

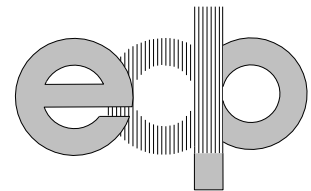
BOG MEADOW INFRASTRUCTURE AND WATER SUPPLY PROJECT

CONTRACT #2 – ELECTRICAL

Bid No. 2014-01

**CITY OF SARATOGA SPRINGS
NEW YORK**

AUGUST 2014



**THE ENVIRONMENTAL DESIGN
PARTNERSHIP, LLP
900 Route 146
Clifton Park, New York 12065**

**Phone: (518) 371-7621
Fax: (518) 371-9540**

**BOG MEADOW INFRASTRUCTURE AND WATER SUPPLY
PROJECT**

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CONTRACT FORMS

**AGREEMENT
BETWEEN OWNER AND CONTRACTOR
FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)**

THIS AGREEMENT is by and between City of Saratoga Springs ("Owner") and
CKM ELECTRICAL SERVICES, INC. ("Contractor").

Owner and Contractor hereby agree as follows:

ARTICLE 1 – WORK

- 1.01 *Contractor shall complete all Work as specified or indicated in the Contract Documents.* Work generally includes site work including trenching for electrical and control conduit, water pipe installation on site and offsite, building rehabilitation and pump replacement.
- 1.02 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows: **BOG MEADOW INFRASTRUCTURE AND WATER SUPPLY PROJECT.**

ARTICLE 2 – ENGINEER

- 2.01 The Project has been designed by Environmental Design Partnership (Engineer), which is to act as Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 3 – CONTRACT TIMES

- 3.01 *Time of the Essence*
- A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.
- 3.02 *Dates for Substantial Completion and Final Payment* **[NOT USED]**
- 4.02 *Days to Achieve Substantial Completion and Final Payment*
- A. The Work will be substantially completed within 180 days after the date when the Contract Times commence to run as provided in Paragraph 2.03 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions within 210 days after the date when the Contract Times commence to run.
- 4.03 *Liquidated Damages*
- A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner

\$500 for each day that expires after the time specified in Paragraph 4.02 above for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner \$500 for each day that expires after the time specified in Paragraph 4.02 above for completion and readiness for final payment until the Work is completed and ready for final payment.

ARTICLE 5 – CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraphs 5.01.A, 5.01.B, and 5.01.C below:

A. For all Work other than Unit Price Work, a lump sum of: **\$\$95,038 (NINETY FIVE THOUSAND THIRTY EIGHT)**

Contract Includes:

- Base Bid \$77,002
- Alternate AE1 \$7,000
- Alternate AE2 \$600
- Alternate AE3 \$436
- Allowance \$10,000

All specific cash allowances are included in the above price in accordance with Paragraph 11.02 of the General Conditions.

B. **(NOT USED)** For all Unit Price Work, an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the actual quantity of that item:

<u>Item</u> <u>No.</u>	<u>Description</u>	<u>Unit</u>	<u>Estimated</u> <u>Quantity</u>	<u>Unit</u> <u>Price</u>
---------------------------	--------------------	-------------	-------------------------------------	-----------------------------

The Bid prices for Unit Price Work set forth as of the Effective Date of the Agreement are based on estimated quantities in the Bid Proposal. As provided in Paragraph 11.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer as provided in Paragraph 9.07 of the General Conditions.

C. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

- A. Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

- A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment at the appropriate phases of completion during performance of the Work. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements.

- 1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentages indicated on the approved schedule of values but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the General Conditions.

- a. ~~_____ percent of Work completed (with the balance being retainage). If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and~~

- b. ~~_____ percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).~~

- ~~B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to _____ percent of the Work completed, less such amounts as Engineer shall determine in accordance with Paragraph 14.02.B.5 of the General Conditions and less _____ percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.~~

6.03 *Final Payment*

- A. Upon final completion and acceptance of the Work in accordance with Paragraph 14.07 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 14.07.

ARTICLE 7 – INTEREST

- 7.01 **(NOT USED)** All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the rate of 0 percent per annum.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

- 8.01 In order to induce Owner to enter into this Agreement, Contractor makes the following representations:

- A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.
- B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
- C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.
- D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities), if any, that have been identified in Paragraph SC-4.02 of the Supplementary Conditions as containing reliable "technical data," and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in Paragraph SC-4.06 of the Supplementary Conditions as containing reliable "technical data."
- E. Contractor has considered the information known to Contractor; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Contract Documents; and (3) Contractor's safety precautions and programs.
- F. Based on the information and observations referred to in Paragraph 8.01.E above, Contractor does not consider that further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.
- G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
- H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
- I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 *Contents*

- A. The Contract Documents consist of the following:
 - 1. This Agreement
 - 2. Performance bond
 - 3. Labor & Materials bond
 - 4. General Conditions

5. Supplementary Conditions
6. Specifications
7. Drawings consisting of 13 sheets with each sheet bearing the following general title:

"Bog Meadow Infrastructure and Water Supply Project – Contract: 2014-01"

8. Certificates of Insurance
 9. Executed Risk & Safety Agreement
 10. Addenda
 11. Exhibits to this Agreement (enumerated as follows):
 - a. Exhibit 1: Prevailing Wage Requirements
 - b. Contractor's Bid
 - c. Documentation submitted by Contractor prior to Notice of Award
 12. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
 - a. Notice to Proceed
 - b. Work Change Directives.
 - c. Change Orders.
- B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 9.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the General Conditions.

ARTICLE 10 – MISCELLANEOUS

10.01 *Terms*

- A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

10.02 *Assignment of Contract*

- A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 *Successors and Assigns*

- A. Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

10.04 *Severability*

- A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

10.05 *Contractor's Certifications*

Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 10.05:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process or in the Contract execution;
2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement. Counterparts have been delivered to Owner and Contractor. All portions of the Contract Documents have been signed or have been identified by Owner and Contractor or on their behalf.

This Agreement will be effective on _____ (which is the Effective Date of the Agreement).

OWNER:

City of Saratoga Springs

CONTRACTOR

CKM Electrical Services

By: _____

Title: _____

City Council Approval: _____

Attest: _____

Title: _____

Address for giving notices:

(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)

By: _____

Title: _____

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

Attest: _____

Title: _____

Address for giving notices:

License No.: _____

(Where applicable)

Agent for service of process:

Submittal Instructions

CONTRACTORS PLEASE NOTE YOUR IFB MUST BE RETURNED AS FOLLOWS:

Step One: You MUST execute and include the following documents with your response:

- Your response to the RFP in question
- Waiver of Immunity and Non-Collusive Bidding Certification
- Vendor Code of Conduct
- Risk & Safety Agreement
- **Certificate of Insurance** (as outlined in Risk & Safety Agreement)
 - Including **Worker's Compensation Certificate**

FAILURE TO SUBMIT IFB DOCUMENTS AS OUTLINED ABOVE WILL LEAD TO IMMEDIATE IFB DISQUALIFICATION.

Step Two: Enclose your bid in a sealed envelope marked:

IFB #: 2014-01 BOG MEADOW INFRASTRUCTURE AND WATER SUPPLY PROJECT

Name of Bidder: _____

CKM Electrical Services

Bid Opening: Thursday, June 26, 2014 at 2:00 p.m.

Step Three: Please return your response to this IFB to the following address:

City of Saratoga Springs
City Clerk
474 Broadway
Saratoga Springs, NY 12866

CONDITIONAL Approval

✓

RSIA

✓

Proof of Insurance

No

Add'l Ins Pk

6/26/14



BID PROPOSAL

DATE OF BID OPENING: Thursday, June 26, 2014 at 2:00 PM.

ALL BIDS SHALL BE ENCLOSED IN A SEALED ENVELOPE MARKED:

**IFB #: 2014-01 – Bog Meadow Infrastructure and Water Supply Project
CONTRACT #2 - ELECTRICAL**

IFB Opening: Thursday, June 26, 2014 at 2:00 p.m.

**AND RETURN TO:
City of Saratoga Springs
City Clerk
474 Broadway
Saratoga Springs, NY 12866**

BID PROPOSAL SUBMITTED BY

Bidder: CKM Electrical Services, Inc.

(Contractor)

DEAR COMMISSIONER:

The undersigned has inspected the proposed work site, reviewed the Instructions to Bidders, Plans and Specifications and hereby agrees to complete the work, including all labor, materials, machinery, scaffolding, lifts, bracing, tools, equipment and other means of construction necessary and incidental, complete and ready for use, as outlined in the project documents. The work, which the contractor is required to perform under this contract, shall be commenced within fourteen (14) consecutive days from the Notice to Proceed to Contractor. Work shall be substantially completed within forty-five (180) days of Notice to Proceed and within sixty (60) days of final completion, including all lead times.

DESCRIPTION	LUMP SUM PRICE	
	IN WRITING	NUMBERS
1 BASE BID	<i>Seventy-seven thousand two and No/100.</i>	77002.00
2 BID ALTERNATE AE1	<i>Seven thousand and No/100</i> ————	7000.00
3 BID ALTERNATE AE2	<i>Six hundred and No/100</i> ————	600.00
4 BID ALTERNATE AE3	<i>Four hundred thirty-six and No/100</i>	436.00
5 NATIONAL GRID ALLOWANCE	TEN THOUSAND DOLLARS AND 0 CENTS	\$10,000.00
TOTAL BID (LUMP SUM BASE BID + BID ALTERNATE 1 + BID ALTERNATE 2 + ALLOWANCE) WRITTEN IN WORDS - \$ <u><i>Ninety-five thousand, thirty-eight and No/100</i></u> \$ <u><i>95038.00</i></u> ✓		

BASE BID:

Provide all labor, materials, machinery, tools, equipment and other means of construction necessary and incidental to: all electrical related work associated with building rehabilitation and well field development.

BID ALTERNATE AE1: Manual Transfer Switch

Includes all cost associated with an outdoor non-automatic transfer switch equal to ASCO Model 386 in weather tight NEMA 3R enclosure as specified on the Contract Drawings.

BID ALTERNATE AE2: Replace Ballast of Exterior Lights

Includes all cost associated with changing the ballast tips on exterior lights for compatibility with new power supply to site as specified on the Contract Drawings.

BID ALTERNATE AE3: Maintain Operation of Existing 50 hp Booster Pump During Construction

Includes all cost associated with scheduling related concerns related to leaving the existing 50 hp pump in operation until a new booster pump is operational. Note temporary power, wiring, and operation shall be the responsibility of Contract #1.

NATIONAL GRID ALLOWANCE:

Bid includes a \$10,000.00 allowance for National Grid related fees. Allowance is to be in accordance with Paragraph 11.02 C Contingency Allowance of the Standard General Conditions of the Construction Contract.

BID BOND OR BID DEPOSIT:

A bid bond or bid deposit check for 10% of the total bid price, made payable to the Commissioner of Finance is attached in the amount of \$ 9503.80 security as required by the Instructions to Bidders for the project.

ACKNOWLEDGEMENTS

Acknowledgement is hereby made of the receipt of the following Addendum:

Addendum No. 1 dated 6/20/14

Addendum No. _____ dated _____

The foregoing proposal (s) include all labor, supervision, material, taxes (if any), overhead, bond costs, profit and other considerations normally included in construction contract costs.

The Undersigned understands that the Owner reserves the right to accept or to reject any proposal(s), but that if notice of the acceptance of this proposal is mailed, telegraphed or delivered to the Undersigned within thirty (30) days after the opening of the bids, or any time before this proposal is withdrawn, the Undersigned will execute a contract with the City of Saratoga Springs for this work.

The Undersigned further agrees that if awarded the contract, he will: (1) Commence work upon receipt of the executed contract, (2) that he will provide bonds as required, (3) that he will commence active construction work at the site as outlined in the Notice to Proceed, (4) that he will substantially complete the work in its entirety, ready for use by the Owner as per the project documents.

Date: 6/26/14, 2014

Signed: Clyde Lounsbury

(Principal of Company)

Printed Name: Clyde Lounsbury

Title: President

Company: CKM Electrical Services, Inc.

Address: 216 Elk St.

Albany, NY 12210

Telephone Number: 518.588.7600 Fax Number: 518.694.4190

Cellular Number: 518.588.7600

Email: clounsbury@ckmesinc.com



Acknowledgements

The Undersigned understands that the City reserves the right to accept or to reject any proposal(s), but that if notice of the acceptance of this proposal is mailed, telegraphed or delivered to the Undersigned within thirty (30) days after the opening of the bids, or any time before this proposal is withdrawn, the Undersigned will execute a contract with the City of Saratoga Springs for this work.

The Undersigned further agrees that if awarded the contract, the undersigned will:

- (1) Commence work upon receipt of the executed contract,
- (2) provide bonds as required,
- (3) commence active construction work at the site as outlined in the Notice to Proceed,
- (4) substantially complete the work in its entirety, ready for use by the City as outlined in the project documents..

Signed: Clyde L. Lounsbury

Printed Name: Clyde Lounsbury

Title: President

Company: CKM Electrical Services, Inc.

Address: 216 Elk St.
Albany, NY 12210

Date: 6/26/14

Telephone Number: 518.588.7600

Cellular Number: 518.588.7600

Facsimile Number: 518.694.4190

Email Address: clounsbury@ckmesinc.com



Waiver of Immunity Clause
Section §139(a) State Finance Law

Upon the refusal by a representative of our firm, when called before a grand jury to testify concerning any transaction or contract with the City of Saratoga Springs, New York, or to sign a waiver of immunity against subsequent criminal prosecution or to answer any relevant question concerning such transactions or contracts,

(a) such person, and any firm, partnership or corporation of which he is a member, partner, director or officer shall be disqualified from thereafter selling to or submitting bids to or receiving awards from or entering into any contracts with any municipal corporation or fire district, or any public department, agency or official thereof, for goods, work or services, for a period of five years after such refusal, and to provide also that

(b) any and all contracts made with any municipal corporation or fire district, or any public department, agency or official thereof, since the effective date of this law, by such person, and by any firm, partnership or corporation of which he is a member, partner, director or officer may be cancelled or terminated by the City without incurring any penalty or damages on account of such cancellation or termination, but any monies owing by the City for goods delivered or work done prior to the cancellation or termination shall be paid.

Non-Collusive Bidding Certification
Section §139(d) State Finance Law

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and, in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of his knowledge and belief:

(1) The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;

(2) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and

(3) No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition."

A bid shall not be considered for award nor shall any award be made where (1), (2), (3) above have not been complied with; provided however, that if in any case the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons therefore.

Signature: Clyde L. G. Print Name: Clyde Lounsberry

Title: President Date: 6/26/14

Company: CKM Electrical Services Address: 216 Elk St. Albany, NY 12210

Subscribed to under penalty of perjury under the laws of the State of New York, this 26th day of June, 2014 as the act and deed of said corporation or partnership.



Vendor/Supplier Code of Conduct

The City of Saratoga Springs is committed to conduct business in a lawful, ethical and moral manner and expects the same standards from vendors/suppliers that the City conducts business with. The City requires that all vendors/suppliers abide by this Code of Conduct. Failure to comply with this Code may be sufficient cause for the City to exercise its' rights to terminate its' business relationship with vendors/suppliers. Vendors/suppliers agree to provide all information requested which is necessary to demonstrate compliance with this Code.

At a minimum, the City requires that all vendors/suppliers meet the following standards:

- Legal: Vendors/suppliers and their subcontractors agree to comply with all applicable local, state and federal laws, regulations and statutes.
 - The City expects vendors/suppliers to respect the City's rules and procedures.
 - Conflict of Interest: The vendor/supplier represents and warrants that it has no conflict, actual or perceived, that would prevent it from doing business with the City of Saratoga Springs.
 - Wages & Benefits: Vendors/suppliers will set working hours, wages, and NYS statutory benefits and overtime pay in compliance with all applicable laws and regulations. Where applicable, as defined by NYS Labor Law, the vendor/supplier must comply with prevailing wage rates.
 - Health & Safety: Vendors/suppliers and their subcontractors shall provide workers with a safe and healthy work environment that complies with local, state and federal health and safety laws.
 - Discrimination: No person shall be subject to any discrimination in employment, including hiring, salary, benefits, advancement, discipline, termination or retirement on the basis of gender, race, religion, age, disability, sexual orientation, nationality, political opinion, party affiliation or social ethnic origin.
 - Working conditions: Vendors/suppliers must treat all workers with respect and dignity and provide them with a safe and healthy environment.
 - Right to organize: Employees of the vendor/supplier should have the right to decide whether they want collective bargaining.
 - Subcontractors: Vendors/suppliers shall ensure that subcontractors shall operate in a manner consistent with this Code.
1. Protection of the Environment: Vendors/suppliers shall comply with all applicable environmental laws and regulations. Vendors/suppliers shall ensure that the resources and material they use are sustainable, are capable of being recycled and are used effectively and a minimum of waste. Where practicable, vendors/suppliers are to utilize technologies that do not adversely affect the environment and when such impact is unavoidable, to ensure that it is minimized.

Vendor Acknowledgement

The undersigned vendor/supplier hereby acknowledges that it has received the City of Saratoga Springs Vendor/Supplier Code of Conduct and agrees that any and all of its facilities and subcontractors doing business with the City will receive the Code and will abide by each and every term therein.

Vendor/supplier acknowledges that its failure to comply with any condition, requirement, policy or procedure may result in the termination of the business relationship. Vendor/supplier reserves the right to terminate its agreement to abide by the Code of Conduct at any time for any reason upon ninety (90) days prior written notice to the City.

Signature: Clyde L. Lounsbury Printed name: Clyde Lounsbury
Title: President Date: 6/26/14
Company Name: CKM Electrical Services, Inc.

Risk and Safety Agreement for Contractor Services

City Project Number: 2014-01 City Project Name: Big Meadow
City Department: D.P.W. / Contact Person: Debbie LaBreche, P.E. / City Ext. 2616
Company Name: CKM Electrical Services, Inc.
Company Address: 216 Elk St., Albany, NY 12210
Company Telephone No.: 518.588.7600 Company Fax No.: 518.694.4190
Contractor Primary Contact for This Project: Clyde Lounsbury Title: President

The City of Saratoga Springs herein requires the following terms and conditions regarding the agreement for the provision of professional services as outlined above:

The Contractor shall procure and maintain during the term of this contract, at the Contractor's expense, the insurance policies listed with limits equal to or greater than the enumerated limits. The Contractor shall be solely responsible for any self-insured retention or deductible losses under each of the required policies. Every required policy, including any required endorsements and any umbrella or excess policy, shall be primary insurance. Insurance carried by the City of Saratoga Springs, its officers, or its employees, if any, shall be excess and not contributory insurance to that provided by the Contractor. Every required coverage type shall be "occurrence basis" with the exception of Professional Errors and Omissions Coverage which may be "claims made" coverage. The Contractor may utilize umbrella/excess liability coverage to achieve the limits required hereunder; such coverage must be at least as broad as the primary coverage (follow form). The Office of Risk & Safety Management must approve all insurance certificates. The City of Saratoga Springs reserves its right to request certified copies of any policy or endorsement thereto. All insurance shall be provided by insurance carriers licensed & admitted to do business in the State of New York and must be rated "A-; VII" or better by A.M. Best (Current Rate Guide). If the Contractor fails to procure and maintain the required coverage(s) and minimum limits such failure shall constitute a material breach of contract, whereupon the City of Saratoga Springs may exercise any rights it has in law or equity, including but not limited to the following: (1) immediate termination of the contract; (2) withholding any/all payment(s) due under this contract or any other contract it has with the vendor (common law set-off); OR (3) procuring or renewing any required coverage(s) or any extended reporting period thereto and paying any premiums in connection therewith. All monies so paid by the City of Saratoga Springs shall be repaid upon demand, or at the City's option, may be offset against any monies due to the Contractor.

The City of Saratoga Springs requires the Contractor name the City as a Certificate Holder for the following coverage for the work covered by this Agreement:

- **Commercial General Liability** Including Completed Products and Operations and Personal Liability Insurance: One Million Dollars per Occurrence with Two Million Dollars Aggregate (**City is also an Additional Insured on a Primary and Non-contributory Basis for this coverage**);
- **Commercial Automobile Insurance**: One Million Dollars Combined Single Limit for Owned, Hired and Non-owned Vehicles
- **Excess Liability Insurance**: Five Million Dollars per Occurrence Aggregate
- **NYS Statutory Workers Compensation, Employer's Liability and Disability Insurance**

If awarded the bid, it shall be an affirmative obligation of the Contractor to advise City's Office of Risk and Safety via mail to Office of Risk and Safety, City of Saratoga Springs, 474 Broadway, Saratoga Springs, NY 12866, within two days of the cancellation or substantive change of any insurance policy set out herein, and failure to do so shall be construed to be a breach of this Agreement. The Contractor acknowledges that failure to obtain such insurance on behalf of the municipality constitutes a material breach of contract and subjects it to liability for damages, indemnification and all other legal remedies available to the City. The Contractor is to provide the City with a

Certificate of Insurance naming the City as ***Additional Insured on a primary and non-contributory basis*** prior to the commencement of any work or use of City facilities. The failure to object to the contents of the Certificate of Insurance or the absence of same shall not be deemed a waiver of any and all rights held by the municipality. In the event the Contractor utilizes a Subcontractor for any portion of the services outlined within the scope of its activities, the Subcontractor shall provide insurance of the same type or types and to the same extent of coverage as that provided by the Contractor. All insurance required of the Subcontractor shall name the City of Saratoga Springs as an ***Additional Insured on a primary and non-contributory*** basis for all those activities performed within its contracted activities for the contract as executed. For the purposes of this bid, the Certificate of Insurance shall name the Certificate Holder as follows: City Saratoga Springs, Attn: Purchasing Agent, 474 Broadway, Saratoga Springs, NY 12866.

The Contractor, to the fullest extent provided by law, shall indemnify and save harmless the City of Saratoga Springs, its Agents and Employees (hereinafter referred to as "City"), from and against all claims, damages, losses and expense (including, but not limited to, attorneys' fees), arising out of or resulting from the performance of the work or purchase of the services, sustained by any person or persons, provided that any such claim, damage, loss or expense is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of property caused by the tortious act or negligent act or omission of Contractor or its employees or anyone for whom the Contractor is legally liable or Subcontractors. Without limiting the generality of the preceding paragraphs, the following shall be included in the indemnity hereunder: any and all such claims, etc., relating to personal injury, death, damage to property, or any actual or alleged violation of any applicable statute, ordinance, administrative order, executive order, rule or regulation, or decree of any court of competent jurisdiction in connection with, or arising directly or indirectly from, errors and/or negligent acts by the Contractor, as aforesaid.

Contractor shall comply with NYS OSHA laws as of July 18, 2008 requiring all workers on New York State public projects be certified as having completed an OSHA 10-hour construction safety course. Proof of this certification is required at the time of the execution of this Agreement. The City of Saratoga Springs specifically reserves the right to suspend or terminate all work under this contract whenever Contractor and/or Contractor's employees or subcontractors are proceeding in a manner that threatens the life, health or safety of any of Contractor's employees, subcontractor's employees, City employees or member(s) of the general public on City property. This reservation of rights by the City of Saratoga Springs in no way obligates the City of Saratoga Springs to inspect the safety practices of the Contractor. If the City of Saratoga Springs exercises its rights pursuant to this part, the Contractor shall be given three days to cure the defect, unless the City of Saratoga Springs, in its sole and absolute discretion, determines that the service cannot be suspended for three days due to the City of Saratoga Springs' legal obligation to continuously provide Contractor's service to the public or the City of Saratoga Springs' immediate need for completion of the Contractor's work. In such case, Contractor shall immediately cure the defect. If the Contractor fails to cure the identified defect(s), the City of Saratoga Springs shall have the right to immediately terminate this contract. In the event that the City of Saratoga Springs terminates this contract, any payments for work completed by the Contractor shall be reduced by the costs incurred by the City of Saratoga Springs in re-bidding the work and/or by the increase in cost that results from using a different vendor.

Contractor, having agreed to the terms and the recitals set forth herein, and in relying thereon, herein signs this Agreement.

Contractor Signature:  Date: 6/26/14

STATEMENT OF BIDDER'S QUALIFICATIONS

All questions must be answered and the data given must be clear and comprehensive. If necessary, questions may be answered on separate sheets. The Bidder may submit any additional information he desires.

1. Name of Bidder. CKM Electrical Services, Inc.
2. Permanent main office address. 216 Elk St., Albany, NY 12210
3. Year organized. 2006
4. If a Corporation, where incorporated. New York
5. How many years have you been engaged in the contracting business under your present firm or trade name? 8 years
6. Provide three (3) references (list amount of each contract and the agency contact person, phone, and email address).

PROJECT NAME / AMOUNT	CONTACT NAME	PHONE	EMAIL
Pleasant Rd. Water Well Impr.	Sub to Trinity Construction	767.2204	
Waterford WWTP	Sub to Trinity Construction	767.2204	
New Paltz WWTP	Sub to Trinity Construction	767.2204	

7. General character of work performed by your company.
Commercial / Industrial Electrical Construction / Maintenance
8. Have you ever defaulted on a contract? If so, where and why?
No
9. Have you ever failed to complete any work awarded to you? No
10. List the more important projects recently completed by your company, stating the approximate cost for each and the month and year completed.

<u>NYSTRS AMU Projects</u>	<u>500,000</u>	<u>6/14</u>
<u>Waterford WWTP</u>	<u>50,000</u>	<u>5/14</u>
<u>NYSTRS Generator</u>	<u>350,000</u>	<u>11/13</u>

11. List your major equipment available for this contract.

Trencher, Backhoe, Bucket truck

12. Background and experience of the principal members of your organization, including the officers.

Owner - 22 years commercial/industrial EC im. (15 years with Kesselmen Electric,

13. Credit available: \$ 200,000.

14. Give bank reference: SEFCU

15. Will you, upon request, fill out a detailed financial statement and furnish any other information that may be required by the local public agency? Yes

THE UNDERSIGNED hereby authorizes and requests any person, firm or corporation to furnish any information requested by the Local Public Agency in verification of Bidder's Qualifications.

Dated this day of: June 24 2014

Signature: Clyde Lunsbury

Printed name: Clyde Lunsbury

Title: President

Company: CKM Electrical Services, Inc.

Company Address: 216 Elk St.

Albany, NY 12210

Selective Insurance Company of America
40 Wantage Avenue
Branchville, New Jersey 07890
973-948-3000

B 1146693

BID BOND

KNOW ALL MEN BY THESE PRESENTS:

That **CKM Electrical Services, Inc.**

216 Elk Street Albany, NY 12210

(hereinafter called the Principal)

as Principal, and the **SELECTIVE INSURANCE COMPANY OF AMERICA**, a corporation created and existing under the laws of the State of New Jersey, with its principal office in Branchville, New Jersey (hereinafter called the Surety), as Surety,

are held and firmly bound unto **City of Saratoga Springs**
City Hall, 474 Broadway Saratoga Springs, NY 12866

(hereinafter called the Obligee)

in the full and just sum of **10 % Percent of the Total Bid Amount**

(**10 %**), good and lawful money of the United States of America, to the payments of which sum of money well and truly to be made, the said Principal and Surety bind themselves, their and each of their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

Signed, sealed and dated this **25th** day of **June** A.D. **2014**.

THE CONDITION OF THIS OBLIGATION IS SUCH, That, if the Obligee shall make any award within 60 days to the Principal for

BOG MEADOW INFRASTRUCTURE AND WATER SUPPLY PROJECT

according to the terms of the proposal or bid made by the Principal therefor, and the Principal shall duly make and enter into a contract with the Obligee in accordance with the terms of said proposal or bid and award and shall give bond for the faithful performance thereof with Surety or Sureties approved by the Obligee; or if the Principal shall, in case of failure so to do, pay to the Obligee the damages which the Obligee may suffer by reason of such failure, not exceeding the penalty of this bond, then this obligation shall be null and void; otherwise it shall be and remain in full force and effect.

In Testimony Whereof, the Principal and Surety have caused these presents to be duly signed and sealed.

WITNESS:

Mark E. Gboudy
(If individual or Firm)

CKM Electrical Services, Inc.

Clyde L. G. (SEAL)

Clyde L. G. (SEAL)

Clyde L. G. (SEAL)

Principal

ATTEST:

Mark E. Gboudy
(If Corporation)

SELECTIVE INSURANCE COMPANY OF AMERICA

By:

Joseph Koncickowski
Attorney-in-Fact
Joseph Koncickowski

ACKNOWLEDGMENT OF PRINCIPAL
(Individual or Partnership)

STATE OF _____
COUNTY OF _____ } ss:

On this _____ day of _____, _____, before me personally
appeared the above named _____

to me known and known to me to be the same described in and who executed the above instrument and duly acknowledged
the execution of the same.

Notary Public _____ County

(Corporation)

STATE OF NEW YORK
COUNTY OF WARREN } ss:

On this 25 day of JUNE, 2014, before me personally
appeared CLYDE LOUNSBURY

to me known, who, being by me duly sworn, did depose and say that he/she resides in DELMAR, NEW YORK

that he/she is the PRESIDENT of CKM ELECTRICAL SERVICES, INC.
the corporation described in and which executed the foregoing instrument; that he/she knows the seal of said corporation; that
the seal affixed to said instrument is such corporate seal; that it was affixed by order of the Board of Directors of said
corporation and that he/she signed his/her name thereto by like order.

Notary Public _____ County

ACKNOWLEDGMENT OF SURETY

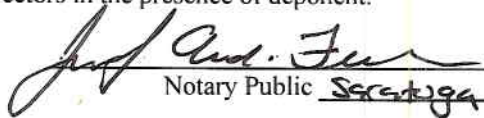
STATE OF NEW YORK
COUNTY OF WARREN } ss:

On this 25th day of June, 2014, before me personally
appeared Joseph Konkikowski

to me known, who, being by me
duly sworn, did depose and say that he/she resides in LAKE GEORGE, NEW YORK
that he/she is the Attorney-in-Fact of the

Selective Insurance Company of America
the corporation described in and which executed the foregoing instrument; that he/she knows the seal of said corporation; that
the seal affixed to said instrument is such corporate seal; that it was so affixed by order of the Board of Directors of said
corporation and that he/she signed his/her name thereto by like order; and deponent further says that he/she is acquainted
with Joseph Konkikowski and knows him/her to be the
Attorney-in-Fact subscribed to the within instrument is in the genuine handwriting of the said Joseph Konkikowski
and was subscribed thereto by like order of the Board of Directors in the presence of deponent.

JENNIFER AUDI FULLER
Notary Public, State of New York
No. 01FU6257918
Qualified In Saratoga County
Commission Expires March 19, 2016


Notary Public Saratoga County



SELECTIVE®

Selective Insurance Company of America
40 Wantage Avenue
Branchville, New Jersey 07890
973-948-3000

BondNo.B 1146693

POWER OF ATTORNEY

Public Bid

SELECTIVE INSURANCE COMPANY OF AMERICA, a New Jersey corporation having its principal office at 40 Wantage Avenue, in Branchville, State of New Jersey ("SICA"), pursuant to Article VII, Section 1 of its By-Laws, which state in pertinent part:

The Chairman of the Board, President, Chief Executive Officer, any Executive Vice President, any Senior Vice President or any Corporate Secretary may, from time to time, appoint attorneys in fact, and agents to act for and on behalf of the Corporation and they may give such appointee such authority, as his/her certificate of authority may prescribe, to sign with the Corporation's name and seal with the Corporation's seal, bonds, recognizances, contracts of indemnity and other writings obligatory in the nature of a bond, recognizance or conditional undertaking, and any of said Officers may, at any time, remove any such appointee and revoke the power and authority given him/her.

does hereby appoint **Joseph Konkowski**

, its true and lawful attorney(s)-in-fact, full authority to execute on SICA's behalf fidelity and surety bonds or undertakings and other documents of a similar character issued by SICA in the course of its business, and to bind SICA thereby as fully as if such instruments had been duly executed by SICA's regularly elected officers at its principal office, in amounts or penalties not exceeding the sum of: **One Hundred Thousand Dollars (\$100,000.00)**

Signed this 25th day of June, 2014

SELECTIVE INSURANCE COMPANY OF AMERICA

By:


Brian C. Sarisky

Its SVP, Chief U/W Officer, Commercial Lines



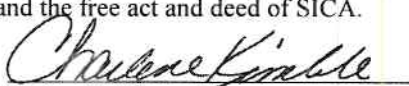
STATE OF NEW JERSEY :

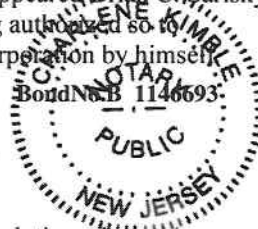
:ss. Branchville

COUNTY OF SUSSEX :

On this 25th day of June, 2014 before me, the undersigned officer, personally appeared **Brian C. Sarisky**, who acknowledged himself to be the Vice President of SICA, and that he, as such Vice President, being authorized so to do, executed the foregoing instrument for the purposes therein contained, by signing the name of the corporation by himself as Vice President and that the same was his free act and deed and the free act and deed of SICA.

Charlene Kimble
Notary Public of New Jersey
My Commission Expires 6/2/2016


Notary Public



The power of attorney is signed and sealed by facsimile under and by the authority of the following Resolution adopted by the Board of Directors of SICA at a meeting duly called and held on the 6th of February 1987, to wit:

"RESOLVED, the Board of Directors of Selective Insurance Company of America authorizes and approves the use of a facsimile corporate seal, facsimile signatures of corporate officers and notarial acknowledgements thereof on powers of attorney for the execution of bonds, recognizances, contracts of indemnity and other writing obligatory in the nature of a bond, recognizance or conditional undertaking."

CERTIFICATION

I do hereby certify as SICA's Corporate Secretary that the foregoing extract of SICA's By-Laws and Resolution in full force and effect and this Power of Attorney issued pursuant to and in accordance with the By-Laws is valid.

Signed this 25th day of June, 2014.


Michael H. Lanza, SICA Corporate Secretary



Important Notice: If the bond number embedded within the Notary Seal does not match the number in the upper right-hand corner of this Power of Attorney, contact us at 973-948-3000.

B91 (4-14)

CERTIFIED COPY



SELECTIVE®

Selective Insurance Company of America
40 Wantage Avenue
Branchville, New Jersey 07890
973-948-3000

BondNo.B 1146693

STATEMENT OF FINANCIAL CONDITION

Public Bid

I hereby certify that the following information is contained in the Annual Statement of Selective Insurance Company of America ("SICA") to the New Jersey Department of Banking and Insurance as of December 31, 2013:

<u>ADMITTED ASSETS (in thousands)</u>		<u>LIABILITIES AND SURPLUS (in thousands)</u>	
Bonds	\$ 1,223,024	Reserve for losses and loss expenses	\$ 895,187
Preferred stocks at convention value	0	Reserve for unearned premiums	293,169
Common stocks at convention values	130,174	Provision for unauthorized reinsurance	853
Subsidiary common stock at convention values	0	Commissions payable and contingent commissions	20,314
Short-term investments	82,666	Other accrued expenses	19,390
Mortgage loans on real estate (including collateral loans)	36,721	Other liabilities	<u>258,668</u>
Other invested assets	77,505	Total liabilities	1,487,581
Interest and dividends due or accrued	12,795		
Premiums receivable	277,559	Surplus as regards policyholders	<u>463,438</u>
Other admitted assets	<u>110,575</u>		
Total admitted assets	<u>\$ 1,951,019</u>	Total liabilities and surplus as regards policyholders	<u>\$ 1,951,019</u>

I further certify that the following is a true and exact excerpt from Article VII, Section 1 of the By-Laws of SICA, which is still valid and existing.

The Chairman of the Board, President, Chief Executive Officer, any Executive Vice President, any Senior Vice President or any Corporate Secretary may, from time to time, appoint attorneys in fact, and agents to act for and on behalf of the Corporation and they may give such appointee such authority, as his/her certificate of authority may prescribe, to sign with the Corporation's name and seal with the Corporation's seal, bonds, recognizances, contracts of indemnity and other writings obligatory in the nature of a bond, recognizance or conditional undertaking, and any of said Officers may, at any time, remove any such appointee and revoke the power and authority given him/her.

IN WITNESS WHEREOF, I hereunto subscribe my name and affix the seal of SICA, this 13 day of March, 2014.

Michael H. Lanza
SICA Corporate Secretary



STATE OF NEW JERSEY :

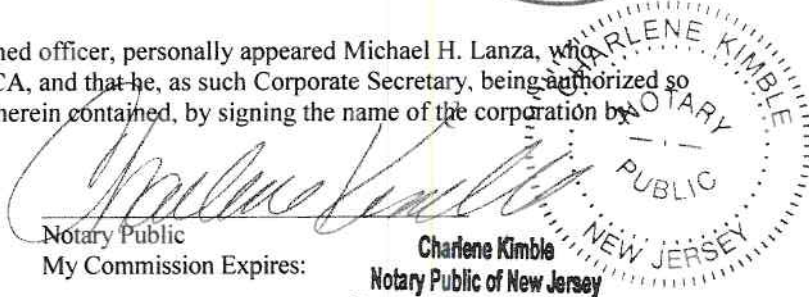
:ss. Branchville

COUNTY OF SUSSEX :

On this 13 day of March, 2014, before me, the undersigned officer, personally appeared Michael H. Lanza, who acknowledged himself to be the Corporate Secretary of SICA, and that he, as such Corporate Secretary, being authorized so to do, executed the foregoing instrument for the purposes therein contained, by signing the name of the corporation by himself as Corporate Secretary.

Notary Public
My Commission Expires:

Charlene Kimble
Notary Public of New Jersey
My Commission Expires 6/2/2016



POLICYHOLDER DISCLOSURE NOTICE OF TERRORISM INSURANCE COVERAGE

The Terrorism Risk Insurance Act of 2002 establishes a program within the Department of the Treasury under which the federal government shares, with the insurance industry, the risk of loss from future terrorist attacks. The Act applies when the Secretary of the Treasury certifies that an event meets the definition of an act of terrorism. The Act provides that to be certified an act of terrorism the event must cause losses of at least five million dollars and must have been committed by an individual or individuals acting on behalf of any foreign person or foreign interest to coerce the government or population of the United States.

Coverage for acts of terrorism is already included in your current bond. In accordance with the federal Terrorism Risk Insurance Act of 2002, we are required to provide you with a notice disclosing the portion of your premium, if any, attributable to the coverage for terrorist acts certified under that Act.

DISCLOSURE OF PREMIUM

Your current bond includes coverage for terrorist acts certified under the Act for no additional premium.

DISCLOSURE OF FEDERAL PARTICIPATION IN PAYMENT OF TERRORISM LOSSES

The United States Government, Department of the Treasury, will pay a share of terrorism losses insured under the federal program. The federal share equals 90% of that portion of the amount of such insured losses that exceeds the applicable insurer retention.

SURETY DISCLOSURE STATEMENT AND CERTIFICATION

Selective Insurance Company of America, surety on the attached bond, hereby certifies the following:

(1) The surety meets the applicable capital and surplus requirements of R.S.17:17-6 or R.S.17:17-7 as of the surety's most current annual filing with the New Jersey Department of Banking and Insurance.

(2) The capital and surplus, as determined in accordance with the applicable laws of the State of New Jersey, of the surety issuing the attached bond are in the following amounts as of the calendar year ended December 31, 2012, which amounts have been certified by certified public accountants:

<u>Company</u>	<u>Capital</u>	<u>Surplus</u>	<u>CPA</u>
Selective Insurance Company of America	\$4,400,000	\$369,921,055	KPMG LLP 345 Park Avenue New York, NY 10154

(3) With respect to the surety issuing the attached bond that has received from the United States Secretary of the Treasury a certificate of authority pursuant to 31 U.S.C. sec 9305, the underwriting limitation established therein and the date as of which the limitation was effective is as follows:

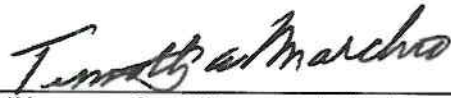
<u>Company</u>	<u>Underwriting Limitation</u>	<u>Effective Date</u>
Selective Insurance Company of America	\$36,992,000	July 1, 2013

(4) The amount of the bond to which this statement and certification is attached is
\$ 100,000.00

CERTIFICATE

(To be completed by an authorized certifying agent/officer for each surety on the bond)

I, Timothy A. Marchio, as Vice President, Bond SBU for Selective Insurance Company of America, a corporation domiciled in New Jersey, DO HEREBY CERTIFY that, to the best of my knowledge, the foregoing statements made by me are true, and ACKNOWLEDGE that, if any of those statements are false, this bond is VOIDABLE.



(Signature of certifying agent/officer)

Timothy A. Marchio

(Printed name of certifying agent/officer)

Vice President, Bond SBU

(Title of certifying agent/officer)

Dated: June 25th 2014
(month, day, year)



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

8/12/2014

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Hughes Insurance Agency, Inc. 328 Bay Road PO BOX 4630 Queensbury NY 12804		CONTACT NAME: House PHONE (A/C No. Ext): (518) 793-3131 FAX (A/C No.): (518) 793-3121 E-MAIL ADDRESS:	
INSURED CKM ELECTRICAL SERVICES INC 216 ELK ST ALBANY NY 12210-1406		INSURER(S) AFFORDING COVERAGE INSURER A: Selective Ins. Co. of So. Caro 19259 INSURER B: Hartford Ins. Co. of the Midwe 37478 INSURER C: INSURER D: INSURER E: INSURER F:	

COVERAGES**CERTIFICATE NUMBER: 14-15 Master****REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	GENERAL LIABILITY			S 2092986	2/8/2014	2/8/2015	EACH OCCURRENCE \$ 1,000,000
	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY						DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 100,000
	<input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR						MED EXP (Any one person) \$ 10,000
							PERSONAL & ADV INJURY \$ 1,000,000
							GENERAL AGGREGATE \$ 3,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER:						PRODUCTS - COMP/OP AGG \$ 3,000,000
	<input type="checkbox"/> POLICY <input checked="" type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC						\$
A	AUTOMOBILE LIABILITY			S 2092986	2/8/2014	2/8/2015	COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000
	<input checked="" type="checkbox"/> ANY AUTO						BODILY INJURY (Per person) \$
	<input type="checkbox"/> ALL OWNED AUTOS						BODILY INJURY (Per accident) \$
	<input type="checkbox"/> HIRED AUTOS						PROPERTY DAMAGE (Per accident) \$
							PIP-Work loss benefits \$
A	<input checked="" type="checkbox"/> UMBRELLA LIAB			S 2092986	2/8/2014	2/8/2015	EACH OCCURRENCE \$ 5,000,000
	<input type="checkbox"/> EXCESS LIAB						AGGREGATE \$ 5,000,000
	<input type="checkbox"/> DED <input checked="" type="checkbox"/> RETENTION \$ 10,000						\$
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY			01WECGD1989	5/22/2014	5/22/2015	<input checked="" type="checkbox"/> WC STATUTORY LIMITS <input type="checkbox"/> OTHER
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH)						E.L. EACH ACCIDENT \$ 1,000,000
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE \$ 1,000,000
							E.L. DISEASE - POLICY LIMIT \$ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

Subject to all policy terms, limitations and conditions:

re: Bog Meadow Infrastructure and Water Supply Project, contract #2 / Electrical

Certificate Holder is Additional Insured on a Primary Non Contributory basis, including Waiver of Subrogation, when required by written contract, agreement or permit.

CERTIFICATE HOLDER**CANCELLATION**

City of Saratoga Springs
Department of Accounts
474 Broadway
Saratoga Springs, NY 12866

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Linda Abodeely/KR

Selective Insurance Company of America
40 Wantage Avenue, Bond SBU
Branchville, New Jersey 07890
973-948-3000

Bond No. **B 1146693**

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that (Here insert full name and address or legal title of Contractor)

CKM Electrical Services, Inc.

of **216 Elk Street Albany, NY 12210**

as Principal, hereinafter called Contractor, and, (Here insert full name and address of legal title of Surety)

SELECTIVE INSURANCE COMPANY OF AMERICA, Wantage Avenue, Branchville, NJ 07890

as Surety, hereinafter called Surety, are held and firmly bound unto (Here insert full name and address or legal title of Owner)

City of Saratoga Springs

City Hall, 474 Broadway Saratoga Springs, NY 12866

as Oblige, hereinafter called Owner, in the amount of **Ninety Five Thousand Thirty Eight Dollars (\$95,038.00)**

for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS,

Contractor has by written agreement dated **August 19th 2014** entered into a contract with Owner for

**BOG MEADOW INFRASTRUCTURE
AND WATER SUPPLY PROJECT**

in accordance with Drawings and specifications prepared by (Here insert full name and address or legal title of Architect)

which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly and faithfully perform said Contract then this obligation shall be null and void, otherwise it shall remain in full force and effect.

The Surety hereby waives notice of any alteration or extension of time made by the Owner.

Whenever Contractor shall be, and declared by owner to be in default under the Contract, the Owner having performed Owner's obligations thereunder and having provided Surety with notice of said default, the Surety may promptly remedy the default, or shall promptly

1) Complete the Contract in accordance with its terms and conditions, or

2) Obtain a bid or bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, or, if the Owner elects, upon determination by the Owner and the Surety jointly of the lowest responsible bidder, arrange for a contract between such bidder and

Owner, and make available as Work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph, hereof. The term "balance of the contract price," as used in this paragraph, shall mean the total amount payable by owner to Contractor under the Contract and any amendments thereto, less the amount properly paid by Owner to Contractor.

Any suit under this bond must be instituted before the expiration of two (2) years from the date on which final payment under the Contract falls due.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the Owner named herein or the heirs, executors, administrators or successors of the Owner.

Signed and Sealed this **11th** day of **August**

, **2014**


(Witness)

CKM Electrical Services, Inc.

(Principal)


(Title)

(Seal)


(Witness)

Selective Insurance Company of America

(Surety)


(Title)

Attorney-in-Fact

Joseph Koncickowski

(Seal)

Selective Insurance Company of America
40 Wantage Avenue, Bond SBU
Branchville, New Jersey 07890
973-948-3000

Bond No. **B 1146693**

LABOR AND MATERIAL PAYMENT BOND

THIS BOND IS ISSUED SIMULTANEOUSLY WITH PERFORMANCE BOND IN FAVOR OF THE OWNER CONDITIONED ON THE FULL AND FAITHFUL PERFORMANCE OF THE CONTRACT

KNOW ALL MEN BY THESE PRESENTS, that (Here insert full name and address or legal title of Contractor)

CKM Electrical Services, Inc.

of **216 Elk Street Albany, NY 12210**

as Principal, hereinafter called Principal, and, (Here insert full name and address or legal title of Surety)

SELECTIVE INSURANCE COMPANY OF AMERICA, Wantage Avenue, Branchville, NJ 07890

as Surety, hereinafter called Surety, are held and firmly bound unto (Here insert full name and address or legal title of Owner)

City of Saratoga Springs

City Hall, 474 Broadway Saratoga Springs, NY 12866

as Obligee, hereinafter called Owner, for the use and benefit of claimants as hereinbelow defined, in the amount of

Ninety Five Thousand Thirty Eight Dollars (\$95,038.00)

for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS,

Principal has by written agreement dated

August 19th 2014

entered into a contract with Owner for

BOG MEADOW INFRASTRUCTURE

AND WATER SUPPLY PROJECT

in accordance with Drawings and specifications prepared by (Here insert full name and address or legal title of Architect)

which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Principal shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the contract, then this obligation shall be void; otherwise it shall remain in full force and effect, subject, however, to the following conditions:

1. A claimant is defined as one having a direct contract with the Principal or with a Subcontractor of the Principal for labor, material, or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.

2. The above named Principal and Surety hereby jointly and severally agree with the Owner that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The owner shall not be liable for the payment of any costs or expenses of any such suit.

3. No suit or action shall be commenced hereunder by any claimant:

a) Unless claimant, other than one having a direct contract with the Principal, shall have given written notice to any two of the following: the Principal, the Owner, or the Surety above named, within ninety

(90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed, such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, Owner or Surety, at any place where an office is regularly maintained for the transaction of business or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer.

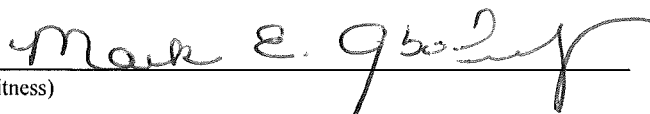
b) After the expiration of one (1) year after the day on which the last of the labor was performed or material was supplied by claimant, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law:

c) Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the Project, or any part thereof, is situated, or in the United States District Court for the district in which the project, or any part thereof, is situated, and not elsewhere.

4. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.

Signed and Sealed this **11th** day of **August**

, **2014**

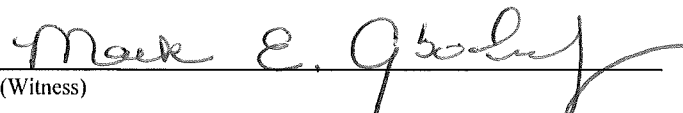

(Witness)

CKM Electrical Services, Inc.

(Principal)

(Title)

(Seal)


(Witness)

Selective Insurance Company of America

(Surety)

(Title)

Attorney-in-Fact

(Seal)

Joseph Konicowski

ACKNOWLEDGMENT OF PRINCIPAL
(Individual or Partnership)

STATE OF _____ }
COUNTY OF _____ } ss:

On this _____ day of _____, _____, before me personally appeared the above named _____

to me known and known to me to be the same described in and who executed the above instrument and dully acknowledged the execution of the same.

Notary Public _____ County

(Corporation)

STATE OF NEW YORK }
COUNTY OF WARREN } ss:

On this 11TH day of AUGUST, 2014, before me personally appeared CLYDE LOUNSBURY

to me known, who, being by me duly sworn, did depose and say that he/she resides in DELMAR, NEW YORK

that he/she is the PRESIDENT of CKM ELECTRICAL SERVICES, INC.
the corporation described in and which executed the foregoing instrument; that he/she knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was affixed by order of the Board of Directors of said corporation and that he/she signed his/her name thereto by like order.

Notary Public _____ County

ACKNOWLEDGMENT OF SURETY

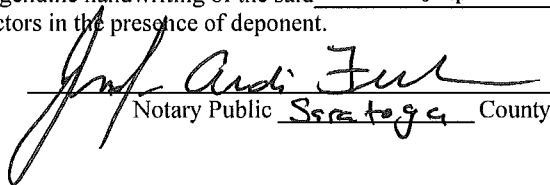
STATE OF New York }
COUNTY OF Warren } ss:

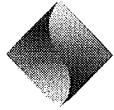
On this 11th day of August, 2014, before me personally appeared Joseph Koncikowski

to me known, who, being by me duly sworn, did depose and say that he/she resides in LAKE GEORGE, NEW YORK
that he/she is the Attorney-in-Fact of the
Selective Insurance Company of America

the corporation described in and which executed the foregoing instrument; that he/she knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation and that he/she signed his/her name thereto by like order; and deponent further says that he/she is acquainted with Joseph Koncikowski and knows him/her to be the
Attorney-in-Fact subscribed to the within instrument is in the genuine handwriting of the said Joseph Koncikowski
and was subscribed thereto by like order of the Board of Directors in the presence of deponent.

JENNIFER AUDI FULLER
Notary Public, State of New York
No. 01FU6257918
Qualified in Saratoga County
Commission Expires March 19, 2016


Notary Public Saratoga County



SELECTIVE®

Selective Insurance Company of America
40 Wantage Avenue
Branchville, New Jersey 07890
973-948-3000

BondNo.B 1146693

POWER OF ATTORNEY

Class B Performance Bond

SELECTIVE INSURANCE COMPANY OF AMERICA, a New Jersey corporation having its principal office at 40 Wantage Avenue, in Branchville, State of New Jersey ("SICA"), pursuant to Article VII, Section 1 of its By-Laws, which state in pertinent part:

The Chairman of the Board, President, Chief Executive Officer, any Executive Vice President, any Senior Vice President or any Corporate Secretary may, from time to time, appoint attorneys in fact, and agents to act for and on behalf of the Corporation and they may give such appointee such authority, as his/her certificate of authority may prescribe, to sign with the Corporation's name and seal with the Corporation's seal, bonds, recognizances, contracts of indemnity and other writings obligatory in the nature of a bond, recognizance or conditional undertaking, and any of said Officers may, at any time, remove any such appointee and revoke the power and authority given him/her.

does hereby appoint **Joseph Konkowski**

, its true and lawful attorney(s)-in-fact, full authority to execute on SICA's behalf fidelity and surety bonds or undertakings and other documents of a similar character issued by SICA in the course of its business, and to bind SICA thereby as fully as if such instruments had been duly executed by SICA's regularly elected officers at its principal office, in amounts or penalties not exceeding the sum of: **Ninety Five Thousand Thirty Eight Dollars (\$95038)**

Signed this 11th day of August, 2014

SELECTIVE INSURANCE COMPANY OF AMERICA

By:

Brian C. Sarisky
Brian C. Sarisky
Its SVP, Chief U/W Officer, Commercial Lines



STATE OF NEW JERSEY :

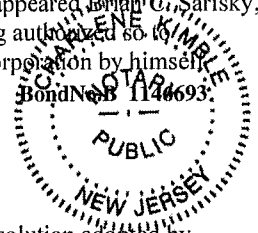
:ss. Branchville

COUNTY OF SUSSEX :

On this 11th day of August, 2014 before me, the undersigned officer, personally appeared **Brian C. Sarisky**, who acknowledged himself to be the Vice President of SICA, and that he, as such Vice President, being authorized so to do, executed the foregoing instrument for the purposes therein contained, by signing the name of the corporation by himself as Vice President and that the same was his free act and deed and the free act and deed of SICA.

Charlene Kimble
Notary Public of New Jersey
My Commission Expires 6/2/2016

Charlene Kimble
Notary Public



The power of attorney is signed and sealed by facsimile under and by the authority of the following Resolution adopted by the Board of Directors of SICA at a meeting duly called and held on the 6th of February 1987, to wit:

"RESOLVED, the Board of Directors of Selective Insurance Company of America authorizes and approves the use of a facsimile corporate seal, facsimile signatures of corporate officers and notarial acknowledgements thereof on powers of attorney for the execution of bonds, recognizances, contracts of indemnity and other writing obligatory in the nature of a bond, recognizance or conditional undertaking."

CERTIFICATION

I do hereby certify as SICA's Corporate Secretary that the foregoing extract of SICA's By-Laws and Resolutions is true in force and effect and this Power of Attorney issued pursuant to and in accordance with the By-Laws is valid.

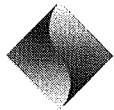
Signed this 11th day of August, 2014

Michael H. Lanza
Michael H. Lanza, SICA Corporate Secretary



Important Notice: If the bond number embedded within the Notary Seal does not match the number in the upper right-hand corner of this Power of Attorney, contact us at 973-948-3000.

CERTIFIED COPY



SELECTIVE®

Selective Insurance Company of America
40 Wantage Avenue
Branchville, New Jersey 07890
973-948-3000

BondNo.B 1146693

POWER OF ATTORNEY

Class B Performance Bond

SELECTIVE INSURANCE COMPANY OF AMERICA, a New Jersey corporation having its principal office at 40 Wantage Avenue, in Branchville, State of New Jersey ("SICA"), pursuant to Article VII, Section 1 of its By-Laws, which state in pertinent part:

The Chairman of the Board, President, Chief Executive Officer, any Executive Vice President, any Senior Vice President or any Corporate Secretary may, from time to time, appoint attorneys in fact, and agents to act for and on behalf of the Corporation and they may give such appointee such authority, as his/her certificate of authority may prescribe, to sign with the Corporation's name and seal with the Corporation's seal, bonds, recognizances, contracts of indemnity and other writings obligatory in the nature of a bond, recognizance or conditional undertaking, and any of said Officers may, at any time, remove any such appointee and revoke the power and authority given him/her.

does hereby appoint **Joseph Konkikowski**

, its true and lawful attorney(s)-in-fact, full authority to execute on SICA's behalf fidelity and surety bonds or undertakings and other documents of a similar character issued by SICA in the course of its business, and to bind SICA thereby as fully as if such instruments had been duly executed by SICA's regularly elected officers at its principal office, in amounts or penalties not exceeding the sum of: **Ninety Five Thousand Thirty Eight Dollars (\$95,038.00)**

Signed this 11th day of August, 2014

SELECTIVE INSURANCE COMPANY OF AMERICA

By:

Brian C. Sarisky
Brian C. Sarisky

Its SVP, Chief U/W Officer, Commercial Lines



STATE OF NEW JERSEY :

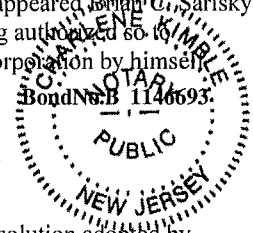
:ss. Branchville

COUNTY OF SUSSEX :

On this 11th day of August, 2014 before me, the undersigned officer, personally appeared Brian C. Sarisky, who acknowledged himself to be the Vice President of SICA, and that he, as such Vice President, being authorized so to do, executed the foregoing instrument for the purposes therein contained, by signing the name of the corporation by himself as Vice President and that the same was his free act and deed and the free act and deed of SICA.

Charlene Kimble
Notary Public of New Jersey
My Commission Expires 6/2/2016

Charlene Kimble
Notary Public



The power of attorney is signed and sealed by facsimile under and by the authority of the following Resolution adopted by the Board of Directors of SICA at a meeting duly called and held on the 6th of February 1987, to wit:

"RESOLVED, the Board of Directors of Selective Insurance Company of America authorizes and approves the use of a facsimile corporate seal, facsimile signatures of corporate officers and notarial acknowledgements thereof on powers of attorney for the execution of bonds, recognizances, contracts of indemnity and other writing obligatory in the nature of a bond, recognizance or conditional undertaking."

CERTIFICATION

I do hereby certify as SICA's Corporate Secretary that the foregoing extract of SICA's By-Laws and Resolution is in full force and effect and this Power of Attorney issued pursuant to and in accordance with the By-Laws is valid.

Signed this 11th day of August, 2014

Michael H. Lanza
Michael H. Lanza, SICA Corporate Secretary



Important Notice: If the bond number embedded within the Notary Seal does not match the number in the upper right-hand corner of this Power of Attorney, contact us at 973-948-3000.



SELECTIVE®

Selective Insurance Company of America
40 Wantage Avenue
Branchville, New Jersey 07890
973-948-3000

BondNo.B 1146693

STATEMENT OF FINANCIAL CONDITION

Class B Performance Bond

I hereby certify that the following information is contained in the Annual Statement of Selective Insurance Company of America ("SICA") to the New Jersey Department of Banking and Insurance as of December 31, 2013:

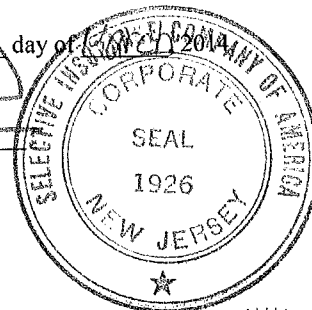
<u>ADMITTED ASSETS (in thousands)</u>		<u>LIABILITIES AND SURPLUS (in thousands)</u>	
Bonds	\$ 1,223,024	Reserve for losses and loss expenses	\$ 895,187
Preferred stocks at convention value	0	Reserve for unearned premiums	293,169
Common stocks at convention values	130,174	Provision for unauthorized reinsurance	853
Subsidiary common stock at convention values	0	Commissions payable and contingent commissions	20,314
Short-term investments	82,666	Other accrued expenses	19,390
Mortgage loans on real estate (including collateral loans)	36,721	Other liabilities	<u>258,668</u>
Other invested assets	77,505	Total liabilities	1,487,581
Interest and dividends due or accrued	12,795		
Premiums receivable	277,559	Surplus as regards policyholders	<u>463,438</u>
Other admitted assets	<u>110,575</u>		
Total admitted assets	<u>\$ 1,951,019</u>	Total liabilities and surplus as regards policyholders	<u>\$ 1,951,019</u>

I further certify that the following is a true and exact excerpt from Article VII, Section 1 of the By-Laws of SICA, which is still valid and existing.

The Chairman of the Board, President, Chief Executive Officer, any Executive Vice President, any Senior Vice President or any Corporate Secretary may, from time to time, appoint attorneys in fact, and agents to act for and on behalf of the Corporation and they may give such appointee such authority, as his/her certificate of authority may prescribe, to sign with the Corporation's name and seal with the Corporation's seal, bonds, recognizances, contracts of indemnity and other writings obligatory in the nature of a bond, recognizance or conditional undertaking, and any of said Officers may, at any time, remove any such appointee and revoke the power and authority given him/her.

IN WITNESS WHEREOF, I hereunto subscribe my name and affix the seal of SICA, this 13 day of March, 2014.

Michael H. Lanza
SICA Corporate Secretary



STATE OF NEW JERSEY :

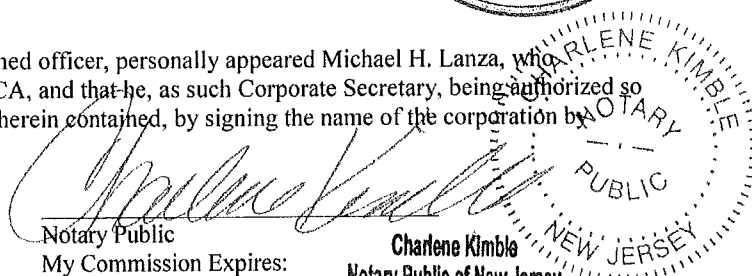
:ss. Branchville

COUNTY OF SUSSEX :

On this 13 day of March, 2014, before me, the undersigned officer, personally appeared Michael H. Lanza, who acknowledged himself to be the Corporate Secretary of SICA, and that he, as such Corporate Secretary, being authorized so to do, executed the foregoing instrument for the purposes therein contained, by signing the name of the corporation by himself as Corporate Secretary.

Notary Public
My Commission Expires:

Charlene Kimble
Notary Public of New Jersey
My Commission Expires 6/2/2016



Selective Insurance Company of America
40 Wantage Avenue
Branchville, New Jersey 07890
973-948-3000

BondNumberB 1146693

SURETY DISCLOSURE STATEMENT AND CERTIFICATION

Selective Insurance Company of America, surety on the attached bond, hereby certifies the following:

(1) The surety meets the applicable capital and surplus requirements of R.S.17:17-6 or R.S.17:17-7 as of the surety's most current annual filing with the New Jersey Department of Banking and Insurance.

(2) The capital and surplus, as determined in accordance with the applicable laws of the State of New Jersey, of the surety issuing the attached bond are in the following amounts as of the calendar year ended December 31, 2013, which amounts have been certified by certified public accountants:

<u>Company</u>	<u>Capital</u>	<u>Surplus</u>	<u>CPA</u>
Selective Insurance Company of America	\$4,400,000	\$463,437,879	KPMG LLP 345 Park Avenue New York, NY 10154

(3) With respect to the surety issuing the attached bond that has received from the United States Secretary of the Treasury a certificate of authority pursuant to 31 U.S.C. sec 9305, the underwriting limitation established therein and the date as of which the limitation was effective is as follows:

<u>Company</u>	<u>Underwriting Limitation</u>	<u>Effective Date</u>
Selective Insurance Company of America	\$46,344,000	July 1, 2014

(4) The amount of the bond to which this statement and certification is attached is
\$ 95,038.00 .

CERTIFICATE

(To be completed by an authorized certifying agent/officer for each surety on the bond)

I, Timothy A. Marchio, as Vice President, Bond SBU for Selective Insurance Company of America, a corporation domiciled in New Jersey, DO HEREBY CERTIFY that, to the best of my knowledge, the foregoing statements made by me are true, and ACKNOWLEDGE that, if any of those statements are false, this bond is VOIDABLE.



(Signature of certifying agent/officer)

Timothy A. Marchio

(Printed name of certifying agent/officer)

Vice President, Bond SBU

(Title of certifying agent/officer)

Dated: August 11th 2014
(month, day, year)

POLICYHOLDER DISCLOSURE NOTICE OF TERRORISM INSURANCE COVERAGE

The Terrorism Risk Insurance Act of 2002 establishes a program within the Department of the Treasury under which the federal government shares, with the insurance industry, the risk of loss from future terrorist attacks. The Act applies when the Secretary of the Treasury certifies that an event meets the definition of an act of terrorism. The Act provides that to be certified an act of terrorism the event must cause losses of at least five million dollars and must have been committed by an individual or individuals acting on behalf of any foreign person or foreign interest to coerce the government or population of the United States.

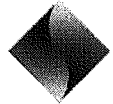
Coverage for acts of terrorism is already included in your current bond. In accordance with the federal Terrorism Risk Insurance Act of 2002, we are required to provide you with a notice disclosing the portion of your premium, if any, attributable to the coverage for terrorist acts certified under that Act.

DISCLOSURE OF PREMIUM

Your current bond includes coverage for terrorist acts certified under the Act for no additional premium.

DISCLOSURE OF FEDERAL PARTICIPATION IN PAYMENT OF TERRORISM LOSSES

The United States Government, Department of the Treasury, will pay a share of terrorism losses insured under the federal program. The federal share equals 90% of that portion of the amount of such insured losses that exceeds the applicable insurer retention.



SELECTIVE®

ALL NOTICES REGARDING CLAIMS AGAINST
THIS BOND MUST BE MAILED OR FAXED TO:

SELECTIVE INSURANCE COMPANY OF AMERICA
Attention: BOND CLAIMS
P.O. Box 7266
London, KY 40742

Telefax: 866-324-3471

Phone: 866-455-9969



WAIVER OF LIEN

(Submit 1 copy with Final Payment Requisition)

_____ (Name) of _____ (Company),
City/Town/Village of _____, contracted with the CITY OF
SARATOGA SPRINGS on _____ (M/D/Y), to furnish:

_____ for the:

_____ Bog Meadow Infrastructure and Water Supply Project _____, on property owned by the
CITY OF SARATOGA SPRINGS at 474 Broadway, Saratoga Springs, NY 12866.

Signing of this Waiver of Lien hereby acknowledges that lien holder waives any right that lien holder now has or in the future may have to claim a mechanic's lien pursuant to statute against the described real property or against the improvements located on the property to secure payment for:

_____, furnished or to
be furnished by lien holder under the described contract.

Lien holder has executed this waiver voluntarily and with full knowledge of lien holder's rights under the laws of the State of New York.

Signed: _____

Printed Name: _____

Title: _____ Dated: _____

.....
State of : (.....)

County of: (.....)

being duly sworn, deposes and says that he/she

.....
of

.....
and that the answers to the foregoing questions and all statements therein contained are true and correct.

SUBSCRIBED TO AND SWORN BEFORE ME this day of, 2013.

Notary Public

CONTRACT CONDITIONS

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

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly by



AMERICAN COUNCIL OF ENGINEERING COMPANIES

ASSOCIATED GENERAL CONTRACTORS OF AMERICA

AMERICAN SOCIETY OF CIVIL ENGINEERS

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
A Practice Division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Endorsed by



CONSTRUCTION SPECIFICATIONS INSTITUTE

These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor (EJCDC C-520 or C-525, 2007 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the Narrative Guide to the EJCDC Construction Documents (EJCDC C-001, 2007 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (EJCDC C-800, 2007 Edition).

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1420 King Street, Alexandria, VA 22314-2794
(703) 684-2882
www.nspe.org

American Council of Engineering Companies
1015 15th Street N.W., Washington, DC 20005
(202) 347-7474
www.acec.org

American Society of Civil Engineers
1801 Alexander Bell Drive, Reston, VA 20191-4400
(800) 548-2723
www.asce.org

Associated General Contractors of America
2300 Wilson Boulevard, Suite 400, Arlington, VA 22201-3308
(703) 548-3118
www.agc.org

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. 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 which is evidence of the agreement between Owner and Contractor covering the Work.
 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. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
 5. *Bid*—The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 6. *Bidder*—The individual or entity who submits a Bid directly to Owner.
 7. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).
 8. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.
 9. *Change Order*—A document recommended by Engineer 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, issued on or after the Effective Date of the Agreement.
 10. *Claim*—A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
 11. *Contract*—The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*—Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.
13. *Contract Price*—The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).
14. *Contract Times*—The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.
15. *Contractor*—The individual or entity with whom Owner has entered into the Agreement.
16. *Cost of the Work*—See Paragraph 11.01 for definition.
17. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.
18. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
19. *Engineer*—The individual or entity named as such in the Agreement.
20. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.
21. *General Requirements*—Sections of Division 1 of the Specifications.
22. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.
23. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
24. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
25. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.
26. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*—The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.
28. *Notice to Proceed*—A written notice given 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 under the Contract Documents.
29. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.
30. *PCBs*—Polychlorinated biphenyls.
31. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.
32. *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.
33. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
34. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.
35. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.
36. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.
37. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
38. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.
39. *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.

40. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
41. *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 for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.
42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.
43. *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 at the Site.
44. *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.
45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.
46. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.
47. *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 Subcontractor.
48. *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 those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
49. *Unit Price Work*—Work to be paid for on the basis of unit prices.
50. *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, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.
51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an

addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 *Terminology*

A. The words and terms discussed in Paragraph 1.02.B through F 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 Paragraph 9.09 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 14.04 or 14.05).

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. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.
- F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known 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. 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 Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *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 Agreement 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 Agreement. 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 Agreement, whichever date is earlier.

2.04 *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 the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

- A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), 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 Documents;
 - 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.

2.06 *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 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, 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 instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.07 *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 2.05.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 component parts of the Work.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, 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. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.
- C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

- A. Standards, Specifications, Codes, Laws, and Regulations
 1. Reference to standards, specifications, manuals, 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, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement 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, 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 Contract Documents. 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 Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

- A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.
2. *Contractor's Review of Contract Documents During Performance of Work:* If, 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) any standard, specification, manual, or code, or (c) 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 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.
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 Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:
 - a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); 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 *Amending and Supplementing Contract Documents*

- A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.
- B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:
 1. A Field Order;
 2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or

3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

- A. Contractor and any Subcontractor or Supplier shall not:
 1. 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
 2. 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.
- 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.

3.06 *Electronic Data*

- A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.
- B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.
- C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *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. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the

Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

- 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 the Work is to be performed 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.

4.02 *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 contiguous to the Site; and
- 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "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.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed 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 4.02 is materially inaccurate; or
- 2. is of such a nature as to require a change in the Contract Documents; 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 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

- B. *Engineer's Review:* After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. *Possible Price and Times Adjustments:*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition 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 meet any one or more of the categories described in Paragraph 4.03.A; and
 - 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 Paragraphs 9.07 and 11.03.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:
 - a. Contractor knew of the existence of such conditions at the time Contractor made a final 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
 - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or
 - c. Contractor failed to give the written notice as required by Paragraph 4.03.A.
3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or 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) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous 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 shall not be responsible for 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 such information and data;
 - b. locating all Underground Facilities shown or indicated in the Contract Documents;
 - c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and
 - d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated:*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, 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 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *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.

4.06 *Hazardous Environmental Condition at Site*

- A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "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 any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.
- D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) 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 4.06.E.

- E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. 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, either party may make a Claim therefor as provided in Paragraph 10.05.
- F. 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. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.
- G. 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: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- H. 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 a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish performance and payment bonds, 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 Documents. 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 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.
- B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds 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 each bond.
- C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, 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 requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

- A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

- A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.
- B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.

- C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.
- D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.
- E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 *Contractor's Insurance*

- A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which 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:
 - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
 - 2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
 - 3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
 - 4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:
 - a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
 - b. by any other person for any other reason;
 - 5. 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; and
 - 6. 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.
- B. The policies of insurance required by this Paragraph 5.04 shall:
 - 1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and 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;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;
3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);
5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and
6. include completed operations coverage:
 - a. Such insurance shall remain in effect for two years after final payment.
 - b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, 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.

5.06 *Property Insurance*

- A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full 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:
 1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of

them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;

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, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, 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.
 3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
 4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;
 5. allow for partial utilization of the Work by Owner;
 6. include testing and startup; and
 7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.
- B. Owner shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee.
- C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.
- D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

- E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 *Waiver of Rights*

- A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies 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 of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their 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 Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (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 as trustee 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:
1. 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 utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.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, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

- A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.
- B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

- A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, 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. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

- A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 – CONTRACTOR’S RESPONSIBILITIES

6.01 *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. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.
- 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.

6.02 *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. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner’s written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *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.
- B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, 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.

6.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 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 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.
 - 2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and “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 specification or description is intended to establish the type, function, appearance, and quality required. If the specification or description contains or is followed by words reading “or-equal” other items of material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.
 - 1. *“Or-Equal” Items:* If in Engineer’s sole discretion 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, it may be considered by Engineer as an “or-equal” item, in which case review and approval of the proposed item may, in Engineer’s sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, 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;
 - 2) 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; and
 - 3) it has a proven record of performance and availability of responsive service.
 - 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.

2. *Substitute Items:*

- a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.
- b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.
- c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.
- d. 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:
 - 1) shall certify that the proposed substitute item will:
 - a) perform adequately the functions and achieve the results called for by the general design,
 - b) be similar in substance to that specified, and
 - c) be suited to the same use as that specified;
 - 2) will state:
 - a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,
 - b) 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
 - c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
 - 3) will identify:
 - a) all variations of the proposed substitute item from that specified, and
 - b) available engineering, sales, maintenance, repair, and replacement services; and
 - 4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.

- B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.
- C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.
- D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- E. *Engineer's Cost Reimbursement:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. 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.
- F. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.
- B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. 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 any right of Owner or Engineer to reject defective Work.

- C. 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. 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 moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.
- E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.
- F. 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.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (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 such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *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.

6.08 *Permits*

- A. Unless otherwise provided in the Supplementary Conditions, 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 opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *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 knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear 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. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner

and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 *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.

6.11 *Use of Site and Other Areas*

A. Limitation on Use of Site and Other Areas:

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.
2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.
3. 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 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 by or based upon Contractor's performance of the Work.

- B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other 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 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 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 property to stresses or pressures that will endanger it.

6.12 *Record Documents*

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

6.13 *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, 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 owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.
- 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 6.13.A.2 or 6.13.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 (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 for protection of the Work 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 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *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.

6.15 *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.

6.16 *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.

6.17 *Shop Drawings and Samples*

- A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. *Shop Drawings:*

- a. Submit number of copies specified in the General Requirements.
- 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 6.17.D.

2. *Samples:*

- a. Submit number of Samples specified in the Specifications.

- b. 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 6.17.D.
- B. 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. *Submittal Procedures:*

- 1. Before submitting each Shop Drawing or Sample, Contractor shall have:
 - a. reviewed and coordinated each 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 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 and approval of that 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 both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

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 (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the

Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. Engineer's review and approval 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 6.17.C.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's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

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.

6.18 *Continuing the Work*

- A. 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, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *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 representation of 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 or the issuance of a notice of acceptability by Engineer;
6. any inspection, test, or approval by others; or
7. any correction of defective Work by Owner.

6.20 *Indemnification*

- A. 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 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 6.20.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 6.20.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.

6.21 *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 law.
- 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, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to 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 6.21, 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 6.17.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

- A. Owner may perform other work related to the Project at the Site with Owner's employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:
 - 1. written notice thereof will be given to Contractor prior to starting any such other work; and
 - 2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.
- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe

access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. 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. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

- C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, 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.

7.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:
 - 1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
 - 2. the specific matters to be covered by such authority and responsibility will be itemized; and
 - 3. the extent of such authority and responsibilities will be provided.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

- A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.
- B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.
- C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

ARTICLE 8 – OWNER’S RESPONSIBILITIES

8.01 *Communications to Contractor*

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 *Replacement of Engineer*

- A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

- A. Owner’s duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner’s identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

8.06 *Insurance*

- A. Owner’s responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

- A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

- A. Owner’s responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *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.

8.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *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.

8.12 *Compliance with Safety Program*

- 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 pursuant to Paragraph 6.13.D.

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *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 Documents.

9.02 *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 9.09. 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.

9.03 *Project Representative*

- A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. 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.

9.04 *Authorized Variations in Work*

- A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which 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. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

- A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

- A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.
- B. In connection with 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, see Paragraph 6.21.
- C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.
- D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

- A. 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 Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

- A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.
- B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.
- C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.
- D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents 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 14.07.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 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

9.10 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *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 by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).
- B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *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 as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.

10.03 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:
 - 1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
 - 2. 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; and
 - 3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of

executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *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.

10.05 *Claims*

- A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.
- B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).
- C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:
 - 1. deny the Claim in whole or in part;
 - 2. approve the Claim; or
 - 3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

- E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

- A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs 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 11.01.B, 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 shall be apportioned on the basis 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, 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 11.01.

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 5.06.D), 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 telegrams, long distance telephone calls, telephone 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 Contractor is required by the Contract Documents to purchase and maintain.

B. *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, expeditors, 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 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which 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 Paragraphs 11.01.A.
- C. *Contractor's Fee:* When all the Work 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 or when a Claim for an 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 12.01.C.
- D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, 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.

11.02 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:*
1. Contractor agrees that:
 - a. 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
 - b. 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:

1. 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.

11.03 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. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.
- 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. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 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; and
 2. there is no corresponding adjustment with respect to any other item of Work; and
 3. Contractor believes that Contractor 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 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 Change of Contract Price

- A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

- B. The value of any Work covered by a Change Order or of any Claim for 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, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or
 2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or
 3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).
- C. *Contractor's Fee*: 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 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;
 - b. for costs incurred under Paragraph 11.01.A.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 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;
 - d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;
 - 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 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

- A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.
- B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, 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 Price or the Contract Times, or both. 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.
- C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is 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 described in this Paragraph 12.03.C.
- D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or 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) sustained by Contractor on or in connection with any other project or anticipated project.
- E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 *Notice of Defects*

- A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. Defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 *Access to Work*

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests 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.

13.03 *Tests and Inspections*

- A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:
 - 1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;
 - 2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and
 - 3. as otherwise specifically provided in the Contract Documents.
- 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 and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

- E. 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.
- F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

- A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.
- B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, 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, furnishing all necessary labor, material, and equipment.
- C. If it is found that the uncovered Work is defective, 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 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 Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.
- D. 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, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *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, 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.

13.06 *Correction or Removal of Defective Work*

- A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. 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 removal (including but not limited to all costs of repair or replacement of work of others).

- B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *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 land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
1. repair such defective land or areas; or
 2. correct such defective Work; or
 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 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. 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) will be paid by Contractor.
- 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 13.07, 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 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. 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) 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 pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *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 in accordance with Paragraph 13.06.A, 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, 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 13.09, 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, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, 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 (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) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. 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 13.09.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 Schedule of Values

- A. The Schedule of Values established as provided in Paragraph 2.07.A 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.

14.02 Progress Payments

A. 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 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.

B. Review of Applications:

1. Engineer will, within 10 days after receipt of each Application for Payment, 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 9.07, 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 Documents; 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 moneys 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 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

- a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
- b. the Contract Price has been reduced by Change Orders;
- c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
- d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. Payment Becomes Due:

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. Reduction in Payment:

1. Owner may refuse to make payment of the full amount recommended by Engineer because:
 - a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
 - b. 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;
 - c. there are other items entitling Owner to a set-off against the amount recommended; or
 - d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.
2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action 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, when Contractor remedies the reasons for such action.
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 14.02.C.1 and subject to interest as provided in the Agreement.

14.03 Contractor's Warranty of Title

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 *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 (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.
- 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 tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.
- E. 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 tentative list.

14.05 *Partial Utilization*

- 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. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and 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 14.04.A through D for that part of the Work.
2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and 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 14.04 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 5.10 regarding property insurance.

14.06 *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 is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *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, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.
2. The final Application for Payment shall be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;
 - b. consent of the surety, if any, to final payment;
 - c. a list of all Claims against Owner that Contractor believes are unsettled; and

- d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) 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.

B. Engineer's Review of Application and Acceptance:

1. If, on the basis of Engineer's observation of the Work during construction and final 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 Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. 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 14.09. 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. Payment Becomes Due:

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

14.08 Final Completion Delayed

- A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and
2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *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 notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will 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 established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
3. Contractor's repeated disregard of the authority of Engineer; or
4. Contractor's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);

2. 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
 3. complete the Work as Owner may deem expedient.
- C. If Owner proceeds as provided in Paragraph 15.02.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 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) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed 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.
- D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.
- E. 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. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.
- F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

15.03 *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;
 3. 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) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) 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 15.03.

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 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 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 16 – DISPUTE RESOLUTION

16.01 *Methods and Procedures*

A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or

2. agrees with the other party to submit the Claim to another dispute resolution process; or
3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 – MISCELLANEOUS

17.01 *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 to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or
 2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

- A. When any period of time is referred to in the Contract Documents 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.

17.03 *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 Documents. 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.

17.04 *Survival of Obligations*

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 *Controlling Law*

- A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

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SUPPLEMENTARY CONDITIONS MODIFICATIONS TO GENERAL CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract, EJCDC C-700 (2007 Edition). 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-2.02 *Copies of Documents*

Delete Paragraph 2.02.A in its entirety and insert the following in its place:

- A. Owner shall furnish to Contractor up to three printed or hard copies of the Drawings and Project Manual and one set in electronic format if requested. Additional copies will be furnished upon request at the cost of reproduction.

SC-2.03 *Commencement of Contract Times; Notice to Proceed*

Delete Paragraph 2.03.A of the General Conditions in its entirety and insert the following in its place:

- A. The Contract Times will commence to run on the Effective Date of the Agreement, 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 after the Effective Date of the Agreement.

SC-4.02 *Subsurface and Physical Conditions*

Add the following new paragraphs immediately after Paragraph 4.02.B:

- C. The following reports of explorations and tests of subsurface conditions at or contiguous to the Site are known to Owner:
- Evaluation of Groundwater Resources Test / Production Well TW-1, prepared by Hanson VanVleet, LLC.
 - Evaluation of Groundwater Resources Test / Production Wells TW-2, TW-3 & TW-4, prepared by Hanson VanVleet, LLC.

SC-4.06 *Hazardous Environmental Condition at Site*

Add the following subparagraphs 4.06.A.1 and 4.06.A.2:

- A. The following reports regarding Hazardous Environmental Conditions at the Site are known to Owner:

NONE

SC5.03 *Certificates of Insurance*

Delete Paragraph 5.03A in its entirety and replace with the following:

- A. Contractor shall deliver to Owner's Office of Risk and Safety with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase, maintain and deliver prior to the commencement of any work or service provided by this agreement. It shall be an affirmative obligation of the Contractor to advise City's Office of Risk and Safety at Fax No. 518.693.4070, e-mail Marilyn.Rivers@Saratoga-Springs.org or via mail to Office of Risk and Safety, City of Saratoga Springs, 474 Broadway, Saratoga Springs, NY 12866, within two days of the cancellation or substantive change of any insurance policy set out herein, and failure to do so shall be construed to be a breach of this Agreement.

Delete Paragraph 5.03B in its entirety.

SC-5.04 *Contractor's Liability Insurance*

Add Section 5.04:

- C. All insurance policies required under this Agreement shall be issued by insurance companies authorized to conduct business under the laws of the State of New York. They shall be written for the benefit of the City of Saratoga Springs, NY; its elected and/or appointed officials, officers, agents, employees and for the Contractor. Said policies shall be effective until all work required or contemplated by the Agreement has been completed. Policies expiring on a fixed date before completion of the Contractor's duties under this Agreement must be renewed not less than 30 days before such expiration date. No policy shall be changed by endorsement without the knowledge and the written consent of the City and, in particular, any notice of cancellation by the insurer shall not be effective until 30 days after the said notice is actually received by the City. Any notice addressed to the City shall be mailed via certified or registered mail to the address set forth herein. The Contractor acknowledges that failure to obtain such insurance on behalf of the City constitutes a material breach of contract and subjects it to liability for damages indemnification and all other legal remedies available to the City.

- D. Before commencing work under this Agreement, the Contractor and each of its Subcontractors shall furnish to the City a certificate of insurance naming: the City of Saratoga Springs, NY; its elected and/or appointed officials, officers, agents and employees as an ***Additional Insured on a primary and non-contributory basis***. Failure to object to the contents of the certificate of insurance or the absence of same shall not be deemed a waiver of any and all rights held by the City. Such certificate shall be on forms acceptable to the City's Office of Risk and Safety Management showing that the Contractor has complied with these requirements. In addition, for policies expiring on a fixed date before completion of the Project, certificates showing renewal must be filed not less than 30 days before such expiration date.
- E. It shall be an affirmative obligation of the Contractor to advise the City's Office of Risk and Safety at Fax No. 518.693.4070, e-mail Marilyn.Rivers@Saratoga-Springs.org or mail via Office of Risk and Safety, City of Saratoga Springs, 474 Broadway, Saratoga Springs, NY 12866, within two days of the cancellation or substantive change of any insurance policy set out herein, and failure to do so shall be construed to be a breach of this Agreement.
- a. The Contractor shall procure and maintain during the term of this contract, at the Contractor's expense, the insurance policies listed in this Article with limits equal to or greater than the enumerated limits.
 - b. The Contractor shall be solely responsible for any self-insured retention or deductible losses under each of the required policies.
 - c. Every required policy, including any required endorsements and any umbrella / excess policy, shall be primary insurance. Insurance carried by the City of Saratoga Springs, its officers, or its employees, if any, shall be excess and not contributory insurance to that provided by the Contractor.
 - d. Every required coverage type shall be "occurrence basis" with the exception of Professional Errors and Omissions Coverage which may be "claims made" coverage.
 - e. The Contractor may utilize umbrella/excess liability coverage to achieve the limits required hereunder; such coverage must be at least as broad as the primary coverage (follow form).
 - f. The Office of Risk & Safety Management must approve all insurance certificates.
 - g. The City of Saratoga Springs reserves its right to request certified copies of any policy or endorsement thereto.
 - h. All insurance shall be provided by insurance carriers licensed & admitted to do business in the State of New York and must be rated "A-:VII" or better by A.M. Best (Current Rate Guide).
 - i. If the Contractor fails to procure and maintain the required coverage(s) and minimum limits such failure shall constitute a material breach of contract, whereupon the City of Saratoga Springs may exercise any rights it has in law or

equity, including but not limited to the following: immediate termination of the contract;

- (1.) withholding any/all payment(s) due under this contract or any other contract it has with the vendor (common law set-off); OR
- (2.) procuring or renewing any required coverage(s) or any extended reporting period thereto and paying any premiums in connection therewith. All monies so paid by the City of Saratoga pSprings shall be repaid upon demand, or at the City's option, may be offset against any monies due to the Contractor.

F. Required Property and Casualty Insurance - Minimum coverage types and amounts:

The limits of liability for the insurance required by Paragraph 5.04 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 5.04.A.1 and A.2 of the General Conditions:

- | | |
|--|-----------|
| a. State: | Statutory |
| b. Applicable Federal
(e.g., Longshoreman's): | Statutory |
| c. Employer's Liability: | \$100,000 |

2. Contractor's General Liability under Paragraphs 5.04.A.3 through A.6 of the General Conditions which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody and control of Contractor:

- | | |
|--|-------------------------|
| a. General Aggregate | <u>\$2,000,000</u> |
| b. Products – Comp. Operations Aggregate: | <u>\$2,000,000</u> |
| d. Personal and Advertising Injury
occurrence/ <u>\$2,000,000 Aggregate</u> | <u>\$1,000,000 each</u> |

- | | |
|---|--------------------|
| e. Each Occurrence (Bodily Injury and
Property Damage) | <u>\$1,000,000</u> |
| f. Property Damage liability insurance will provide
Explosion, Collapse, and Under-ground coverages
where applicable. | <u>\$1,000,000</u> |
| g.. Excess or Umbrella Liability | |

- | | |
|----------------------|--------------------|
| 1. General Aggregate | <u>\$5,000,000</u> |
| 2. Each Occurrence | <u>\$5,000,000</u> |

3. Automobile Liability under Paragraph 5.04.A.6 of the General Conditions:

a. Combined Single Limit of \$1,000,000

4. The Contractual Liability coverage required by Paragraph 5.04.B.4 of the General Conditions shall provide coverage for not less than the following amounts:

a. Bodily Injury:
1. Each person \$1,000,000
2. Each Accident \$2,000,000

b. Property Damage:
1. Each Accident \$1,000,000
2. Annual Aggregate \$2,000,000

SC-5.05 *Owner's Liability Insurance*

Delete SC-5.05 in its entirety.

SC-5.06 *Property Insurance*

Delete SC-5.06 in its entirety.

SC-5.07 *Waiver of Rights*

Delete SC-5.07 in its entirety.

SC5.08 *Receipt and Application of Insurance Proceeds*

Delete SC-5.08A in its entirety.

SC-5.10 *Partial Utilization, Acknowledgement of Property Insurer*

Delete SC-5.10 in its entirety.

SC-6.05 *Substitutes and "Or-Equals"*

Amend paragraph 6.05.C by making two subparagraphs under the Title C. Engineer's Evaluation. The second paragraph text is retitled, 6.05.C.2 After Effective Date of Agreement. A new paragraph is added before this paragraph to read as follows:

1. During Bidding, the Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, or “or-equal” materials and equipment as defined in Paragraph 6.05 of the General Conditions, or those substitute or materials and equipment approved by the ENGINEER and identified by Addendum. The materials and equipment described in the Bidding Documents establish a standard of required type, function, and quality to be met by any proposed substitute or “or-equal” item. Request for ENGINEER’s clarification of materials and equipment considered “or-equal” prior to the Effective Date of the Agreement must be received by the ENGINEER at least 7 days prior to the date for receipt of bids. No item of material or equipment will be considered by ENGINEER as a substitute unless written request for approval has been submitted by Bidder and has been received by ENGINEER at least 15 days prior to the date for receipt of Bids. Each request shall conform to the requirements of paragraph 6.05 of the General Conditions. The burden of proof of the merit of the proposed item is upon the Bidder. ENGINEER’s decision of approval or disapproval of a proposed item will be final. If ENGINEER approves any proposed substitute 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.

SC-6.06 *Concerning Subcontractors, Suppliers, and Others*

Replace 6.06G with the following paragraph:

- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.

Add a new paragraph immediately after Paragraph 6.06.G:

- H. 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 a particular Subcontractor or Supplier.

SC-6.10 *Taxes*

Add a new paragraph immediately after Paragraph 6.10.A:

- B. Owner is exempt from payment of sales and compensating use taxes of the State of New York and of cities and counties thereof on all materials to be incorporated into the Work.
 1. Owner will furnish the required certificates of tax exemption to Contractor for use in the purchase of supplies and materials to be incorporated into the Work.
 2. Owner’s exemption does not apply to construction tools, machinery, equipment, or other property purchased by or leased by Contractor, or to supplies or materials not incorporated into the Work.

Add the following new paragraphs immediately after Paragraph 6.17.E:

- F. Contractor shall furnish required submittals with sufficient information and accuracy in order to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing subsequent submittals of Shop Drawings, samples, or other items requiring approval and Contractor shall reimburse Owner for Engineer's charges for such time.
- G. In the event that Contractor requests a change of a previously approved item, Contractor shall reimburse Owner for Engineer's charges for its review time unless the need for such change is beyond the control of Contractor.

Add the following new paragraphs immediately after Paragraph 9.03.A:

- B. The Resident Project Representative (RPR) will be Engineer's employee or agent at the Site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's actions. RPR's dealings in matters pertaining to the Work in general shall be with Engineer and Contractor. RPR's dealings with Subcontractors shall be through or with the full knowledge and approval of Contractor. The RPR shall:
 - 1. *Schedules:* Review the progress schedule, schedule of Shop Drawing and Sample submittals, and schedule of values prepared by Contractor and consult with Engineer concerning acceptability.
 - 2. *Conferences and Meetings:* Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences and other project-related meetings, and prepare and circulate copies of minutes thereof.
 - 3. *Liaison:*
 - a. Serve as Engineer's liaison with Contractor, working principally through Contractor's authorized representative, assist in providing information regarding the intent of the Contract Documents.
 - b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.
 - c. Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.
 - 4. *Interpretation of Contract Documents:* Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.

5. *Shop Drawings and Samples:*

- a. Record date of receipt of Samples and approved Shop Drawings.
- b. Receive Samples which are furnished at the Site by Contractor, and notify Engineer of availability of Samples for examination.

6. *Modifications:* Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report such suggestions, together with RPR's recommendations, to Engineer. Transmit to Contractor in writing decisions as issued by Engineer.

7. *Review of Work and Rejection of Defective Work:*

- a. Conduct on-Site observations of Contractor's work in progress to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.
- b. Report to Engineer whenever RPR believes that any part of Contractor's work in progress will not produce a completed Project that conforms generally to the Contract Documents or will imperil the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise Engineer of that part of work in progress that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.

8. *Inspections, Tests, and System Startups:*

- a. Verify that tests, equipment, and systems start-ups and operating and maintenance training are conducted in the presence of appropriate Owner's personnel, and that Contractor maintains adequate records thereof.
- b. Observe, record, and report to Engineer appropriate details relative to the test procedures and systems start-ups.

9. *Records:*

- a. Record names, addresses, fax numbers, e-mail addresses, web site locations, and telephone numbers of all Contractors, Subcontractors, and major Suppliers of materials and equipment.
- b. Maintain records for use in preparing Project documentation.

10. *Reports:*

- a. Furnish to Engineer periodic reports as required of progress of the Work and of Contractor's compliance with the progress schedule and schedule of Shop Drawing and Sample submittals.
 - b. Draft and recommend to Engineer proposed Change Orders, Work Change Directives, and Field Orders. Obtain backup material from Contractor.
 - c. Immediately notify Engineer of the occurrence of any Site accidents, emergencies, acts of God endangering the Work, damage to property by fire or other causes, or the discovery of any Hazardous Environmental Condition.
11. *Payment Requests:* Review Applications for Payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to Engineer, noting particularly the relationship of the payment requested to the schedule of values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.
12. *Certificates, Operation and Maintenance Manuals:* During the course of the Work, verify that materials and equipment certificates, operation and maintenance manuals and other data required by the Specifications to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have these documents delivered to Engineer for review and forwarding to Owner prior to payment for that part of the Work.
13. *Completion:*
- a. Participate in a Substantial Completion inspection, assist in the determination of Substantial Completion and the preparation of lists of items to be completed or corrected.
 - b. Participate in a final inspection in the company of Engineer, Owner, and Contractor and prepare a final list of items to be completed and deficiencies to be remedied.
 - c. Observe whether all items on the final list have been completed or corrected and make recommendations to Engineer concerning acceptance and issuance of the Notice of Acceptability of the Work.

C. The RPR shall not:

- 1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).
- 2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.

3. Undertake any of the responsibilities of Contractor, Subcontractors, Suppliers, or Contractor's superintendent.
4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of Contractor's work unless such advice or directions are specifically required by the Contract Documents.
5. Advise on, issue directions regarding, or assume control over safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.
6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.
7. Accept Shop Drawing or Sample submittals from anyone other than Contractor.
8. Authorize Owner to occupy the Project in whole or in part.

SC-11.01 *Cost of the Work*

Delete Paragraph 11.01.A.5 in its entirety.

SC-11.03 *Unit Price Work*

Delete Paragraph 11.03.D in its entirety and insert the following in its place:

D. The unit price of an item of Unit Price Work shall be subject to reevaluation and adjustment under the following conditions:

1. If the Bid price of a particular item of Unit Price Work amounts to 20 percent or more of the Contract Price and the variation in the quantity of that particular item of Unit Price Work performed by Contractor differs by more than 30 percent from the estimated quantity of such item indicated in the Agreement; and
2. If there is no corresponding adjustment with respect to any other item of Work; and
3. If Contractor believes that Contractor has incurred additional expense as a result thereof or if Owner believes that the quantity variation entitles Owner to an adjustment in the unit price, either Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Article 10 if the parties are unable to agree as to the effect of any such variations in the quantity of Unit Price Work performed.

SC-12.01 *Change of Contract Price*

Delete the Paragraph 12.01.B.3 in its entirety.

SC-14.07.B.2 *Additional Reasons to Withhold Payments*

Add the following paragraph 14.07.B.2 immediately after paragraph 14.07.B.1 of the General Conditions to read as follows:

Reasons ENGINEER may refuse to recommend the whole or any part of any payment, or nullify any such payment previously recommended, are to protect OWNER from loss because:

- A. of injury to persons, or damage to the work or property of other contractors, subcontractors, or other caused by the act or neglect of the CONTRACTOR or any of his/her Subcontractors; or
- B. of defective Work and Work not remediated; or
- C. of CONTRACTOR'S failure to make payment to Subcontractors or Suppliers, or for labor; or
- D. Liability for liquidated damages has been incurred by CONTRACTOR (when the Agreement includes such liquidated damage provisions).

The OWNER shall have the right, as an agent for the CONTRACTOR, to apply any such amounts so withheld in such a manner as the OWNER may deem proper to satisfy such claims or to secure protection. Such application of such money shall be deemed payment to the account of the CONTRACTOR.

SC-14.09 *Waiver of Claims*

Delete SC-14.09 Waiver of Claims in its entirety.

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END OF SECTION



Andrew M. Cuomo, Governor

Peter M. Rivera, Commissioner

CITY OF SARATOGA SPRINGS

Travis Mitchell, Engineer
Environmental Design
Partnership, LLP
900 Route 146
Clifton Park NY 12065

Schedule Year 2013 through 2014
Date Requested 12/23/2013
PRC# 2013011117

Location Ingersoll Road
Project ID# 2014-01
Project Type Development of a new groundwater well field including submersible pumps, related piping, control systems, chlorination and connection to existing system. Rehabilitation of an existing pumping

PREVAILING WAGE SCHEDULE FOR ARTICLE 8 PUBLIC WORK PROJECT

Attached is the current schedule(s) of the prevailing wage rates and prevailing hourly supplements for the project referenced above. A unique Prevailing Wage Case Number (PRC#) has been assigned to the schedule(s) for your project.

The schedule is effective from July 2013 through June 2014. All updates, corrections, posted on the 1st business day of each month, and future copies of the annual determination are available on the Department's website www.labor.state.ny.us. Updated PDF copies of your schedule can be accessed by entering your assigned PRC# at the proper location on the website.

It is the responsibility of the contracting agency or its agent to annex and make part, the attached schedule, to the specifications for this project, when it is advertised for bids and /or to forward said schedules to the successful bidder(s), immediately upon receipt, in order to insure the proper payment of wages.

Please refer to the "General Provisions of Laws Covering Workers on Public Work Contracts" provided with this schedule, for the specific details relating to other responsibilities of the Department of Jurisdiction.

Upon completion or cancellation of this project, enter the required information and mail **OR** fax this form to the office shown at the bottom of this notice, **OR** fill out the electronic version via the NYSDOL website.

NOTICE OF COMPLETION / CANCELLATION OF PROJECT

Date Completed: _____ Date Cancelled: _____

Name & Title of Representative: _____

Phone: (518) 457-5589 Fax: (518) 485-1870
W. Averell Harriman State Office Campus, Bldg. 12, Room 130, Albany, NY 12240

SPECIFICATIONS

SECTION 01100 - SUMMARY

PART 1 - GENERAL

1.1 PROJECT DESCRIPTION

The Bog Meadow Well Field Development and Pump Station Rehabilitation project involves the rehabilitation of an existing surface water pumping facility and the development of three new groundwater production wells and fourth future well located on the same site along Ingersoll Road in the City of Saratoga Springs. The existing surface water pump station is used to transfer water from the Bog Meadow Brook to Loughberry Lake and has been in operation since the mid 1960's. The facility includes two vertical turbine pumps, one 50 hp pump and one 60 hp pump as well as the original control system.

The City of Saratoga Springs has recently constructed four groundwater production wells on the Bog Meadow site, pumps will be installed within three of the production wells and a common supply header system will be constructed delivering raw groundwater to an existing transmission main between the Bog Meadow Pump Station and the Loughberry Lake Water Treatment Facility. Provisions will be made within the existing pump station to house control equipment for the new well field. Provisions will be made for the possibility of a future connection between the well field and the existing finish water distribution system near the intersection of Azalea Drive and Ingersoll Road.

The project will be completed under two contracts; Contract #1 – General and Contract #2 – Electrical. A more detailed description of each contract follows.

CONTRACT #1 – GENERAL

Contract Drawings include **Bog Meadow Infrastructure and Water Supply Project Sheets C.S., S1, P1, B1, B2, D1-D3, ES1, E1-E3, M1.**

The CONTRACTOR shall supply all supervision, labor, equipment, and materials to complete the work outlined in this section. The work generally includes all building rehabilitation work (with the exception of electrical work under Contract #2), all site work including trenching for electrical & control conduit, all water pipe installation on site and offsite.

Contract #1 includes but is not limited to the following detailed scope of work:

1. PERMITS

Required permits include, but are not limited to, the following:

- a. Highway Work Permits from the City of Saratoga Springs
- b. Building Permit from the City of Saratoga Springs

2. PUMP STATION REHABILITATION

CONTRACTOR shall furnish and install all elements associated with the pump house rehabilitation except electrical (Contract #2) work as identified within the Contract Documents.

CONTRACTOR shall perform removals and shall furnish and install sink drain, and seepage pit as shown on the Contract Drawings.

CONTRACTOR shall coordinate location, with other contracts, and construct all house-keeping pads, as identified on the Contract Drawings.

CONTRACTOR shall construct chlorination room within existing pump house and perform related ventilation replacement and upgrades all as noted on the Contract Drawings and described herein.

Except where otherwise noted CONTRACTOR shall furnish and install low voltage / communication wire for all control devices.

3. BOOSTER PUMP REPLACEMENT

Plumbing and mechanical work, including control system provisions, master meter, and connection to supply line within clear well as shown on Contract Drawings. Contract #1 shall retain PUMP SUPPLIER to align and shim all booster pumps and motors per manufacturers recommendations. Pump and motor frames to be grouted to base per manufacturers recommendations. Contract #1 shall return control system supplier(s) to assist in control system programming and integration. Contractor shall obtain a written certification from manufacturers representative that the equipment has been installed to meet the operation objectives identified in the Contract Documents.

4. WELL FIELD DEVELOPMENT

The City of Saratoga Springs has constructed and tested four groundwater production wells on the Bog Meadow site. CONTRACTOR shall construct an access road to the production wells including related grading, drainage and erosion control provisions to the existing groundwater wells all as shown on the Contract Drawings and described herein.

CONTRACTOR shall furnish and install production well pumps, pitless adapters, meter vaults, fencing and common supply header system all as shown on the Contract Draw-

ings and described herein. Provisions are made for the possibility of connecting the fourth production well at a future date.

CONTRACTOR shall perform trenching associated with the conduit for well pump power and communication for each of the three production wells and the future well location all as shown on the Contract Drawings and described herein.

CONTRACTOR shall extend the common production well supply header through a proposed meter pit adjacent to the existing building. A master meter will be installed within the meter pit and provisions for chlorination will be made. In general Contract #2 is responsible for furnishing and installing conduit; however, in the case of the meter pit, Contract #1 shall furnish and install conduit and low voltage power and communication wire.

Contract #1 includes all trenching and backfilling required for electrical conduit. CONTRACTOR shall coordinate this work with Contract #2. Contract #1 includes all restoration work required to restore disturbed areas to a condition equal to or better than existed prior to the work.

Contract #1 shall return control system supplier(s) to assist in well field / alarm system control system programming and integration. Contractor shall obtain a written certification from manufacturers representative that the equipment has been installed to meet the operation objectives identified in the Contract Documents.

CONTRACT #2 – ELECTRICAL

Contract Drawings include **Bog Meadow Infrastructure and Water Supply Project Sheets C.S., S1, S1A, P1, B1, B2, B2A, D1-D3, D3A, ES1, E1-E3, M1.**

The CONTRACTOR shall supply all supervision, labor, equipment, and materials to complete the work outlined in this section. Contract #2 includes but is not limited to the following scope of work:

The City of Saratoga Springs has constructed and tested four groundwater production wells on the site. Contract #2 shall furnish and install conduit and power and communication wire for the three production wells; Contract #1 will provide trenching and backfill. Close coordination is required with Contract #1.

Contract #2 shall supply and install low voltage and communication wire to three existing and one future well at this time (to be pulled through single conduit).

Contract #2 shall furnish and install all power and electrical process conduit within pump station except as noted.

CONTRACTOR shall supply and install power wire for three production wells currently constructed (power wire to future wells to be supplied and installed under separate contract).

CONTRACTOR shall supply and install all electrical work with proposed pump house as identified within the Contract Drawings.

1.2 RELATED DOCUMENTS

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

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. Contract #1 and Contract #2 are covered by these contract documents.
- B. Total bids for each contract shall include mobilization, demobilization, and bonding costs for the CONTRACTOR to execute the entire contract.
- C. CONTRACTOR shall be responsible for the job site security and safety of all work areas.
- D. Owner: City of Saratoga Springs
- E. Engineer: The Contract Documents, dated March 2014, were prepared for Project by the Environmental Design Partnership, 900 Route 146, Clifton Park, New York 12065. Phone: (518) 371-7621.

1.4 TYPE OF CONTRACT

- A. Project will be constructed under multiple prime contracts.

1.5 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 16-division format and CSI/CSC's "MasterFormat" numbering system.
 - 1. Division 1: Sections in Division 1 govern the execution of the Work of all Sections in the Specifications.
- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 - 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for

clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

- a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
- C. **Conflicting Requirements:** If different or conflicting requirements are found within the Contract Documents or if compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to CONTRACT ADMINISTRATOR for a decision before proceeding.
 1. **Minimum Quantity or Quality Levels:** The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to ENGINEER OR CONTRACT ADMINISTRATOR for a decision before proceeding.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

3.1 SEQUENCE OF OPERATIONS / MAINTENANCE OF SURFACE WATER PUMPING

- A. It is critical during the summer months to maintain the ability to transfer surface water from the Bog Meadow facility to Loughberry Lake. Contractor must maintain the ability to operate the existing surface water booster pumps or new surface water booster pumps during the months of June, July, and August. Actual operation of the booster pumps will be at the discretion of the City of Saratoga Springs. The maximum allowable down time of the booster pumps shall be 2 days over a 2 week period. The Contractor is responsible for all necessary work and expenses associated with this requirement. Contract #1 will be responsible for coordinating this work and providing backup power as necessary.

END OF SECTION 01100

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SECTION 01230 - ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes identification of Alternate items specified in the Bid Form and defined in the Contract Documents.
- B. All Alternate materials described in the Section are required to have prices provided on the Bid Form as submitted by the Bidder.
- C. Do not submit Alternates other than as described in this Section.

1.2 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.3 PAYMENT

- A. Work specified in this Section is considered incidental and payment shall be included as part of appropriate unit price in Bid Form.

1.4 SCHEDULE OF ALTERNATES

- A. **Add Alternate A1 – Well Field Connection Directly to Distribution System. Includes all work required to connect the new well field directly into the existing distribution system as shown on the Contract Drawings. The work generally includes chlorination and fluoridation equipment within the pump house, a nested pipe network to achieve desired chlorine contact time, and connection to the existing water system distribution system on Azalea Drive. This alternate shall be bid lump sum.**
- B. **Add Alternate A2 – Wet Well Epoxy Coating. Includes the coating of interior walls and floor of the existing wet well with NSF/ANSI 61 approved epoxy coating. Sherwin Williams Tank**

Clad HS or approved equal to be installed per manufacturers recommendations. The unit price for this alternate shall include all costs associated with furnishing and applying the epoxy coating per manufacturers recommendations. The unit of measure shall be on a square foot basis; the area to which the epoxy coating shall be applied will be determined by the Owner and Engineer.

- C. **Add Alternate A3 – Replace Existing Meter Manhole.** Includes all costs associated with replacing the existing meter manhole, adjacent to the Bog Meadow Pump Station, with a precast manhole and frame and cover as specified on the Contract Drawings. This alternate shall be bid lump sum.
- D. **Add Alternate AE1 – Manual Transfer Switch.** Includes all cost associated with an outdoor non-automatic transfer switch equal to ASCO Model 386 in weather tight NEMA 3R enclosure as specified on the Contract Drawings. This alternate shall be bid lump sum.
- E. **Add Alternate AE2 – Replace Ballast of Exterior Lights.** Includes all cost associated with changing the ballast tips on exterior lights for compatibility with new power supply to site as specified on the Contract Drawings. This alternate shall be bid lump sum.

1.5 INSTALLATION

- A. Coordination:
 - 1. Modify or adjust affected Work as necessary to integrate Work of selected Alternates into Project.
 - 2. Include as part of each Alternate, miscellaneous devices, accessories, and items incidental to or required for complete installation whether or not indicated as part of Alternate.
- B. Execute accepted Alternates under same conditions as other Work of Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01230

SECTION 01250 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Sections include the following:
 - 1. Division 1 Section "Unit Prices" for administrative requirements for using unit prices.
 - 2. Division 1 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK

- A. Contract Administrator will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Engineer's Supplemental Instructions."

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Engineer will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Proposal Requests issued by Engineer are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
 - 2. Within 7 days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.

- d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Contract Administrator.
 - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 4. Include costs of labor and supervision directly attributable to the change.
 - 5. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

1.5 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Proposal Request, Contract Administrator will issue a Change Order for signatures of Owner and Contractor on EJCDC form 1910-8-B.

1.6 CONSTRUCTION CHANGE DIRECTIVE

- A. Work Change Directive: Contract Administrator may issue a Work Change Directive on EJCDC Document 1910-8-F. Work Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - 1. Work Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Work Change Directive.
 - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01250

SECTION 01290 - 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 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections include the following:
 - 1. Division 1 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 2. Division 1 Section "Unit Prices" for administrative requirements governing use of unit prices.

1.3 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with Continuation Sheets.
 - b. Submittals Schedule.
 - 2. Submit the Schedule of Values to Contract Administrator at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
 - 3. Subschedules: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values correlated with each phase of payment.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least 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 Engineer.

- c. Engineer's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
2. 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.
- 1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. 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 specified, include evidence of insurance or bonded warehousing.
6. 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.
7. 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.
8. 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.
9. 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.

1.4 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Contract Administrator 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 Forms: Use **AIA Documents G702 and G703 Application and Certificate for Payment**.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Contract Administrator 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 of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment to Contract Administrator 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.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from every entity who is 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 final or full waivers.
 - 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 - 4. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
 - 5. Waiver Delays: Submit each Application for Payment with Contractor's waiver of mechanic's lien for construction period covered by the application.
 - a. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.

- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of Values.
 3. Contractor's Construction Schedule (preliminary if not final).
 4. Products list.
 5. Schedule of unit prices.
 6. Submittals Schedule (preliminary if not final).
 7. List of Contractor's staff assignments.
 8. List of Contractor's principal consultants.
 9. Copies of any required permits.
 10. Certificates of insurance and insurance policies.
 11. Certified payrolls.
- H. Application for Payment at Substantial Completion: After issuing 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 Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. Final Payment Application: 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, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 6. Evidence that claims have been settled.
 7. Final, liquidated damages settlement statement.
 8. Certified payroll as required by Prevailing Rate Schedule

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01290

SECTION 01330 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Sections include the following:
 - 1. Division 1 Section "Payment Procedures" for submitting Applications for Payment and the Schedule of Values.
 - 2. Division 1 Section "Quality Requirements" for submitting test and inspection reports.
 - 3. Division 1 Section "Closeout Procedures" for submitting warranties and Project Record Documents.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Contract Administrator's responsive action.
- B. Informational Submittals: Written information that does not require Contract Administrator's and Construction Manager's responsive action. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

- A. General: Electronic copies of CAD Drawings of the Contract Drawings will not be provided by Engineer for Contractor's use in preparing submittals.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

- a. Contract Administrator reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Contract Administrator's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 - 1. Initial Review: Allow 7 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Contract Administrator will advise Contractor when a submittal being processed must be delayed for coordination.
 - 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 - 3. Resubmittal Review: Allow 7 days for review of each resubmittal.
- D. Identification: Place a permanent label or title block on each submittal for identification.
 - 1. Indicate name of firm or entity that prepared each submittal on label or title block.
 - 2. Provide a space approximately 4 by 5 inches on label or beside title block to record Contractor's review and approval markings and action taken by Contract Administrator.
 - 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Engineer.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Location(s) where product is to be installed, as appropriate.
 - l. Other necessary identification.
- E. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.
- F. Additional Copies: Unless additional copies are required for final submittal, and unless Contract Administrator observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
 - 1. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Contract Administrator.
- G. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Contract Administrator will discard submittals received from sources other than Contractor.
 - 1. Transmittal Form: Provide locations on form for the following information:

- a. Project name.
 - b. Date.
 - c. Destination (To:).
 - d. Source (From:).
 - e. Names of subcontractor, manufacturer, and supplier.
 - f. Category and type of submittal.
 - g. Submittal purpose and description.
 - h. Specification Section number and title.
 - i. Drawing number and detail references, as appropriate.
 - j. Transmittal number.
 - k. Submittal and transmittal distribution record.
 - l. Remarks.
 - m. Signature of transmitter.
- H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each submittal to show which products and options are applicable.
 - 3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Standard product operation and maintenance manuals.
 - e. Compliance with specified referenced standards.
 - f. Notation of coordination requirements.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 - 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.

- c. Fabrication and installation drawings.
 - d. Schedules.
 - e. Design calculations.
 - f. Compliance with specified standards.
 - g. Notation of coordination requirements.
 - h. Notation of dimensions established by field measurement.
 - i. Relationship to adjoining construction clearly indicated.
 - j. Seal and signature of professional engineer if specified.
2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 40 inches.

D. Samples: Prepare physical units of materials or products, including the following:

- 1. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Engineer's sample where so indicated. Attach label on unexposed side that includes the following:
 - a. Generic description of Sample.
 - b. Product name or name of manufacturer.
 - c. Sample source.

E. Product Schedule or List: Prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

- 1. Type of product. Include unique identifier for each product.

F. Application for Payment: Comply with requirements in Division 1 Section "Payment Procedures."

G. Schedule of Values: Comply with requirements in Division 1 Section "Payment Procedures."

H. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

- 1. Name, address, and telephone number of entity performing subcontract or supplying products.
- 2. Number and title of related Specification Section(s) covered by subcontract.
- 3. Drawing number and detail references, as appropriate, covered by subcontract.

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.

- 1. Number of Copies: Submit two copies of each submittal, unless otherwise indicated. Contract Administrator will not return copies.

2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 3. Test and Inspection Reports: Comply with requirements in Division 1 Section "Quality Requirements."
-
- B. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of engineers and owners, and other information specified.
 - C. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements.
 - D. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.
 - E. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements.
 - F. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
 - G. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
 - H. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.
 - I. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
 - J. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Contract Administrator.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 CONTRACT ADMINISTRATOR'S ACTION

- A. General: Contract Administrator will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Contract Administrator will review each submittal, make marks to indicate corrections or modifications required, and return it. Contract Administrator will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.
- C. Informational Submittals: Contract Administrator will review each submittal and will not return it, or will reject and return it if it does not comply with requirements. Contract Administrator will forward each submittal to appropriate party.
- D. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION 01330

SECTION 01400 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.
- C. Quality-control services include inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities. They do not include contract enforcement activities performed by Engineer.
- D. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-control services required by Engineer, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- E. Related Sections include the following:
 - 1. Division 1 Section "Submittals" specifies requirements for development of a schedule of required tests and inspections.

1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.

- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Engineer.
- C. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

1.4 DELEGATED DESIGN

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Contract Administrator.

1.5 SUBMITTALS

- A. Reports: Prepare and submit certified written reports that include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.
 - 10. Ambient conditions at time of sample taking and testing and inspecting.
 - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 - 12. Name and signature of laboratory inspector.
 - 13. Recommendations on retesting and reinspecting.
- B. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

- B. **Manufacturer Qualifications:** A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance.
- C. **Professional Engineer Qualifications:** A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
- D. **Testing Agency Qualifications:** An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed.

1.7 QUALITY CONTROL

- A. **Contractor Responsibilities:** Unless otherwise indicated as the responsibility of another identified entity, Contractor shall provide inspections, tests, and other quality-control services specified elsewhere in the Contract Documents and required by authorities having jurisdiction. Costs for these services are included in the Contract Sum.
 - 1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 - 3. Submit a certified written report, in duplicate, of each quality-control service.
 - 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 - 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- B. **Retesting/Reinspecting:** Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.
- C. **Associated Services:** Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 - 1. Access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 - 4. Facilities for storage and field-curing of test samples.
 - 5. Delivery of samples to testing agencies.
 - 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.

7. Security and protection for samples and for testing and inspecting equipment at Project site.
- D. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 1. Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 1. Provide materials and comply with installation requirements specified in other Sections of these Specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01400

SECTION 01420 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Contract Administrator's action on Contractor's submittals, applications, and requests, "approved" is limited to Contract Administrator's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Contract Administrator. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Installer": Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.

- J. "Experienced": When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- K. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.
- C. Conflicting Requirements: If different or conflicting requirements are found within the Contract Documents or if compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to CONTRACT ADMINISTRATOR for a decision before proceeding.
 - 1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to ENGINEER OR CONTRACT ADMINISTRATOR for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source and make them available on request.
- E. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

BOCA BOCA International, Inc.
 www.bocai.org

(708) 799-2300

- F. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

NIST	National Institute of Standards and Technology www.nist.gov	(301) 975-6478
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OSHA	Occupational Safety & Health Administration www.osha.gov	(202) 693-1999
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- G. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

NYSDOH	New York State Department of Health 77 Mohican Street Glens Falls, NY 12801	(518) 793-3893
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NYSDOT	New York State Department of Transportation 1220 Washington Avenue Albany, New York 12232-0204	(518) 457-2124
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PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01420

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SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes requirements for temporary facilities and controls, including temporary utilities, support facilities, and security and protection facilities.
- B. Temporary utilities include, but are not limited to, the following:
 - 1. Water service and distribution.
 - 2. Temporary electric power and light.
 - 3. Sanitary facilities, including drinking water.
- C. Support facilities include, but are not limited to, the following:
 - 1. Temporary roads and paving.
 - 2. Dewatering facilities and drains.
 - 3. Waste disposal facilities.
 - 4. Construction aids and miscellaneous services and facilities.
 - 5. Sanitary facilities, including drinking water.
- D. Security and protection facilities include, but are not limited to, the following:
 - 1. Environmental protection.
 - 2. Stormwater control.
 - 3. Barricades, warning signs, and lights.

1.3 QUALITY ASSURANCE

- A. Standards: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:
 - 1. Building code requirements.
 - 2. Health and safety regulations.
 - 3. Utility company regulations.
 - 4. Police, fire department, and rescue squad rules.
 - 5. Environmental protection regulations.

- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide new materials. Undamaged, previously used materials in serviceable condition may be used if approved by Contract Administrator. Provide materials suitable for use intended.
- B. Water: Potable.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction until permanent water service is in use. Disinfect temporary water piping before use.

3.2 SUPPORT FACILITIES INSTALLATION

- A. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate to support loads and to withstand exposure to traffic during construction period. Locate temporary roads and paved areas in same location as permanent roads and paved areas. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
 - 1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
 - 2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Division 2 Section "Earthwork."
 - 3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
 - 4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course

pavement before installation of final course according to Division 2 Section "Hot-Mix Asphalt Paving."

- B. Traffic Controls: Provide temporary traffic controls at junction of temporary roads with public roads. Include warning signs for public traffic and "STOP" signs for entrance onto public roads. Comply with requirements of authorities having jurisdiction.
- C. Dewatering Facilities and Drains: Comply with requirements in applicable Division 2 Sections for temporary drainage and dewatering facilities and operations not directly associated with construction activities included in individual Sections. Where feasible, use same facilities. Maintain Project site, excavations, and construction free of water.
 - 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining property nor endanger permanent Work or temporary facilities.
 - 2. Before connection and operation of permanent drainage piping system, provide temporary drainage where roofing or similar waterproof deck construction is completed.
 - 3. Remove snow and ice as required to minimize accumulations.

3.3 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects. Avoid using tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near Project site.
- B. Stormwater Control: Provide stormwater and erosion control devices as shown on the Contract Drawings at a minimum. Contractor shall adjust the actual location and quantity of erosion control devices depending upon field conditions. An Erosion and Sediment control plan has been established which illustrates the minimum level of Erosion and Sediment control necessary.
- C. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from construction damage. Protect tree root systems from damage, flooding, and erosion.
- D. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erecting structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and public of possible hazard. Where appropriate and needed, provide lighting, including flashing red or amber lights.

3.4 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage caused by freezing temperatures and similar elements.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
 - 2. Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

END OF SECTION 01500

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SECTION 01700 - EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. General installation of products.
 - 4. Coordination of Owner-installed products.
 - 5. Progress cleaning.
 - 6. Starting and adjusting.
 - 7. Protection of installed construction.
 - 8. Correction of the Work.
- B. Related Sections include the following:
 - 1. Division 1 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
 - 2. Division 1 Section "Closeout Procedures" for submitting Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.3 SUBMITTALS

- A. Qualification Data: For contractor to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of engineers and owners, and other information specified.
- B. Certificates: Submit certificate signed by contractor certifying that location and elevation of improvements comply with requirements.

1.4 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
 - 1. Before construction, verify the location and points of connection of utility services.
- B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Owner not less than 2 days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Owner's written permission.
- C. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit

to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

- D. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- E. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Engineer. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Engineer promptly.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
 - 1. Establish benchmarks and control points to set lines and levels as needed to locate each element of Project.
 - 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 3. Inform installers of lines and levels to which they must comply.
 - 4. Check the location, level and plumb, of every major element as the Work progresses.
 - 5. Notify Contract Administrator when deviations from required lines and levels exceed allowable tolerances.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- D. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Contract Administrator.

3.4 FIELD ENGINEERING

- A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Engineer. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Engineer before proceeding.

2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- B. Benchmarks: Establish and maintain a minimum of 2 permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
1. Make vertical work plumb and make horizontal work level.
 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction forces.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction forces.
1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually

agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.

2. Preinstallation Conferences: Include Owner's construction forces at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction forces if portions of the Work depend on Owner's construction.

3.7 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- F. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- G. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

- H. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

3.10 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction.
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

END OF SECTION 01700

SECTION 01770 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Project Record Documents.
 - 3. Warranties.
 - 4. Final cleaning.
- B. Closeout requirements for specific construction activities are included in appropriate Sections in Division 2.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
 - 1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of Work claimed as substantially complete.
 - a. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
 - b. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
 - 2. Advise Owner of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 7. Complete startup testing of systems.
 8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Contract Administrator will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Contract Administrator, that must be completed or corrected before certificate will be issued.
1. The Contract Administrator will repeat inspection when requested and assured that the Work is substantially complete.
 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following. List exceptions on the request.
1. Submit a final Application for Payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.
 2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
 3. Submit certified copy of Contract Administrator's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Contract Administrator. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 4. Submit consent of surety of final payments.
 5. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
- B. Reinspection Procedures: The Contract Administrator will reinspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Engineer.
1. Upon completion of reinspection, the Contract Administrator will prepare a certificate of final acceptance. If the Work is incomplete, the Engineer will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
 2. If necessary, reinspection will be repeated.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit 2 copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
 - 1. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Engineer.
 - d. Name of Contractor.
 - e. Page number.

1.6 PROJECT RECORD DOCUMENTS

- A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for Contract Administrator's reference during normal working hours.
- B. Record Drawings: Maintain and submit one set of blue- or black-line white prints of Contract Drawings and Shop Drawings.
 - 1. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
 - a. Give particular attention to information on concealed elements that cannot be readily identified and recorded later.
 - b. Accurately record information in an understandable drawing technique.
 - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - d. Mark Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings.
 - 2. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
 - 3. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - 4. Note Construction Change Directive numbers, Change Order numbers, alternate numbers, and similar identification where applicable.
 - 5. Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Organize into manageable sets; bind each set with durable paper cover sheets. Include identification on cover sheets.

- C. Miscellaneous Record Submittals: Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Immediately prior to the date of dates of Substantial Completion, complete miscellaneous records and place in good order. Identify miscellaneous records properly and bind or file, ready for continued use and reference. Submit to the Engineer for the Owner's records.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

- f. Leave Project clean and ready for use.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 01770

SECTION 01781 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for Project Record Documents.
- B. General project closeout requirements are included in Section "Project Closeout".

1.3 SUBMITTALS

- A. Project Record Documents required include:
 - 1. Marked-up copies of Contract Drawings
 - 2. Marked-up copies of Shop Drawings.
 - 3. Field records for variable and concealed conditions.
 - 4. Record information on Work that is recorded only schematically.
 - 5. Coordination Drawings.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.
 - 1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an understandable drawing technique.
 - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Locations and depths of underground utilities.
 - d. Actual equipment locations.
 - e. Changes made by Change Order or Construction Change Directive.
 - f. Changes made following Engineer's written orders.
 - g. Details not on the original Contract Drawings.
 - h. Field records for variable and concealed conditions.
 - i. Record information on the Work that is shown only schematically.
3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

2.2 MISCELLANEOUS RECORD SUBMITTALS

- A. Refer to other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Immediately prior to Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for use and reference. Submit to the Engineer for the Owner's records.
 1. Categories of requirements resulting in miscellaneous records include, but are not limited to the following:
 - a. Field records on excavations and foundations.
 - b. Field records on underground construction and similar Work.
 - c. Survey showing locations and elevations of underground lines.
 - d. Invert elevations of drainage piping.
 - e. Authorized measurements utilizing unit prices or allowances.
 - f. Certifications received in lieu of labels on bulk products.
 - g. Batch mixing and bulk delivery records.
 - h. Testing and qualifications of tradesmen.
 - i. Documented qualification of installation firms.
 - j. Load and performance testing.
 - k. Inspection and certifications by governing authorities.
 - l. Leakage and water-penetration tests.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Engineer's reference during normal working hours.

END OF SECTION 01781

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SECTION 01785 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.01 SUMMARY

- A. To aid the continued instruction of OWNER'S operating and maintenance personnel, and to provide a positive source of information regarding products incorporated into the Work, furnish and deliver the Operation and Maintenance (O&M) data described in this Section and as specified in other sections of these Specifications.
- B. ENGINEER'S review and acceptance of O&M data will be only for conformance with requirements of this section, for form of submittal and organization of data and completeness of information provided, but not for technical content or coordination between individual suppliers. ENGINEER will be sole judge of completeness of data.

1.02 PAYMENTS

- A. Progress payments for equipment delivered, stored or installed under these Contract Documents will not be made until copies of O&M data delivered to and approved by ENGINEER.
- B. Progress payments for control systems packaged with equipment will not be made until O&M data incorporated into equipment and control system manual delivered to and approved by ENGINEER.

1.03 SUBMITTALS

- A. Submit 4 copies of complete O&M data, bound in covers bearing suitable identification, for review within 30 days after CONTRACTOR receives approved Shop Drawings for equipment.
- B. Format:
 - 1. Size: 8-1/2 in. by 11 in., or 11 in. by 17 in. folded, with standard 3-hole punching.
 - 2. Paper: 20-lb minimum, white.
 - 3. Text: Manufacturer's printed data or typewritten.
 - 4. Drawings:
 - a. Bind in text.
 - b. Fold larger drawings and place in text page size envelope bound into binder. Place identification on outside of envelope.
 - 5. Provide tabbed section dividers.
 - a. Provide title of section on divider.
 - b. Provide tab index in Table of Contents.
 - 6. Cover: Label each submittal cover with "OPERATION AND MAINTENANCE INSTRUCTIONS" and following:
 - a. Project Title: BOG MEADOW INFRASTRUCTURE AND WATER SUPPLY PROJECT
 - b. Name of equipment as set forth in Contract Documents.
 - c. Specification section number for equipment as set forth in Contract Documents.
 - 7. Binders:

- a. Bind each submittal into a D-ring commercial quality binder with durable and cleanable plastic covers.
- b. Filled to not more than 75% of capacity.
- c. When multiple binders used, contents shall be organized into related groupings and each binder cover shall bear identification of specific content.

8. Page number submittals.

1.04 QUALITY ASSURANCE

- A. In preparing data required by this section, use only personnel thoroughly trained and experienced in operation and maintenance of the described items, completely familiar with the requirements of this section, skilled in technical writing to the extent needed for communicating the essential data, and skilled in drafting to prepare required drawings.

PART 2 – PRODUCTS

(NOT USED)

PART 3 – EXECUTION

3.01 GENERAL

- A. Review O&M submittal and complete Form 1 to Section 01785, CONTRACTOR SUBMITTAL FORM, in its entirety indicating requirements of this section have been met. ENGINEER will reject submittals without completed Form 1.

3.02 GENERAL CONTENT OF DATA

- A. Each submittal shall contain equipment data pertaining to not more than one Specification section number indicated in Contract documents.
- B. Title Sheet: First page inside cover listing following:
 - 1. Title: OPERATION AND MAINTENANCE INSTRUCTIONS.
 - 2. Project Title: BOG MEADOW INFRASTRUCTURE AND WATER SUPPLY PROJECT
 - 3. Name of equipment as set forth in Contract Documents.
 - 4. Specification section number for equipment as set forth in Contract Documents.
 - 5. CONTRACTOR'S name, address, and telephone number.
 - 6. Subcontractor's name, address, and telephone number if equipment provided by Subcontractor.
 - 7. Purchase order number, manufacturer's shop order number or other such number required for parts and service.
 - 8. Manufacturer's name, address, and telephone number.
 - 9. Name, address, and telephone number for local source of parts and service.
- C. Product List: Immediately after title sheet. List of each product and major components, indexed to content of submittal, and identified by product name and model number as set forth by manufacturer and Specification section and article number.
- D. Table of Contents: Immediately following product list. Arrange in logical, systematic order and shall be at minimum a tabbed section index. Provide each tabbed section with table of contents for section.

- E. Product Data Sheets: Provide specification and catalog sheets showing configuration, manufacturer's specifications, models, options, and styles of equipment and major components being provided. Product data sheets shall show project specific information with inapplicable information deleted by removal. Insert in tabbed sections.
- F. Drawings:
 - 1. Supplement text with drawings to clearly illustrate following:
 - a. Product and components.
 - b. Relations of component parts of equipment and systems.
 - c. Control and flow diagrams.
 - 2. Drawings to be actual drawings of equipment from manufacturer. "Typical" drawings not acceptable, unless they accurately illustrate actual equipment.
- G. Special Information:
 - 1. Provide explanation of interrelationships of equipment and components, and effects one component has on another or system.
 - 2. Provide overall instructions and procedures for equipment tying in instructions and procedures for separate components into unified instructional package.
 - 3. Provide glossary of special terms used by manufacturer.
 - 4. Organize in consistent format under separate headings for different procedures.
 - 5. Provide logical sequence on instructions for each procedure.
- H. Warranty, Bond, or Service Contract.
 - 1. Provide copy of each issued.
 - 2. Provide information sheets to explain proper procedures in event of failure or malfunction to prevent voiding warranty or bond, and instances affecting validity of warranty or bond.

3.03 SPECIFIC CONTENT OF DATA

- A. Specific content, for each unit of equipment and system, shall include following:
 - 1. Description of Unit and Component Parts:
 - a. Function, normal operating characteristics, and limiting conditions.
 - b. Performance curves, engineering data, and tests as applicable.
 - c. Complete nomenclature and commercial number of replacement parts.
 - d. Complete nameplate data.
 - e. P&ID numbers for equipment as set forth in Contract Documents.
 - 2. Operating Procedures:
 - a. Startup, break-in, and normal operating instructions.
 - b. Regulation, control, stopping, shutdown, and emergency instructions.
 - c. Summer and winter operating instructions.
 - d. Special operating instructions.
 - 3. Maintenance Procedures:
 - a. Routine maintenance operations.

- b. Guide to troubleshooting.
 - c. Disassembly, repair, and reassembly instructions.
 - d. Alignment, adjusting, and checking instructions.
 - 4. Servicing and Lubrication Schedule:
 - a. List of lubricants required and quantity to be applied.
 - b. Schedule of lubrication.
 - c. Schedule for other routine maintenance.
 - 5. Manufacturer's printed instructions regarding safety precautions for both protection of personnel and prevention of damage to equipment.
 - 6. Description of sequence of operation of controls.
 - 7. Manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
 - 8. Recommended spare parts to be stocked, and quantity.
 - 9. Predicted life of parts.
 - 10. Control diagrams (ladder diagrams, instrumentation loop diagrams, and electrical schematics as appropriate).
 - 11. Bill of material.
 - 12. Completed EQUIPMENT DATA FORM typewritten on copy of Form 2 to Section 01785. (Example of completed form is Form 3 to Section 01785.)
 - 13. Other data as required under pertinent section of Specifications.
- B. Specific content for each electric and electronic system, as applicable to equipment.
- 1. Description of System and Component Parts:
 - a. Function, normal operating characteristics, and limiting conditions.
 - b. Performance curves, engineering data, rating tables, and tests as applicable.
 - c. Complete nomenclature and commercial number of replaceable parts.
 - d. Complete nameplate data.
 - e. P&ID numbers for equipment as set forth in Contract Documents.
 - 2. Circuit Directories of Panelboards:
 - a. Electrical service.
 - b. Controls.
 - c. Communications.
 - 3. Complete instrumentation loop diagrams with tabulated listing of components in each control circuit or loop.
 - 4. Operating Procedures:
 - a. Routine and normal operating instructions.
 - b. Sequences required.
 - c. Special operating instructions.
 - 5. Maintenance Procedures:
 - a. Routine maintenance operations.
 - b. Guide to troubleshooting.
 - c. Disassembly, repair, and reassembly instructions.
 - d. Adjustment and checking instructions.

6. Manufacturer's printed instructions regarding safety precautions for both protection of personnel and prevention of damage to equipment.
 7. Recommended spare parts to be stocked, and quantity.
 8. Other data as required under pertinent sections of Specifications.
- C. Prepare and include additional data when need for such data becomes apparent during instruction of OWNER'S personnel.

FORM 1 TO SECTION 01785
CONTRACTOR SUBMITTAL FORM

Page 1 of 5

TO: (Engineer) (Address) (Attn:)		DATE	
		SPECIFICATION SECTION TITLE	
		SECTION NO.	
FROM: (Contractor) (Address)		MANUFACTURER/ VENDOR	
		NO. OF COPIES	

GENTLEMEN:

We have checked the O&M data submittal dated _____ and have found it to be in accordance with Specification Section 01785 and as noted below.

Signature of Contractor

	Provided	Not Applicable	Page No.
FORMAT			
Size: 8-1/2 x 11 or 11 x 17			
Paper: 20-lb min, white			
Text: Printed data / typewritten			
Drawings:			
Standard size bound in text			
Text-size labeled envelopes			
Tabbed Section Dividers			
Cover:			
Title			
Project title			
Equipment name			
Specification section no.			
Binders: Plastic cover			
Pages: Numbered			

FORM 1 TO SECTION 01785
CONTRACTOR SUBMITTAL FORM

Page 2 of 5

	Provided	Not Applicable	Page No.
GENERAL CONTENT			
One Specification Section			
Title Sheet:			
Title			
Project title			
Equipment name			
Specification section no.			
Contractor ID			
Subcontractor ID			
Purchase order data			
Manufacturer ID			
Service / parts supplier ID			
Product List			
Table of Contents			
Product Data Sheets: Tabbed sections			
Drawings:			
Illustrate product and components			
Control and flow diagrams			
Special Information:			
Interrelationships of equipment and components			
Unified instruction package			
Glossary			
Instructions organized in consistent format			
Instructions in logical order			
Warranty, Bond, Service Contract			

FORM 1 TO SECTION 01785
CONTRACTOR SUBMITTAL FORM

Page 3 of 5

	Provided	Not Applicable	Page No.
SPECIFIC CONTENT (EQUIPMENT / SYSTEM)			
Description of Unit and Components:			
Equipment function			
Normal operating characteristics			
Limiting conditions			
Performance curves			
Engineering data			
Test data			
Replaceable parts list			
Nameplate data			
P&ID numbers			
Operating Procedures:			
Startup			
Normal operation			
Regulation and control			
Stopping and shutdown			
Emergency			
Seasonal operation			
Special instructions			
Maintenance Procedures			
Routine			
Troubleshooting			
Disassembly / repair / reassembly			
Adjustment and checking			
Service and Lubrication:			
List of lubricants			
Lubrication schedule			
Maintenance schedule			
Safety Precautions / Features			
Sequence of Operation of controls			
Assembly Drawings			
(Continued)			

Page 4 of 5

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FORM 1 TO SECTION 01785
CONTRACTOR SUBMITTAL FORM

Page 5 of 5

	Provided	Not Applicable	Page No.
SPECIFIC CONTENT (ELECTRIC / ELECTRONIC)			
Description:			
Equipment Function			
Normal operating characteristics			
Performance curves			
Engineering data			
Test data			
Replaceable parts list			
Nameplate data			
P&ID numbers			
Panelboard Directories			
Electrical			
Controls			
Communications			
Instrumentation Loops:			
Diagrams			
Components each circuit / loop			
Operating Procedures			
Normal operation			
Sequences			
Special instructions			
Maintenance Procedures:			
Routine			
Troubleshooting			
Disassembly / repair / reassembly			
Adjusting and checking			
Safety Precautions / Features			
Spare Parts List			
Additional Data			

FORM 2 TO SECTION 01785
EQUIPMENT DATA FORM

Page 1 of 4

PROJECT NAME			
CONTRACT NO.			
CONTRACTOR			
EQUIPMENT NO.		ASSET NO.*	
DESCRIPTION		MAINT. NO.*	
LOCATION			
MANUFACTURER			
PURCHASED FROM			
VENDOR ORDER NO.			
DATE OF PURCHASE		PURCHASE PRICE	\$
LOCAL SUPPLIER			
ADDRESS			
PHONE NO.			
MODEL NO.			
NO. OF UNITS			
SERIAL NUMBERS			
*By Owner			

FORM 2 TO SECTION 01785
EQUIPMENT DATA FORM

Page 2 of 4

EQUIPMENT NO.		ASSET NO.*	
DESCRIPTION		MAINT. NO.*	
NAMEPLATE DATA			
ELECTRIC MOTOR		PUMP / HVAC UNIT	
MANUFACTURER		MANUFACTURER	
TYPE	[]AC []DC	TYPE	
HORSEPOWER		SIZE	
RPM		CAPACITY	
VOLTAGE		PRESSURE	
AMPERAGE		ROTATION	
PHASE		IMPELLER SIZE	
FRAME		IMPELLER MATL.	
DRIVE / REDUCER		OTHER (I&C)	
MANUFACTURER		MANUFACTURER	
TYPE	[]GEAR	TYPE	
	[]V-BELT	SIZE	
	[]CHAIN		
	[]VARIDRIVE		
SERVICE FACTOR		CAPACITY	
RATIO		RANGE	

*By Owner

Page 3 of 4

EQUIPMENT NO.		ASSET NO.*	
DESCRIPTION		MAINT. NO.*	

FREQUENCY

List required frequency of each maintenance operation.
--

*By Owner

FORM 2 TO SECTION 01785
EQUIPMENT DATA FORM

Page 4 of 4

LUBRICATION / RECOMMENDED SPARE PARTS LIST

EQUIPMENT NO.		ASSET NO.*	
DESCRIPTION		MAINT. NO.*	

LUBRICANT LIST

REFERENCE SYMBOL	LUBRICANT TYPE (MILITARY STANDARD)	RECOMMENDED LUBRICANT AND MANUFACTURER
List of symbols in "Maintenance Operation"	List general lubrication type.	List specific lubrication name, viscosity, and manufacturer.

RECOMMENDED SPARE PARTS LIST

PART NO.**	DESCRIPTION	UNIT	QUANTITY	UNIT COST

ADDITIONAL DATA AND REMARKS

*By Owner

**Identify parts provided by this contract with two asterisks.

Note: Attach additional sheets if necessary.

<div style="text-align: center;"> <i>"EXAMPLE"</i> FORM 3 TO SECTION 01785 EQUIPMENT DATA FORM </div> <div style="text-align: right;">Page 1 of 4</div>			
PROJECT NAME	Anytown WWTP		
CONTRACT NO.	10023		
CONTRACTOR	Built-to-Last		
EQUIPMENT NO.	P-8-6-5, P-8-6-6	ASSET NO.*	
DESCRIPTION	Feed Pumps	MAINT. NO.*	
LOCATION	Chemical Building		
MANUFACTURER	Pumptech		
PURCHASED FROM	Suppliers Inc.		
VENDOR ORDER NO.	SI-1324-aa		
DATE OF PURCHASE	May 7, 1997	PURCHASE PRICE	\$1,200
LOCAL SUPPLIER	Helpful Tech.		
ADDRESS	464553 N. Balyor, Outthere, Ohio 45362		
PHONE NO.	354-576-9876		
MODEL NO.	CC-2-5674		
NO. OF UNITS	2		
SERIAL NUMBERS	P674A123456-A / P674A123456-B		
*By Owner			

<div style="text-align: center;"> <i>"EXAMPLE"</i> FORM 3 TO SECTION 01785 EQUIPMENT DATA FORM </div> <div style="text-align: right;">Page 2 of 4</div>			
EQUIPMENT NO.	P-8-6-5, P-8-6-6	ASSET NO.*	
DESCRIPTION	Feed Pumps	MANIT. NO.*	
NAMEPLATE DATA			
ELECTRIC MOTOR		PUMP / HVAC UNIT	
MANUFACTURER	Westinghouse	MANUFACTURER	Pumptechn
TYPE	[X]AC []DC	TYPE	Centrifugal
HORSEPOWER	25	SIZE	2 inch
RPM	2000	CAPACITY	9 gpm
VOLTAGE	460	PRESSURE	14 psig
AMPERAGE	1.4 FL	ROTATION	CW
PHASE	3	IMPELLER SIZE	NA
FRAME	28a	IMPELLER MATL.	NA
DRIVE / REDUCER		OTHER (I&C)	
MANUFACTURER	Westinghouse	MANUFACTURER	
TYPE	[X] GEAR	TYPE	
	[] V-BELT	SIZE	
	[] CHAIN		
	[] VARIDRIVE		
SERVICE FACTOR		CAPACITY	
RATIO	1:1	RANGE	
*By Owner			

Page 3 of 4

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<div> <div>“EXAMPLE”</div> <div> <div>FORM 3 TO SECTION 01785</div> <div>EQUIPMENT DATA FORM</div> </div> <div>Page 4 of 4</div> </div>				
LUBRICATION / RECOMMENDED SPARE PARTS LIST				
EQUIPMENT NO.	P-8-6-5, P-8-6-6		ASSET NO.*	
DESCRIPTION	Feed Pumps		MAINT. NO.*	
LUBRICANT LIST				
REFERENCE SYMBOL	LUBRICANT TYPE (MILITARY STANDARD)	RECOMMENDED LUBRICANT AND MANUFACTURER		
List of symbols in “Maintenance Operation”	List general lubrication type.	List specific lubrication name, viscosity, and manufacturer.		
1	Lithium base grease	Texaco TH268		
RECOMMENDED SPARE PARTS LIST				
PART NO.**	DESCRIPTION	UNIT	QUANTITY	UNIT COST
**2-567-098	Mechanical seal	1	1	
3-987-456567	O-Ring	1	2	\$6.75
ADDITIONAL DATA AND REMARKS				
<div> <div>*By Owner</div> <div>**Identify parts provided by this contract with two asterisks.</div> <div>Note: Attach additional sheets if necessary.</div> </div>				

END OF SECTION

SECTION 01820 - SYSTEMS DEMONSTRATIONS

PART 1 – GENERAL

1.01 DESCRIPTION

A. Before Substantial Completion is considered, CONTRACTOR shall test and demonstrate specific items of equipment and systems in operation. Conduct testing and demonstrations on following systems.

1. BOOSTER PUMP OPERATION

a. Bog Meadow Booster Pump System with pumping equipment, piping, valves, and instrumentation and control system.

2. WELL FIELD OPERATION

a. Bog Meadow Well Field with all three groundwater wells, piping, valves, and instrumentation and control system.

3. ALARM AND MONITORING SYSTEM OPERATION

a. Monitor alarm systems remotely and verify the alarms are working and signals are transmitted to the water system operator. At a minimum the following alarms shall be checked:

- 1) Well pump smart alarm
- 2) Booster pump smart alarm
- 3) Room Freeze alarm

B. Preliminary:

1. CONTRACTOR shall provide services of qualified representatives of Suppliers to be present at Project Site as necessary to successfully complete systems demonstrations.

C. Coordination:

1. Designate representative of CONTRACTOR to be responsible for testing and demonstrations of systems.
2. CONTRACTOR shall submit schedule of systems testing and demonstrations for review by ENGINEER and OWNER 10 days prior to tests and demonstrations.
3. Notify ENGINEER at least 10 working days before tests and demonstrations are to begin so ENGINEER can make arrangements with OWNER to witness testing and demonstrations.
4. Reschedule cancelled tests and demonstrations 5 working days in advance.

1.02 SUBMITTALS

A. Operation and Maintenance (O&M) Data:

1. Submit in accordance with Sections 01330 and 01785 before conducting Systems demonstrations.

B. Reports:

1. Testing of components and systems.

- a. Prepare report for each system on results and activities encompassing testing required by this Section. Submit report within two working days of completion of tests.
- b. Report shall describe findings of inspections; revisions, modifications or replacement of equipment; calibrations; test results; dates and names of persons involved and observing inspections, testing, and other activities pertaining to testing of components and systems; and statement regarding operational condition of components and systems.

C. Submit in accordance with Section 01330.

1.03 PAYMENT

- A. Work specified in this section is considered incidental and payment shall be included as part of Lump Sum Contract Items.

PART 2 – PRODUCTS

(Not Used)

PART 3 – EXECUTION

3.01 TESTING OF SYSTEM COMPONENTS

- A. Each system component shall be inspected and tested by CONTRACTOR and reported by CONTRACTOR to be ready for startup before training OWNER'S personnel and before beginning system demonstration.
- B. Inspections and tests shall be made to determine if equipment is properly assembled, aligned, adjusted, calibrated, wired and connected. Changes, adjustments, or replacements of equipment necessary to comply with requirements of Contract shall be performed without additional cost to OWNER.
- C. Complete Instructional Services before beginning system demonstration.

3.02 SYSTEMS DEMONSTRATIONS

- A. Upon completion of inspection and testing of system components, and upon completion of Instructional Services, demonstrate operation and performance of each system.
 1. Where no specific performance requirements are stated in Specifications, demonstrate to show equipment operates in accordance with acceptable industry standards for application of equipment.
 2. System demonstration shall show equipment operates within manufacturer's tolerances for noise and vibration, equipment is responsive to manual and automatic controls, control and protective devices are properly set, and equipment operates on controlled or intermittent basis when such operation is intended.
 3. Demonstrate proper function and process control for each control point, alarm, and safety lockout system.
- B. Temporary facilities and services are CONTRACTOR'S responsibility. CONTRACTOR shall provide temporary facilities and services as required to complete testing and systems demonstrations.

- C. ENGINEER will consider system demonstration successful and complete when system operates properly for 120 consecutive hours without interruption.
- D. If, in ENGINEER'S opinion, any system is not operating properly at any time during system demonstration, CONTRACTOR shall stop demonstration and adjust, calibrate, or replace equipment and instrumentation and controls as required to correct problem. After corrections have been made, restart system demonstration and operate system for 120 consecutive hours without interruption.

3.03 SUBSTANTIAL COMPLETION

- A. ENGINEER will not consider Work substantially complete until all system demonstrations have been successfully completed:

END OF SECTION

SECTION 02230 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Protecting existing trees and vegetation to remain.
 - 2. Removing trees and other vegetation.
 - 3. Clearing and grubbing.
 - 4. Topsoil stripping.
- B. Related Sections include the following:
 - 1. Division 1 Section "Construction Facilities and Temporary Controls" for temporary utilities, temporary construction and support facilities, temporary security and protection facilities, and environmental protection measures during site operations.
 - 2. Division 2 Section "Earthwork" for soil materials, excavating, backfilling, and site grading.

1.3 DEFINITIONS

- A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of weeds, roots, and other deleterious materials.

1.4 MATERIALS OWNERSHIP

- A. Except for materials indicated to be stockpiled or to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from the site.

1.5 QUALITY ASSURANCE

- A. Preinstallation Conference: Conduct conference at Project site as required by Owner and Contract Administrator.

1.6 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. Improvements on Adjoining Property: Authority for performing indicated removal and alteration work on property adjoining Owner's property will be obtained by Owner before award of Contract.
- C. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated.
- D. Notify utility locator service for area where Project is located before site clearing.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Provide erosion-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- C. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots.
 - 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
 - 2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
 - 3. Completely remove stumps, roots, obstructions, and debris extending to a depth of 18 inches below exposed subgrade.

4. Use only hand methods for grubbing within drip line of remaining trees.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
 1. Place fill material in horizontal layers not exceeding 8-inch loose depth, and compact each layer to a density equal to adjacent original ground.

3.3 SITE IMPROVEMENTS

- A. Remove existing above and below grade improvements as indicated and as necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
 1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.

3.4 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. Burning is not permitted.
- C. No stumps or other debris shall be filled, side cast, or placed outside the project limits.

END OF SECTION 02230

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SECTION 02300 - EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to other sections of the specifications, drawings, and details to determine type and extent of work effecting the work of this section, whether or not such work is specifically mentioned in this section. It is the intent of this specification to include all labor and materials required to complete this section whether or not it is clearly or explicitly shown.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Excavating and backfilling trenches.
 - 2. Excavating and backfilling trenches for underground utilities including sewer, storm sewer, and water.
 - 3. Dewatering.
 - 4. Soil compaction.
 - 5. All grading and earthwork.
- B. Contractor is responsible for all required layout lines and levels.
- C. Related Sections include the following:
 - 1. Division 1 Section "Construction Facilities and Temporary Controls."

1.3 DEFINITIONS

- A. Backfill: Soil materials used to fill an excavation.
 - 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 - 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe.
- C. Borrow: Satisfactory soil imported from off-site for use as fill or backfill.
- D. Excavation: Removal of material encountered above subgrade elevations.

1. Additional Excavation: Excavation below subgrade elevations as directed by Engineer. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
 2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be without additional compensation.
- E. Fill: Soil materials used to raise existing grades.
- F. Rock: Rock material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material 3/4 cu. yd. or more in volume that when tested by an independent geotechnical testing agency, according to ASTM D 1586, exceeds a standard penetration resistance of 100 blows/2 inches.
- G. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- H. Subbase Course: Gravel layer placed between the subgrade and asphalt paving courses, or layer placed between the subgrade and a concrete pavement or walk.
- I. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
- J. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.4 SUBMITTALS

- A. Samples: The Contractor shall furnish representative earth materials to the testing laboratory for analysis and report, as directed by the Contract Administrator or as outlined on the specifications.
- B. Material Test Reports: From a qualified testing agency indicating and interpreting test results, investigations, findings, and recommendations to the Contractor and the Contract Administrator.

1.5 QUALITY ASSURANCE

- A. Reference Standards:
1. The latest edition of the following standards, as referenced herein, shall be applicable.
 - a. "Standard Specifications, Construction and Materials, New York State Department of Transportation, Office of Engineering".
 - b. "Standard Specifications for Highway Materials and Methods of Sampling and Testing, American Association of State Highway and Transportation Officials (AASHTO)".
 - c. American Society for Testing and Materials (ASTM).

- B. The Contractor shall comply with the requirements for soil erosion and sedimentation control and other requirements of governmental authorities having jurisdiction, including the State of New York.
- C. The Contractor shall provide and pay for all costs in connection with an approved independent testing facility to determine conformance of soils and aggregate with the specifications.

1.6 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Contract Administrator and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Contact utility-locator service for area where Project is located before excavating.
- B. Notify the Contract Administrator of any unexpected subsurface condition.
- C. Protect excavations by shoring, bracing, sheet piling, or by other methods, as required to ensure the stability of the excavation. Comply with OSHA requirements.
- D. Protection of Existing Utilities:
 - 1. Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations. Comply with OSHA requirements.
 - a. Relocate existing two (2) 3" P.E. water supply lines to avoid a conflict with the proposed water tank.
 - 2. Coordinate interruption and or termination of utilities with the utility companies and the Owner.
 - 3. Provide a minimum of forth-eight (48) hours notice to the Owner and receive written notice to proceed before interrupting any utility.
 - 4. Repair any damaged utilities as acceptable to the Owner, Engineer, and utility company at no additional cost to the Owner.
- E. Protection of Persons and Property:
 - 1. Barricade open excavations occurring as part of this work and post with waning lights, if required.
 - 2. Protect structures, utilities, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
 - 3. Perform excavation within drip-line of large trees, to remain, by hand and protect the root system from damage or dryout to the greatest extent possible. Maintain moist conditions for root system and cover exposed roots with burlap. Paint root cuts of 1" diameter and larger with emulsified asphalt tree paint.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: ASTM D 2487 soil classification groups GW, GP, GM, SW, SP, and SM, or a combination of these group symbols; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: ASTM D 2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT, or a combination of these group symbols.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Backfill and Fill: Satisfactory soil materials.
- E. Subbase: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2- inch sieve and not more than 8 percent passing a No. 200 sieve.
- F. Bedding: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.
- G. Crushed Stone: Material to conform to New York State Department of Transportation material designation 703-0201 maximum Size No. 2 screen designation.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.2 DEWATERING

- A. The Contractor shall remove all water from the excavation promptly and continuously throughout the progress of the work and shall keep the excavation dry at all times until the structures to be built therein are completed and are backfilled or have sufficient weight to resist uplift pressures. Groundwater levels shall be depressed to a minimum of 2 feet below excavation subgrade. No pipe or masonry is to be laid in water and water shall not be allowed to rise on or flow over any pipe or masonry until such time as approved by the Engineer.

- B. All necessary precautions shall be taken to prevent disturbances of and to properly drain the subgrades upon which concrete is to be placed and upon which pipe is to be laid. If necessary, in the opinion of the Engineer, well points, deep wells, or other means shall be used to lower the groundwater level, and observation wells shall be installed to confirm that groundwater levels are lowered as specified. Well points, if used, shall be shifted frequently to avoid drainage from too long a distance. Provide a suitable point of discharge in a manner satisfactory to the Engineer.
- C. Precautions shall be taken to protect uncompleted work from flooding during storms or from other causes. All pipe lines or structures not stable against uplift during construction or prior to completion shall be thoroughly braced or otherwise protected.

3.3 EXPLOSIVES

- A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavation to subgrade elevations regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions.
 - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.5 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 - 1. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended for bearing surface.

3.6 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
- B. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
- C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and

barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

1. For pipes and conduit less than 6 inches in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.
3. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.7 APPROVAL OF SUBGRADE

- A. Notify Contract Administrator when excavations have reached required subgrade.
- B. If Contract Administrator determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
 1. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
- C. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Contract Administrator.

3.8 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill may be used when approved by Contract Administrator.
 1. Fill unauthorized excavations under other construction or utility pipe as directed by Contract Administrator.

3.9 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow materials and satisfactory excavated soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.10 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Surveying locations of underground utilities for record documents.
2. Inspecting and testing underground utilities.
3. Removing concrete formwork.
4. Removing trash and debris.
5. Removing temporary shoring and bracing, and sheeting.
6. Installing permanent or temporary horizontal bracing on horizontally supported walls.

3.11 UTILITY TRENCH BACKFILL

- A. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- B. Backfill trenches excavated under footings and within 18 inches of bottom of footings; fill with concrete to elevation of bottom of footings.
- C. Place and compact initial backfill of subbase material, free of particles larger than 1 inch, to a height of 12 inches over the utility pipe or conduit.
 1. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.
- D. Coordinate backfilling with utilities testing.
- E. Fill voids with approved backfill materials while shoring and bracing, and as sheeting is removed.
- F. Place and compact final backfill of satisfactory soil material to final subgrade.
- G. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.12 FILL

- A. Preparation: Remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface before placing fills.
- B. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- C. Place and compact fill material in layers to required elevations as follows:
 1. Under grass and planted areas, use satisfactory soil material.

3.13 MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air-dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.14 COMPACTION OF BACKFILLS AND FILLS

- A. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 6 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
 - 1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill material at 95 percent modified proctor.
 - 2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill material at 95 percent modified proctor.
 - 3. Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill material at 85 percent modified proctor.

3.15 GRADING

- A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Lawn or Unpaved Areas: Plus or minus 1 inch.

3.16 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.
- B. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

3.17 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
 - 1. Scarify or remove and replace soil material to depth as directed by Engineer; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.18 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Owner.
 - 1. Remove waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 02300

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SECTION 02526 – PITLESS UNITS

PART 1 - GENERAL

1.1 SUMMARY

- A. Complete assembled Pitless Unit System including well cap, lift-out bail, hold down hooks, lift out pipe, discharge body with support ring, spool with check valves and pressure equalizing passages..

1.2 SUBMITTALS

- A. Bidders shall submit as part of their bid the Manufacturer and Model of the Pitless Unit to be installed if other than as specified in the Contract Documents (i.e., an or equal).
- B. Shop Drawings: Submit shop drawings including detailed specifications and drawings of the Pitless Unit System furnished by the manufacturer.

PART 2 - PRODUCTS

2.1 PITLESS UNIT

- A. The Pitless Unit shall be Baker Manufacturing Company, Monitor Division, Model **5PS1012WBWE06M6ES** or equal. The unit should be factory assembled, before shipping to the site. The pitless unit must conform to the Recommended Standards for Water Works, Great Lakes Upper Mississippi River Board of State Public Health & Environmental Managers, Health Education Services, Albany, NY.

2.2 WELL CAP

- A. Watertight Cap shall be secured to the pitless casing with a compression gasket. The top of the cap can be removed without affecting the sealed conduit or wiring. The heavy duty watertight cap will have a separate protected downward facing stainless steel screened well vent with pipe nipple. Construction of the cap and well vent will be of heavy duty gray cast iron and painted with a green enamel finish.

2.3 UPPER CASING

- A. The Upper Casing is factory assembled to the discharge body, and the lift out and hold down mechanism are factory assembled to the spool. Upper casing thickness must conform to the Recommended Standards for Water Works, and be coated with a rust protective coating. The upper casing must provide a watertight connection from the discharge body to the well cap.

The discharge port center line to be **5 feet** below grade, and the pitless upper casing to extend **2 feet** above grade.

2.4 SPOOL

- A. The spool shall include **6 inch** NPT per ANSI B 1.20.1 male or female drop pipe connection and shall be constructed of lead-free galvanized heavy duty gray cast iron, ductile iron, or steel with a lead-free galvanized plating on the wetted surface of over .010 inches thick. The spool will have o-ring grooves machined into the spool retaining the o-rings when setting or pulling the system.

The positive pressure o-ring seals shall be constructed of neoprene or equivalent. Spool shall be designed to accommodate probe tubes or water samplers and NPT ports for discharge pressure taps. O-ring protection should be provided to prevent the seals from dragging on the upper casing when the pump is installed or removed.

2.5 DISCHARGE BODY

- A. The Discharge Body shall be constructed of lead-free galvanized ductile iron or lead-free galvanized steel. O-ring seat to be designed to prevent crevice and galvanic corrosion, dissimilar metals should be avoided. Discharge body designed to be strong enough to prevent distortion due to vertical movement of discharge pipe thereby allowing spool to bind in the discharge body. Minimum I.D. of the discharge body to be equal to or greater than I.D. of the well casing for ease in well servicing.

2.6 HOLD-DOWN MECHANISM

- A. The Pitless Unit spool should have a hold down mechanism, factory assembled to spool and capable of preventing rotation of the pitless spool relative to the discharge body, at full rated locked rotor torque of the submersible pump motor. The spool must also have a factory assembled lift out pipe and bail, or spider capable of **2000 lbs.** rated load, to allow lifting a water filled drop pipe and pump out of the well for service. Components to be constructed of ductile iron or steel with a corrosion resistant coating.

END OF SECTION

SECTION 02920 - LAWNS AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Seeding.
- B. Related Sections include the following:
 - 1. Division 2 Section "Site Clearing" for topsoil stripping and stockpiling.
 - 2. Division 2 Section "Earthwork" for excavation, filling and backfilling, and rough grading.

1.3 DEFINITIONS

- A. Finish Grade: Elevation of finished surface of planting soil.
- B. Manufactured Soil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- C. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.
- D. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill immediately beneath planting soil.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful lawn establishment.
 - 1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Seed: Deliver seed in original sealed, labeled, and undamaged containers.

PART 2 - PRODUCTS

2.1 SEED

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.
- B. Seed Species: State-certified seed of grass species, as follows:
- C. Seed Species: Seed of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 0.5 percent weed seed:
 - 1. Sun and Partial Shade: Proportioned by weight as follows:
 - a. 50 percent Kentucky bluegrass (*Poa pratensis*).
 - b. 30 percent chewings red fescue (*Festuca rubra* variety).
 - c. 10 percent perennial ryegrass (*Lolium perenne*).
 - d. 10 percent redtop (*Agrostis alba*).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive lawns and grass for compliance with requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
 - 1. Protect adjacent and adjoining areas from hydroseeding overspray.
- B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 LAWN PREPARATION

- A. Limit lawn subgrade preparation to areas to be planted.

- B. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future.
- C. Restore areas if eroded or otherwise disturbed after finish grading and before planting.

3.4 SEEDING

- A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
 - 1. Do not use wet seed or seed that is moldy or otherwise damaged.
- B. Sow seed at the rate of 2 lb/1000 sq. ft..
- C. Rake seed lightly into top 1/8 inch of topsoil, roll lightly, and water with fine spray.
- D. Protect seeded areas with slopes exceeding 1:6 with erosion-control fiber mesh and 1:4 with erosion-control blankets installed and stapled according to manufacturer's written instructions.
- E. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose depth over seeded areas. Spread by hand, blower, or other suitable equipment.

3.5 HYDROSEEDING

Permanent Seeding and Planting of all unpaved areas of the site shall be completed using hydroseeding.

- A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.
 - 1. Apply slurry uniformly to all areas to be seeded in a two-step process. Apply first slurry application at a minimum rate of 500-lb/acre dry weight but not less than the rate required to obtain specified seed-sowing rate. Apply slurry cover coat of fiber mulch at a rate of 1000 lb/acre.

3.6 SATISFACTORY LAWNS

- A. Satisfactory Seeded Lawn: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. (0.92 sq. m) and bare spots not exceeding 5 by 5 inches.

3.7 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris created by lawn work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Erect barricades and warning signs as required to protect newly planted areas from traffic. Maintain barricades throughout maintenance period and remove after lawn is established.
- C. Remove erosion-control measures after grass establishment period.

END OF SECTION 02920

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SECTION 03300 – CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies cast-in-place concrete, including formwork, reinforcing, mix design, placement procedures, and finishes. Cast-in-place concrete specifications for storage tank floor and foundation shall be prepared separately and submitted by design engineer for review.

1.3 QUALITY ASSURANCE

- A. Comply with latest edition of the following:
 - 1. ACI 211.1 "Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete."
 - 2. ACI 301 "Specifications for Structural Concrete for Buildings."
 - 3. ACI 303 "Guide to Cast-In-Place Architectural Concrete Practice."
 - 4. ACI 304 "Guide for Measuring, Mixing, transporting, and Placing Concrete."
 - 5. ACI 305 "Hot Weather Concreting."
 - 6. ACI 306 "Cold Weather Concreting."
 - 7. ACI 318 "Building Code Requirements for Structural Concrete."
 - 8. ACI 347 "Guide to Formwork for Concrete."
 - 9. ACI SP-15 "Field Reference Manual." A copy of this publication shall be kept in the field office at all times during concrete construction.
 - 10. CRSI "Manual of Standard Practice."
- B. To minimize irregularities in appearance and/or color, the cement, aggregates, admixtures, and water for each type of concrete construction exposed to view in completed project shall be obtained from same source for duration of that type of construction.

1.4 SUBMITTALS

- A. Shop Drawings: Submit shop drawings for fabrication, bending, and placement of concrete reinforcement. Show bar schedules, bar spacing, diagrams of bent bars, arrangements of concrete reinforcement. Include special reinforcement required for openings through concrete. Show elevations of reinforcement for all members at minimum ¼ inch = 1'-0" scale.

- B. Mix design: Submit proposed mix designs for concrete at least 15 days before start of concreting.
- C. Submit data and installation instructions for proprietary material.

1.5 PRODUCT HANDLING

- A. Store materials so as to ensure preservation of their quality and fitness for the Work. Store reinforcement and formwork in a manner to prevent damage and accumulation of dirt.

1.6 CONCRETE TESTING SERVICES

- A. Employ, at Contractor's expense, a testing laboratory acceptable to Contract Administrator to perform material evaluation tests and for quality control during placement. Tests shall be taken at point of discharge into structure.
 - 1. Sample and test concrete for quality control during placement as follows:
 - a. Record time concrete batched as shown on truck ticket, and record time truck is emptied.
 - b. Sample Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
 - c. Concrete Compressive Test
 - d. Compressive Test Specimen: ASTM C 31, one set of six standard cylinders for concrete to be placed in pads and landing. Store undisturbed, and in an insulated box during cold weather. Deliver cylinders to lab between 16 and 32 hours after making.
 - 1) Compressive Strength Tests: ASTM C 39, one set of six cylinders for each 50 cubic yards or fraction thereof, of each concrete class placed in any one day; two lab specimens tested at 7 days, two lab specimens tested at 28 days, and two specimens retained in reserve for later testing if required.

1.7 Test Reports

- A. Forward results to Architect, Engineer, Owner, concrete producer, and Contractor on same day that tests are made.
 - 1. Reports of compressive strength tests shall contain: general information of project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, name of individual making specimen, location of concrete batch in structure, design compressive strength at twenty-eight days, concrete mix proportions and materials, compressive strength, and type of break for both seven-day and twenty-eight-day tests.

1.8 WORKMANSHIP

- A. Contractor shall be responsible for correction of concrete work which does not conform to specified requirements, including strength, tolerances, and finishes. Correct deficient concrete as directed by Engineer.

PART 2 - PRODUCTS

2.1 FORM MATERIALS AND ACCESSORIES

- A. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces.
 - 1. Use overlaid plywood complying with U.S. Product Standards PS-1 "A-C or B-B High Density Overlaid Concrete Form," Class 1.
- B. Form Coatings: Provide commercial formulation form-coating compounds with a maximum VOC of 350 mg/l that will not bond with, stain, nor adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces requiring bond or adhesion, nor impede wetting of surfaces to be cured with water or curing compound. Concrete form release agent for surfaces used in potable water storage or transport to be non-petroleum based and meet NSF requirements and be approved by the NYS Department of Health.
- C. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plan of the exposed concrete surface.

2.2 REINFORCING MATERIALS

- A. Deformed bars: ASTM A 615, Grade 60; ties and stirrups, Grade 40. Deformed bars to be welded: ASTM A 706.
- B. Steel Wire: ASTM A 82, plain, cold-drawn steel.
- C. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars in place. Use wire-bat-type supports complying with CRSI specifications.
- D. Minimum 16-gage annealed tie wire, ASTM A 82.

2.3 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II.
- B. Aggregates: ASTM C 33 (normal weight), one source, and as herein specified.

1. Fine Aggregates: Clean, sharp, natural sand free from loam, clay , lumps, or other deleterious substances.
 2. Coarse Aggregate: Clean uncoated, processed aggregate free from clay, mud, loam or foreign matter; conforming to Size 467 for foundations and 57 for slabs. For slabs on grade, provide minimum 1800 pounds per cubic yard of concrete, uniformly graded to 1-1/2 inches, clean, processed, crushed stone with low absorption and free of flat/elongated particles, approved by NYSDOT.
- C. Water: Clean, fresh, and drinkable.

2.4 RELATED MATERIALS

- A. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. Per square yard, complying with AASHTO M 182, Class 2.
- B. Curing Sheet Materials: One of the following moisture-retaining covers, complying with ASTM C 171; waterproof paper, polyethylene film, or polyethylene-coated burlap.
- C. Clear Curing and Sealing Compound: NO clear curing and sealing compounds are to be used on concrete floor slab in-fill and equipment maintenance pads. All interior pads are to receive paint finish.
- D. Horizontal Joint Sealants: Sikadur 51SL by Sika Corp;, or accepted equivalent. Storage tank sealants to be NSF approved.
- E. Chamfer Strips: Provide wood, metal, PVC, or rubber chamfer strips fabricated to provide 3/4-inch chamfer on all exposed edges indicated.
- F. Non-Shrink Grout: Corp of Engineers CRD-C 621.
 1. Conspec 100 by Conspec Manufacturing Co.
 2. Euro N-S Grout by Euclid Chemical Co.
 3. Sika Grout 212 by Sika Corp.
 4. Masterflow 928 or Set Grout by Master Builders, Inc.
 5. SonogROUT by Sonneborn Building Products
 6. Or accepted equivalent.

2.5 PROPORTIONING AND MIX DESIGN

- A. Prepare design mixes for concrete. Use independent testing facility acceptable to Architect/Engineer for preparing and reporting proposed mix designs.
- B. Where concrete production facility can establish uniformity of its production for concrete of similar strength and materials based on recent test data, the average strength used as a basis for determining mix design proportions shall exceed specified design strength by requirements of ACI 318, Section 5.3.2.1 or ACI 301, Section 3.9.

- C. When a concrete production facility does not have field test records for calculation of standard deviation, the required average strength shall be determined according to ACI 318, Section 5.3.2.2.
- D. Contractor has the option to use a site mixed concrete; however, mix design shall still be submitted for approval.

E. Concrete Quality: Per Drawings.

2.6 REINFORCING FABRICATION

- A. Fabricate bars to required lengths, shapes, and bends. Do not rebend or straighten reinforcement in a manner that shall weaken the material.

PART 3 - EXECUTION

3.1 JOB CONDITIONS

- A. Examine conditions under which concrete shall be placed. Do not proceed with work until all unsatisfactory conditions are corrected.

3.2 NOTIFICATION

- A. Notify Engineer 24 hours before anticipated time of completion of reinforcement in any section.
- B. Do not place concrete until reinforcement has been observed by Architect/Engineer and corrections, if any, made.

3.3 FORMWORK INSTALLATION

- A. General: Design, erect, support, brace, and maintain formwork to support vertical and lateral, static and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork, so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances complying with ACI 347.

- B. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to reduce uniform smooth lines and tight edge joints.

3.4 REINFORCEMENT PLACEMENT

- A. Clean reinforcement of loose rust, mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.
- B. Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcement by metal chairs, runners, bolsters, spacers, and hangers, as required.
- C. Place reinforcement to obtain at least the minimum coverages for concrete protection.

3.5 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in.
- B. General: Comply with ACI 304, "recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete," and as herein specified.
- C. Deposit concrete continuously or in layers of such thickness that no concrete shall be placed on concrete which has hardened sufficiently to cause formation of seams or planes of weakness within section. Provide construction joints if section cannot be placed continuously.
- D. Maintain reinforcing in proper position during concrete placement.
- E. Topping Placement: Clean and prepare the existing concrete surface down to sound concrete and as recommended by the topping manufacturer. Mixing, placing, and curing shall be applied to all surfaces. Addition of a pea-stone aggregate acceptable to the manufacturer may be used to obtain the thick topping profile. Provide trowel finish and pitch to floor drain as shown on the Drawings.

3.6 CONSOLIDATION

- A. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.

3.7 SURFACE FINISHES

- A. Smooth-Form Finish: Provide smooth-form finish for formed concrete surfaces that shall be exposed to view, or to be covered with material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, painting, or other similar system. Produce smooth-form finish by selecting form material to impart a smooth, hard, uniform texture and arranging

them orderly and symmetrically with a minimum of seams. Repair and patch defective areas with all fins and other projections completely removed and smoothed.

3.8 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling required to complete work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.

3.9 CURING AND PROTECTION

- A. Concrete shall be protected from premature drying, excessively hot or cold temperature, and mechanical injury according to provisions of ACI 301, Chapter 12.
- B. Curing Methods: Perform curing of concrete by wet curing or by moisture-retaining cover curing, and by combinations thereof, as specified.
- C. Provide wet curing by following methods.
 - 1. Keep concrete surface continuously wet by covering with water.
 - 2. Use continuous water-fog spray.
 - 3. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4-inch lap over adjacent absorptive covers.
- D. Provide moisture-cover curing as follows:
 - 1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - 2. Apply curing/sealing compound to all concrete pads and landings.

3.10 COLD WEATHER CONCRETING

- A. Place concrete during cold weather in accordance with ACI 306.

- B. For cold weather concreting (defined as a period when for more than 3 successive days the mean daily temperature drops below 40 degrees F), concrete temperature shall be maintained in accordance with Table 3.1 and concrete protection shall be maintained in accordance with Table 5.3 as given in "Cold Weather Concreting," reported by ACI Committee 306.

3.11 HOT WEATHER CONCRETING

- A. Place concrete in accordance with ACI 305.

3.12 CONCRETE SURFACE REPAIRS

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Architect.
- B. Repair or Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. These include surface defects such as, color, texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on surface, and stains and other discoloration that cannot be removed by cleaning. Flush out form tie holes, fill with dry-pack mortar, or precast cement cone plugs secured in place with bonding agent.
- C. Repair of Unformed Surfaces: Test unformed surfaces for smoothness, and verify surface plane to tolerances specified for each surface and finish. Correct
 - 1. Repair finished unformed surfaces that contain defects that affect durability of concrete. These include surface defects such as crazing, cracks, spalling, popouts, honeycombs, rock pockets, and other objectionable conditions.
- D. Repair methods: not specified above may be used, subject to acceptance of Architect/Engineer.

END OF SECTION

SECTION 09900 – PAINTING

1.0 PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Furnish all labor, materials and equipment to complete all Painting Work as shown on the drawings, hereinafter specified or both.
- B. System description:
1. Coatings: Ready mixed except field catalyzed coatings of good flow and brushing properties, capable of drying or curing free of streaks or sags and completely covering specified surfaces with the uniform minimum dry-film thicknesses as indicated herein.

REFERENCES

- C. Conform to the Building Code of New York State.
- D. Conform to all Federal, State, County and local City of Schenectady rules, regulations and/or ordinances concerning Volatile Organic Compounds (VOCs).
- E. Additional references:
1. Society for Protective Coatings (SSPC), 40 24th Street, 6th Floor, Pittsburgh PA 15222-4656. T:877.281.7772:
 - a. SSPC-SP 1 - Solvent Cleaning
 - b. SSPC-SP 2 - Hand Tool Cleaning
 - c. SSPC-SP 3 - Power Tool Cleaning
 - d. SSPC-SP 13 / NACE No. 6 Surface Preparation for Concrete
 2. U.S. Environmental Protection Agency (EPA), Stationary Sources Compliance Division, Washington D.C.
 - a. Method 24
 3. Ozone Transport Commission (OTC), 444 North Capitol Street, Suite 638, Washington D.C. 20001. T:202.508.3840:
 - a. Regulation No.41

1.3 WORK INCLUDED

- A. Surface preparation and field application of paints and coatings.
- B. Assistance, as required, and coordination with other trades.
- C. Painting work is required on surfaces as indicated within the Contract Drawings.
- D. Painting work shall be three (3) coats, one (1) coat of primer plus two (2) coats of finish, unless otherwise noted below or on the drawings.
- E. Wet-sand or HEPA-vacuum sand between each coat of all type finishes.

1.4 SUBMITTALS

- A. Submittals: Submit two copies of color samples to OWNER for approval prior to ordering.

1.5 QUALITY CONTROL

- A. All painting work shall be performed in accordance with manufacturer's instructions.
- B. Painting shall only be performed when surface is dry and when weather conditions are satisfactory. Comply with paint manufacturer's recommendation for environmental conditions in which paint materials can be applied.
- C. Do not paint in areas where dust is being generated or will be generated before the coatings are thoroughly dry.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. All paints, varnishes, enamels, lacquers, stains, paste fillers, primers and similar materials shall be delivered in original containers with seal unbroken. Packaging shall bear the manufacturer's name, label, and the following list of information:
 - 1. Product name, type (description)
 - 2. Application & use instructions
 - 3. Surface preparation
 - 4. VOC content
 - 5. Environmental issues
 - 6. Batch date
 - 7. Color number
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction. Store and apply materials in environmental conditions required by manufacturer's instructions. Protect from freezing.
- C. All painting materials used on the job shall be stored in a single place, outside the building properly. Such place shall be well ventilated and kept clean. Maintain a clean, dry storage area, to prevent contamination or damage to the coatings.

- D. All oily rags, empty containers and other waste shall be removed from the building at the end of the day's work.

1.7 INDOOR AIR QUALITY

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not apply coatings under environmental conditions outside manufacturer's absolute limits.
- B. Maximize ventilation during application and drying.
- C. Painting should be performed prior to the installation of absorbent material such as carpeting and ceiling tile.
- D. Applicators shall wear protective clothing and respirators when applying oil-based paints or using spray equipment with any paints.
- E. Painting must be completed a minimum of 48 hours prior to occupancy.

1.8 MAINTENANCE STOCK

- A. Deliver to owner a 1-gallon container, property labeled and sealed, of each color and type of finish coat paint used on project.

2.0 PART 2 – PRODUCTS

2.1 MATERIALS

- A. Manufacturers
 - 1. The Sherwin-Williams Company, 101 Prospect Avenue NW, Cleveland OH 44115. T:800.321.8194.
 - 2. Pre-approved equal.
- B. All materials shall be applied as specified by manufacturer's printed instructions.
- C. Block fillers, primers, and undercoat materials for each coating system should be from the same manufacturer as the final coats.
- D. Conform to all Federal, State, County and local City of Schenectady rules, regulations and/or ordinances concerning Volatile Organic Compounds (VOCs).
- E. Water-based paints shall not be formulated or manufactured with chemicals listed by Green Seal to be hazardous including, but not limited to: formaldehyde, halogenated solvents, aromatic hydrocarbons, mercury, and mercury compounds. Paints shall not be tinted with pigments of lead, cadmium, chromium, and their oxides.

F. Finish System Descriptions

System No.	Description	
1	First Coat:	Macropoxy 646 Fast Cure, B58-600 Series 5.0-10.0 mils DFT
	Second Coat:	Macropoxy 646 Fast Cure, B58-600 Series 5.0-10.0 mils DFT
	Third Coat:	Acrolon 218 Polyurethane, 3.0 – 6.0 mils DFT
2	First Coat:	Macropoxy 646 Fast Cure, B58-600 Series 5.0-10.0 mils DFT
	Second Coat:	Macropoxy 646 Fast Cure, B58-600 Series 5.0-10.0 mils DFT
3	First Coat:	ArmorSeal Water Based Epoxy Primer/Sealer 2.0-3.0 mils DFT
	Second Coat:	ArmorSeal Floor-Plex 7100 1.5-2.0 mils DFT
	Third Coat:	Armor Seal Floor-Plex 7100 1.5-2.0 mils DFT
4	First Coat:	PrepRite 200 Interior Latex Primer (B28W200) 1.0 – 1.4 mils DFT
	Second Coat:	Waterbased Catalyzed Epoxy (B70-200 series) 2.5– 3.0 mils DFT
	Third Coat:	Waterbased Catalyzed Epoxy (B70-200 series) 2.5– 3.0 mils DFT
5	First Coat:	Hi-Solids Alkyd Metal Primer (B50NZ) 3.0– 5.0 mils DFT
	Second Coat:	Aquaclad Waterbased Alkyd Topcoat (B55 Series) 1.5– 3.0 mils DFT
	Third Coat:	Aquaclad Waterbased Alkyd Topcoat (B55 Series) 1.5– 3.0 mils DFT

3.0 PART 3 – EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. Comply with manufacturer's recommendation for surface preparation.
- B. All painting work shall be done on prepared surfaces. Verify that substrate conditions are ready to receive Work. All surfaces shall be clean, smooth and free of all imperfections that would be visible after application of paint finish. Correct minor defects and clean surfaces which affect work of this section.
- C. Masonry, Concrete, Cement and Concrete Unit Masonry shall cure for seven days (minimum regardless of moisture content) prior to the application of primer coats.
- D. Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing. Promptly reinstall immediately after required drying time period elapses.
- E. Gypsum board, plaster, and patched areas shall be smooth and matched to adjacent areas.

- F. Existing Surfaces: recognize that any surface preparation short of total removal of the old coating may compromise the service length of the system; the Contractor is solely responsible for the preparation method(s) selected.
- G. Check for compatibility by applying a test patch of the recommended coating system, covering at least 2 to 3 square feet. Allow surface to dry one week before testing adhesion per ASTM D3359. If the coating system is incompatible, complete removal is required (per ASTM 4259).
- H. New Gypsum Board Surfaces: Drywall must be clean and dry. All fastener heads must be set and filled with latex compounds. Joints must be taped and covered with a latex joint compound. Fill minor defects with latex compounds. Filled fastener heads and tape joints must be sanded smooth and all dust removed prior to painting. Spot prime defects after repair.
- I. Previously Coated Surfaces: All surface contamination such as oil, grease, loose paint, mill scale dirt, foreign matter, rust, mold, mildew, mortar, efflorescence, and sealers must be removed to assure sound bonding to the tightly adhering old paint. Surfaces of old paint film must be clean and dull before repainting; thorough washing with an abrasive cleanser will clean and dull in one operation, or, wash thoroughly and dull by sanding. Spot prime any bare areas with an appropriate primer.
- J. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust, hand and/or power tool clean as required, clean surfaces with solution as approved by paint manufacturer. Prime bare steel surfaces.
- K. Existing and New Shop Primed Metal Door, Door Frame and Window Frame Surfaces: All surface contamination such as oil, grease, loose paint, mill scale dirt, foreign matter, rust, mold, mildew, mortar, and sealers must be removed to assure sound bonding to the tightly adhering old paint. Glossy surfaces of old paint films must be clean and dull before repainting. Thorough washing with an abrasive cleanser will clean and dull in one operation, or, wash thoroughly and dull by sanding. Spot prime any bare areas with an appropriate primer.

3.2 APPLICATION

- A. Only skilled mechanics shall be employed for painting work.
- B. Apply products in accordance with manufacturer's instructions.
- C. Shop and prime coats shall be touched up at rust spots, welds and abrasions.
- D. No painting work shall be done while surfaces are damp. All coats shall be thoroughly dry before applying succeeding coats. All interior coats shall be fine-sanded between coats.
- E. Finish work shall be uniform, of approved color, free from runs, sags or other defects. Apply material evenly. The finished work shall show no cloudiness, spotting, holidays, laps, brush marks, runs, curtains, sags, or other surface imperfections.
- F. Final coat on interior work shall not be applied until other trades and workmen are finished with their work. Touch up and patch surfaces as required after the completion of work by other trades.

- G. Exterior painting shall not be applied in damp weather or when temperature is below 50° F.
- H. Interior painting shall not be done when the temperature is below 60° F., nor when satisfactory results cannot be obtained due to humidity or excessive temperatures.
- I. Do not apply any coating over condensation or when surface temperature is within 5° F of the dew point.

3.3 PAINT FINISH SCHEDULE

A. Schedule

Surface Description	System No.
Ductile Iron Supply & Suction Piping	1
Ductile Iron Finish / Pressure Piping	2
Concrete Floor, Pump Bases, & House-keeping pads	3
Concrete Unit Masonry & Gypsum Wallboard Surfaces	4
Metal Doors and Door Frames	5

3.4 SCHEDULE – COLORS

- A. Ductile Iron Supply Piping: Olive Green as selected by OWNER.
- B. Ductile Iron Finish / Pressure Piping: Light Blue as selected by OWNER.
- C. Ductile Iron Suction Piping: Dark Blue as selected by OWNER.
- D. Interior Concrete Floor Surfaces, Pump Bases, & House-keeping pads: Light Gray as selected by OWNER.
- E. Concrete Unit Masonry and Gypsum Ceiling and Wall Surfaces: White as selected by OWNER.
- F. Metal Doors and Frames: Gray as selected by OWNER.

3.5 CLEAN UP

- A. Prior to final completion of the project, the Contractor shall examine all the painted surfaces of the project and refinish or retouch as necessary.

- B. As work proceeds, promptly remove finishes where spilled, splashed, or spattered.
- C. Upon completion of work, remove excess paint, stain, varnish, adhesive, caulk, etc. from all other surfaces that were not specified to receive same.
- D. Equipment cleanup – Whenever possible, clean up shall be conducted with water or water-based agents. Mineral based thinners or solvents should only be used on an as needed basis after non-water-based applications.

END OF SECTION

SECTION 11230 – ELECTROMAGNETIC FLOW METER, LIQUID, SINGLE CHANNEL

PART 1 - GENERAL

1.1 SCOPE

- A. This section describes the requirements for a flow sensor.
- B. Under this item, the contractor shall furnish and install the flow measurement equipment and accessories as indicated on the plans and as herein specified.

1.2 QUALITY ASSURANCE

- A. Referenced Standards and Guidelines - Complies with applicable portions of ANSI/AWWA Standards and NSF/ANSI Standard 61, Annex G. There are currently no AWWA standards that specifically address electromagnetic metering.
 - 1. Flow measurement function complies with Industry Standards
 - a. ANSI B16.5 Class 150 RF
 - b. AWWA Class B
 - c. NEMA 4X/6P (IP66/IP67)
 - d. CSA

1.3 SUBMITTALS

- A. The following information shall be included in the submittal for this section:
 - 1. Outline dimensions, conduit entry locations and weight
 - 2. Customer connection and power wiring diagrams
 - 3. Data sheets and catalog literature for microprocessor-based transmitter and transducer
 - 4. Interconnection drawings
 - 5. Installation and operations manual

6. List of spare parts
7. Complete technical product description including a complete list of options provided
8. Any portions of this specification not met must be clearly indicated or the supplier and contractor shall be liable to provide all additional components required to meet this specification

1.4 SYSTEM DESCRIPTION

- A. Electromagnetic flow meter is intended for fluid metering in industries including water, wastewater, food and beverage, pharmaceutical and chemical. Measures fluid flow of water or fluids which are highly corrosive, very viscous, contain a moderate amount of solids, or require special handling. No moving parts are in the flow stream. Amplifier shall be remote-mounted. Unit is ideally suited for measuring dynamic, non-continuous flow. In applications where a minimum and/or maximum flow rate must be tracked and monitored, the unit provides pulse signals that can be fed to dedicated batch controllers, PLCs and other more specialized instrumentation.

1.5 DEFINITIONS

- A. Amplifier – Device used for increasing the power of a signal. It does this by taking energy from a power supply and controlling the output to match the input signal shape but with larger amplitude.
- B. ANSI – (American National Standards Institute) A private non-profit organization that oversees the development of voluntary consensus standards for products, services, processes, systems, and personnel in the United States. The organization also coordinates U.S. standards with international standards so that American products can be used worldwide.
- C. AWWA – (American Water Works Association) An international non-profit professional organization founded to improve water quality and supply.

- D. Detector Coils – Also called an “induction loop”, an electromagnetic communication or detection system which uses a moving magnet to induce an electrical current in a nearby wire.
- E. Electrode – An electrical conductor used to make contact with a nonmetallic part of a circuit (e.g. a semiconductor, an electrolyte or a vacuum).
- F. Modbus RTU – a serial communications protocol published by Modicon (now Schneider Electric) in 1979 for use with its programmable logic controllers (PLCs). This is used in serial communication & makes use of a compact, binary representation of the data for protocol communication.
- G. NEMA – (National Electrical Manufacturers Association) Is the 'Association of Electrical Equipment and Medical Imaging Manufacturers' in the United States. Its approximately 450 member companies manufacture products used in the generation, transmission, distribution, control, and end use of electricity. These products are used in utility, industrial, commercial, institutional, and residential applications.
- H. NSF – (National Science Foundation) A United States government agency that supports fundamental research and education in all the non-medical fields of science and engineering.
- I. PLCs – (Programmable Logic Controller) A digital computer used for automation of electromechanical processes, such as control of machinery on factory assembly lines, amusement rides, or light fixtures. PLCs are used in many industries and machines.
- J. PTFE – (Polytetrafluoroethylene) A synthetic fluoropolymer of tetrafluoroethylene that finds numerous applications. The best known brand name of PTFE is Teflon by DuPont Co.
- K. Serial Communications – In telecommunication and computer science, serial communication is the process of sending data one bit at a time, sequentially, over a communication channel or computer bus. This is in contrast to parallel communication, where several bits are sent as a whole, on a link with several parallel channels.

PART 2 – PRODUCTS

1.1 APPROVED MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with specifications, provide flow measurement equipment by one of the following:

1. Badger Meter – Model M-2000

1.2 OPERATING CONDITIONS

- A. System Components

1. Metering Tube (Detector)

- a. Consists of stainless steel tube lined with a non-conductive material. Energized detector coils around tube create a magnetic field across the diameter of the pipe. As a conductive fluid flows through the magnetic field, a voltage is induced across two electrodes; this voltage is proportional to the average flow velocity of the fluid.

2. Signal Amplifier

- a. Consists of unit which receives, amplifies, and processes the detector's analog signal. Signal is converted to both analog and digital signals that are used to display rate of flow and totalization. Processor controls zero-flow stability, analog and frequency outputs, serial communications and a variety of other parameters. Integrated LCD display indicates rate of flow, forward and reverse totalizers and diagnostic messages. Display guides user through programmable routines.

- B. Operational Requirements

1. Electromagnetic Flow Meter

- a. The flow meter system shall operate with a pulsed DC excitation frequency, and shall produce a signal output that is directly proportional and linear with the volumetric flow rate of the liquid flowing through the metering tube. The metering system shall include a metering sensor tube (detector), a signal amplifier, and the necessary connecting wiring. The metering system shall

have the ability to incorporate a meter mounted or remote mounted amplifier.

b. Engineering Units:

- 1) The signal amplifier shall be program selectable to display the following units of measure: U.S. gallons, imperial gallons, million gallons (U.S.), cubic feet, cubic meters, liters, hector-liters, oil barrels, pounds, ounces or acre feet.

c. Operating Principle: Electromagnetic Induction

d. Metering Tube (Detector)

- 1) The metering tube (detector) shall be constructed of 316 stainless steel, and rated for a maximum allowable non-shock pressure and temperature for steel pipe flanges, according to ANSI B16.5.
- 2) The metering tube (detector) shall be available in line size 8" [200 mm].
- 3) The metering tube (detector) end connections shall be carbon steel or 316 stainless steel flanged, according to ANSI B16, Class 150 and AWWA Class B standards.
- 4) The insulating liner material of the metering tube (detector) shall be made of a hard rubber elastomer and NSF-listed for meter sizes 4" and above, in conformance with manufacturer's recommendation for the intended service or an NSF-listed meter option with PTFE liner.
- 5) The metering tube (detector) shall include two self-cleaning measuring electrodes. The electrode material shall be corrosion resistant and available in Alloy C or 316 stainless steel.
- 6) The metering tube (detector) shall include a third "empty pipe detection" electrode located in the upper portion of the inside diameter of the flow tube in order to detect an empty pipe condition when the

flow tube is running partially empty. Empty pipe detection that is not activated until the pipe is 50% empty is not acceptable.

- 7) The metering tube (detector) housing shall be constructed of carbon steel, welded at all joints, and rated to meet NEMA 6P (IP67) ratings.
- 8) For remote amplifier applications, the metering tube (detector) junction box enclosure shall be constructed of cast aluminum (powder-coated paint) and shall meet 6P (IP67) ratings.
- 9) When installed in non-metallic or internally lined piping, the metering tube (detector) shall be provided with a pair of corrosion resistant grounding rings. The grounding ring material shall be 316 stainless steel.
- 10) Fluid Temperature Range
 - i. For remote amplifier applications, the fluid temperature range shall be 32°F to 178°F [0°C to 80°C] at a maximum ambient temperature of 122°F [50°C] for the hard rubber liner material.

e. Signal Amplifier

- 1) The signal amplifier shall be microprocessor based, and shall energize the detector coils with a digitally controlled pulsed DC. The excitation frequency shall be program selectable for the following: 1Hz, 3.75Hz, 7.5Hz, or 15Hz. (factory optimized to pipe size and application)
- 2) The signal amplifier electrical power requirement shall be 85-265VAC, 45-65Hz. The power consumption shall not exceed 15W.
- 3) The signal amplifier shall have an ambient temperature rating of -4°F to 140°F [-20°C to 60°C].
- 4) The signal amplifier shall include non-volatile memory capable of storing all programmable data and accumulated totalizer values in the event of a power interruption.

- 5) Automatic zero stability, low flow cut-off, empty pipe detection and bi-directional flow measurement shall be inherent capabilities of the signal amplifier.
- 6) All signal amplifier outputs shall be galvanically isolated to 250 volts.
- 7) The signal amplifier and remote junction enclosures shall be constructed of cast aluminum (powder-coated paint) and shall meet NEMA 4X (IP66) ratings.
- 8) Outputs:

The signal amplifier shall provide a total of four digital outputs, one analog output and one digital input.

- i. Up to four open collector digital outputs, program selectable from the following: Forward pulse, reverse pulse, AMR pulse, flow set point, empty pipe alarm, flow direction, reset output, error alarm and 24V supply.
- ii. Up to two active digital (24 Volt) outputs, program selectable from the following: Forward pulse, reverse pulse, AMR pulse, flow set point, empty pipe alarm, flow direction, preset output, error alarm and 24V supply.
- iii. Up to two AC solid-state relay outputs, program selectable from the following: Frequency output, flow set point, empty pipe alarm, flow direction, preset amount and error alarm.
- iv. One digital input, program selectable from the following: Remote reset, batch reset and positive return to zero.
- v. Advanced protocol support using Modbus/RTU.
- vi. One analog output programmable and scalable from the following: 0-10mA, 0-20mA, 2-10mA or 4-20mA. Voltage sourced and isolated. Max. loop resistance = 800 ohms.

f. Control and Programming

- 1) The signal amplifier shall be programmed via three function buttons. The programming functions shall be available in a user-friendly, menu driven software through the four-line LCD interface. The signal amplifier shall accommodate the following languages: English, German, Czech, French or Spanish.
- 2) Programmable parameters of the amplifier include, but are not limited to: calibration factors, totalizer resets, unit of measure, analog and pulse output scaling, flow-alarm functions, language selection, low-flow cutoff, noise dampening factor and excitation frequency selection.
- 3) The signal amplifier shall have a programming option allowing entry of a selected numeric password value for tamper protection.

g. System Performance

- 1) The metering system shall operate over a flow range of 0.10 to 39.4 ft/s [0.03 to 12.0 m/s].
- 2) The metering system shall perform to an accuracy ± 0.2 percent of rate for velocities greater than 1.64 ft/s [0.50 m/s], ± 0.0032 ft/s [± 1 mm/s] for velocities less than 1.64 ft/s [0.50 m/s].
- 3) The metering system shall be capable of measuring the volumetric flow rate of liquids having an electrical conductivity as low as 5.0 micromhos per centimeter.
- 4) The system measuring repeatability shall be $<0.10\%$ of full scale.

h. Indication

- 1) The signal amplifier shall include a four-line, 20-character, backlit LCD interface to display the following values:
 - i. Flow rate in selectable rate units
 - ii. Forward totalizer in selectable volume units
 - iii. Reverse totalizer in selectable volume units
 - iv. Net totalizer in selectable volume units

- v. Error or alarm messages
- vi. Software revision level

PART 3 - EXECUTION

1.1 INSTALLATION

- A. Follow manufacturer's recommendation for installation. Installation will conform to the guidelines provided by the Installation & Operation Manual.
- B. Straight pipe requirement shall be an equivalent of three diameters on the inlet (upstream) side, and two diameters on the outlet (downstream) side.
- C. For best performance, place meter vertically, with liquid flowing upward and meter electrodes in a closed, full pipe.

1.2 CALIBRATION

- A. Each meter shall be hydraulically calibrated in an ISO 9000-certified testing facility, which utilizes a computerized gravimetric testing method with a measuring uncertainty of 0.1%.
- B. Each meter shall be provided with a calibration certificate indicating the measured error (percent deviation) at three different flows, respectively equivalent to 25%, 50% and 75% of the nominal flow rate for each size.

1.3 MANUFACTURER'S WARRANTY

- A. Terms
 - 1. The manufacturer of the above specified equipment warrants the Product to be free from defects in materials and workmanship appearing within the earlier of either: One (1) year after installation; or one (1) year and six (6) months after shipment from manufacturer.

END OF SECTION

SECTION 11240 - MECHANICAL DIAPHRAGM METERING PUMP

PART 1 GENERAL

1.01 DESCRIPTION

- A. Chemical metering pumps shall be Mechanically Actuated Diaphragm, positive displacement, motor driven, metering pump.
- B. Chemical metering pump shall be driven by a microprocessor controlled stepper motor providing a minimum of 3000:1 turndown ratio. The stepper motor is to be coupled to a flat, PTFE diaphragm via a gear assembly. The drive assembly shall be a maintenance free design.
- C. The pump shall operate at 100% stroke length throughout the pumps entire capacity range.
- D. Solenoid-driven pumps, hydraulically actuated diaphragm pumps and those with a lost motion spring return will not be accepted.
- E. The liquid end & valve design shall provide for ease of maintenance. Ball checks shall be cartridge type design.
- F. Each pump shall have a maximum capacity of 2 GPH at 230 PSI.
- G. Each unit shall be Grundfos DDA 7.5-16FC Series digital dosing pumps.

PART 2 PRODUCT

2.01 Enclosure

- A. Drive mechanism and microprocessor shall be housed in a corrosion resistant, plastic UV stabilized enclosure.
- B. The pump design shall include provisions for optional positioning of the control interface/display, for right/left side and front mounting.
- C. Pump enclosure rating shall be to IP65 and NEMA 4X standards.

- D. The pump design shall include an integral removable click stop mounting plate, to allow for flat base or wall mounting.

2.02 DRIVE

- A. The pump's stroke length will always be 100%. No adjustment to the stroke length, to regulate flow, or for other reasons, is acceptable.
- B. An integral variable speed stepper motor shall be used to ensure the pump discharge phase extends through out the full period between suction intervals.
- C. Variable frequency drives shall not be accepted.
- D. The motor shall be integral, supplied with power cord and plug.
- E. The drive mechanism shall not require regular field service or external lubrication.

2.03 INTERFACE

- A. User interface/display shall be backlit LCD with selectable on-site positioning for either side or front mounting.
- B. The interface shall provide a selection of metered output to be displayed in gallons per hour (gph). Pumps displaying percent (%) of output only will not be accepted.
- C. The interface should include a turn and push knob (click wheel) for easy navigation.
- D. The interface menu shall include 25 language selections and provide easy navigation of all configuration and operational functions.
- E. The interface shall include a lock function to protect against unauthorized changes.
- F. A built in counter shall be included to provide a running total of, accumulated strokes, cumulative hours of operation and dosing flow.
- G. A priming button shall be provided on the interface. The priming button shall initiate a time selectable prime cycle operating at full capacity without need of attenuating the pumps output setpoint.
- H. A system of white, red, yellow and green LCD shall indicate pump status and alarm conditions.

2.04 LIQUID END

- A. The process diaphragm shall be PTFE, PTFE coated diaphragms are not acceptable.
- B. Head and valves body material shall be PVC, with Ceramic ball material.
- C. Wetted gasket material shall be FKM.
- D. Suction and discharge valve design shall incorporate double ball arrangement. Spring-loaded valves shall be available as an option. Direction of flow shall be clearly marked on each check valve to ensure correct installation.
- D. Head design shall incorporate integral priming valve.
- E. A back-plate with separation chamber shall have a safety lip seal and drain hole.

2.05 OPERATION

- A. Repeatable metering accuracy shall be $\pm 1\%$ at constant hydraulic conditions throughout the entire output range.
- B. Pump shall have an integral flow control system with selective fault diagnostic and pressure monitoring.
- C. The pump shall be equipped with a slow mode function for use with high-viscosity liquids. The slow mode function shall reduce the suction speed to either 50 or 25% of maximum capacity to ensure optimal priming and pumping reliability.
- D. The pump shall be equipped with a calibration function which when initiated operates the pump for a set number of strokes and displays the anticipated pumped volume. The calibration process allows adjustment of the pump to set the calibration relative to the drawdown volume.
- E. The pump shall be equipped with an analog re-scalable 0/4-20mA signal input. The scaling menu should allow for four point adjustments (two for signal, two for flow) within the signal and flow ranges.
- F. The pump shall be equipped with provisions for selectable mode NO/NC external pump enable/disable interface.

- G. The pump shall be equipped with input connections for dual level control and alarm outputs for low-level and empty tank warnings.
- H. The pump shall be equipped with a programmable proportional 0/4-20mA signal output.
- I. The pump shall be able to automatically de-aerate the pump head without the need for external devices.
- J. The pump shall be equipped with two potential free selective programmable outputs.

2.06 CONTROL

- A. The pump shall come equipped with 5 menu selectable control modes; Manual, analog, pulse, timer or batch. Optionally, the pump shall also be Profibus compatible.

Manual Control

1. Output of pump is displayed in gal or liters per hour. Pump output adjustment is performed with the turn and push knob (click wheel) on the interface.
2. Pumping rate changes are to be achieved through precise speed control with fixed full stroke length.
3. Pump should include a start/stop key.

Automatic Control

1. Analog: Pump shall include direct interface provisions for analog control. Both direct and reverse acting 0/4-20mA input configurations are to be acceptable inputs. The menu configuration shall permit pump maximum output multipoint scaling. The pump shall include a local alarm for loss of input signal.
2. Pulse: The pump shall include direct interface provisions for pulse output devices. In pulse control mode, the pump shall be configured to deliver a volume of product per incoming pulse. The pump speed shall attenuate the delivery rate based on the frequency of pulses generated by the external device.

3. Batch: In batch mode the pump shall respond to deliver a menu configurable quantity of liquid after receiving a remotely provided contact input.
4. Cycle timer: The configuration menu of the cycle timer shall permit the user to prescribe batch volume, timed sequence start point and the time between each successive timed delivery cycle.
5. Week timer: The pump shall be equipped with a real-time clock and a seven-day internal week timer. The configuration menu shall permit the user to prescribe up to 16 procedures with batch volume, dosing time, start time and weekdays.

PART 3: EXECUTION

3.01 INSTALLATION

- A. The equipment shall be installed per the contract documents and manufacturer's recommendations.

3.02 WARRANTY

- A. The equipment/system warranty, unless otherwise stated, shall be warranted to be free of defects in material and workmanship for a period of 24 months from the date of installation, but not more than 30 months from the date of manufacture.

4.01 ACCESSORIES

- A. Optional installation kits shall include:
 1. PVC foot non-return valve with strainer and weight.
 2. PVC Injection non-return valve, spring-loaded
 3. Polyethylene discharge tubing
 4. PVC suction tubing
 5. PVC vent tubing
- B. Cable and plug for connecting external control devices such as process controllers, flow meters, start/stop contacts, and level sensors.

SPECIFICATION FOR WIRELESS MONITORING AND CONTROL SYSTEM WITH INTERNET BASED DATA ACCESS FOR WATER SYSTEMS - 11250

PART ONE - GENERAL

1.01 DESCRIPTION

- A. Furnish and install a factory wireless data cellular based communication system for the purpose of monitoring and controlling various equipment operations. The supplier of the communication system shall be responsible for coordination required to insure equipment compatibility. The communication system shall be provided complete, in place, as shown on the Drawings, specified herein and needed for a complete, proper installation.
- B. Summary of PART TWO - PRODUCTS
 - 1. Subsection 2.01: General
 - 2. Subsection 2.02: Monitoring and Control System
 - 3. Subsection 2.03: RTU Locations
 - 4. Subsection 2.04: Monitoring Input Points Defined
 - 5. Subsection 2.05: Other Materials
- C. 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. Section 16000: Electrical

1.02 EQUIPMENT COMPATIBILITY

- A. The Contractor shall be responsible for coordinating the instrumentation equipment, communication equipment and other related equipment so that all elements are compatible and form a complete working system. Shop drawing submittals shall include sufficient information regarding component compatibility to demonstrate compliance with this requirement.

PART TWO - PRODUCTS

2.01 GENERAL

- A. Qualifications of Manufacturers Products used in the work of this Section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of satisfactory production acceptable to the Engineer.
1. The submitting Company shall provide evidence of, and warrant compliance with, substantially all below listed requirements.
 2. The submitting Company shall have been in business providing remote facility monitoring and control services through the data side of the cellular system to the water distribution / wastewater collection industry or a substantially similar industry for at least six years.
 3. The submitting Company shall be the actual manufacturer and operator, or a duly authorized and trained agent of the manufacturing company or a combination of both, who will actually provide, maintain, and warranty the proposed system.
 4. The Manufacturing Company of the field equipment shall also be the provider of all monitoring related services associated with the field equipment and all ongoing service agreements will be with the actual company providing the monitoring service, not a subcontractor or agent.
 5. The submitting company shall have a primary central monitoring and control center and a fully redundant, physically separate, backup-computer monitoring center. Either center shall have the capability of operating all the remote monitoring and control field RTU's.
 6. The submitting Company shall offer and provide 24 X 7 technical support.
- B. Qualifications of Manufacturers Representative
1. Subject to any "or equal" provisions of the Contract Documents, the Engineer has determined that PCS of Round Lake, NY (518) 689-8207 could supply the products specified in this Section.

2.02 MONITORING AND CONTROL SYSTEM

- A. Microprocessor Based Field RTU
1. Data Cellular Radio
 - a. The Remote Terminal Unit (RTU) shall incorporate a radio that utilizes the data side of any cellular system to transmit the data and alarms monitored, as well as receive manual or automated control commands.
 - b. Cellular radios from all cellular carriers shall be able to mount in the same mounting port on the motherboard and consequently be interchangeable in no more than 10 minutes.
 2. Enclosure Options

The RTU shall be offered in at least the following three enclosure options:

 - a. NEMA1 with battery inside the enclosure
 - b. NEMA1 "FlatPak" with a depth of less than 1.5 inches so it is able to fit between the inner and outer door of a double door control panel.
 - c. NEMA4X with the battery inside and which has front door and top "sun shades" to reduce internal temperatures when placed in the sun.
 3. Microprocessor Feature Updates

Microprocessor features like data transmission rates shall be able to be adjusted through the cellular system without any site visits necessary.

4. RTU Inputs and Outputs

- a. RTU shall have eight (8) digital inputs. These eight (8) inputs must have end of line resistor supervision, or similar supervision, that can detect normal alarm trip inputs and detect input wiring disconnection/shorting as a distinctly different signal and report.
- b. RTU shall have an optional expansion board of an additional eight (8) digital inputs
- c. The digital inputs shall be user selectable as normally open (NO) or normally closed (NC).
- d. At least eight of the RTU digital inputs must be capable of being programmed to record and report pump run times in one minute increments or less as indicated by a relay opening and closing. If only two pumps are monitored then the unit shall also be capable of recording and reporting simultaneous pump run times.
- e. RTU shall have built-in alarms for input wiring fault, AC failure, communication failure and low battery detection.
- f. RTU shall have two (2) analog inputs measuring 4-20mA or 1-5 VDC at 10 bit resolution with four (4) alarm thresholds per input.
- g. RTU shall have an optional expansion board of an additional four (4) analog inputs.
- h. RTU shall have an optional expansion board of an additional eight (8) digital inputs.
- i. RTU shall have an optional expansion board of an additional two (2) analog outputs.
- j. RTU shall have an optional expansion board of two (2) pulse counter inputs
- k. RTU shall have an electronic key reader input to monitor on-site personnel. The RTU shall utilize an audible tone to verify key reading. Each key in the system shall provide unique identification of the key holder when they are on site vs. "someone" is on site.
- l. RTU shall have three (3) digital normally open or closed output relays rated at ½ ampere@ 120VAC.
- m. The well RTU (s) shall have the ability to be programmed to either:
 - i. Continue the current well call relay status or
 - ii. Force off the well call to run status. If the well RTU(s) lose communications with the hosted SCADA service computer(s) for more than two minutes.
- n. The output relay(s) from the well(s) RTU shall be wired only into the automatic circuit for well pump(s) run. The local off and hand circuits shall be unaffected by the RTU relay output(s). The output relays on the well(s) RTU(s) shall be wired into 12vdc solid state interposing relays. The switched side of the solid state interposing relay(s) shall be used to control the well(s) pump(s) motor starter in the automatic well call circuit.
- o. The system shall have an alarm on pump call to run and fail to run.

5. Status Lights on Motherboard

- a. indicator lights above each digital input shall visually display the status of the digital input
- b. Radio signal strength shall be displayed by at least 8 indicator lights in 5db increments between -75db and -110db to facilitate accurate antenna placement
- c. Operational and diagnostic status of at least 8 criteria shall be displayed by individual indicator lights.

6. Power Requirements

- a. The RTU shall be powered by 12 volts AC and have a built in battery backup capable of keeping the RTU powered for 30 hours in case of primary AC failure.
- b. All terminations inside the RTU enclosure shall be low voltage AC or DC (28 volts or less).
- c. The Tank and well(s) RTU(s) shall be grounded in accordance with the NEC regulations.

B. Communication Links

1. Communication System

- a. Wireless communication links shall be through the data side of the cellular system. The voice side of the cellular system and satellite based links are not acceptable.

2. Cellular Carriers

- a. The submitting company shall have direct relationships with the cellular companies and shall not use third parties to affect data transport through the cellular companies. The general architecture of the system will be based on using third generation cellular data for telemetry and on sending that data to a web based hosted SCADA computer service that manages the entire system except field maintenance.
- b. The RTU will have interchangeable data cellular radios that will communicate through third generation GPRS (ATT), CDMA (Verizon) or iDEN (Nextel) to maximize the likelihood of reliable communication.
- c. If a GPRS (ATT) radio is used, the submitting company shall have PTCRB approval from ATT to use the radio, contract and product acceptance with ATT. If an iDEN radio is used the submitting company shall have certified partner status, contract and product acceptance with Sprint/ Nextel.
- d. The Customer will not have or have to purchase cellular data contracts direct with the carrier(s).

3. Security Protocols

- a. All the cellular radios shall all make continuous, secure socket connections (SSL) from the radio, through the cellular system, to the submitting company's servers and web pages.
- b. The RTU shall utilize a transmission scheme that encrypts the transmitted data utilizing a 128 bit encryption method that meets or exceeds the advanced encryption standard (AES). The 128 bit AES encryption shall be at all stages of data transfer and storage
- c. The cellular radios shall all have private IP addresses
- d. The submitting company shall have established multiple, private gateways through the cellular system, completely behind firewalls, with at least one of the cellular providers.

4. Data Transmission Rates

- a. All alarms will be transmitted immediately upon occurrence; delays can be added by the customer at the RTU or the supplier's website.
- b. The RTU shall either transmit non-alarm data updates every hour or continuously transmit all digital state changes on an as occurs basis; analog and pulse inputs will be transmitted at least once every two minutes. The customer may choose to utilize either type of RTU at any proposed site.
- c. The RTU will have an effective, continuous, transfer rate of at least 19,200 baud.

5. Communication Link Structure and Performance Criteria

- a. The communication link structure shall be a secure socket connection from the RTU through the cellular system to the supplier's servers, and it shall be a continuous connection, 24 x 7, 365.
 - b. Receipt of all data sent from the RTU to the server center shall be acknowledged by the server center back to the RTU in real time for every data packet sent. Such structure is called end-to-end data acknowledgement.
 - c. The secure socket connection shall be from the RTU through the cellular system direct to the system supplier; no third parties shall receive the data from the cellular carrier and then pass it to the system supplier.
 - d. The above mentioned secure socket connection shall be monitored for end-to-end uptime with interruptions as small as 15 seconds being captured.
 - e. Both end-to-end uptime and the number of times the link was disconnected/reconnected shall be reported for each RTU continuously with daily summary statistics posted on the customer website. All the end-to-end uptime history of each RTU shall be available on the customer web site from when it first powered up to the present. Weekly management summaries of each RTUs end-to-end uptime shall be automatically emailed to the customer.
- C. Centralized Server Centers: Hardware and Software Requirements
- 1. Server Center Physical Structure
 - a. The server center housing shall be able to withstand a direct hit from at least an F-3 tornado and continue operations.
 - b. The server center housing shall have at least six (6) separate and redundant, on-site power generating facilities to backup the local utility power such that there can be stand-alone operation of the center for at least 24 hours.
 - c. Entrance to the facility shall be controlled by armed guards at all entrances 24x7x365
 - 2. Server Center Redundancy Structure
 - a. The server center shall house the manufacturers completely redundant and hot linked:
 - i. Servers
 - ii. Interconnects
 - iii. Databases
 - iv. Power supplies
 - v. Inbound cellular connections
 - vi. Outbound internet hubs and providers
 - 3. Database Structure
 - a. All data from the RTU's shall be held for customer access forever.
 - b. All databases shall be backed up and archived daily
 - c. The hosted system shall have password protected SSL web based customer screens. Automatic control logic for well operation shall be maintained by the hosted SCADA computer service. The hosted service shall monitor, at least every two minutes the level of the tank(s). The hosted SCADA service computer shall issue control relay commands to the associated well(s) when pre programmed low, off, lead, lag, lag 2 and high tank level thresholds are reached. The low, off, lead, lag, and lag 2 and high level thresholds shall programmable by the customer via the secure web site. All threshold changes shall be individually password protected and logged. The secure web site shall also provide the customer the ability to put each well pump(s) in automatic, off or hand operation mode. The secure web site shall provide the customer the ability to enable/disable alternation of the well(s). The hosted well

- control SCADA service shall provide control for up to three wells from a single tank. Multiple tanks may be depicted and controlled on a single customer secure web site
- d. The databases shall be capable of interfacing and transferring, on a continuous basis, all RTU data to an OPC compliant database for access by other OPC compliant HMI software packages.
 - i. Client side OPC software will run as an executable or NT service.
 - ii. Client side OPC software will, on a user definable interval, establish a socket connection to static IP address(s) at providers' server center.
 - iii. OPC software shall retrieve all changed OPC tag values and close the socket. OPC software shall be set up so as customers OPC computers firewalls may be programmed to only allow Internet traffic to/from the designated service providers IP addresses and port numbers.
 - iv. OPC software will allow for multiple customer OPC software packages to establish, concurrently, OPC connections so as to provide for redundant HMI database operation at customers locations.
 - v. Customer's firewalls will not be programmed to accept socket connections.
4. Field Hardware
- a. The tanks and well(s) SCADA control system shall utilize Mission Communications model M-800 RTUs and SCADA control service or approved equal
 - b. The system shall include the installation of a XX (15, 25, 50 or 100) PSI pressure transducer at as close to the base of the tank(s) as possible. The pressure transducer shall be protected from the elements and shall have a voltage surge suppressor able to withstand and discharge a voltage spike of at least 10,000 volts connected to the transducers analog circuit within three feet of the pressure transducer. The surge suppressor and transducer shall be grounded in accordance with NEC regulations. The grounding rod shall be within five feet of the surge suppressor. There shall be no bends in the ground wires with less than a 6 inch radius. Straight ground wires are preferred.
5. System Security
- a. All data links shall be behind firewalls, 128 bit encrypted and never accessible, addressable or viewable via the general public Internet, Private IP's are required, pooled public IP's will not be accepted.
6. System Software
- a. The system software shall collect and display:
 - i. Alarms including individuals accepting alarms
 - ii. the current state to the web service H/O/A operational status (not the well site(s) MCC H/O/A switches), the current values for well pump(s) off, lead, lag and lag 2 thresholds, the current status of well pump alternation, the current status of well(s) call to run and a graphic depicting the current and previous 24-hour tanks level and which well pump(s) were called during fill cycles.
 - iii. RTU electronic key reads with user names, time of read, and site name
 - iv. pump running status,
 - v. pump run times with historical graphs,
 - vi. individual pump flow estimates,
 - vii. automatic daily analysis of pump runtimes for abnormalities with automatic customer notification of such abnormalities,

- viii. pump starts with hourly analysis of excess pump starts with automatic notifications of excess pump starts,
- ix. minute-by-minute radio health checks with automatic notification of non-reporting or poorly reporting RTU's,
- x. scaled and labeled pulse totalizations and if rainfall gauges are used, inter-day rainfall graphs and run time verses rain fall based on either rain gauges installed as part of the system or as run time verses a reporting airport rain gauge;
- xi. Utilizing real-time data collection have the ability to based on digital input closure, open or close digital output relay on the same or another real-time unit (Intertie)

D. Alarm System Structure and Software

1. Alarm Delivery Formats
 - a. Alarms shall be delivered in the following formats:
 - i. Phone (voice call), fax, pager (numeric or alphanumeric (short alpha or long alpha format), text message, email, or any combination of the above simultaneously.
 - b. Alarms shall be able to be acknowledged by phone, text message, 2-way pager, email or on the customer web site.
 - c. Voice alarm acknowledgement shall be adjustable to be able to mimic the format of dialers.
 - d. Alarms will be called out on alarm and upon return to normal conditions.
 - i. Return to normal alarms can be adjusted to call the alarm callout group or a different callout group.
2. Alarm Callout Formats
 - a. Alarm callout groups shall be able to be setup to automatically switch between callout groups at different hours of the day and/or different days of the week.
 - b. Alarm callout groups shall be able to have multiple teams within each group to easily facilitate rotation of teams of on-call personnel.
3. Alarm Message Formats
 - a. All alarms shall have the alarm condition, time, alarm location and pump status at the time of the alarm in each message.
 - b. Alarm message format shall be adjustable to include just the above information when calling a phone where it is known who will answer the phone, or be adjustable to add an introductory message asking for a specific person when calling a phone where it is not known who will answer the phone (like a home phone).
 - c. Alarms shall be able to be delivered individually or be able to be grouped into one message so that multiple, simultaneous alarms (like AC Fail at multiple sites) can be delivered and acknowledged in one phone call.
4. Alarm Dispatch Logs
 - a. Each alarm shall have a full log of each notification attempt of that alarm documenting the following:
 - i. Date, time, and alarm condition
 - ii. If each notification attempt was a success or failure and the reason for each failure if an attempt was a failure (like line busy, call dropped, etc)

- iii. A recording of each voice notification attempt so the specific reason for a notification failure can be known.
 - iv. Date, time, and name of person who acknowledged the alarm.
- 5. Voice Alarm Delivery Capacity
 - a. Manufacturer shall provide at least 20 outbound lines to deliver voice alarms so as not delay delivery of current alarms.

E. REMOTE DATA ACCESS

- 1. Remote Data Access Format
 - a. Data collected by the system shall be able to be remotely accessed by simple web browser. The system shall provide individual web pages for the User to access via any web browser.
 - b. To access the web pages, the User will have to enter a User Name and Password.
 - i. The User can set up any of three levels of access to the web pages:
 - 1. Read only...can see but cannot make any changes
 - 2. Read/Write...can see and can make changes
 - 3. Read/Write/Control...can see, make changes and effect control functions, also add or remove logins/ passwords.
 - c. The system supplier will provide at least two separate web sites for each customer. One shall be designed to be viewed on a traditional laptop or desktop computer. The other shall be designed to be viewed on a web enabled cell phone or PDA. This web site will still have graphs showing trending of data, and will be designed to minimize the data sent so as to minimize the page loading times and size of the data plans necessary to view the site on a web enabled cell phone or PDA.
 - d. The system supplier will provide secure access through a specified phone without the need for web access (Voice SCADA). This will require login to system via numeric 5 digit code and must be set up in the system to an associated login for that site to a specific phone number to maintain site security.
 - e. In addition to the above web sites, if the User has Mission M800 Real-time RTUs, the User will be provided at no additional charge with a customizable software interface that will display real-time status and graphic trending of data collected by the M800 RTU.
 - i. The software will be downloadable from the Mission customer website.
 - ii. The software will automatically update itself every time the User accesses the software.
 - iii. The software will require NO programming to customize.
 - iv. The software will be the Mission Real Time Viewer.
- 2. Remote Access Security
 - a. In addition to the Username and Password structure described above, all access of the User web site shall be logged. Such logging data to included date, time and duration of access, User Name and Password of user to access the site and IP address of the accessing computer. The log will be accessible through the User web site
- 3. Automated Administrative Reports and Alerts
 - a. The User web site shall produce and automatically deliver weekly reports which summarize alarms and responses, pump runtimes and flow estimates, weekly

end-to-end uptime percentages of each RTU, and all electronic key uses at the RTU sites.

- b. The web site shall be capable of sending two (2) different categories of notifications, Alarms and Alerts. Alarms are for conditions that the User decides they want to be notified immediately about. Alerts are conditions that need attention, but are not so time sensitive that they cannot wait till the next morning.
 - i. The Alarms callout list and the Alert callout list shall be able to be separate and distinctly different.
- c. The User web site shall analyze daily pump run times at compared to a moving 30 day average of that pumps most recent runtimes and automatically Alert the User is the pump runs outside the normal runtime variation pattern.
- d. The User web site shall analyze hourly pump runtimes and automatically compare it to two (2) User set thresholds. If the Alert threshold is exceeded, an Alert will be sent the following morning. If the Alarm threshold is exceeded, an alarm will send immediately.
- e. The User web site shall send an Alert the first morning that units are in Communications fail even though Alarms have been sent at the time the RTUs went off-line. Such Alerts are a reminder to Management that they still have units that are off line.

2.03 RTU LOCATIONS

- A. RTUs shall be located at as shown on the Construction Drawings.
- B. RTUs at each location shall be furnished with an omnidirectinal antenna at grade plus 8ft.

2.04 MONITORING POINTS PER RTU

- A. The inputs to be monitored are as follows:

1. Digital inputs

- DI-1 Room Freeze Alarm
- DI-2 Well #1 Pump Smart on/off
- DI-3 Well #2 Pump Smart on/off
- DI-4 Well #3 Pump Smart on/off
- DI-5 Booster #1 Pump Smart on/off
- DI-6 Booster #2 Pump Smart on/off
- DI-7 Well Pump Alarm
- DI-8 Booster Pump Alarm

2. Analog inputs with four (4) hi/low threshold alarms

AI-1 Well Mag Meter Flow Rate (Meter MH#1)

AI-2 Hach CL-17 Chlorine residual (Add Alternate A1)

5. Relay Outputs

R-1 Well Pump Smart on/off

R-2 Booster Pump Smart on/off

2.05 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.

PART THREE - EXECUTION

3.01 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.

3.02 COORDINATION

- 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. Additional coordination with the supplier's information here.

3.03 INSTALLATION

- A. Install the work of this Section in strict accordance with the manufacturer's recommendations and shop drawings as approved by the Engineer.
- B. Upon completion of the installation, carefully inspect each component and verify that all items have been installed in their proper location, adequately anchored, and adjusted to achieve optimum operation.
 - If required, the contractor shall adjust the antenna placement or elevation to obtain consistent, stable operation of the system.
- C. Delineate timing of RTU installation and commissioning.

3.04 SERVICE

- A. Demonstrate to the Owner's operation and maintenance personnel the proper methods for operating and maintaining the equipment, and the contents of the operation and maintenance manual required to be submitted under Article 1.03 in this Section.
- B. The Contractor shall furnish to the Owner, through the Engineer, a written report prepared by the instrumentation equipment manufacturer's field service technician certifying that:
 - A. the equipment has been properly installed in accordance with manufacturer's recommendations;
 - 2. the equipment check out and initial start-up activities have been completed in accordance with manufacturer's recommendations and under the technician's supervision;
 - 3. Antenna placement has been optimized
 - 4. The equipment is free from any undue stress imposed by connecting conduit or anchor bolts;
 - 5. The equipment operates satisfactorily and in compliance with the requirements of this Section.
- C. If applicable, delineate whether or not the Contractor shall include with his bid, the on-site services of the instrumentation equipment manufacturer's field service technician, and for what period. This service shall be for the purpose of instruction of plant personnel and testing of the system.

END OF SECTION

SECTION 11260 – LINESHAFT TURBINE PUMPS

PART 1 - GENERAL

1.1. SCOPE

This specification covers a lineshaft turbine pump with above ground discharge, the lineshaft bearings lubricated by the water being pumped and furnished with suitable driver and accessories as specified herein. The pumping unit shall be designed and furnished in accordance with the latest Hydraulic Institute and AWWA Standards for lineshaft turbine pump.

1.2. SERVICE CONDITIONS

The pump shall be designed and constructed to operate satisfactorily with a reasonable service life, when installed in a dependable and adequate water resource location. The pump shall be the product of, and manufactured by Goulds Water Technology. Other manufacturers will be considered providing the unit offered is an approved equal in all respects to the brand and model preferred by the customer. Factory pump performance curves for alternate pumps shall be submitted with the bid.

PART 2 – PRODUCTS

2.1. APPROVED MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with specifications, provide pump equipment by one of the following:

1. Goulds Water Technology (Local Supplier Emerick Associates, Inc (518)785-6692)

2.2. OPERATING CONDITIONS

Design flow conditions: 1750 Gallons per minute

Design head: 120 Feet total dynamic head (TDH)

Minimum pump efficiency: 85 Percent

Maximum allowable speed: 1770 RPM

Liquid to be pumped: Water

2.3. PUMP CONSTRUCTION

A. Bowl assembly

The bowls shall be flanged type constructed of close grained cast iron conform to ASTM

A48, class 30. They shall be free from sand holes, blowholes, or other faults and must be accurately machined and fitted to close tolerances. They shall be capable of withstanding a hydrostatic pressure equal to twice the pressure at rated flow or 1.5 times shut-off head, whichever is greater. The intermediate bowls shall have enamel or epoxy lined waterways for maximum efficiency and wear protection. All intermediate bowls shall be of identical design for interchangeability. All the bowls shall be fitted with sleeve type bearings of bronze alloy C89835.

B. Impellers

The impellers shall be constructed from ASTM B584 Silicon Bronze and shall be the semi-open type. They shall be free from defects and must be accurately cast, machined and filed for optimum performance and minimum vibration. Impellers shall be balanced to grade G6.3 of ISO 1940 as minimum. They shall be securely fastened to the bowl shaft with taper locks of C1018 steel.

C. Suction

The suction bowl or suction bell shall be provided with a non-soluble grease packed bronze bearing. A bronze sand collar shall be provided to protect this bearing from abrasives in the pumping fluids. The bearing housing shall have sufficient opening at the bottom for easy removal of the bearing. A strainer of cone or basket type may be provided. It shall have a net inlet area equal to at least three times the impeller inlet area. The maximum opening shall not be more than 75% of the maximum opening of the water passage through the bowl or impeller.

D. Shaft

The bowl shaft shall be constructed from ASTM 582 type 416 stainless steel. It shall be precision ground and polished with surface finish better than 40 RMS.

2.4. COLUMN ASSEMBLY - OPEN LINESHAFT

A. Column pipe

The column pipe shall be furnished in sections not exceeding a nominal length of 10 ft and shall be connected with flanges. The length of the top and bottom sections shall not be more than 5 ft. The pipes shall be of ASTM A53 grade B steel pipe and the weight shall be not less than schedule 30. All column flange faces shall be parallel and machined for rabbet fit to permit accurate alignment. The inside diameter of the pipe shall be such that the head losses shall not be more than 5 feet per 100 feet of pipe or the flow velocity not to exceed 3 ft/sec based on rated flow of the pump.

B. Lineshaft

The lineshaft shall be of ASTM A582 type 416 stainless steel ground and polished with surface finish not to exceed 40 RMS. They shall be furnished in interchangeable section not over ten feet in length, and shall be coupled with threaded stainless steel couplings (up to 2-15/16" diameter) machined from solid steel bar. It shall have left-hand thread to tighten during pump operation. The diameter of the shaft and coupling shall be designed in accordance with AWWA E101 Standard.

C. Bearing

Bearing shall be fluted rubber retained in the centering spider by a shoulder on each end of the bearing.

2.5. DISCHARGE HEAD ASSEMBLY

A. Discharge Head

It shall be of the high profile type to allow shaft coupled above stuffing box and provided for mounting the driver and support the column and bowl assemblies. It shall be of high-grade cast iron, ASTM A48 Class 30, or fabricated steel. The above ground outlet shall be flanged to match 10 inch ANSI class 125. It shall have a 1/2" NPT connection for a pressure gauge.

B. Stuffing Box

The stuffing box shall be cast iron and shall contain a minimum of five rings of packing (or mechanical seal). It shall have a pressure relief connection. The packing gland shall be a 316 SS split type secured in place with non-corrosive studs and nuts. The bearing shall be C89835 bronze. A rubber slinger shall be secured to the shaft above the packing gland.

2.6. ELECTRIC MOTOR

The motor shall be a heavy duty squirrel cage induction type, NEMA Class F insulation with WP-1 enclosure, 1800 RPM vertical hollow shaft motor, with a non-reverse ratchet to prevent reverse rotation of the rotating elements. A thrust bearing of ample capacity to carry the weight of all rotating parts plus the maximum hydraulic thrust load under all conditions of operation calculated L10 life shall be no less than 8800 hours. Provision shall be made for momentary up thrust equal to 30% of the rated down thrust. The motor shall be premium efficiency, 1.15 service factor, and suitable for use on 460 volt, three phase, 60 Hz electric service. When vertical hollow shaft motor is used, an adjusting nut shall be provided at the top of the motor for setting the impeller to bowl running clearance.

SECTION 11270 – WELL SUBMERSIBLE TURBINE PUMPS

PART 1 - GENERAL

1.1. SCOPE

This specification covers a deep well submersible turbine pump with above ground discharge and furnished with suitable driver and accessories as specified herein. The pumping unit shall be designed and furnished in accordance with the latest Hydraulic Institute and AWWA Standard for submersible turbine pumps.

1.2. SERVICE CONDITIONS

The pump shall be designed and constructed to operate satisfactorily with a reasonable service life, when installed in a dependable and adequate water resource location. The pump shall be the product of, and manufactured by Goulds Water Technology. Other manufacturers will be considered providing the unit offered is an approved equal in all respects to the brand and model preferred by the customer. Factory pump performance curves for alternate pumps shall be submitted with the bid.

PART 2 – PRODUCTS

2.1. APPROVED MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with specifications, provide pump equipment by one of the following:

1. Goulds Water Technology (Local Supplier Emerick Associates, Inc (518)785-6692)

2.2. OPERATING CONDITIONS

A. Production Well #1

Design conditions: 510 Gallons per minute

Design head: 296.0 Feet total dynamic head (TDH)

Minimum Pump Efficiency of: 79.3 %

Maximum allowable speed: 3,450 RPM

Rated Power: 50 HP

Well diameter I.D.: 10 Inches

Goulds model 8RJLC - 4 Stage

B. Production Well #2

Design conditions: 460 Gallons per minute
Design head: 310.0 Feet total dynamic head (TDH)
Minimum Pump Efficiency of: 79.1 %
Maximum allowable speed: 3,450 RPM
Rated Power: 50 HP
Well diameter I.D.: 10 Inches
Goulds model 8RJLC-4 Stage

C. Production Well #3

Design conditions: 350 Gallons per minute
Design head: 304.0 Feet total dynamic head (TDH)
Minimum Pump Efficiency of: 78.7 %
Maximum allowable speed: 3,450 RPM
Rated Power: 40 HP
Well diameter I.D.: 10 Inches
Goulds model 7CLC-4 Stage

2.3. PUMP CONSTRUCTION

A. Bowl Assembly

The bowls shall be flanged type constructed of close grained cast iron conform to ASTM A48, class 30. They shall be free from sand holes, blowholes, or other faults and must be accurately machined and fit- ted to close tolerances. They shall be capable of withstanding a hydrostatic pressure equal to twice the pressure at rated flow or 1.5 times shut-off head, whichever is greater. The intermediate bowls shall have enamel or epoxy lined waterways for maximum efficiency and wear protection. All intermediate bowls shall be of identical design for interchangeability. All the bowls shall be fitted with sleeve type bearings of bronze alloy C89835. A discharge bowl shall be used to connect bowl assembly to the discharge pipe. An extra-long bronze bearing packed with non-soluble grease shall be provided in the top bowl and extended into the discharge bowl The bearing shall have a threaded cast iron cap or plug at the top to protect the bearing from abrasives. The hub of the discharge bowl should be such that the bearing can be easily removed through the top of the hub. A thrust ring shall be above the top impeller to prevent excessive vertical upthrust.

B. Impellers

The impellers shall be constructed from ASTM B584 Silicon Bronze and shall be the enclosed type. They shall be free from defects and must be accurately cast, machined, balanced, and filed for optimum performance and minimum vibration. Impellers shall be balanced to grade G6.3 of ISO 1940 as minimum. They shall be securely fastened to the bowl shaft with taper locks of C1018.

C. Motor Adapter

The inlet motor adapter shall be of ASTM A536 Gr. 60-40-18 ductile iron and shall contain an extra-long bronze bearing. The inlet area shall have a net open area of at least four times the eye of the impeller and shall be protected with a 304 stainless steel screen. The openings on the screen shall not be more than 75% of the minimum opening of the water passage through the bowl or the impeller.

D. Shaft

The pump shaft shall be of ASTM 582 type 416 stainless steel. It shall be precision ground and polished with surface finish better than 40 RMS.

E. Coupling

The shaft coupling shall be of stainless steel and be capable of transmitting the total torque and total thrust of the bowl assembly in either direction of rotation.

2.4. DISCHARGE PIPE

The discharge pipe shall be ASTM A53 grade B standard weight steel pipe, in 21 or 40 feet lengths and connected by threaded sleeve type steel coupling. The ends of the pipes shall have ANSI B1.20.1 standard tapered pipe threads. Inside diameter of the pipe shall be such that the head losses shall not be over 5 feet per 100 feet of pipe.

2.5. SUBMERSIBLE CABLE

Pump cable shall be sized to limit the voltage drop to no more than 5%. The cable shall have three separate conductors and a ground and shall be included in a single continuous jacketed assembly. The insulation shall be water and oil resistant, and suitable for continuous immersion. The cable should be of sufficient length and shall not contain any splicing between the motor and motor control panel. The cable should be adequately

secured to the discharge pipe by plastic ties, or other non metallic means, at 10 foot intervals.

2.6. SURFACE PLATE

The surface plate shall be of fabricated steel. The plate shall incorporated a long radius elbow welded securely to a ANSI Class 150 6" flange and shall rigidly support the total weight of the motor, bowl assembly, discharge pipe, cable, and column of water. The plate shall have a cable seal of adequate size to accommodate the cable size and well vent and water level indicator.

2.7. SUBMERSIBLE ELECTRIC MOTOR

The motor shall be hermetically sealed type of NEMA design 3600RPM, with outside diameter not to exceed 6 inches. The motor shall be capable of continuous operation under water at the specified conditions outlined above. A suitable thrust bearing shall be incorporated in the lower end of the motor adequate to receive the entire hydraulic thrust load of the pump unit plus the weight of the rotating parts regardless of the direction of rotation. The motor shall have a 1.15 service factor, and suitable for use on 460 volt, three phase, 60 Hz electric service.

The motor leads shall be of sufficient length so that they may be spliced above the bowl assembly and the leads shall be protected by a type 304 stainless steel cable guard held in place with stainless steel banding. As the motor lead exit the top of the cable guard it shall be properly protected to prevent damaging or cutting the lead by the cable guard material.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Follow manufacturer's recommendation for installation. Installation will conform to the guidelines provided by the Installation & Operation Manual.

END OF SECTION

SECTION 11280 - VARIABLE SPEED DRIVE SPECIFICATION

PART 1 – GENERAL

1.1 DESCRIPTION

- A. This specification describes an AC variable speed Direct Torque Control or sensorless vector equivalent drive used to control the speed of a centrifugal pump power an AC induction motor

PART 2 – PRODUCT

2.1 ADJUSTABLE FREQUENCY DRIVES

- A. The drive shall be solid state, with a Pulse Width Modulated (PWM) output. The drive shall be a Direct Torque Control (DTC) or sensorless vector equivalent AC to AC converter utilizing the latest isolated gate bipolar transistor (IGBT) technology. The drive must also provide an optional operational mode for scalar or V/Hz operation.
- B. The Drive shall be UL listed, Canadian UL listed, or CSA listed and comply with EMC Directive 89/336 EEC, Low Voltage Directive 73/23 EEC and Machinery Directive 98/37 EC in accordance with the European Union's CE directive.
- C. The Drive shall utilize the same communications architecture, utilizing plug-in communications cards, for high-speed noise immune connectivity throughout the entire Drive manufacturer's Power range.
- D. Ratings
 - 1) The Drive shall be rated to operate from 3-phase power at 230VAC to 690VAC $\pm 10\%$, 48Hz to 63Hz. The Drive shall employ a full wave rectifier to prevent input line notching and operate at a fundamental (displacement) input power factor of 0.97 at all speeds and loads. The Drive efficiency shall be 98% or better at full speed and load. An internally mounted AC line reactor or DC choke shall be provided to reduce input current harmonic content, provide protection from power line transients such as utility power factor correction capacitor switching transients and reduce RFI emissions.
 - 2) The overload current capacity shall be 110% of rated current for one (1) minute out of five (5) minutes. Output frequency shall be adjustable between 0Hz and 180Hz.
- E. Operator Control Panel (Keypad)
 - 1) Each Drive shall be equipped with a front mounted operator control panel (keypad) consisting of a four- (4-) line by 20-character back-lit alphanumeric

display and a keypad with keys for Run/Stop, Local/Remote, Increase/Decrease, reset, menu navigation and parameter select/save.

- 2) The control panel shall include a feature for uploading parameter settings to control panel memory and downloading from the control panel to the same drive or to another drive.
- 3) All Drives throughout the entire power range shall have the same customer interface, including digital display, and keypad, regardless of horsepower rating.
- 4) The keypad shall be removable and insert able under drive power, capable of remote mounting, and shall have its own non-volatile memory. The drive should have the option to operate normally with the keypad removed.
- 5) During normal operation, one (1) line of the control panel shall display the setpoint reference, run/stop and local/remote status. The remaining three (3) lines of the display shall be programmable to display the values of any three (3) operating parameters. At least 24 VFD and 18 pump related parameter selections shall be available including the following:
 - a. Pump process variable in units of psig, gpm, ft, etc.
 - b. Vibration level in units of IP/s or mm/s
 - c. Energy Savings verses a constant speed pump
 - d. RPM
 - e. Output frequency, voltage, current and torque
 - f. Input voltage, power and kilowatt hours
 - g. Heat sink temperature and DC bus voltage
 - h. Status of discrete inputs and outputs

F. I/O Capabilities

- 1) Six (6) discrete inputs shall be designed for “dry contact” inputs used with either an internal or external 24 VDC source. An option 115VAC inputs should be available.
- 2) Three (3) form C relay contact outputs, all independently programmable. Relay contacts shall be rated for continuous 2 Amps at 24VDC or 115/230VAC. Function selections shall include indications that the drive is ready, running, faulted. General and specific warning and pump fault indications shall be available
- 3) Three (3) analog inputs, one (1) +/- 0VAC - 10VAC and two (2) 4mA - 20mA, all independently programmable. A differential input isolation amplifier shall be provided for each input. Analog input signal processing functions shall include scaling adjustments and adjustable filtering. If the input reference (4-20mA or 2-

10V) is lost, the AFD shall give the user the option of the following: (1) stopping and displaying a fault, (2) running at a programmable preset speed, (3) hold the AFD speed based on the last good reference received, or (4) cause a warning to be issued, as selected by the user. The drive shall be programmable to signal this condition via a keypad warning and/or over the serial communications bus.

- 4) Two (2) analog, outputs providing 4mA to 20mA signals. Analog output signal processing functions shall include scaling adjustments, adjustable filtering and signal inversion. Outputs shall be independently programmable to provide signals proportional to at least 21 output function selections including output speed, frequency, current, process variable and condition monitoring levels.

G. Serial communications

- 1) Serial communication interface modules are available for a wide selection of communication protocols. Available adapters are as follows: Modbus, Modbus Plus, Profibus, DeviceNet and Ethernet.
- 2) Serial communication capabilities shall include, but not be limited to, run-stop control; setpoint adjustment, current limit, and accel/decel time adjustments. The drive shall have the capability of allowing the Distributed Drive Controller (DDC) to monitor feedback such as process variable feedback, output speed/frequency, current (in amps), % torque, power (kW), kilowatt hours (resettable), operating hours (resettable), relay outputs, and diagnostic warning and fault information. Additionally, remote Local Area Network (LAN) VFD fault reset shall be possible.
- 3) A fiber optic communication port shall also be provided for personal computer interface. Microsoft Windows®-based software shall be available for drive setup, diagnostic analysis, monitoring and control. The software shall provide real time graphical displays of drive performance.

H. Drive Protective Functions

- 1) For each programmed warning and fault protection function, the drive shall display a message in complete words or standard abbreviations. The sixty-four (64) most recent fault messages and times shall be stored in the drive's fault history.
- 2) The drive shall include internal MOV's for phase to phase and phase to ground line voltage transient protection.
- 3) Output short circuit and ground fault protection rated for 65,000 amps shall be provided per UL508C without relying on line fuses. Motor phase loss protection shall be provided.
- 4) The drive shall provide electronic motor overload protection qualified per UL508C.

- 5) Protection shall be provided for AC line or DC bus overvoltage at 130% of maximum rated voltage or undervoltage at 65% of min. rated voltage and input phase loss.
- 6) A power loss ride through feature will allow the drive to remain fully operational after losing power as long as kinetic energy can be recovered from the rotating mass of the motor and load.
- 7) Stall protection shall be programmable to provide a warning or stop the drive after the motor has operated above a programmed torque level for a programmed time limit.
- 8) Underload protection shall be programmable to provide a warning or stop the drive after the motor has operated below a selected underload curve for a programmed time limit.
- 9) Over-temperature protection shall provide a warning if the power module temperature is less than 5°C below the over-temperature trip level.

PART 3 – CONTROLS AND PROGRAMMING

3.1 APPLICATION PROGRAM

- A. All logic set forth in this specification must reside internal to the drives internal microprocessor. If an external controller is required it must be clearly stated and included in the base bid.
- B. Drive shall be preprogrammed with a pump specific application macro.
- C. The program must be designed for ease of use and come standard with a user friendly programming manual specific for centrifugal pumps.
- D. The Control Panel (keypad) should have the ability to display pump nomenclature (PSIG, GPM, IP/s, mm/s, etc.) to allow the operator to have a better understanding of the current pump and system status.
- E. Drive shall have an internal PID to control a process variable such as pressure, flow, level, etc. The PID controller should be able to regulate speed or torque to accurately control the process variable.
 - 1) The drive shall recognize system low demand and have the option to automatically shut down in a suspended sleep mode until the process demand requires the pump to turn back on.
- F. The drive system shall have the ability to perform process control (PID) using either motor speed, or motor torque, as the manipulated variable.
- G. The drive shall have the ability to follow a speed reference through the drives keypad, an analog input or serial bus command.

3.01.1 MULTIPUMP PROGRAM

- A. The drive program shall have a Multipump Macro that would allow a maximum of 4 drives to communicate and control up to a 4 pumps. One drive will operate one pump.
- B. Drive to drive communication shall be over a fiber optic network for maximum RFI/EMI noise suppression.
- C. The drives shall control to a single process variable and automatically stage and de-stage pumps on and off depending on the process demand. The settings at which the pumps are staged and de-staged shall be field adjustable through the drives standard keypad.
- D. In the event of a drive, motor or pump fault the others drives will recognize this failure and shall compensate with the next available pump.
- E. When multipump pumps are running the drives shall synchronize in speed to ensure the pumps share the load evenly.
- F. In the event a pump is demonstrating wear and is not able to share the load equally a synchronous torque option will be available. This option will synchronize the torques of all the running pumps to help evenly distribute the load over all the running pumps. The motors shall be identical on all the pumps running in synchronous torque mode.
- G. The drives shall alternative the operation of the pumps based operating hours of the pumps. After a programmable time widow the lead status will transfer to the next available drive.
- H. The drives shall have a pressure boost function to compensate for additional system friction losses at higher flow rates. This function shall automatically increase the pressure setpoint when additional pumps are staged on. Alternatively the pressure setpoint will decrease as pumps are de-staged off.

3.2 MOTOR CONTROLS

- A. A motor parameter ID function shall automatically define the motor equivalent circuit used by the sensorless vector torque controller.
- B. The drive shall be capable of starting into a rotating load and accelerate or decelerate to reference without safety tripping or component damage (flying start).
- C. The drive shall have the ability to automatically restart after an overcurrent, overvoltage, undervoltage or pump protect fault. The number of restart attempts, trial time, and time between reset attempts shall be programmable
- D. The drive shall have a feature that limits the output amps and/or torque to the motor to prevent overloading of the motor.
- E. Drive shall have adjustable accel/decel ramp rates to limit the in-rush current and prevent water hammer in the piping system.

3.3 FLOW ESTIMATION

- A. Flow Estimation – The drive shall have the ability to estimate the pump flow to an accuracy of $\leq \pm 5\%$ of the total rated pump flow through a variable speed range of 50%-100% of the motor synchronous speed and without external process transmitters.
- B. The flow calculation algorithm shall be operational using commonly available pump performance curves. Factory performance tests shall not be required to attain the flow accuracy.
- C. The flow calculation algorithm shall have the ability to be field calibrated without requiring field instrumentation.
- D. () When checked; the flow calculation logic shall be capable of correcting for a changing specific gravity via a 4-20 mA signal, serial buss communication, or corrected via temperature transmitter input.
- E. () When checked; The flow calculation logic shall be capable of calculating pump flow on a magnetic drive pump with a metal containment shell.

3.4 PUMP PROTECTION

- A. Pump Protection – The drive shall have the ability to warn and/or protect the pump against process upset conditions of dry-running (severe cavitation), operation below recommended minimum flow, and operation past recommended maximum flow throughout the anticipated variable speed range and without the need for external process transmitters.
- 1) The pump protection feature shall be easily set-up using values of flow GPM
 - 2) The pump protection feature shall have the ability to offer control reactions specific to the condition:
 - a. Dry-Run: Warn only, Warn & Stop
 - b. Min-Flow: Warn only, Warn & Control to Min Speed
 - c. Max-Flow: Warn only
 - 3) The protection logic shall account for changing load profiles due to changes in speed, including mechanical and hydraulic losses
 - 4) The protection logic shall not false trip when the drive is reducing speed in normal control modes.
 - 5) () When checked; The protection logic shall be capable of calculating pump flow on a magnetic drive pump with a metal containment shell.

3.5 FLOW ECONOMY

- A. Flow Economy – The drive shall have the ability to calculate the Flow Economy ratio of pump flow divided by electrical input power.
- 1) The pump flow shall be calculated using a sensorless flow function integral to the drive.
 - 2) The electrical power input shall be the true electrical power consumption which includes all drive and motor losses.
 - 3) The Flow Economy Ratio shall be a selectable parameter on the drives keypad and shall be available through a 4-20mA output or through a serial bus register.

3.6 CONDITION MONITORING

- A. Drive shall have the capability to monitor up to two(2) channels of information. These channels shall be either an external 4-20mA / 0-10VDC analog inputs or a minimum of 13 internal drive and pump signals.
- 1) The keypad display should clearly indicate the units of the condition monitored such as Amps, Hz, IP/s or mm/s etc.

- 2) The drive will have two programmable levels for a high condition and two programmable levels for low levels to signal a warning and alarm.
- 3) In the event the event the alarm level is reached drive shall have the option to signal an alarm, go to a safe predetermined minimum speed, fault the pump or go into a suspended sleep mode until the level is restored above normal.

3.7 CAVITATION CONTROL

- A. The drive shall have the ability to monitor the suction conditions of a pump and react to prevent the onset of pump cavitation.
- B. The drive shall have the ability to monitor an external analog signal from either a suction pressure or level transmitter.
 - 1) When the suction conditions of the pump reach a critical low level the drive will slow down to reduce the NPSH requirement of the pump. The
 - a. The intensity at which the drive reduces the pump speed shall be configurable to the specific application.
 - 2) The drive shall resume normal operation above the low level limit threshold.

3.8 PUMP CLEANING SEQUENCE

- A. The drive shall have the ability to detect a blockage in the pump using sensorless speed and torque measurements.
- B. On detection of this blockage the pump shall enter into a Pump Cleaning Sequence. This sequence includes running the pump in a programmed designed to clear blockages. This program includes running the pump in forward and reverse directions until the blockage is cleared.
- C. If the blockage can not be cleared the drive shall fault the pump and clearly identify the pump has faulted due to blockage.
- D. The drive supplier shall verify with the pump manufacturer the pump is suitable to run in reverse rotation.

SECTION 16000 – GENERAL REQUIREMENTS, ELECTRICAL

PART 1 – GENERAL

1.1 GENERAL PROVISIONS

- A. All work done under this title, on drawings or specified, is subject to the General and Special Contract Conditions for the entire project, and the Contractor for this portion of the work is required to refer especially thereto, contract and specifications. Specification sections specifically pertaining to electrical work have 16000 series numbers.
- B. Drawings and specifications are complementary and must be so interpreted and anything required by either alone is the same as if required by both. Wherever any material, article, operation or method is either specified or shown on the drawings, this Contractor is required to provide each item and perform each prescribed operation according to the designated quality, qualification or condition, furnishing all necessary labor, equipment, and incidentals.
- C. The Contractor is expected to be familiar with the terms and abbreviations used in the trade. In the event that any abbreviation used in these specifications or on the drawings is not clear to the Contractor, he should request clarification during the bidding period. The failure to understand any such term or abbreviation shall not be used as a basis for a change in cost. The Engineer decision on the interpretation will be final.
- D. The lists of equipment, tabulations of data, and schedules appearing in the specifications or on the drawings are included only for the assistance and guidance of the Contractor in arriving at a more complete understanding of the intended installation. They are not intended, nor to be construed, as relieving the responsibility of the Contractor in making his own takeoff and providing all the required work.
- E. This section outlines general requirements for electrical work of various types. Provisions of certain articles such as submittals, testing, etc. will apply only to those items of work which are included in a specific project and to the extent applicable thereto.

1.2 REGULATORY REQUIREMENTS, CODES AND FEES

- A. Refer to General Conditions.
- B. Comply with all applicable OSHA, Federal, State and Municipal laws and regulations.
- C. Additional regulations include, but are not limited to:
 - 1. American Society for Testing Materials (ASTM).
 - 2. American National Standards Institute (ANSI).
 - 3. Association of Edison Illuminating Companies (AEIC).
 - 4. Edison Electrical Institute (EEI).
 - 5. Institute of Electrical and Electronics Engineers (IEEE).
 - 6. Insulated Power Cable Engineers Association (IPCEA).

7. National Electrical Manufacturer's Association (NEMA).
 8. National Fire Protection Association (NFPA).
 - a. National Electrical Code, NFPA No. 70-2005.
 - b. Other publications included in "National Fire Codes", published by NFPA.
 9. National Electrical Safety Code, Handbook No. H30, by National Bureau of Standards, except for requirements which have been superseded by NFPA Publications (NESC).
 10. Local Electrical Code.
 11. Local Utility Standards.
 12. Underwriters Laboratories (UL).
- D. Each item of equipment and material shall conform to requirements of these applicable publications which make them most suitable in the option of the Engineer for environmental conditions where they shall be installed.
- E. The Contractor shall also be responsible for adherence to all rules, requirements and specifications as set forth above. Ignorance of any rule, requirement or specification shall not be an excuse for non-conformity or for a Change Order. The Contractor is not to proceed with non-conformance work, but report to Engineer for further action.
- F. Items which are within the scope of items tested by Underwriters Laboratories, Inc., or other suitable nationally recognized independent testing laboratories shall have their conformance with these applicable publications evidenced by attachment of authorized seal, label, or stamp of said testing laboratories.
- G. Approval of items, whether evidenced by seal, label, or stamp, shall not absolve Contractor from compliance with requirements of Contract Documents.
- H. Secure necessary permits and pay all required fees applicable to the work in Division 16.

1.3 SCOPE OF WORK TO BE PROVIDED AND INTENT

- A. Equipment and Systems Specified in Division 16:
1. Intent: It is the general intent of the drawings and these specifications that the Contractor responsible for electrical work furnish and install complete, workable systems in compliance with all applicable codes and regulations and to the satisfaction of the Engineer and Owner.
 2. The Contractor shall furnish to the jobsite and install all equipment and materials specified in the applicable technical sections of this specification. Installation shall be in strict accordance with locations as indicated on the drawings, as detailed, as scheduled and as specified in the technical sections. Installation shall include all accessories required to assure a complete and workable installation of the equipment and system.
 3. The work shall include the furnishing of all labor, materials, tools, equipment, transportation, permits, inspection fees, services, and all necessary related items required for complete and operating systems.
 4. The Electrical Drawings show the layout, circuiting, etc., but not minute details.

1.4 SUBMITTALS

A. Shop Drawings

1. Submit 6 copies of each shop drawing required by the specifications. Show the information, dimensions, connections and other details necessary to insure that the shop drawings accurately interpret the Contract Documents. Show adjoining construction in such detail as required to indicate proper connections. Where adjoining connected construction requires shop drawings or product data, submit such information for approval at the same time so that connections can be accurately checked.
2. The shop drawings will be reviewed and two stamped copies will be returned. If returned copies are stamped "REJECTED" OR "REVISE AND RESUBMIT", promptly resubmit six copies of shop drawings meeting contract requirements. If returned copies are stamped "SUBMIT SPECIFIED ITEM", promptly submit six copies of shop drawings meeting contract requirements.

B. Product Data

1. Submit 6 copies each item of product data required by the specifications. Modify product data by deleting information which is not applicable to the project or by making each copy to identify pertinent products. Supplement standard information, if necessary, to provide additional information applicable to the project.
2. The product data will be reviewed and two copies will be returned. If returned copies are stamped "REJECTED" OR "REVISE AND RESUBMIT", promptly resubmit six copies of shop drawings meeting contract requirements. If returned copies are stamped "SUBMIT SPECIFIC ITEM", promptly submit six copies of shop drawings meeting contract requirements.

C. Submittal Requirements

1. Contractor shall review and stamp all shop drawings prior to submittal.
2. Before submittals, if Contractor proposes to use substitute or "equal" equipment, he shall clearly state all functional, dimensional, design and other important features that deviate from the specified equipment. Failure to do so will not relieve the Contractor of his responsibility later on, even if approved by the Engineer, and the Contractor shall be liable for all consequences, including replacement at no additional cost to the Owner, if so directed by the Engineer.
3. Identify all submittals by project title and number. Include Contractor's name, date and revision dates. On shop drawings, product data and samples, also include name of supplier and subcontractor (if any), and applicable specification section number. Stamp each submittal and initial or sign the stamp to certify review and approval of submittal verification of field measurements, and compliance with the Contract Documents.
4. Shop drawings to include:
 - a. Specification page and paragraph reference.
 - b. Electrical characteristics such as voltage, short circuit interrupting capacity and coordination, photometric performance, etc.
 - c. Dimensions, mounting details, type of material, gauge, etc.
 - d. Finish and trim, type, color, process.
 - e. Manufacturer's complete Model and/or Catalog Number including any optional accessories required to meet the terms of the Contract Documents.

5. Operating manuals required for final payment.
6. Submittals are required for the following items in general:
 - a. Enclosed Circuit Breakers.
 - b. Transfer Switches.
 - c. Controllers.
 - d. Transient Voltage Surge Suppressors.
 - e. Conduit.
 - f. Grounding Components.
 - g. SCADA Equipment.
 - h. Instrumentation.
 - i. Special Equipment.

1.5 APPROVAL OF MATERIALS

- A. Items specified have been checked by the Engineer for appearance, performance, space limitation and serviceability.
- B. Unless the words “approved equal” appear, the Contractor is to choose from the manufacturers mentioned and state the make of equipment he/she intends to purchase on a sheet provided at the time of the Contract signing.
- C. Engineer, not Contractor or vendor, shall be the final judge of equal materials.
- D. Requests for substitutions must be made in writing ten (10) days prior to bid date so that an addendum may reach all Contractors.
- E. If Substitutions are proposed after the bids are received, the Contractor shall state amount of credit to the Owner for the substitution.

1.6 SUBSTITUTIONS

- A. Any increase in cost to other Contractors caused by an approved substitution, shall be borne by the Contractor under Division 16.
- B. Refer to General Conditions for additional requirements. In case of a conflict, the more stringent of the two requirements will apply.

1.7 TESTING OF SUBSYSTEMS

- A. General
 1. Schedule all tests as soon as each part of the wiring system is complete and before it is energized.
 2. All test equipment and set-up shall be provided by the Contractor.
 3. All electrical energy and/or fuel required for the tests shall be furnished by the Contractor, unless noted otherwise.
- B. Wiring Systems – 600 Volts or Less
 1. All conductors of all systems shall be tested for opens, shorts, and grounds.
 2. Power cable tests with 1,000V megger and control/instrumentation cable tests with 500V megger.

- C. Grounding Systems
 - 1. Conduit systems shall be checked for “grounds” at convenient points such as outlets which are located near metallic piping systems or building structural steel.
 - 2. Demonstrate that derived systems grounds, at transformer secondaries, are “grounded”.
 - 3. When applicable, check system neutrals and equipment grounding conductors separately for opens, shorts and unintentional grounds before interconnection to the grounding systems.
 - 4. All grounds rods shall be tested for grounding resistance before any grounding conductors are connected.

1.8 DEMONSTRATION OF COMPLETE ELECTRICAL SYSTEMS

- A. General
 - 1. Schedule system checkouts when work is complete and ready for final inspection.
 - 2. Notify the Engineer and the Owner at least 48 hours in advance.
 - 3. All test equipment and set-up shall be provided by the Contractor.
- B. Power Distribution System
 - 1. On a feeder-by-feeder basis, energize all loads simultaneously or as directed by the Engineer for a period of two hours.
 - 2. Check for load balance among phases on all feeders.
 - 3. Correct phase imbalance, if necessary, or as directed by the Engineer; correct defective equipment or workmanship immediately.

1.9 REPORTS

- A. The items listed below are all specified elsewhere; they are listed below for reference and convenience and are not limited thereto.
- B. The Contractor shall submit all required reports to the Engineer before submission of his request for final payment.
- C. Submit individual reports for each of the following:
 - 1. Motor Current and Voltage.
 - 2. Megger and grounding.
 - 3. Instrumentation.

1.10 RECEIPTS

- A. The items listed below may be specified elsewhere; they are listed below for reference and convenience.
- B. The Contractor shall obtain written receipts as applicable from the Owner’s authorized representative for each of the following items or systems listed in subparagraph “C” below. (The Contractor shall submit copies of the receipts to the Engineer before submission of his request for final payment):
 - 1. Certification of complete system; this certification may be part of the “report” in paragraph “REPORTS” above.
 - 2. Instruction of Owner’s authorized representatives.

3. Bound copies of wiring diagrams, catalog "cuts", maintenance instructions, spare parts lists, etc.
 4. Guarantee and service contracts.
- C. Submit receipts for each of the following:
1. NYBFU, or equivalent, inspect certificate or other specified authority.
 2. Spare fuses.
 3. Panel and cabinet keys.
 4. Spare lamps.
 5. Other special system applicable to the project.

1.11 DEFINITIONS

- A. Other definitions are included in the General Conditions and in various sections of the Specifications.
- B. The following terms shall have the meanings ascribed to them in this Section, wherever they appear in the Contract Documents.
1. Company Field Advisor: A company employee certified in writing by the company to be technically qualified in design, installation and servicing of the required products. Personnel involved solely in sales do not qualify.
 2. Provide: Furnish and install, in place and ready for use.
 3. Chapter 100 – "DEFINITIONS" – of NEC.
 4. AFF: Above Finished Floor.
 5. AFG: Above Finished Grade.
 6. BFG: Below Finished Grade.

1.12 RECORD DRAWINGS

- A. Contractor shall maintain on site, at times, two sets of drawings, at a place accessible to the Engineer and Owner's Representative for inspection, with up-to-date records of all changes made during construction. These sets are As-Built drawings and shall be marked "PROJECT RECORD DRAWINGS".
- B. Contractor shall submit one set to the Engineer at the time of request for final payment.

PART 2 – PRODUCTS

2.1 ELECTRICAL EQUIPMENT AND MATERIALS

- A. New, unless otherwise indicated.
1. It is the intent of this Contract that all material and/or equipment of the same manufacturer, or in the case of special systems which are a composite of a number of manufacturers' products, shall be supplied and/or serviced from an organization with one source of responsibility.
- B. Design
1. Equipment and accessories are specifically described or identified by manufacturer's catalog numbers: designed in conformity with applicable technical standards, suitable for maximum working loads, and shall have a neat and finished appearance.

All material specified by manufacturer's name and/or identification are to be considered the standard of quality that are to be used throughout the installation.

- C. NOTE: All equipment capacities indicated in the schedules or within this specification are to interpreted as minimum, unless otherwise noted.
 - 1. Obtain from Contractor supplying equipment from the manufacturer, printed installation instructions, and wiring diagrams to aid in properly executing work installation where applicable, especially to insure that manufacturer's warranty shall be applicable.
 - 2. Submit copies of such instructions to the Engineer prior to installation for use in supervision of work.
- D. All electrical equipment shall operate without objectionable noise or vibration, as determined by Engineer. Make necessary modifications or replacements as approved, without extra cost to the Owner if required by Engineer or Owner's Representative.

2.2 EQUIPMENT SUPPLIERS AND MANUFACTURERS

- A. Major equipment for the emergency power system shall be installed under the direct supervision of a factory authorized sales and service agent.
- B. Suppliers shall maintain an adequate supply of spare parts and have technical personnel available to make repairs to systems within twenty-four (24) hours after they are notified by Owner.
- C. Shop drawings shall be disapproved if not accompanied by proof that the foregoing has been complied with.

2.3 SAMPLES

- A. As requested by the Engineer.

PART 3 – EXECUTION

3.1 EQUIPMENT INSTALLATION

- A. Erect equipment in a neat and workmanlike manner; align, level and adjust, for satisfactory operation; install so that connecting and disconnecting of conduit and accessories can be made readily, and so that all parts are easily accessible for inspection, maintenance, repairs, and replacement.

3.2 MATERIALS AND PROPERTY PROTECTION

- A. The following is in addition to and supplementary to the General Conditions of the Contract.
 - 1. Follow manufacturer's recommendations for protection of equipment and materials during storage, construction and startup. Protect equipment outlets, pipe, and conduit openings with temporary plugs or caps.
 - 2. Contractor shall be responsible for protection of his tools, etc. at job site.

3.3 COORDINATION

- A. Where job conditions require reasonable changes in indicated locations or arrangements prior to roughing, make such changes without extra cost to Owner.
- B. Adjust work to avoid obstacles anticipated or encountered during and after the construction of the project.
- C. Items included under coordination shall be:
 - 1. Scheduling, proposed routing, critical dimensions, with all other trades prior to roughing and equipment installation.
 - 2. Power wiring, control wiring, and interlocks shall be coordinated with all other trades furnishing power consuming equipment prior to submission of wiring diagrams in applicable submittals.
 - 3. Final locations of major equipment such as switchboards, transformers, etc., and concrete slabs shall be determined in the field with prior approval of the Engineer or Owner's Representative.
 - 4. Contractor shall study and compare all Contract Drawings, Specifications, and other instructions, and shall at once report to the Engineer any error, inconsistency or omission which he may discover. Failure to do so shall not entitle the Contractor to make his own interpretations or ask for Change Orders later on.

3.4 WORKMANSHIP

- A. Complete electrical installation shall be made in a neat and workmanlike manner in conformance with best trade practice or modern electrical shops by competent, experienced mechanics, and to the full satisfaction and approval of the Engineer and Owner's Representatives.
 - 1. Remove and replace all work rejected as defective, non-operational or not in conformance with intent of this Contract.

3.5 DIMENSIONS, ELEVATIONS, AND LAYOUTS

- A. Verify dimensions and elevations shown or scaled on drawings by actual field measurements after building construction or alterations work has progressed to the point where such measurements may be taken.
 - 1. Advise Engineer in writing regarding those critical dimensions which must be held by other Trades as they perform their work prior to their commencing this portion of the work.
 - 2. Assume full responsibility for the accuracy of all work under the Contract and make corrections as required at no extra cost to the Owner.
 - 3. It shall be this Division's responsibility to coordinate with all other trades and separate equipment contracts regarding mechanical equipment layouts, space requirements, mounting details, "roughing-in" dimensions, and for items substituted for those specified herein to avoid conflict.
 - 4. Arrange for disassembling large pieces of equipment for entry into buildings as necessary to pass through available openings.
- B. Layouts

1. Layouts of feeders and wiring shown on drawings are diagrammatic, and shall be construed as such, intended to show scope of work and general arrangement.

3.6 CLEANING, POLISHING, AND PAINTING

- A. In addition to requirements of General Conditions:
 1. Remove labels, dirt, paint, grease, and stains from exposed devices, equipment, and fixtures provided under this Contract.
 2. Clean and polish same to present a first-class, workmanlike job ready and suitable for use by occupants.
 3. Vacuum clean equipment, including current conducting components and compartments, immediately before testing and immediately before putting equipment into service.
 4. "Touch-up" or fully paint with matching colors all marred, scratched or rusty surfaces of equipment installed.

3.7 TESTING BALANCING, REPORTS, ETC.

- A. During progress of installation and at the completion of the work, test complete systems as directed and specifically as follows:
 1. Demonstrate freedom from shorts and grounds.
 2. Take amperage and voltage readings as directed and record.
 3. Test all control systems.
 4. Provide testing of special equipment as specified elsewhere.
 5. Balance connected loads across phases at panels and load centers.
- B. Cooperate in testing equipment furnished by other Trades, including but not limited to:
 1. Checking motors for rotation.
 2. Running full load tests on all power consuming equipment.
 3. Coordinating and testing control wiring and interlocks.
- C. All the circuit breakers shall be factory tested.
- D. Measure ground resistance of separately derived systems, resistance at outlets and similar points.
- E. Provide written reports detailing the tests performed and results noted.
- F. Provide individual certificate of completion for all the systems from the supplier's or manufacturer's representative performing the final tests.

3.8 PROTECTION OF WORK DURING CONSTRUCTION

- A. Keep conduit fittings, boxes, raceways, cabinets, and enclosures closed to prevent entrance of foreign matter.
- B. The Contractor shall be fully responsible for his own materials and equipment whether or not they have been paid for by the Owner and if any such materials or equipment are stolen, lost, or damaged, they shall be replaced by the Contractor without any additional cost to the Owner. This includes the proper protection of all finished surfaces or equipment,

escutcheon plates, etc., against damage by paint, plaster, dirt, etc., until other trades have completed their work.

3.9 CIRCUIT NUMBERS

- A. Circuit numbers shown on the drawings are for reference and may be rearranged as required for load balancing purposes and duly recorded.
- B. The fixtures, devices, or equipment shown on a common circuit may not be rearranged to other circuits without written permission of the Engineer.
- C. If circuit numbers or connections are changed from those shown on the drawings for any reason, the changed items should be so noted on the "Project Record Documents".
- D. In any case, the circuits and numbers used shall be entered in the circuit directory of the respective panel.

3.10 IDENTIFICATION

- A. Acceptable Materials and Methods
 - 1. All transfer switches, panelboards, disconnect switches, magnetic contractors, motor starters, panels and control in unfinished areas shall be identified with engraved plastic "lamacoid" plates. Designations will be selected by the Owner or Engineer. Main switches shall also be marked with the service voltage, phase and wire.
 - 2. Mark similar items in finished areas only as directed.
 - 3. Label all feeders where they pass through pull boxes with permanent tags designating feeder number and destination.
 - 4. Provide complete typewritten circuit directories under transparent cover in all panels. Identify areas as directed by the Owner.
 - 5. Identify opposite termination of each empty conduit at both ends using tags as in "3" above.
 - 6. Phase identification where required may be accomplished with colored insulation, colored tape at each termination and junction point, or with printed adhesive-type wire markers or sleeves at each termination and junction point.
 - 7. Individual conductor identification where specified for communication, signal or alarm systems shall be accomplished with printed adhesive-type wire markers or sleeves at each termination and junction point. Insulation color may be used for conductor identification in these systems.
 - 8. For underground feeders, use marker tape.
- B. Unacceptable Materials and Methods
 - 1. Embossed plastic tape labels such as "Dymo-Marker" or similar will not be accepted or approved.
 - 2. Hand-written panel directories will not be accepted.
 - 3. All temporary pencil, felt-tip markers, or similar notions on the exposed surfaces of switchboards, panels or other enclosures shall be removed before final acceptance. Under no circumstances will these methods be accepted or approved in lieu of the methods specified in paragraph "IDENTIFICATION – Acceptable Materials and Methods" above.

3.11 EXCAVATION AND BACKFILLING

- A. Contractor shall include, unless directed otherwise, as a part of his Electrical Work, all excavation and backfilling required for his trade, both inside and outside of buildings. All excavation shall provide sufficient clearances for proper execution of the work. Banks of excavation shall be maintained in a safe and stable condition at all times, using piling if necessary. Methods and phasing of excavation and backfill must be approved by the Engineer.
- B. Open trenches shall be adequately protected to avoid injury to work, workmen, or public. All precautions, barricades and other requirements shall be as required by state or local laws or ordinances. Insofar as is possible, obstruction of roadways and sidewalks shall be kept to a minimum.
- C. In general, all excavations shall be backfilled to the original elevations of the ground, unless otherwise required or directed. 3" of fine sand bedding and 3" of fine sand backfill shall encompass underground feeders. Remaining backfill shall be free of rocks 3" or larger in diameter. No cinders or other corrosive material shall be used as backfill. In grass areas, compact in backfill 12" lifts. Under pavement, compact backfill in 6" lifts or as indicated. Seed grass areas as required.
- D. Care shall be taken to avoid any injury or damage to the work during backfilling.
- E. Excavation under footings shall be performed only by written permission from the Engineer prior to excavation under said footings.
- F. Percentage of maximum density requirements: Provide compaction to obtain at least 95 percent of maximum density (determined in accordance with ASTM D 1557) of same soil material compacted at optimum moisture content, for actual density of each layer of fill material in place.
- G. Moisture Control
 - 1. Maintain actual moisture content in soil material at time of compaction to within a range of 1 percent below and 3 percent above optimum moisture content of soil, as determined by moisture-density relation test.
 - 2. When soil materials are too dry for proper compaction, uniformly apply required amount of water to surface of fill layer in such a manner as to prevent free water appearing on surface during or after compaction operation.
 - 3. Remove and replace, or scarify and air dry, material that are too wet to permit compaction to specified percentage of maximum density.
- H. Restore the existing surface/construction to original condition and to match the surrounding.

3.12 EQUIPMENT FOUNDATIONS AND SUPPORTS

- A. The Contractor shall provide all concrete pads, steel supports, platforms, hangers, and carriers, required for the proper installation of his piping and equipment, except where specifically noted otherwise. Such work shall be pre-approved before actual installation.

This will also include housekeeping pads for electrical equipment, whether shown on drawings or not.

3.13 CUTTING AND PATCHING

- A. The Contractor shall be responsible for all cutting, patching, and restoration created because of his own work unless specifically stated otherwise.
- B. Unnecessary cutting and patching shall be avoided through proper planning of work, provision of conduit sleeves, and cooperation with other Contractors.
- C. In no case shall structural members be cut or notched unless written approval is given by the Engineer.
- D. All patching shall be done by workmen who are skilled in this line of work.

3.14 OPENINGS AND SLEEVES

- A. Openings, chases, and recesses shall be provided by the General Contractor. The Contractor shall coordinate sizes and locations of his required openings and furnish them to the General Contractor.
- B. Sleeves through foundation walls, masonry walls, and floor slabs shall be Schedule 80 PVC, at least two sizes larger than the conduit they serve. Provide waterstop flanges on sleeves through foundation walls. Pre-planned and pre-coordinated openings in interior foundation walls that are not part of below grade accessible/occupied spaces, may be provided in lieu of these sleeves.
- C. The Contractor shall install and maintain all sleeves for his conduits. Sleeve installation shall be timely so as not to interfere with the general job progress.
- D. Openings in hollow core slabs for hangers shall be drilled by the Contractor under the supervision of the General Contractor.

3.15 EXISTING SERVICES

- A. Active: When encountered in work, protect, brace and support existing active sewers, gas, electric, water, and other services where required for proper execution of work. If existing active series are encountered, that require relocation, make request in writing for determination. Do not prevent or disturb operation of active services that are to remain. Repair broken service at no cost to the Owner. Record on Contractor's job site drawings set.
- B. Inactive Services: When encountered in work, remove, cap, or unplug inactive services. Notify utility companies or other agencies having jurisdiction; protect or remove these services as directed. Record on "Project Record" drawings.
- C. Interruption of Services: Where work makes temporary shutdowns of services unavoidable, shutdown at night or at such times as approved by the Owner, which will cause least interference with established operating routine. Arrange to work continuously, including

overtime if required, to assure that services will be shut down only during time actually required to make necessary connections to existing work.

- D. Shutdown or interruption of existing services shall be as indicated and closely coordinated with the Owner.

END OF SECTION 16000

SECTION 16100 – BASIC MATERIALS AND METHODS

PART 1 – GENERAL

1.1 WORK UNITS

- A. Raceways.
- B. Conductors.
- C. Outlet, Junction, and Pull Boxes.
- D. Wiring Devices.
- E. Manual Transfer Switches.
- F. Equipment Enclosures.
- G. Box Pads.
- H. Supporting Devices.

1.2 RELATED WORK

- A. Section 16000 – General Requirements, Electrical.
- B. Section 16137 – Underground Conduit System.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Factory packaged products shall be delivered in the manufacturer's original containers.
- B. Transport and handle materials and equipment in such a manner as to prevent their damage.
- C. Arrange for delivery of materials and equipment during the hours of the day established by the Resident Project Representative or by the Owner.
- D. Have workmen available to receive and unload materials and equipment delivered to the site. Do not deliver, or have delivered, any materials and equipment to the site unless such forces are available.
- E. Neatly pile, store, and protect products in assigned or designated locations or where directed by Owner's Representative.
- F. Protect products subject to damage by temperature or other weather conditions.

1.4 CATALOG NUMBERS

- A. Catalog numbers are given for reference only. Use manufacturer's latest product in the series indicated in the specifications.

PART 2 – PRODUCTS

2.1 RACEWAYS, FITTINGS, AND ACCESSORIES

- A. Rigid Steel Conduit: UL listed, hot dipped galvanized on the outside and inside, as manufactured by
 1. Allied Tube & Conduit Corp.,
 2. Jones & Laughlin Steel Corp.,
 3. Robroy Industries, Inc.,
 4. Triangle PWC Inc.,
 5. Wheatland Tube Co.,
 6. Wheeling-Pittsburgh Steel Corp.
- B. Liquidtight Flexible Metal Conduit:
 1. Anaconda Metal Hose Div.'s Sealtite Type UA,
 2. Electri-Flex Co.'s Type LA Liquidtite,
 3. Flexi-Guard Inc.'s (OZ/Gedney) Type UAG,
 4. Universal Metal Hose Co.'s Universal Sealflex-U.
- C. Rigid Non-Metallic Raceways:
 1. Schedule 80 PVC Conduit: Carlon Mfg.
 2. PVC wireway: Carlon Mfg.
- D. Insulated Bushings, Plastic Bushings, Insulated Grounding Bushings: As manufactured by
 1. Crouse-Hinds Co.'s
 2. OZ/Gedney Co.,
 3. Thomas & Betts Corp.
- E. Connectors and Couplings:
 1. Couplings (For Rigid Conduit): Standard threaded couplings as provided by conduit manufacturer.
 2. Sealtite Connectors (For Liquidtite Flexible Metal Conduit):
 - a. Appleton Electric Co.'s STB Series,
 - b. Crouse-Hinds Co.'s LTB Series,
 - c. OZ/Gedney Co.'s 4Q-50-IT Series,
 - d. Thomas & Betts Corp.'s 5332 Series.
 3. Hazardous Location Flexible Couplings:
 - a. OZ/Gedney Co.'s ECLK or ECGJH.
- F. Conduit Bodies & Covers: Bodies – Hot Dipped Galvanized Steel, Covers – Gasketed, Zinc Pre-galvanized;
 1. Appleton Electric Co.'s Unilets,
 2. Crouse-Hinds Co.'s Condulets
 3. OZ/Gedney Co.'s Conduit Bodies,

- G. Expansion Fittings:
 - 1. Appleton-Electric Co.'s XJ,
 - 2. Crouse-Hinds Co.'s XJ,
 - 3. OZ/Gedney Co.'s AX.

- H. Expansion/Deflection Fittings:
 - 1. OZ/Gedney Co.'s Type DX,
 - 2. Crouse-Hinds Co.'s XD.
- I. Vertical Conductor Supports
 - 1. Kellem's Div. Harvey Hubbell Conduit Riser Grips,
 - 2. OZ/Gedney Co.'s Type M or Type R.

- J. Oxide Inhibiting Compound:
 - 1. Burndy Corp.'s Penetrox
 - 2. Ideal Industries Inc.'s Noalox,
 - 3. ITT Blackburn's CT-CONTAX,
 - 4. Thomas & Betts Corp.'s 21059.

- K. Fire Protective Seals:
 - 1. Type 1 (Silicone Foam):
 - a. Chase Technology Corp.'s CTC PR-855, or Dow Corning's Silicone RTV Foam.
 - 2. Type 2 (Epoxy Mix):
 - a. Hysol Div. Dexter Corp.'s Hyson Fire-Stop Compound.
 - 3. Type 3 (Retardant/Mineral Wool Stuffing):
 - a. Lenclean Inc.'s Fire Plug Pillow.
 - 4. Type 4 (Modular Frame):
 - a. Nelson Electric's Multi-Cable Transit.
 - 5. Type 5 (Modular Plug):
 - a. Nelson Electric's Multi-Plug.
 - 6. Type 6 (Expanding Plug):
 - a. OZ/Gedney Co.'s Type CFS, CFSI
 - b. Thunderline Corp.'s High Temperature Link-Seal.

- L. Non-Shrink Patching Mortar:
 - 1. Anti-Hydro Waterproofing Co.'s A-H Hydraulic Cement,
 - 2. Sonneborn-Contech's Sonopatch
 - 3. Standard Dry Wall Products' Thorite.

- M. Duct Seal:
 - 1. Appleton Electric Co.'s DUC Weatherproof Compound,
 - 2. Manville Corp.'s Duxseal,
 - 3. OZ/Gedney Co.'s DUX.

2.2 CONDUCTORS (600 VOLTS AND UNDER) AND ACCESSORIES

- A. Acceptable Manufacturer's for Insulated Conductors:
 - 1. American Insulated Wire Corp.,
 - 2. Anaconda Wire & Cable Co.,

3. General Cable Corp.
 4. General Electric Co.,
 5. ITT Royal,
 6. Rome Cable Corp.,
 7. Southwire Co.,
 8. Triangle PWC Inc.
- B. Date of Manufacture: No insulated conductor over one year old when delivered to the site will be acceptable.
- C. Conductors: Annealed uncoated copper or annealed coated copper in conformance with the applicable standards for the type of insulation to be applied on the conductor. Conductor sizes No. 12 AWG and larger shall be stranded.
- D. Insulation:
1. Type XHHW: Moisture and heat resistant cross-linked polyethylene insulation rated 600V conforming to U.L. requirements for type XHHW insulation (75° C Wet and 90° C Dry).
 2. Type THWN: Polyvinylchloride insulation rated 600V with nylon jacket conforming to U.L. requirements for Type THWN insulation (75°C).
 3. Type THHN: Polyvinylchloride insulation rated 600V with nylon jacket conforming to U.L. requirements for Type THHN insulation (90°).
 4. Instrument Cables: Twisted Shielded Pair, #16 AWG copper conductor, overall foil shield with copper drain, 300 Volt rated, PVC jacket, Belden or as approved by the instrument manufacturer.
- E. Splice Connectors
1. Spring Type:
 - a. Ideal Industries Inc.'s Wing Nuts or Wire Nuts,
 - b. 3M Co.'s Scotchlok Type Y, R, G, B,
 - c. Thomas & Betts Corp.'s Piggies.
 2. Indent Type with Insulating Jacket:
 - a. Ideal Industries Inc.'s Crimp Connectors
 - b. Thomas & Betts Corp.'s STA-KON.
 3. Indent Type (Uninsulated):
 - a. Burndy Corp.'s Hydent,
 - b. Thomas & Betts Corp.'s Compression Connectors.
- F. Terminals:
1. Burndy Corp.'s Nylon Insulated Terminals,
 2. Ideal Industries Inc.'s RN or SN Series,
 3. Thomas & Betts Corp.'s STA-KON Nylon Self-Insulated Terminals.
- G. Lugs:
1. Burndy Corp.'s Hylug YA, YA-L, YA-2LH,
 2. Ideal Industries Inc.'s SL Cable Connectors,
 3. Thomas & Betts Corp.'s 54930 Series, 54850 Series.
- H. Insulation Tapes:

1. Plastic Tape:
 - a. 3M Co.'s Scotch No. 88
 - b. Bishop/Tomic's No. 85
 - c. Plymouth Rubber Co.'s Premium CW.
 2. Rubber Tape:
 - a. 3M Co.'s Scotch No. 23
 - b. Bishop/Tomic's No. W-963,
 - c. Plymouth Rubber Co.'s Splicing Compound ASTM.
- I. Moisture Sealing Tape:
1. 3M Co.'s Scotch No. 2200, 2210,
 2. Bishop/Tomic's No. 4000T,
 3. Plymouth Rubber Co.'s Plyseal.
- J. Electrical Filler Tape:
1. 3M Co.'s Scotchfil,
 2. Bishop/Tomic's No. 125T,
 3. Plymouth Rubber Co.'s Slipknot Filler Tape.
- K. Color Coding Tape:
1. 3M Co.'s Scotch No. 35,
 2. Bishop/Tomic's No. 112T
 3. Plymouth Rubber Co.'s Slipknot 37.
- L. Heat Shrinkable Splices Complete with Connectors:
1. Electronized Chemicals Corp.'s Insultite,
 2. Raychem Corp.'s Thermofit Type WCS,
 3. Thomas & Betts Corp.'s SHRINK-KON Insulators.
- M. Tags:
1. Premarked Self-Adhesive:
 - a. W.H. Brady Co.'s B-940,
 - b. Ideal Industries Inc.'s Mylar/Cloth wire markers,
 - c. Markwik Corp.'s Permanent Wire Markers,
 - d. Thomas & Betts Co. E-Z Code WSL self-laminating.
 2. Embossed Aluminum: Standard stamped or embossed aluminum tags, minimum $\frac{3}{4}$ " wide, length as required by inscription, as manufactured by
 - a. Tech Products, Inc.,
 - b. Seton Name Plate Corp.

2.3 OUTLET, JUNCTION, PULL BOXES AND TERMINAL BOXES

- A. Galvanized Steel Boxes For Concealed Work: Standard type galvanized steel boxes and device covers as manufactured by
1. Appleton Electric Co.,
 2. Raco Inc.,
 3. Steel City Electrical Products.

- B. Galvanized Steel Junction and Pull Boxes For Exposed Work: Code gage, galvanized steel screw cover boxes as manufactured by
 - 1. Gray Metal Products Inc.'s
 - 2. Hoffman Engineering Co.,
 - 3. Hammond Co.
- C. Device Boxes: Malleable iron with galvanized finish for use with steel conduit, with threaded hubs and covers with gaskets and stainless steel screw fasteners as manufactured by
 - 1. Appleton Electric Co.,
 - 2. Crouse-Hinds Co.,
 - 3. OZ/Gedney Co.,
- D. Threaded Type Boxes For Exposed Work:
 - 1. Appleton Electric Co.,
 - 2. Crouse-Hinds Co.,
 - 3. OZ/Gedney Co.,
- E. Class I, Division 1 or 2, Groups C & D hazardous locations: Use listed and approved materials.

2.4 WIRING DEVICES

- A. Receptacles:
 - 1. Duplex Receptacle, NEMA 5-20R (20A, 125V, 2P, 3W) specification grade as manufactured by one of the following: Bryant, Crouse-Hinds, General Electric, Hubbell, Leviton.
 - 2. Ground Fault Interrupter Duplex Receptacle Rated 20A (NEMA 5-20R), Circuit-Ampacity 20A: Bryant's GFR52FT, Crouse-Hinds, General Electric, Leviton.
 - 3. Class I, Division 1 or 2, Groups C & D hazardous locations: Use listed and approved devices. Refer to plans for additional specifications.
 - 4. Provide receptacles in weatherproof enclosure, with while-in-use covers, where indicated on the drawings.
- B. Snap Switches: 20 A, 120/277-V ac, Heavy-duty, quiet type.
- C. Device Covers:
 - 1. Outdoors: Weatherproof, raintight.
 - 2. While-In-Use Covers: Taymac Corp or approved equal.

2.5 MANUAL TRANSFER SWITCHES

- A. Type HD, Heavy Duty, Double Throw, 240V ac, 100A: UL 98 and NEMA KS1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position. Square D class 3110 or equal.

2.6 EQUIPMENT ENCLOSURES

- A. Public works style, NEMA 4x, 0.125 thick Aluminum alloy type 5052-H32, equipped with (2) adjustable "C" mounting channels on both side and back walls, double flanged door, pad

lockable stainless steel door handle, sealed seams, open bottom design for use with box pad, size as indicated on plans, as manufactured by; APX Enclosures Inc, Hennessey Products, Flextronics – Chatham Technologies, with the following options;

1. Back panel.
2. Factory Insulation.
3. 500 W heater.
4. Door activated fluorescent light.

2.7 BOXPADS

- A. Polymer concrete combining concrete with selectively-graded aggregates and polymer resin, fiber glassed reinforced, high strength, lightweight, ASTM D-2444, ASTM-570, designed to support and secure the intended equipment, as manufactured by Hubbell-Quazite, Armorcast Products Company, CDR Systems Corporation.

2.8 SUPPORTING DEVICES

- A. "C" Beam Clamps:
1. For 1" Conduit Maximum:
 - a. Caddy Fastener Div./Erico Products Inc.'s BC-8P and BC-8PSM Series,
 - b. HIT Spring Steel Fasteners Inc.'s CH Series.
 2. For 3" Conduit Maximum:
 - a. Appleton Electric Co.'s BH-500 Series beam clamp with H50W/B Series hangers,
 - b. Kindorf Elec. Prod. Div./Midland Ross Corp. 500 Series beam clamp with 6HO-B Series Hanger,
 - c. OZ/Gedney Co.'s IS-500 Series beam clamp with H-OWB Series hanger.
 3. For 4" Conduit Maximum:
 - a. Kindorf Elec. Prod. Div./Midland Ross Corp. E-231 beam clamp and E-234 anchor clip and C-149 series lay-in hanger,
 - b. Unistrut Corp.'s P2676 beam clamp and P-1659A Series anchor clip with J1205 Series lay in hanger.
 4. For Threaded Rods (100 lbs. load max.):
 - a. Caddy Fastener Div./Erico Products Inc.'s BC-4A.
 - b. HIT Spring Steel Fasteners Inc.'s master clamp MC.
 5. For Threaded Rods (200 lbs. load max):
 - a. Appleton Electric Co.'s BH-500 Series, Kindorf Elec. Prod. Div./Midland Ross Corp. 500 Series,
 - b. OZ/Gedney Co.'s IS-500 Series.
 6. For Threaded Rods (300 lbs load max).
 - a. Kindorf Elec. Prod. Div./Midland Ross Corp. E-231 beam clamp and E-234 anchor clip,
 - b. Unistrut Corp.'s P2676 beam clamp and P-1659A Series anchor clip.
- B. Fastening Fittings for Wood and Existing Masonry:
1. Kindorf Elec. Prod. Div./Midland Ross Corp. E-243, E-244, E-245. E-170.
 2. Unistrut Corp.'s P2682.
 3. Versabar Corp's VX-4310, VX-2308, VX-4308, VX-4309.

- C. Pipe Straps: Two hole steel conduit straps with Galv-Krom finish;
 - 1. Kindorf Elec. Prod. Div./Midland Ross Corp. C-144 or C-280 Series.
- D. Pipe Clamps: One hole malleable iron type clamps:
 - 1. Kindorf Elec. Prod. Div./Midland Ross Corp. HS-400,
 - 2. OZ/Gedney Co.'s 14-50 Series.
- E. Channel Support System and Accessories: 12 gage hot dipped galvanized steel channel and accessories as manufactured by
 - 1. B-Line Division-The Binkley Co.'s, B-22 (1-5/8" x 1 5/8"), B-12 (1-5/8" x 2 7/16"), B-11 (1-5/8" x 3-1/4"),
 - 2. Kindorf Elec. Prod. Div./Midland Ross Corp., B-900 (1-1/2" x 1-1/2"), B-901 (1-1/2" x 1-7/8"), B-902 (1-1/2" x 3"),
 - 3. Unistrut Corp.'s P-3000 (1-3/8" x 1-5/8"), P-5500 (1-5/8" x 2-7/16"), P-5500 (1-5/8" x 3-1/4"),
 - 4. Versabar Corp.'s; VA-1 (1-5/8" x 1-5/8"), VA-3 (1-5/8" x 2-1/2").

Note: Use channel supports of sizes adequate for the applied loads, or as indicated on drawings.

PART 3 – EXECUTION

3.1 RACEWAY INSTALLATION

- A. Each raceway shall enclose one circuit unless otherwise indicated on the drawings.
- B. Do not change number or raceways to less than the number indicated on the drawings.
- C. Install raceways for telecommunication outlets as noted.
- D. Raceway Types and Locations:
 - 1. Underground: Refer to Section 16137.
 - 2. Outdoors, above grade: Rigid Steel Conduit.
 - 3. Inside: Rigid Steel Conduit, except for the grounding electrode conductor – PVC may be used.
 - 4. Liquidtight Flexible Metal Conduit, except for the grounding electrode conductor – PVC may be used. Liquidtight Flexible Metal Conduit: Install equipment grounding conductor in 1-1/2" and larger sizes. Bond at each box or equipment to which conduit is connected. Use 1 to 2 feet of liquidtight flexible metal conduit for final conduit connection to; motors of vibrating equipment.
 - 5. Class I, Division 1 or 2, Groups C & D hazardous locations: Use listed and approved devices. Refer to plans for additional specifications.
- E. Conduit Size: Size as indicated or as required per the NEC, whichever is larger. Inside; use 3/4" minimum, Underground; use 1" minimum.
- F. Materials in Conduit Runs: All conduits in a conduit run shall be of the same material. A combination of steel and aluminum conduit or fittings will not be permitted.
- G. Conduit Ends:

1. Use 2 locknuts and insulated bushing on end of each conduit entering cabinet or galvanized box (plastic bushing may be used on ½" and ¾" conduit).
 2. Use insulated grounding bushings on the ends of conduits which are not directly connected to the enclosure (such as stub-ups under equipment, etc.), where concentric knockouts are used. Bond between bushings and enclosure with equipment grounding conductor.
- H. Expansion Joints: Use expansion joint fittings where conduits cross expansion joints and in conduit runs exceeding 150 feet. Use deflection fittings where the expansion joint moves in more than one plane. Use listed expansion/deflection fittings where required underground.
- I. Conduit Installed Exposed:
1. Install vertical runs perpendicular to the floor.
 2. Install runs on the ceiling perpendicular or parallel to the walls.
 3. Install horizontal runs parallel to the floor.
- J. Conduit Installed Underground:
1. Refer to Section 16137.

3.2 CONDUCTOR INSTALLATION

- A. Types and Use:
1. Use Types XHHW, THWN, or THWN/THHN (except where special type insulation is required).
- B. Circuiting: Do not change, group or combine circuits other than as indicated on the drawings except as permitted when reusing existing raceways.
- C. Conductor Size: Install conductors of size shown on drawings. Where size is not indicated for branch circuit wiring, the minimum size allowed is No. 12 AWG. Where size is not indicated for control wiring, the minimum size allowed is No. 14 AWG.
- D. Splices:
1. Dry Locations:
 - a. For conductors No. 8 or smaller, use spring type pressure connectors or indent type pressure connectors with insulating jackets.
 - b. For conductors No. 6 AWG or larger, use uninsulated indent type pressure connectors. Fill indentions with electrical filler tape and apply insulation tape to provide insulation equivalent to that of the conductor.
 2. Damp Locations: As specified for dry locations, except apply moisture sealing tape over the entire insulated connection.
 3. Wet Locations: Use uninsulated indent type pressure connectors and insulate with resin splice kits or heat shrinkable splices.
 4. Splices underground, within handholes and manholes shall not be acceptable.
- E. Terminations:
1. For conductors No. 10 AWG or smaller, use terminals for:
 - a. Connecting control and signal wiring to terminal strips.
 - b. Connecting wire to equipment designed for use with terminals.

2. For conductors No. 8 AWG or larger, use lugs for:
 - a. Connecting cables to flat bus bars.
 - b. Connecting cables to equipment designed for use with lugs.
 3. For conductor sizes larger than terminal capacity on equipment, reduce the larger conductor to the maximum conductor size that terminal can accommodate. Reduced section shall not be longer than 1 foot. Use bolted clamp type or pressure connectors suitable for reducing connection.
- F. Color Code For Branch Circuits: Install color coded insulated conductors for branch circuits as follows: 120/208/240 Volt Circuits
- 2 wire circuit – white*, black
- 3 wire circuit - white*, black, red.
- 4 wire circuit – white*, black, red, blue.
- * White to be used only as neutral, if neutral not required, use black, red, or black, red, blue for phase to phase circuits.
- 277/480 Volt Circuits
- 2 wire circuit – natural gray**, brown
- 3 wire circuit – natural gray**, brown, yellow.
- 4 wire circuit – natural gray**, brown, yellow, orange.
- ** Natural gray to be used only as neutral, if neutral not required, use brown, yellow or brown, yellow, orange for phase to phase circuits.
- G. Color Code and Identification of Feeders:
1. Install color coding tapes on feeders at terminations and at 1'- 0" intervals in gutters, pullboxes and manholes. Color code as follows: 120/208/240 Volt Circuits
- 2 wire circuit – white*, black
- 3 wire circuit – white*, black, red.
- 4 wire circuit – white*, black, red, blue.
- * White to be used only as neutral, if neutral not required, use black, red or black, red, blue for phase to phase circuits.
- 277/480 Volt Circuits
- 2 wire circuit – natural gray**, brown
- 3 wire circuit – natural gray**, brown, yellow.
- 4 wire circuit – natural gray**, brown, yellow, orange.
- ** Natural gray to be used only as neutral, if neutral not required, use brown, yellow or brown, yellow, orange for phase to phase circuits.
2. Identify interior feeders by feeder number and size in pullboxes and gutters with pre-marked self-adhesive tags.
 3. Identify exterior feeders by feeder number and size in manholes with embossed aluminum tags and attach tags to cables with non-ferrous metal wire.
 4. Install tags to that they are easily read without moving adjacent conductor or requiring removal of arc proofing tapes.
- H. Color Code For Control Circuits:

1st conductor - black
2nd conductor – white (neutral only, if required)
3rd conductor – green (grounding only, if required)
4th conductor- red
5th conductor – blue
6th conductor – orange
7th, etc. – In accordance with ICEA/NEMA WC-30 “Color Coding of Wires and Cables”
Other identification methods may be used, as approved.

- I. Color Code For Communication And Signaling Circuits: In accordance with ICEA/NEMA WC-30 “Color Coding of Wires and Cables”. Other identification methods may be used, as approved or as indicated.

3.3 OUTLET, JUNCTION AND PULLBOX INSTALLATION

- A. Boxes For Exposed Conduit System:
 - 1. Unless noted otherwise, use hot dipped galvanized steel threaded type boxes for all work.
 - 2. Unless noted otherwise, boxes mounted outdoors may be corrosion resistant non-metallic.
- B. Mounting Position: Install boxes for receptacles so that long axis of the face plate will be vertical.

3.4 WIRING DEVICE INSTALLATION

- A. General:
 - 1. Receptacles:
 - a. Install receptacles with ground pole in the down position.
 - b. Weatherproof Covers: Install weatherproof covers with gaskets on wiring devices located outdoors and in damp and wet locations.
 - c. Test GFI devices. Replace malfunctioning components.

3.5 MANUAL TRASFER SWITCHES

- A. Mount within the equipment enclosure with required clearances.
- B. Make line connection and connections to the receptacle.

3.6 EQUIPMENT ENCLOSRE INSTALLATION

- A. Secure by bolting to box pad. Assure that enclosure is plum. Provide clear working spaces around enclosure.

3.7 BOX PAD INSTALLATION

- A. Install in accordance with the manufactures written instructions. Pad shall be installed at the depth such that the pad extends 3” above finished grade. Smooth and finish grade around enclosure for safe approach.

3.8 SUPPORTING DEVICE INSTALLATION

A. Attachment of Conduit System:

1. Wood Construction: Attach conduit to wood construction by means of pipe straps or pipe clamps and wood screws or lag bolts.
2. Masonry Construction: Attach conduit to masonry construction by means of pipe straps or pipe clamps and masonry anchorage devices.
3. Steel Beams: Attach conduit to steel beams by means of "C" beam clamps and hangers.
4. Multiple Parallel Conduit Runs: Use channel support system.
5. Conduit Above Suspended Ceiling: Do not rest conduit directly on runner bars, T-bars, etc. Support conduit from ceiling supports or from construction above suspended ceiling.

3.9 MAINTAINING FIRE RESISTANCE: (REFER ALSO TO SECTION 16000)

A. New Construction: Conduit and equipment shall be firestopped to prevent the passage of flame, smoke fumes and hot gases. Use the following methods of firestopping to suit job conditions:

1. Integrate conduit or equipment directly in cast-in-place concrete or unit masonry.
2. Integrate sleeves in cast-in-place concrete or unit masonry. Install conduits through sleeves and fill annular space with Type 1, 2, 5 or 6 fire protective seals.
3. Integrate Type 4 fire protective seal in cast-in-place concrete or unit masonry.
4. Where conduit or equipment passes through larger pre-constructed openings in floors and walls, seal around the conduit or equipment with Type 3 fire protective seal or non-shrink patching mortar.

3.10 PAINTING

A. Paint exposed raceways, fittings, pull boxes, junction boxes, etc., installed in finished spaces:

1. Painted or Primed Surface: Paint with 2 coats of paint to match color of adjacent surfaces.
2. Galvanized or aluminum Surface: Paint with one coat of primer conforming to Federal Specification TT-P-641 (zinc dust, zinc oxide for galvanized surfaces), TT-P-645 (zinc chromate for aluminum or steel surfaces) followed by 2 coats of paint to match color of adjacent surface.
3. Provide PVC patch as required for PVC coated materials.

END OF SECTION 16100

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SECTION 16137 – UNDERGROUND CONDUIT SYSTEM

PART 1 – GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. General Requirements, Electrical: Section 16000.
- B. Basic Materials & Methods: Section 16100.

1.2 SUBMITTALS

- A. Product Data: Catalog sheets, specifications and installation instructions.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Rigid Steel Conduit: Per Section 16100.
- B. Rigid Nonmetallic Conduit And Fittings: Per Section 16100
- C. Conduit Spacers and Levelers: Commercially manufactured type to suit conduit, installation and spacing requirements.
- D. Duct Seal: Appleton Electric Co.'s DUC Weatherproof Compound, Manville Corp.'s Duxseal, OZ/Gedney Co.'s DUX, or Thomas & Betts Corp.'s DX.
- E. Drag Line: Minimum 1/8 inch polypropylene monofilament utility rope; American Synthetic Ropes' Flotorope, Greenlee Tool Co.'s 2 ply Rope 431, or Thomas Industries/Jet Line Products' Rope 232.
- F. Thru Wall Sealing Bushings:
 - 1. For Walls Which Have or Will Have Membrane Waterproofing:
 - a. Cast-In-Place Installations: OS/Gedney Co.'s Type FSK thruwall seal and Type FSKA membrane clamp adapter.
 - b. Core Drilled or Sleeved Installations: OZ/Gedney Co.'s Type CSM and Type CSMC with membrane clamp adapter.
 - 2. For Walls Which Will Not Have Membrane Waterproofing:
 - a. Cast-In-Place Installations: OZ/Gedney Co.'s Type FSK.
 - b. Core Drilled or Sleeved Installations: OZ/Gedney Co.'s Type CSM, or Thunderline Corp.'s Link-Seal.
 - 3. Insulated Grounding Bushings: Appleton Electric's Co.'s GIB-50 Series, Crouse Hinds GLL series, OZ/Gedney Co.'s IBC-50L Series, Raco Inc.'s 1212 Series, or Thomas & Betts Corp.'s 3870 or BG Series.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Before installing any Work, lay out the proposed course for the conduits.

3.2 INSTALLATION

- A. Spacing:
1. Arrangement for Power and Signal Service: Separate power system conduits from signal system conduits with minimum of 12 inches of earth.
- B. Depth:
1. Existing Grade To Remain: Unless otherwise indicated or directed, install conduit more than 24 inches below the existing finished grade.
 2. Existing Grade to Be Altered: Unless otherwise indicated or directed, install conduit more than 24 inches below the existing grade where the finished grade is to be higher than existing grade. Where the finished grade is to be lower than the existing grade, install conduit more than 24 inches below finished grade.
 3. Under Roads and Parking Lots:
 - a. Rigid Steel Conduit: Unless otherwise indicated or directed, install Rigid Steel conduit more than 24 inches below top surface of roads and parking lots.
 - b. Rigid Nonmetallic Conduit: Unless otherwise indicated or directed, install Rigid Nonmetallic Conduit more than 24 inches below top surface of roads and parking lots.
 4. Crossing Obstructions: Use Rigid Steel conduit where top of conduit system is less than 18 inches below finished grade when crossing obstructions (heating tunnels, etc.).
 5. In Rock:
 - a. Unless otherwise indicated on the drawings, install Rigid Steel conduit or Rigid Nonmetallic Conduit at depths previously specified. Backfill with suitable material in accordance with SECTION 16000 – GENERAL REQUIREMENTS, ELECTRICAL.
 - b. Where conduit is indicated to be installed at lesser depths, use Rigid Steel conduit. Cover conduit with minimum 2 inches of concrete. In exposed rock area fill trench with concrete to surface level of rock. Where rock is not exposed, complete backfill in accordance with SECTION 1600 – GENERAL REQUIREMENTS, ELECTRICAL.
- C. Pitch:
1. Pitch conduit away from buildings.
 2. Pitch conduit away from building a minimum of 12 inches per 100 feet. On runs where it is impossible to maintain the grade all one way, grade from center so that conduits pitch both directions away from building.
- D. Jacking Conduits: Rigid Steel Conduit may be jacked under roads, parking lots, etc. Submit jacking details for approval.

- E. Conduits Entering Buildings:
 - 1. Seal conduit entrances into building wall watertight. Exception: Seal is not required in below grade foundation walls associated with slab on grade construction.
 - 2. Install insulated grounding bushing on conduit entrance stub up associated with slab on grade construction.
 - 3. Install insulated grounding bushing, and 2 locknuts on conduit where conduit is terminated in cabinet, junction or pull box.
- F. Cleaning Conduits: Take precautions to prevent foreign matter from entering conduits during installation. After installation clean conduits with tools designed for the purpose.
- G. Conduit for Future Use (Spare Conduit and Empty Conduit): Demonstrate to the Engineer that conduits installed for future use are clear of obstructions (draw mandrel $\frac{1}{2}$ inch less in diameter than conduit). Install a drag line in each conduit.
- H. Sealing Ends of Conduits:
 - 1. Occupied Conduit: Seal ends of conduits to be used for Work of this contract until cables are to be installed. After cable installation, seal conduits at building entrances. Seal with duct seal.
 - 2. Conduits For Future Use: Seal the ends of spare and empty conduits at building entrances. Seal with plastic plugs.

3.3 CONDUIT SCHEDULE – TYPES AND USE

- A. Rigid Steel Conduit: Install in all locations unless otherwise specified or indicated on the drawings.
- B. Rigid Nonmetallic Conduit: Use for underground electric service laterals and well pump circuits.

END OF SECTION 16137

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SECTION 16289 – TRANSIENT VOLTAGE SUPPRESSION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes Field-mounted TVSS (also referred to as Surge Protective Devices SPD's) for low-voltage (120 to 480V) power distribution equipment.

1.3 DEFINITIONS

- A. TVSS: Transient voltage surge suppressor(s), both singular and plural; also, transient voltage surge suppression with Surge Protective Devices.
- B. SPD: Surge Protective Devices SPD's. Maybe be used interchangeably with TVSS.

1.4 SUBMITTALS

- A. Section 01330 – Submittal Procedures: Procedures for submittals.
 - 1. Product Data: For each type of product indicated. Include rated capacities, operating weights, electrical characteristics, furnished specialties, and accessories.
 - 2. Include suggested over-current protective device ratings and requirements.
 - 3. Warranties: Provide certificate warranty.
- B. Section 01780 – Closeout Submittals: Procedures for closeout submittals.
 - 1. Operation and Maintenance Data: For TVSS devices to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, by a testing agency, and marked for intended location and application.
- B. Comply with IEEE C62.41.2 and test devices according to IEEE C62.45.
- C. Comply with NEMA LS 1.
- D. Comply with NFPA 70.

1.6 COORDINATION

- A. Coordinate location of field-mounted TVSS devices to allow adequate clearances for maintenance.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of surge suppressors that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 20 years, from date of Substantial Completion.
 - 2. Warranty type: Free replacement.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Manufacturer: Subject to compliance with requirements, Eaton-Innovative Technologies, Inc. or equal.
- B. Surge Protection Devices:
 - 1. General: All mode protection, NEMA 4 enclosure.
 - 2. At Transfer Switches: 80kA per phase, 40 kA per mode, model PTX080-D with integral fused disconnect or approved equal.
 - 3. At panelboards: 80kA per phase, 40 kA per mode, model PTX080 or approved equal.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install TVSS devices readily adjacent to the equipment it is intended to protect.
 - 1. Conductor lead length shall not exceed manufacturer's specifications.
 - 2. Provide a circuit breaker, rating as recommended by the TVSS manufacturer, as a dedicated disconnecting mean for TVSS unless otherwise indicated.
 - 3. After installing TVSS devices but before electrical circuitry has been energized, test for compliance with requirements. Assure led phase indication.
 - 4. Complete startup checks according to manufacturer's written instructions.

END OF SECTION 16289

SECTION 16452 – GROUNDING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes grounding of electrical systems and equipment and basic requirements for grounding for protection of life, equipment, circuits, and systems. Grounding requirements specified in this Section may be supplemented in other Sections of these Specifications.

1.3 QUALITY ASSURANCE

- A. Comply with NFPA 70.
- B. Comply with UL 467.
- C. Listing and Labeling: Provide products specified in this Section that are listed and labeled.
 - 1. The Terms “Listed” and “Labeled”: As defined in the National Electrical Code, Article 100.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Chance: A.B. Chance Co.
 - 2. Erico Inc.; Electrical Products Group.
 - 3. Heary Brothers Lightning Protection Co.
 - 4. Ideal Industries, Inc.
 - 5. ILSCO.
 - 6. Kearney.
 - 7. Lyncole XIT Grounding.
 - 8. O-Z/Gedney Co.
 - 9. Racor, Inc.
 - 10. Thomas & Betts, Electrical.
 - 11. Utilco Co.

2.2 GROUNDING AND BONDING PRODUCTS

- A. Governing Requirements: Where types, sizes, ratings, and quantities indicated are in excess of National Electrical Code (NEC) requirements, the more stringent requirements and the greater size, rating, and quantity indications govern.

2.3 WIRE AND CABLE GROUNDING CONDUCTORS

- A. Comply with Division 16 Section "Basic Materials and Methods." Conform to NEC Table 8, except as otherwise indicated, for conductor properties, including stranding.
- A. Equipment Grounding Conductors: Insulated with green color insulation.
- C. Grounding-Electrode Conductors: Stranded cable.
- D. Underground conductors: Bare, tinned, stranded, except as otherwise indicated.
- E. Bare Copper Conductors: Conform to the following:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Assembly of Stranded Conductors: ASTM B 8.
 - 3. Tinned Conductors: ASTM B33.

2.4 MISCELLANEOUS CONDUCTORS

- A. Braided Bonding Jumpers: Copper tape, braided No. 30 AWG bare copper wire, terminated with copper ferrules.
- B. Bonding Straps: Soft copper, 0.05 inch thick and 2 inches wide, except as indicated.

2.5 CONNECTOR PRODUCTS

- A. Pressure Connectors: High-conductivity-plated units.
- B. Bolted Clamps: Heavy-duty type.
- C. Exothermic-Welded Connections: Provided in kit form and selected per manufacturer's written instructions for specific types, sizes, and combinations of conductors and connected items.

2.6 GROUNDING ELECTRODES AND TEST WELLS

- A. Grounding Rods: Copper-clad steel, size ¾ inch by 120 inches unless noted otherwise. Provide Sectional type, copper-clad steel rods for longer lengths as indicated or as required to obtain specified resistance to ground.
- B. Test Wells: Fabricate from 15-inch long, square-cut sections of 8-inch diameter, Schedule 80, PVC pipe.

PART 3 – EXECUTION

3.1 APPLICATION

- A. Equipment Grounding Conductors: Comply with NEC Article 250 for types, sizes, and quantities of equipment grounding conductors, except where specific types, larger sizes, or more conductors than required by NEC are indicated.
 - 1. Install equipment grounding conductor with circuit conductors in all raceways and cables.
- B. Separately Derived Systems: Where NEC requires grounding, ground according to NEC Paragraph 250-26.
- C. Lightning Protection Surge Arrestors: Bond directly to equipment ground conductor, grounding electrode conductors and piping system. Use #8 AWG minimum bonding conductor.
- D. Water Piping: Bond to water piping whether shown on plan or not. Conductor size shall be the same size as the grounding electrode conductor.

3.1 INSTALLATION

- A. General: Ground electrical systems and equipment according to NEC requirements, except where Drawings or Specifications exceed NEC requirements.
- A. Grounding Rods: Locate minimum of 1-rod length from each other and at least the same distance from any other grounding electrode.
 - 1. Drive until tops are 2 inches below the finish floor or final grade, except as otherwise indicated.
 - 2. Interconnect with grounding electrode conductors. Use exothermic welds, except at test wells and as otherwise indicated. Make three connections without damaging copper coating or exposing steel.
- C. Grounding Conductors: Route along the shortest and straightest path possible, except as otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- D. Unless noted otherwise, install ground electrode conductors in raceways.

3.3 CONNECTIONS

- A. General: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to assure high conductivity and to make contact points closer in order of galvanic series.
 - 2. Make connections with clean, bare metal at points of contact.
 - 3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
 - 4. Make aluminum-to-galvanized steel connections with tin-plated copper jumpers and mechanical clamps.
 - 5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

- B. Exothermic-Welded Connections: Use, unless noted otherwise, for all ground rod connections. Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
- C. Equipment Grounding-Wire Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.
- D. Noncontact Metal Raceway Terminations: Where metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushing with bare grounding conductor to grounding bus or terminal in housing. Bond electrically noncontinuous conduits at both entrances and exits with grounding bushings and bare grounding conductors, except as otherwise indicated.
- E. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. Where these requirements are not available, use those specified in UL 486A and UL 486B.
- F. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by manufacturer of connectors. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.
- G. Moisture Protection: Where insulated grounding conductors are connected to grounding rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

3.4 FIELD QUALITY CONTROL

- A. Tests: Subject to completed grounding system to a megger test at each location where a maximum ground resistance level is specified, at service disconnect enclosure grounding terminal, and at ground test wells. Measure ground resistance not less than 2 full days after the last trace of precipitation, and without the soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance. Perform tests by the 2-point method according to IEEE 81.
- B. Maximum grounding to resistance values are as follows:
 - 1. Equipment Rated 500kVA and Less 10 ohms.
 - 2. Equipment Rated 500 to 1000 kVA: 5ohms.
 - 3. Equipment Rated More than 1000 kVA: 3 ohms.
 - 4. Pad-Mounted Equipment: 5 ohms.
 - 5. Or where less resistance is required by the serving utility.

- C. Excessive Ground Resistance: Where resistance to ground exceeds specified values, notify Owner promptly and include recommendations to reduce ground resistance and to accomplish recommended work.
- D. Report: Prepare test reports, certified by the testing organization, of ground resistance at each test location. Include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

END OF SECTION 16452

