

2. The material, equipment and installation procedures used shall be according to the manufacturer's specifications.

2.7 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.

PART 3 - EXECUTION

3.1 SUBGRADE PREPARATION

- A. Subgrade preparation shall be in accordance with Section 3.6 of 31 23 00 Excavation and Fill of these specifications.
- B. Geotextile Fabric, Geogrid and Aggregate Base shall be in accordance with Section32 11 23 Aggregate Base Courses of these specifications.

3.2 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.
- 3.3 STEEL REINFORCEMENT
 - A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
 - B. Epoxy coated bars will not be required.
- 3.4 JOINTS
 - A. General: Joints in sidewalks and driveways shall be by tooling while the concrete is plastic. Sawed joint may be allowed in pavements and curbs. All sidewalks, driveways and pavements shall be edged. Deformed steel tie bars in Longitudinal Construction Joints shall be placed by drilling and epoxy setting when adjacent slabs are to be constructed separately. Form construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.
 - B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.

- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.
- D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Sawed contraction joints for a depth equal to at least one-fourth of the concrete thickness. Sidewalk joints shall be tooled and not sawed.
- E. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces. Tool joints on all sidewalks and in locations indicated on the Drawings.
- F. Contractor shall submit a jointing plan for approval by owner's representative prior to placing any concrete pavement.
- 3.5 CONCRETE PLACEMENT AND FINISHING
 - A. Moisten subbase to provide a uniform dampened condition at time concrete is placed.
 - B. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
 - C. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
 - D. Strike Off, Consolidation and Finishing: The pavement may be placed utilizing an approved vibrating screed or other approved strike-off and consolidating machine that provides a surface that is uniform texture, true to grade and cross section and free from porous areas. Additional consolidation with handheld or machine vibrators in front of strike off may be necessary if adequate consolidation is not being achieved. Longitudinal hand bull floating with a float having a min. width of 5 ft for non-vehicular slabs and a min. width of 10 ft for vehicular use slabs will be required. Floats or darbies shall be used at all edges as necessary to provide a uniform surface plane.
 - E. General: Do not add water to concrete surfaces during finishing operations.
 - F. Exterior Finish:
 - 1. Burlap Finish: Drag a seamless strip of damp burlap across float-finished concrete, perpendicular to line of traffic, to provide a uniform, gritty texture.
 - 2. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.
 - 3. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating floatfinished concrete surface 1/16 to 1/8 inch deep with a stiff-bristled broom, perpendicular to line of traffic.
 - G. Interior (smooth) Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish floating to a trowel smooth surface.
 - H. Apply surface treatments, if any, per manufacturer's recommendations.
3.6 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- D. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound or a combination of these methods.

3.7 CONCRETE PROTECTION

A. Apply penetrating permanent concrete protection treatment to all concrete pavements, sidewalk and curb and gutters at its time of concrete placement at rates as required by the manufacturer.

3.8 PAVEMENT TOLERANCES

- A. Comply with tolerances of ACI 117 and as follows:
 - 1. Elevation: 1/4 inch.
 - 2. Thickness: Plus 3/8 inch, minus 1/4 inch.
 - 3. Surface: Gap below 10-foot- long, unleveled straightedge not to exceed 3/16 inch.
 - 4. Joint Spacing: Max 2 times slab thickness (inches) times 24.
 - 5. Contraction Joint Depth: 1/3 slab thickness, no minus.
 - 6. Joint Width: Plus 1/8 inch, no minus.
- B. Curb tolerances:
 - 1. Finished curb surfaces including curb top, face and gutter line shall not vary more than a $\frac{1}{4}$ " from the testing edge of a 10 foot straightedge. Permissible deficiencies in section thickness will be up to a $\frac{1}{4}$ ".

3.9 PAVEMENT MARKING

- A. Allow concrete pavement to cure for 28 days and be dry before starting pavement marking.
- B. Sweep and clean surface to eliminate loose material and dust. Remove any oil or grease.
- C. Apply paint with mechanical equipment to produce pavement markings of dimensions indicated with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 16 mils.
- D. Paint shall not be applied at air temperatures below 40 degrees F.
- 3.10 WHEEL STOPS
 - A. Securely attach wheel stops into pavement with not less than two galvanized steel dowels embedded in holes drilled or cast into wheel stops at one-quarter to one-third points. Firmly bond each dowel to wheel stop and to pavement. Securely install dowels into pavement and bond to wheel stop. Recess head of dowel beneath top of wheel stop.

3.11 SEALANT

- A. The top ¼ inch of all expansion joints (excluding tooled joints) shall be sealed with a self-leveling polyurethane horizontal sealant complying with ASTM C920, Type M, Grade P, Class 25.
- B. Pavement joints shall be sealed with hot-poured joint sealer in compliance with Article 420.12 and Article 1050.02.
 - 1. The hot poured sealer shall be placed utilizing a "V" shaped wand tip, to allow penetration of the materials into the joints while providing neat completely filled joints.
 - 2. Joints shall be completely filled or over banded not to exceed 1½". Excessive over banding shall be removed as directed by the A/E.

3.12 FIELD QUALITY CONTROL

- A. The Contractor will provide testing services of a soils engineer and/or independent laboratory for this project.
- B. Upon completion of each test and/or inspection, promptly distribute copies of test or inspection reports to A/E.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
 - 1. Testing Frequency: Obtain one composite sample for the first 10 cu. yd. placed each day, plus one set for each additional 50 cu. yd. placed.
 - 2. Slump: Required 2"-4" ASTM C 143/C 143M; one test at point of placement for each composite sample of each concrete mixture. Perform additional tests when concrete consistency appears to change.
 - 3. Air Content: Required 6% (-2%, +1%) ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173/C 173M, volumetric method, for structural lightweight concrete; one test for each composite sample of each concrete mixture.
 - 4. Concrete Temperature: ASTM C 1064/C 1064M; one test per truck when air temperature is 35 deg F and below and when 85 deg F and above.
 - 5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample of each concrete mixture.
 - 6. Compression Test Specimens: ASTM C 31/C 31M.
 - a. Cast and laboratory cure one set of four (4) standard 6" x 12" or 4" x 8" cylinder specimens for each composite sample.
 - b. Cast and field cure one additional standard cylinder specimen for each composite sample for cold or hot weather concrete.
 - 7. Compressive-Strength Tests: ASTM C 39/C 39M;
 - a. If 6" x 12" cylinders are taken: test one of four laboratory-cured specimens at 7 days and one set of two specimens at 28 days. The forth specimen will be a hold to serve as a spare if specimens do not reach their design strengths.
 - b. If 4" x 8" cylinders are taken: test one of five laboratory-cured specimens at 7 days and one set of three specimens at 28 days. The fifth specimen will be a hold to serve as a spare if specimens do not reach their design strengths.
 - c. A compressive-strength test shall be the average compressive strength from a set of two or three specimens obtained from same composite sample and tested at age indicated.

3.13 REPAIRS AND PROTECTION

- A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.
- B. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement.
- C. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

SECTION 331010 WATER SERVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Work under this section includes furnishing all labor, materials, tools, equipment, and appurtenances for the water service as an installed unit complete in place with all necessary appurtenances and incidental fittings.

1.2 SUBMITTALS:

- A. Catalog Data: Obtain manufacturer's literature and illustrations.
- B. Installation Instructions: Complete manufacturer's installation instructions.
- C. Maintenance Data: Parts list and maintenance instructions.
- D. Contractor shall submit for approval by the Engineer, dimension prints or shop drawings for the following:
 - 1. Brass fittings.
 - 2. Brass saddles and corporation stops.
 - 3. Meter yokes or setters.
 - 4. Meter pits and lids.
 - 5. Service pipe and Stiffeners.

1.3 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

A. Excavation and Fill: Section 312300.

1.4 QUALITY ASSURANCE

- A. Acceptable Manufacturers:
 - 1. Corporation Clamps and Stops:
 - a. Mueller.
 - b. Ford.
 - 2. Service Pipe Fittings and Stiffeners:
 - a. Mueller.
 - b. Ford.

PART 2 - PRODUCTS

2.1 CUSTOMER METER SETTINGS

- A. General:
 - 1. The water service to be installed is located on the drawing.

2.2 SERVICE PIPE

A. Service pipe shall be the nominal diameter size as indicated on the drawings, polyethylene (PE 3408) with a working pressure of 200 PSI, 250 PSI on services below 650' elevation.

B. General:

- 1. PE-3408 polyethylene pipe and/or tubing shall conform to all applicable requirements in the latest revision of the following standards.
- 2. AWWA C-901 For polyethylene (PE) Pressure Pipe and Tubing, 1/2" through 3" for water Service.
- 3. ASTM D1248 For Polyethylene Plastics Molding and Extrusion Materials.
- 4. ASTM D2239 For Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled inside diameter.
- 5. ASTM D2737 For Polyethylene (PE) Plastic Tubing.
- C. Material:
 - 1. The NSF approved polyethylene extrusion compound from which the PE pipe is extruded shall comply with applicable requirements for PE-3408 PE material as described in ASTM D1248 (latest revision).
 - 2. It shall have a minimum cell classification per ASTM D3350 of 345434C, and a material test category per AWWA C-901, ASTM D2239, or ASTM D2737 of C3.
- D. Ratings; Dimensions; and Tolerances:
 - The PE pipe or tubing shall be rated for 200 psi with water at 73.4° F and have a hydrostatic design stress of 800 psi and a hydrostatic design basis of 1600 psi. Minimum burst-pressure requirements shall be 630 psi at 73.4° F. Dimensions and tolerances shall comply with applicable AWWA &/or ASTM standards for SDR-9 copper tube size (CTS-OD) O.D. = 1.25".

SECTION 333216 PACKAGED UTILITY WASTEWATER PUMPING STATION

PART 1 - GENERAL

1.1 SUMMARY

- A. For this Section of the work, the Contractor shall construct an automatic pumping station, including two (2) grinder pumps, check valve, polyethylene tank, controls and alarm panel.
- B. The package lift station shall include all applicable appurtenances necessary for a complete and operable installation.

1.2 SUBMITTALS

A. Shop drawings, electrical wiring diagrams, schematics, dimensional drawings and a description of operation shall be furnished to the Engineer/Architect for approval prior to manufacture or shipment of the equipment.

1.3 SUBSTITUTIONS

- A. If, prior to the execution of the contract, the Engineer/Architect's approval is obtained for alternate equipment, the Contractor shall, at his (her) own expense, make any changes in the structures, building, piping or electrical necessary to accommodate the equipment and if engineering is required due to substitution of other material, the Contractor shall pay the Engineer for the engineering service.
- B. It will be assumed that the cost to the Contractor of the equipment proposed to be substituted is less than the specified equipment and if the substitution is approved, the Contractor's bid price shall be reduced by an amount equal to the net savings.
- C. Substitution of equipment other than that specified and shown will not be considered after the execution of the contract.

PART 2 - PRODUCTS

2.1 PACKAGE LIFT STATION

A. The package lift station shall be model DH152-129 (hard wired level controls) as manufactured by E/ONE Environmental One Corporation. The station shall be rated for flows of 3,000 gpd with 150 gallon capacity. Pumps shall be 1 hp, 1,725 rpm, high torque, capacitor start, thermally protected , 120/240V, 60 Hz, 1 phase.

A concrete lift station enclosure with pumps and controls may be utilized in lieu of the package lift station. If utilized, the lift station shall provide the same capacity, pump sizes, controls, alarms, and all other features provided by the package lift station. Additionally, the same warranties shall be provided for all equipment and components.

- B. Inlet connections: 4-inch inlet grommet standard for DWV pipe.
- B. Discharge: Adaptable to a 2-inch PVC force main. Capable of 15 gpm at 0 psig, 11 gpm at 40 psig and 7.8 gpm at 80 psig.
- C. Accessories: Stainless steel check valve
- D. Alarm Panel:
 - 1. E/One Sentry "Basic" panel supplied with audible and visual high level alarms. Panel shall be approved by UL, CSA, CE and NSF.
 - 2. Panel shall be corrosion-proof, NEMA 4X-rated, thermoplastic enclosure. A padlock shall be provided to prevent unauthorized entry (dead front).
 - 3. "Basic" Option Package:
 - Circuit breakers, 240 or 120 VAC service
 - Terminal blocks and ground lugs
 - Audible alarm with manual silence
 - Manual run feature and run indicator
 - Redundant start function with high-level alarm
 - Safety front authorized personnel only when locked
 - Conformal-coated alarm board (both sides)
 - Alarm board overload protection
 - Additional Option: GFCI Receptacle
- 2.2 CONCRETE BALLAST
 - A. Poured in place or pre-cast concrete in accordance with manufacturer requirements.

PART 3 - EXECUTION

3.1 FACTORY TESTS

- A. All components of the pump station shall be given an operational test at the factory to check for excessive vibration, for leaks in the piping or seals and for correct operation of the automatic control system and all auxiliary equipment. The pump suction and discharge lines shall be coupled to a reservoir and the pumps shall recirculate water for at least one hour under simulated service conditions. The automatic control shall be adjusted to start and stop the pumps at approximately the levels required by the job conditions.
- B. Factory test instrumentation must include flow measuring with indicator; compound suction gauge; bourdon tube type discharge pressure gauge; electrical meters to measure amperes, volts, kilowatts and power factor; speed indicator; vibrometer capable of measuring both amplitude and frequency.
- C. A description of test equipment must be included with submittal data.

3.2 INSTALLATION AND OPERATING INSTRUCTIONS

- A. Installation of the pump chamber, entrance tube and related appurtenances shall be done in accordance with written instructions provided by the Manufacturer.
- B. The Manufacturer shall further provide a complete and detailed Installation, Operation and Maintenance Manual. This manual shall cover, in addition to installation and general operating procedures, the operation, maintenance, and servicing procedures of the major individual components provided with the pump station.
- C. The Manufacturer shall provide the services of a factory-trained representative for a maximum period of one day to perform initial startup of the pump station and to instruct the owner's operating personnel in the operation and maintenance of the equipment.

3.3 GUARANTEE

- A. The Manufacturer shall guarantee for a minimum of two (2) years from date of start up that the structure and all equipment will be free from defects in design, material and workmanship. Warranties and guarantees by the suppliers of various components in lieu of a single source responsibility by the Manufacturer will not be accepted. The Manufacturer shall assume prime responsibility for the guarantee of the station and all components.
 - 1. In the event a component fails to perform as specified or is proven defective in service during the guarantee period, the Manufacturer shall provide a replacement part without cost to the owner. He (she) shall further provide, without cost, such labor as may be required to replace, repair or modify major components such as the station structure, pumps, pump motors, sewage piping manifold, etc. After startup service has been performed, the labor to replace accessory items, such as dehumidifier, sump pump, alternator, etc., shall be the responsibility of others.
 - 2. The replacement or repair (including cost of parts and labor) of those items normally consumed in service, such as pump seals, fluorescent tubes, oil, grease, etc., shall be considered as part of routine maintenance and station upkeep.
 - 3. It is not intended that the Manufacturer assume responsibility for contingent liabilities or consequential damages of any nature resulting from defects in design, material, workmanship or delays in delivery, replacement or otherwise.

SECTION 334101 SANITARY SEWERAGE SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide sanitary sewerage system in accordance with the Standard Specifications for Water and Sewer Main Construction in Illinois, 7th Edition, or latest revision, as shown on the Drawings, and as specified herein.
- 1.2 All work on public right of way shall also be in accordance with the rules and regulations of the City of Hamilton sanitary sewer department.

1.3 SUBMITTALS

- A. Product data: Within 15 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
 - 1. Materials list of items proposed to be provided under this Section.
 - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.

1.4 QUALITY ASSURANCE

A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.5 PERMITS AND ENTRY UPON LANDS

A. The Owner will obtain permits and/or easements for entering upon private lands, public streets, roads and highways, railroads, etc. to the limits and lines shown on the Plans for construction purposes. The Contractor shall confine his operations to the outlined areas and shall comply with all special instructions shown on the Plans or set forth in the Contract Documents.

1.6 UTILITIES AND DRAIN TILES

A. Before starting excavation, establish location and extent of underground utilities occurring in the work area. Utilities shown on the plans indicate the best knowledge of the Owner with regard to general location and nature of the facilities in the area. They are shown for the convenience of the Contractor and shall not relieve the Contractor of the responsibility to properly investigate and protect the utilities. The Contractor shall remain responsible for damages to existing utilities whether indicated on the plans or not.

- B. The Contractor shall notify the Joint Utility Locating Information for Excavators (J.U.L.I.E.) 800/892-0123 and the Owner or his/her site representative 48 hours prior to start of work.
- C. Existing underground utilities are herein defined as consumer service connections, such as water, gas, sewer, electric, telephone, etc., and also culverts, sanitary sewers, storm sewers, combined sewers, water mains, underground power lines, gas mains and the usual appurtenances thereto.
- D. An attempt is made to indicate or show accurate location of all underground utilities or drain tiles in the line of, or crossing the proposed work. In general, wherever record information was available of locations and wherever field location was possible during surveys, the approximate position of utilities and drain tiles is shown on the Plans. These are primarily for the purpose of indicating the approximate position of the underground lines with respect to the proposed sewer lines.
- E. The determination of the exact location of all existing facilities, and all other pipes, services and structures, and their proper protection, support and maintenance during all construction operations is the expressed responsibility of the Contractor in the performance of this contract. Contractors are advised to secure any additional information, relative to the underground utility lines, by consulting with proper private and public officials, under whose jurisdiction the maintenance and operation of the utility lines lie, and/or by field investigations at his own expense.
- F. Wherever underground utilities or drain tiles are disturbed or damaged as a result of the construction work proposed herein and such utilities can be replaced at their original locations and grades, all costs in connection with such replacement work shall be borne by the Contractor and no separate or extra payment will be made therefore.
- G. Where existing underground utilities or drain tiles are in conflict with the new work, so that such utilities cannot be replaced as originally found prior to excavation, and where relocation and changes are required, then the work shall be replaced or relocated by "others" at no cost to the Contractor. The Contractor shall so coordinate his work as to allow a reasonable time for such replacement or relocation and in no event shall extra compensation be allowed for such coordination or any reasonable delay occasioned there from. Should it be found necessary or desirable by the Owner for the Contractor to perform the work of replacement or relocation, the Engineer/Architect will issue in writing a field order defining the extent of the additional work and instructing the Contractor to proceed with such construction. Compensation for such work shall be determined as set forth in the General Specifications, under "Extra, Additional, or Omitted Work Payment."

1.7 TREES, SHRUBBERY, STRUCTURES AND ABOVE GROUND UTILITIES

- A. All trees, shrubbery, utility poles and the like in the line of work shall be protected and preserved except as shown on the Plans, unless permission of the Owner and approval of the Engineer/Architect are obtained for their removal. Construction operations may require hand trenching and tunneling under and adjacent to trees and poles, which are to be preserved.
- B. Private and/or public walls, steps, walks, drives, roads, roadbeds, fences or other structures except trees in the line of work shall be replaced to as good a condition as prior to the start of excavation.
- C. All grassed surface areas shall be replaced to a condition equal to that found prior to the start of work.

- D. Erosion control measures shall be installed in accordance with Section 31 25 13 Erosion Control of these Specifications.
- E. Existing structures and markers such as inlet castings, fire hydrants, highway and street signs, valve boxes, etc., that may be disturbed during the progress of the work, shall be cleaned and reset in their original position in such a manner as may be required by the Engineer/Architect.

PART 2 - PRODUCTS

2.1 PIPE MATERIALS FOR SEWERS

- A. Sewer pipe shall comply with provisions of these specifications for the type, class, strength, coatings and linings of the pipe as shown on the Plans and as described herein:
 - 1. Polyvinyl Chloride (PVC) Pipe 4" to 15" diameter:
 - a. Dimensions of pipe and fittings shall conform to ASTM D3034.
 - b. Minimum acceptable Standard Dimension Ratio (SDR) shall be 26.
 - 1) SDR 26: Minimum pipe stiffness of 115 psi.
 - c. PVC plastic meeting ASTM D 1784, Cell Classification 12454 or 12364.
 - 2. Polyvinyl Chloride Pipe (PVC) 18" to 27" diameter:
 - a. Dimensions of pipe and fittings shall comply with ASTM F 679.
 - b. Pipe stiffness per ASTM D 2412, 46 psi.
 - c. PVC plastic meeting ASTM D 1784, Cell Classification 12454 or 12364.
- B. Joints:
 - 1. PVC Pipe joints for ASTM 3034 and ASTM 679 pipe shall be flexible elastomeric seals per ASTM D 3212 and ASTM F 477 or solvent welded joints per ASTM D 2855 for 4" and 6" only.
- C. Manholes:
 - 1. Manholes shall materials shall comply with applicable Articles 602.02, 603.02, 604.02, 605.02 of the Standard Specifications and details in the Drawings. Pipe stubs when specified for future connections shall consist of a one-foot section of belled pipe of the specified diameter inserted in a watertight connection and an airtight plug.
- D. Cast in Place Concrete:
 - 1. Concrete: Use Class SI concrete. Comply with the following IDOT Specifications.
- E. Non-Shrink Grout
 - 1. Comply with IDOT Section 1024.02 of the Standard Specifications.
- F. Granular Foundation:

- 1. Granular foundation material shall be gravel or crushed stone sized primarily within a 1" to maximum 3" range. Quality shall consist of sound durable aggregate particles reasonably free of objectionable deleterious materials.
- G. Bedding, Haunching and Backfill :
 - 1. Bedding, Hauching and Backfill material as specified in Section 31 23 33 Trenching and Backfilling.
- H. Select Granular Backfill:
 - 1. Select granular backfill shall be a CA-6 material per IDOT specifications, except the quality may be Grade D and up to 15% fines passing the #200 sieve will be allowed (CA-6 Special or B6X).

2.2 CONNECTIONS

- A. Connect nonpressure, gravity-flow sewage piping to building's as shown on the Drawings.
- B. Make connections to existing piping and underground manholes.
 - 1. New connection
 - a. Use commercially manufactured wye fittings for piping branch connections with sizing as show in the plans.
 - 2. Connection to Existing Storm Sewer
 - a. Use commercially manufactured wye or insertable tee fittings to the existing piping. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete complying with Class SI concrete, or install insertable tee per manufacturer's recommendations.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.
- B. Field Measurements Make necessary measurements in the field to assure precise fit of items in accordance with the approved design.

3.2 INSTALLATION

A. Excavation and backfilling for sewers, collection lines, manholes, structures and appurtenances, shall comply with governing Federal, State laws and municipal Ordinances as may be

necessary to protect life property or the Work. In any event, the minimum protection shall conform to the rules and regulations of the Occupational Safety and Health Act (OSHA) Standards for Construction.

- B. Connections to Existing Manholes shall be completed in accordance with Division 6 "Structures for Sanitary and Storm Sewers" of the Standard Specifications section 3.05, and details in the Drawings.
- C. Connections of dissimilar types of pipe when joined outside of a manhole or other structure shall be joined with suitable adapters, such as:
 - 1. Fernco Flexible Coupling, Fernco, Inc. (Davison, Michigan).
 - 2. Flexi-Seal Coupling, Mission Rubber Co. (Corona, California).
 - 3. Approved equal.
- D. Foundations and Bedding:
 - 1. All sewer pipe shall be laid on an aggregate bedding, having a minimum thickness of 4 inches below the pipe and extending to the mid point of the pipe as shown on the Drawings.
 - 2. Compaction requirements for foundation, bedding and haunching shall be based upon the material utilized in accordance with the Section 312333 "Trenching and Backfilling" of these Specifications.
- E. Gravity Sewer Installation:
 - 1. Install watertight plug to prevent water from entering the existing sewer system.
 - 2. Clean pipe interior and joints prior to installation. Keep pipe clean during construction.
 - 3. Begin at the lowest point in the line. Lay groove or bell end pointing upstream unless otherwise specified.
 - 4. Use a saw to cut ends of pipe flush with inside wall of manholes and structures. Do not use hammer or other means to break pipe.
 - 5. Provide manholes as specified in the contract documents.
 - 6. Clean joint surfaces to remove soil or foreign material prior to jointing pipe. Assemble joints according to pipe manufacturer's recommendations. Use equipment that does not apply damaging forces to pipe joints.
 - 7. Install cap, plug, or bulkhead at exposed ends of pipe upon completion of construction or whenever pipe installation is not in progress.
- F. Tees and Laterals:
 - 1. Unless otherwise specified, tees and laterals shall be of the same type and strength material as the main sewer pipe.
 - 2. Lateral pipes and connecting tees or saddles shall be six-inch unless otherwise specified and shall be installed at locations shown on the Plans.
 - 3. Sewer laterals shall be installed at right angles to the sewer main. Trenching and backfilling laterals shall comply with the same requirements as the main sewer pipe it joins. Open ends of laterals or tees shall be closed with air tight plugs which can readily be removed at a later date without breaking the lateral pipe or tee, if required.
 - 4. The Contractor shall be responsible for installing laterals to the depth shown on the Plans.
 - 5. Contractor shall locate tees and ends of laterals by field measurements from manholes and main sewer and submit a record of locations to the Engineer.

- G. Backfilling Trenches:
 - 1. Compaction requirements for trench backfill shall be based upon the material utilized in accordance with the Section 31 23 33 "Trenching and Backfilling" of these Specifications and as shown on the plans.
 - 2. After sewers are laid and bedded in an open cut, the trench shall be backfilled to the planned ground surfaces. Unless otherwise permitted by the regulatory authority, not more than three hundred (300) feet of completed pipe shall be left without backfill.
 - 3. In all backfill types, trench shields, sheeted sections and bracing shall in no case be withdrawn before the trench is sufficiently filled to prevent personal injury, or collapse of trench walls, banks, road surfaces, adjacent utility structures, sidewalks or other property, public or private.
 - 4. When PVC pipe is utilized, select granular initial backfill at least twelve (12) inches above the top of the pipe shall be placed utilizing the same type of material used for haunching.
- H. Cleaning Inspection and Testing:
 - 1. The following tests and inspection of sanitary sewers as specified in Section 31-1.11 of the Standard Specifications shall be performed:
 - 2. Exfiltration of air under pressure:
 - a. After the construction of the sewer mains, manholes and laterals, onto the sanitary system, the municipality shall perform a low pressure air test. Personnel will perform the air test from manhole to manhole.
 - b. Air leakage test results shall not be less than the time per inch of pipe diameter per length of sewer pipe as specified in the table entitled "Air Test Table.", Article 31-1.11C.
 - c. If the section of sewer fails to pass the test, it shall be the Contractor's responsibility to locate the problems and make the necessary repairs.
 - d. Following the successful passage of a low pressure air test, the City will immediately assume responsibility for the operation and maintenance of the sewers with the exception of settlement of the sewer trenches.
 - 3. For flexible themoplastic pipe, a deflection test shall be performed in accordance with Section 31-1.11 of the Standard Specifications (Contractor Performed).
 - 4. Manholes shall be air tested for leakage by the Contractor in accordance with ASTM C1244-93, Standard Test Method for Concrete Sewer Manholes by the Negative Pressure (Vacuum) Test or most recent approved.
 - 5. Manhole preparation:
 - a. Plug all lift holes.
 - b. Temporarily plug all pipes entering the sewer manhole, taking care to securely brace the pipes and plugs to prevent them from being drawn into the sewer manhole.
 - 6. Test procedure:
 - a. The test head shall be placed at the top of the manhole in accordance with the manufacturer's recommendations.
 - b. A vacuum of 10 in. Hg shall be drawn on the manhole, the valve on the vacuum line of the test head closed, and the vacuum pump shut off. The time shall be measured for the vacuum to drop to 9 in. Hg.

c. The manhole shall pass if the time for the vacuum reading to drop from 10 in. Hg to 9 in. Hg meets or exceeds the values indicated in Table 1 of ASTM Designation C 1244 (see below).

Depth (ft)	Diameter, in.								
	30	33	36	42	48	54	60	66	72
	Time, in seconds								
8	11	12	14	17	20	23	26	29	33
10	14	15	18	21	25	29	33	36	41
12	17	18	21	25	30	35	39	43	49
14	20	21	25	30	35	41	46	51	57
16	22	24	39	34	40	46	52	58	67
18	25	27	32	38	45	52	59	65	73
20	28	30	35	42	50	53	65	72	81
22	31	33	39	46	55	64	72	79	89
24	33	36	42	51	59	64	78	87	97
26	36	39	46	55	64	75	85	94	105
28	39	42	49	59	69	81	91	101	113
30	42	45	53	63	74	87	98	108	121

TABLE 1 from ASTM Designation: C 1244 Minimum Test Times for Various Manhole Diameters in Seconds

- d. If the manhole fails the test, the Contractor shall make necessary repairs and retest the manhole. Repairs must be repeated until the manhole passes the test.
- e. If manhole joint sealants are pulled out during the vacuum test, the manhole must be disassembled and the joint sealants replaced.
- f. Manholes will also be subject to visual inspection with all visual leaks being repaired.
- I. Sewer Pipe and Water Main Separation:
 - 1. Horizontal Separation of Gravity Sewers from Water Mains: Separate gravity sewer mains from water mains by a horizontal distance of at least 10 feet unless:
 - a. The top of a sewer main is at least 18 inches below the bottom of the water main, and
 - b. The sewer is placed in a separate trench or in the same trench on a bench of undisturbed earth at a minimum horizontal separation of 3 feet from the water main.
 - c. When it is impossible to obtain the required horizontal clearance of 3 feet and a vertical clearance of 18 inches between sewers and water mains, the sewers must be constructed of water main materials meeting the requirements of Section 5010, 2.01. However, provide a linear separation of at least 2 feet.
 - 2. Separation of Sewer Force Mains from Water Mains: Separate sewer force mains and water mains by a horizontal distance of at least 10 feet unless:
 - a. The force main is constructed of water main materials meeting a minimum pressure rating of 150 psi and the requirements of Section 5010, 2.01 and
 - b. The sewer force main is laid at least 4 linear feet from the water main.
 - 3. Separation of Sewer and Water Main Crossovers:
 - a. Vertical separation of sanitary sewers crossing under any water main should be at least 18 inches when measured from the top of the sewer to the bottom of the

water main. If physical conditions prohibit the separation, the sewer may be placed not closer than 6 inches below a water main or 18 inches above a water main. Maintain the maximum feasible separation distance in all cases.

b. Where the sewer crosses over or less than 18 inches below a water main, locate one full length of sewer pipe of water main material so both joints are as far as possible from the water main. The sewer and water pipes must be adequately supported and have watertight joints. Use a low permeability soil for backfill material within 10 feet of the point of crossing.

3.3 FIELD QUALITY CONTROL

A. The **Owner** will provide testing services of a soils engineer and/or independent laboratory for this project. Trenching and backfilling testing shall be completed in accordance with Section 31 23 33 "Trenching and Backfilling" of these Specifications