COMMITTEE ON WAYS AND MEANS

1. Invocation – Councilmember Seekings

2. Approval of Minutes:
   December 21, 2021

3. Bids and Purchases

4. Stormwater Management: Approval of Concord Street Pump Station UpFit Construction Manager at Risk (CMAR) services contract with Black & Veatch Corporation in the amount of $1,699,540 for design services, project implementation plan, project and/or program management, grant funding assistance, permitting research, permitting services, design and construction administrative services, CMAR representative services, to update and rehabilitate the Concord Street Pump Station. Approval of this contract will obligate $1,699,540 of the $5,996,000 project budget. The funding source for this project is the Drainage Fund.

5. Stormwater Management: Approval of Spring-Fishburne Drainage Improvements Phase 5 - Pump Procurement contract with Xylem Water Solutions in the amount of $5,959,684 for the supply of three variable speed axial or mixed flow vertical column pumps with diesel engine drives (120,000 gpm) for the future pump station as part of the Spring-Fishburne Phase 5 project. With the approval of the project budget, Staff is authorized to award and/or amend contracts $40,000 or less, to the extent project contingency funds exist in the Council Approved Budget. Approval of this procurement contract will institute a project budget of $38,452,663 of which $5,959,684 will be obligated by this contract. The funding sources for this project are: King St. Gateway TIF ($26,003,011) and the South Carolina Transportation Infrastructure Bank ($12,449,652).

6. Stormwater Management: Approval of Spring-Fishburne US17 Phase 5 Fee Amendment #22 with Davis & Floyd in the amount of $1,456,700 for pre-construction services to support bidding and awarding of contract of the pump station superstructure, permitting, code review and design updates. Approval of Fee Amendment #22 will increase the Phase 5 portion of the professional services contract by $1,456,700 (from $337,842 to $1,794,542). The funding sources for this project are King Street Gateway TIF ($26,003,011) and South Carolina Transportation Infrastructure Bank ($12,449,652).

7. Police Department: Approval of an MOU between CPD and Beaufort County Sheriff’s Office and other partnering agencies to share in the application and use of Cellebrite Premium Extraction Software. There is no match required for FY22 use.
8. Police Department: Approval to accept an award for the FFY21 Bureau of Justice Assistance Grant Comprehensive Opioid, Stimulant, and Substance Abuse Site-based Program in the amount of $900,000 to be used to fund a Project Coordinator, two Peer Support Specialists and software to support overdose follow-up. There is no match required for this grant. Per CPD, the estimated annual cost of the program after conclusion of the grant, if continued, would be $285,000.

9. The Committee on Real Estate (Meeting was held on Monday, January 10, 2022 at 3:30 p.m., Conference Call: 1-929-205-6099; Access Code: 835 678 884)

a. Request approval of an ordinance authorizing the Mayor to execute a First Amendment to Option to Lease by and between the City of Charleston and The Lowline Housing, L.P.

b. Please consider the following annexations:

   (i) 2216 S. Dallerton Circle (0.26 acre) (TMS# 310-07-00-044), West Ashley, (District 11). The property is owned by Danielle D. Cerasi.

   (ii) 1506 N. Edgewater Drive (1.59 acre) (TMS# 349-09-00-026), West Ashley, (District 11). The property is owned by Ellison C. and Jeanne R. Livingston.

   (iii) 30, 32, and 34 Wedgepark Road, 43 and 49 Lolandra Avenue (0.99 acre) (TMS# 418-13-00-254 through 256, 260, and 262), West Ashley, (District 3). The properties are owned by Glory Holdings, LLC.

   (iv) 2319 Lazy River Drive (0.62 acre) (TMS# 310-14-00-014), West Ashley, (District 11). The property is owned by Carl E. Seel, Sr. and Jean B. Seel.

In accordance with the Americans with Disabilities Act, people who need alternative formats, ASL (American Sign Language) Interpretation or other accommodation please contact Janet Schumacher at (843) 577-1389 or email to schumacherj@charleston-sc.gov three business days prior to the meeting.
COMMITTEE / COUNCIL AGENDA

TO:       John J. Tecklenburg, Mayor
FROM:     Geona Shaw Johnson  DEPT:  Housing & Community Dev.
SUBJECT: REALTOR SERVICES
REQUEST: Approval to establish a contract for Realtor Services with Bridge Commercial Solutions, LLC, 25 Calhoun St., Ste. 220, Charleston, SC 29401 to seek land opportunities for the development of affordable & workforce housing. Solicitation #21-P027R

COMMITTEE OF COUNCIL: Ways & Means  DATE: January 11, 2022

COORDINATION: This request has been coordinated with: (attach all recommendations/reviews)

Corporate Counsel  Yes  N/A  Signature of Individual Contacted  Attachment
Cap. Proj. Cmte. Chair  No  No
Housing & Community  X  No  [Signature]
Procurement Director  X  No

FUNDING: Was funding previously approved? Yes  No  N/A  X
If yes, provide the following: Dept./Div.:  Account #:  Balance in Account  Amount needed for this item

Does this document need to be recorded at the RMC’s Office? Yes  No

NEED: Identify any critical time constraint(s).

CFO’s Signature: [Signature]
FISCAL IMPACT: Sales commission for realtor services will be paid as a part of closing on a completed sale transaction from funds allocated for affordable housing based on the fee schedule submitted by Bridge Commercial.

Mayor’s Signature: John J. Tecklenburg, Mayor

ORIGINATING OFFICE PLEASE NOTE: A FULLY STAFFED/APPROVED (except Mayor’s Signature) PACKAGE IS DUE IN THE CLERK OF COUNCIL’S OFFICE NO LATER THAN 10:00AM THE DAY OF THE CLERK’S AGENDA MEETING.
Score-Sheet

Realtor Services
Solicitation # 21-P027R

<table>
<thead>
<tr>
<th>Firm</th>
<th>Scores of Scorers</th>
<th>Total Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge Corporate Solutions</td>
<td>90 95 92 88 81</td>
<td>446</td>
</tr>
<tr>
<td>Johnson &amp; Wilson Real Estate</td>
<td>54 74 50 55 72</td>
<td>305</td>
</tr>
<tr>
<td>Nancy Fabian</td>
<td>53 32 72 52 77</td>
<td>286</td>
</tr>
</tbody>
</table>

Buyer: [Signature]  
Date: 11/23/21

Witness: [Signature]  
Date: 11/23/21
STATE OF SOUTH CAROLINA  
)  
COUNTY OF CHARLESTON  
)

AGREEMENT BETWEEN THE CITY OF CHARLESTON 
AND BRIDGE CORPORATE SOLUTIONS, LLC FOR 
REALTOR SERVICES

THIS AGREEMENT is entered into this _____ day of _____________, 20___ between the City of Charleston, a municipal corporation organized under the laws of the State of South Carolina (hereinafter referred to as “the City”), and Bridge Corporate Solutions, LLC (hereinafter referred to as the “Contractor”).

NOW, THEREFORE, for and in consideration of the mutual promises, covenants and conditions stated herein, the parties agree as follows:

§1. SCOPE OF SERVICES

The parties agree that the Contractor shall furnish the Realtor Services in accordance with Solicitation #21-P027R. All attachments and exhibits, including Exhibits A, B, C, D and E listed below, shall be incorporated herein:

Exhibit A: Solicitation #21-P027R (the “Request for Proposal”)  
Exhibit B: Insurance Requirements  
Exhibit C: Contractor’s Proposal  
Exhibit D: Contractor’s Cost Proposal  
Exhibit E: Contractor’s Cost Proposal Clarified

1. The Contractor shall diligently and in a professional and timely manner perform the services as described and set forth in Exhibit A, Exhibit C, Exhibit D and Exhibit E as approved by the City in fulfilling its obligations as set forth in this Agreement. Unless modified in writing by the parties hereto, the duties of the Contractor shall not be construed to exceed the provision of the services pertaining to this Agreement.

2. The Contractor hereby warrants and represents to the City that it possesses all necessary licenses to perform the work as set forth in this Agreement, carries the requisite insurance policies as set forth in Exhibit B, and is competent and able to provide professional and high quality services to the City in accordance with this Agreement.

3. The Contractor shall bill only for work according to Exhibit A, Exhibit C, Exhibit D and Exhibit E as approved by the City and the proposed pricing for such work as shown in Exhibit E. No additional work shall be performed unless requested by the City Official authorized for this project. If the City requests any additional work from the Contractor, the parties shall negotiate any possible additional costs related thereto prior to Contractor’s performance of such requested additional work.
4. The Contractor agrees to send any and all reports of work done by the Contractor to the City on a regular basis and to the agreed upon City Representative.

§2. CONTRACT TERM

The initial term of this Agreement shall be for a period of one (1) year from the date of execution. The City reserves the right to extend the Agreement if the City determines the extension is in its best interest; said extension will be on an annual basis and shall not exceed four (4) additional one (1) year periods.

§3. COMPENSATION AND PAYMENT TERMS

This Agreement authorizes payments to be made in accordance with the Request for Proposal, Addenda and the Contractor(s)' Proposal Response and Cost Proposal, Exhibits A, C, D, and E. The time and manner of payments will be governed by the provisions of Exhibit E. Payment to the Contractor shall be made after services have been rendered. The Contractor must submit an original invoice for each payment request to the City in care of Accounts Payable whose mailing address is PO Box 853, Charleston, SC 29402, and whose physical office is located at 116 Meeting Street, Charleston, SC 29401. Faxed and/or copied invoices from the Contractor to the City shall not be accepted. Rates shall not increase during the term of this Agreement or any agreement extensions. If the Contractor requests a price increase, it shall be in accordance with the US Department of Labor/Bureau of Labor Statistics/Consumer Price Indexes, and shall only be requested ninety (90) days prior to the anniversary date of the Agreement. The City shall have the sole discretion to honor or reject the Contractor's request for a price increase.

§4. WARRANTIES AND REPRESENTATIONS

A. The Contractor hereby represents and acknowledges that it is a licensed, bonded contractor capable of performing the work hereunder.

B. All equipment, materials, and supplies incorporated in the work covered by this Agreement and provided by the Contractor are to be of the highest quality for their intended purpose. When requested, the Contractor shall furnish to the City for approval the name of the manufacturer, the model number, and other identifying data and information regarding the performance, capacity, nature and rating of the machinery, mechanical, and other equipment which the Contractor is required to incorporate into the project. Machinery, equipment, material and supplies used without the required prior approval of the City shall be at the risk of subsequent rejection by the City at no cost to the City.

C. The Contractor warrants and represents that its staff is knowledgeable about, and experienced in providing the materials specified in the work required in accordance with this Agreement and warrants that it will use its best skill and attention to provide the above described work and materials in a professional and timely manner.
§5. SUBCONTRACTORS

A. If any Subcontractor shall be used for this project, the Contractor shall provide to the City’s Director of Procurement a list of names of any of the intended Subcontractors, the Subcontractor’s applicable license number(s), and a description of the work to be done by each subcontractor, if requested by the City.

B. The Contractor shall not substitute any Subcontractor without the prior written consent of the City’s Director of Procurement.

C. The Contractor shall be responsible for all services performed by a Subcontractor. Responsibilities include, but are not limited to, compliance with any applicable licensing and insurance regulations.

D. If at any time the City’s Director of Procurement determines that any Subcontractor is incompetent or undesirable, he shall notify the Contractor accordingly, and the Contractor shall take immediate steps for the termination/cancellation of the Subcontractor from any further work on the project. In addition, the Contractor shall take the necessary steps to replace such terminated Subcontractor from work on the project with a Subcontractor who is acceptable to the City.

E. Nothing contained in any contract resulting from this Agreement shall create any contractual relationship between any Subcontractor and the City of Charleston.

§6. INDEMNIFICATION

Except for expenses or liabilities incurred by the Contractor arising from the negligence of the City, the Contractor hereby expressly agrees to indemnify and hold the City harmless against any and all expenses and liabilities arising out of the performance or default of this Agreement as follows:

The Contractor expressly agrees to the extent that there is a causal relationship between its negligent, reckless or intentionally wrongful action or inaction, or the negligent, reckless or intentionally wrongful action or inaction of any of its employees or Subcontractors or any person, firm, or corporation directly or indirectly employed by the Contractor, and any damage, liability, injury, loss or expense (whether in connection with bodily injury or death or property damage or loss) that is suffered by the City and its employees or by any member of the public, to indemnify and save the City and its employees harmless against any and all liabilities, penalties, demands, claims, lawsuits, losses, damages, costs and expenses arising out of the performance or default of this Agreement. Such costs shall include defense, settlement, court costs and reasonable attorneys’ fees incurred by the City and its employees. This promise by the Contractor to indemnify the City shall include bodily injuries or death occurring to the City’s officers, officials, employees and any person directly or indirectly employed by the City, the City’s employees, the employees of any other independent contractors including Subcontractors, or to any member of the public. When the City submits notice, Contractor shall promptly defend any aforementioned action. This obligation shall survive the suspension or termination of this Agreement. The limits of insurance
coverage required herein shall not serve to limit this indemnity obligation. The recovery of costs and fees shall extend to those incurred in the enforcement of this indemnity.

§7. INSURANCE REQUIREMENTS

The Contractor shall comply with all insurance requirements which are set forth in Exhibit B.

§8. GRATUITIES AND KICKBACKS

Gratuities. It shall be unethical and a violation of this Agreement by the Contractor for any person to offer, give or agree to give any employee or former employee, or for any employee or former employee to solicit, demand, accept, or agree to accept from another person a gratuity or an offer of employment in connection with any decision, approval, disapproval, recommendation, preparation or any part of a program requirement or a purchase request, influencing the content of any specification or procurement standard, rendering of advice, investigation, auditing, or in any other advisory capacity in any proceeding or application, request for ruling, determination, claim or controversy, or other particular matter pertaining to any program requirement of a contract or subcontract, or to any solicitation or bid therefore.

Kickbacks. It shall be unethical and a violation of this Agreement by the Contractor for any payment, gratuity, or offer of employment to be made by or on behalf of a Subcontractor under a contract to the Contractor, or to hire any Subcontractor or any person associated therewith, as an inducement for the award of a subcontract or order.

§9. TERMINATION

For Convenience: The City reserves the right to terminate the contract with the Contractor when it is in the best interest of the City, including, but not limited to non-appropriation of funds. If the contract is so terminated, the City shall provide the Contractor with a minimum of thirty (30) days written notice and shall compensate Contractor for all necessary and reasonable direct costs of performing the services actually accomplished as of the date of termination. No other costs shall be allowed for a termination for convenience. No damages shall be allowed for a termination for convenience.

For Default: If the Contractor fails to comply with the terms of the contract the City shall notify the Contractor in writing of the specifics regarding such noncompliance. If the Contractor fails to begin to cure the noncompliance within five (5) days after the notice, the City may terminate the contract by written notice to the Contractor with a minimum of thirty (30) days thereafter and Contractor shall only be compensated for services actually completed prior to termination, contractor shall not be entitled to any costs or damages resulting from a termination under this section.

§10. ASSIGNMENT

The Contractor shall not assign in whole or in part any part of this Agreement without the prior written consent of the City. The Contractor shall not assign any money due or to become due to it under this Agreement without the prior written consent of the City.
§11. NOTICES

All notices required under this Agreement to the parties shall be deemed properly given when deposited in the United States mail, either by registered or certified mail (postage prepaid) to:

To:                      To:
City of Charleston   Bridge Corporate Solutions, LLC
John J. Tecklenburg   Peter S. Fennelly, SIOR, MCR, SLCR
Mayor                   President
PO Box 304              25 Calhoun St., Ste. 220
Charleston, SC  29402   Charleston, SC  29401

With copies to:

City of Charleston
Legal Department
50 Broad Street
Charleston, SC  29401

City of Charleston
Procurement Division
75 Calhoun Street, Suite 3500
Charleston, SC  29401

§12. CHANGE ORDERS

No oral statement of any person shall modify or otherwise change, or affect the terms, conditions or specifications stated in this Agreement. The City’s Procurement Director shall make all change orders to this Agreement in writing. The City shall not be bound by any change in this Agreement unless approved in writing by the Procurement Director.

§13. ENTIRE AGREEMENT

This document and its Exhibits constitute the entire Agreement between the parties and all previous negotiations leading thereto. This Agreement shall be modified only by a written agreement signed by the City and the Contractor.

§14. GOVERNING LAWS

The laws of the State of South Carolina shall govern this Agreement. All litigation arising under this Agreement shall be litigated in the Circuit Court in the Ninth Judicial Circuit of Charleston County, South Carolina, in the Court of Common Pleas.

§15. LICENSE AND PERMITS

The Contractor shall, without additional expense to the City, be responsible for obtaining all necessary licenses and permits required by the State of South Carolina, or the City of
Charleston or any other authority having jurisdiction as necessary to fully perform its obligations pursuant to this Agreement. The Contractor shall provide a copy of its valid City of Charleston Business License to the City upon the execution of this Agreement.

§16. PUBLICITY RELEASES

The Contractor agrees not to refer to the award of this Agreement in any commercial advertising in such a manner as to state or imply that the products or services provided are endorsed or preferred by the City. The Contractor shall not have the right to include the City’s name in its published list of customers without prior approval of the City. With regard to news releases, the Contractor shall only be permitted to use the name of the City and the type and duration of this Agreement in any news releases provided the Contractor shall first have obtained the prior written approval of the City. The Contractor also agrees not to publish, or cite in any form, any comments or quotes from the City’s employees unless it is a direct quote from the Public Information Officer of the City.

§17. INDEPENDENT CONTRACTOR

The Contractor is an independent contractor and shall not be deemed an employee of the City of Charleston for any purpose whatsoever. The Contractor acknowledges that it is the Contractor’s duty to verify identity and eligibility of its employees and all subcontractors in accordance with IRCA ("Immigration Reform and Control Act") as amended. The Contractor further agrees to indemnify the City if the Contractor fails to comply with IRCA as amended.

§18. SEVERABILITY

If any provision of this Agreement shall be held to be invalid or unenforceable for any reason, the remaining provisions shall continue to be valid and enforceable. If a court finds that any provision of this Agreement is invalid and unenforceable, but that by limiting such provision it would become valid and enforceable, then such provision shall be deemed to be written, construed and enforced as so limited.

§19. WAIVER OF CONTRACTUAL RIGHTS

The failure of either party to enforce any provision of this Agreement shall not be construed as a waiver or limitation of that party’s right to subsequently enforce and compel strict compliance with every provision of this Agreement.

§20. COMPLIANCE WITH LEGAL REQUIREMENTS

All applicable Federal, State and local laws, ordinances, and rules and regulations of any authorities (including but not limited to any laws, ordinances or regulations relating to the SC Department of Revenue or the SC Board of Contractors) shall be binding upon the Contractor during the term of this Agreement. The Contractor shall be responsible for compliance with any such law, ordinance, rule or regulation, and shall hold the City harmless and indemnify same in the event of non-compliance as set forth in this Agreement.
§21. BACKGROUND CHECK

The City reserves the right to conduct criminal background checks on individuals assigned to this project, including the Contractor, its employees, agents or Subcontractors.

§22. SC STATE AND LOCAL TAX

Except as otherwise provided, contract prices shall include all applicable state and local taxes.

If applicable, two percent (2%) income tax withholding shall be withheld from each and every payment pursuant to Section 12-9-310 of the South Carolina Code of Laws (1976, as amended) for certain out-of-state contractors, and such sums will be paid over to the South Carolina Department of revenue and Taxation (the "SCDRT"). When and if the City receives an executed SCDRT form I-312, Nonresident Taxpayer Registration Affidavit – Income Tax Withholding, such withholding shall cease.

Contractor shall calculate that portion of this Agreement that is subject to the nine percent (9%) South Carolina sales and/or use tax, which amount shall be itemized and shown on all invoices, and shall be paid to the SCDRT by the Contractor. If the Contractor is a non-South Carolina company, the City shall withhold said amount from all invoices and remit payment to the SCDRT, unless the Contractor furnishes the City with a valid South Carolina Use Tax Registration Certificate Number. The total of all sales tax to become due and payable in connection with this Agreement is listed herein.

The Contractor shall indemnify and hold harmless the City for any loss, cost, or expense incurred by, levied upon or billed to the City as a result of the Contractor’s failure to pay any tax of any type due in connection with this Agreement.

§23. NONDISCRIMINATION

The contractor, sub recipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of the contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate.
IN WITNESS WHEREOF, the parties hereto, by their authorized representatives, have signed, sealed and delivered this Agreement at Charleston, South Carolina.

WITNESSES FOR THE CITY:

______________________________

Date: _________________________

______________________________

Name

Date: _________________________

John J. Tecklenburg
Mayor
Date: _________________________

WITNESSES FOR VENDOR:

______________________________

Name

Date: _________________________

Peter S. Fennelly, SIOR, MCR, SLER
President
Date: _________________________

______________________________

Name

Date: _________________________
EXHIBIT A

Proposal Number: 21-P027R  Proposals will be received until: September 28, 2021 @ 12:00pm
Proposal Title: Realtor Services
Mailing Date: September 1, 2021  Direct Inquiries to: Robin B. Robinson
Vendor Name:  FEIN/SS#: 
Vendor Address: 
City – State – Zip: 
Telephone Number:  Fax Number: 

Minority or Women Owned Business:
Are you a certified Minority or Women-Owned business in the State of South Carolina?  ☐ Yes  ☐ No
If so, please provide a copy of your certificate with your response.

Authorized Signature:  ______________________  Title: ______________________
Date: ______________________

I certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm, or person submitting a bid for the same materials, supplies, equipment or services and is in all respects fair and without collusion or fraud. I agree to abide by all conditions of this bid and certify that I am authorized to sign this bid for the bidder. This signed page must be included with bid submission.

IMPORTANT

1. This solicitation seeks proposals responding to the Scope of Work for Realtor Services. This solicitation does not commit the City of Charleston to award a contract, to pay any costs incurred in the preparation of applications submitted, or to procure or contract for the services. The City reserves the right to accept or reject any, all or any part of any proposal received as a result of this Solicitation, or to cancel in part or in its entirety this Solicitation if it is in the best interest of the City to do so. The City shall be the sole judge as to whether proposals submitted meet all requirements contained in this solicitation.

2. Offeror may mail, or hand-deliver response to the Procurement Division. Do Not Fax in the proposal response. Please show the solicitation number on the outside of any mailing package. The City of Charleston assumes no responsibility for unmarked or improperly marked envelopes. If directing any other correspondence to the Procurement Division not related to the solicitation, please do not include the solicitation number on the envelope. If the Bidder chooses not to respond to this solicitation, it is recommended to return the “No Proposal Response Form” to our office.

3. DEADLINE FOR SUBMISSION OF OFFER: Any proposal or offer received after the Procurement Director or his designee has declared that the time set for opening has arrived, shall be rejected unless the offer has been delivered to the designated purchasing office or the governmental bodies’ mail room which services that purchasing office prior to the proposal opening.

4. Questions regarding this solicitation must be submitted in writing to Robin B. Robinson or Vera White no later than 12:00pm on September 13, 2021. Questions may either be faxed to 843-720-3872 or emailed to Robin Barrett Robinson, robinsonr@charleston-sc.gov or Vera White, whitev@charleston-sc.gov.

9
INSTRUCTIONS TO OFFERORS

1. Number of Submittals required is stated in the General Information section of this Solicitation. Proposals must be mailed or hand-delivered. Responses received by fax or other electronic means (email, CD, etc.) will be rejected. Proposals must be submitted in a sealed envelope and must be addressed to the City of Charleston Procurement Division, 75 Calhoun Street, Suite 3500 Charleston, SC 29401. Failure to do so may result in a premature opening of, or failure to open such Proposal. Each sealed envelope containing a Proposal shall be marked on the outside with the Offeror’s complete Name, Address, Solicitation Number, Description of Services Requested by Solicitation (i.e., Elevator Maintenance, Road Construction), along with the Due Date and Time. If you do not choose to submit a proposal, please complete and return the enclosed “No Proposal” response form.

A “No Proposal” qualifies as a response; however, it is the responsibility of the Vendor to notify the Procurement Office if you receive solicitations that do not apply. Failure to respond to three (3) solicitations during the calendar year may result in removal from Vendor’s List.

All pages that require a Signature shall be included with the proposal. Failure to include these required pages may result in the proposal being deemed Non-Responsive.

2. Offerors must clearly mark as “Confidential” each part of their proposal which they consider to be proprietary information that could be exempt from disclosure under the South Carolina Freedom of Information Act, S.C. Code Ann. §§ 30-4-10 to – 165 (2007 & Supp. 2015). See paragraph 45 for more details. The City reserves the right to determine whether this information should be exempt from disclosure and no legal action may be brought against the state or its agents for its determination in this regard.

3. Proposals must be made in the official name of the individual, firm, company, partnership, corporation, joint venture or other legal entity under which the business is conducted (showing official business address) and must be signed in ink by a person duly authorized to legally bind the legal entity submitting the proposal.

4. Proposals should be typewritten or computer-generated; however, if this is not possible, the handwriting must be legible. A Proposal shall include, but is not limited to, addresses of all legal entities which will participate in the proposed services. The type of organization of the Bidder, whether individual, firm, partnership, corporation, joint venture or other legal entity, shall be stated. Any affiliations, parent-subsidiary relationships, and corporate identities including the names of the principals of such legal entity must be fully disclosed and clearly explained.

5. If an error is made before submitting the proposal, the error should be crossed out, corrections entered and initialed by the person signing the proposal. Erasures or use of typewriter correction fluid may be cause for rejection. No proposal shall be altered or amended after specified time for opening.
6. Proposals may be withdrawn by written request received from the Offeror prior to the
time set for opening of Proposals, but not thereafter.

7. Proposals should be prepared simply and economically. All data, materials, and
documentation shall be available in a clear, concise form and reproducible upon request
"at cost" for the City’s internal use. The City reserves the right to reproduce proposals
for internal use in the evaluation process.

8. All Proposals shall provide a straight forward, concise description of Offeror’s ability to
satisfy the requirements of the Solicitation.

9. All Addendum and Award Notices will be posted on our website: www.charleston-
sc.gov, then click on the Bidline link.

10. The terms and conditions in this Solicitation shall prevail unless otherwise modified by
the City of Charleston in an Addendum to this Solicitation. The City of Charleston
reserves the right to reject, in whole or in part, any proposal which does not comply with
such terms and conditions. The City of Charleston reserves the right to retain all
proposals submitted and to use any ideas in a proposal regardless of whether that
proposal is selected. Submission of a proposal indicates acceptance by the Offeror of the
conditions contained in this Solicitation, unless clearly and specifically noted in the
proposal submitted and confirmed in any resulting contract between the City of
Charleston and the Offeror selected.

11. No substitutions shall be considered after the contract award except by Amendment.

12. The City seeks qualified vendors to be responsible for completion of the work described
herein and the City reserves the option to award portions of the project to multiple
Offeror if such is to the advantage of the City. Therefore, any one proposal submitted by
more than one company shall be deemed to be a proposal for a joint venture between or
among the companies so submitting proposals unless the proposal clearly and
unequivocally describes that only one firm proposes to act as principal and the other
firm(s) contractual position is clearly defined. The companies submitting as a joint
venture shall be held jointly and severally responsible for the entire project and shall not
be permitted to limit their liability to the City.

13. All proposals should be complete and carefully worded and shall convey all of the
information requested by the City. If errors or exceptions are found in a proposal, or if
the proposal fails to conform to the requirements of the Solicitation, the City shall be the
sole judge as to whether that variance is significant enough to reject the proposal.

14. The City reserves the right to request satisfactory evidence of their ability to furnish
services in accordance with the terms and conditions listed herein. The City further
reserves the right to make the final determination as to the Offeror’s ability to provide
said services.

15. The Offeror is solely responsible for all costs and expenses associated with the
preparation of the proposal and of any supplementary presentation (including any oral
presentation) requested by the City.
16. GRATUITIES AND KICKBACKS
   A) **Gratuities.** It shall be unethical for any person to offer, give or agree to give any employee or former employee, or for any employee or former employee to solicit, demand, accept, or agree to accept from another person a gratuity or an offer of employment in connection with any decision, approval, disapproval, recommendation, preparation or any part of a program requirement or a purchase request, influencing the content of any specification or procurement standard, rendering of advice, investigation, auditing, or in any other advisory capacity in any proceeding or application, request for ruling, determination, claim or controversy, or other particular matter pertaining to any program requirement or a contract or subcontract, or to any solicitation or proposal therefore.

   B) **Kickbacks.** It shall be unethical for any payment, gratuity, or offer of employment to be made by or on behalf of a subcontractor under a contract to the prime contractor, or to hire any subcontractor or any person associated therewith, as an inducement for the award of a subcontract or order.

17. OFFEROR REPRESENTATIONS
   Each Offeror by submitting a Proposal represents that:

   A) The Offeror has read and understands this Solicitation (including all Specifications and Attachments) and that its Proposal is made in accordance therewith.

   B) The Offeror has reviewed the Solicitation and has become familiar with the local conditions under which the Scope of Work is to be performed. The failure or omission of an Offeror to acquaint himself with existing conditions shall in no way relieve him of any obligation with respect to this proposal or any resulting contract.

   C) The Proposal is based on the terms, materials, services and obligations required by this Solicitation, without exception.

   D) The Offeror is qualified to provide the services and equipment required under this Solicitation and, if awarded the contract, shall do so in a professional, timely manner using successful Offeror's best skills and attention.

   E) The Offeror is guaranteeing that all goods and services will meet the requirements of the Solicitation during the contract period.

18. COMPETITIVE PROCUREMENT
   It is the intent and purpose of the City of Charleston that this Solicitation permits competition. It shall be each Offeror's responsibility to advise the City if any language, provision, or other requirement, or any combination thereof, inadvertently restricts or limits the satisfaction of the specifications stated in this Solicitation to a single source. Such notification must be submitted in writing, and must be received by the City of Charleston Procurement Division no later than the last date for written questions. Any such notification shall be reviewed by the City’s Procurement Director.
19. ADDENDA/CHANGES
Any additions, deletions, modifications, or changes made to this Solicitation shall be processed through the City’s Procurement Director. Any deviation from this procedure may result in the disqualification of the proposal or the cancellation of any contract resulting from this Solicitation. Requests for interpretation of this Solicitation and any other questions concerning the Solicitation shall be made in writing, and addressed to the City’s Procurement Director, 75 Calhoun Street, Suite 3500, Charleston, South Carolina 29401. Questions may be transmitted by fax, but it shall be the responsibility of the sender to confirm receipt by the City. These requests must be submitted by the deadline for written questions. Responses to said requests shall be made at the discretion of the City’s Procurement Director. When issued, such interpretations and answers to such questions shall be in the form of an addendum to the Solicitation which shall be posted on the City’s website, www.charleston-sc.gov. All such addenda shall become part of the Solicitation and each Offeror shall be bound by such addenda whether or not received by the Offeror. The City of Charleston shall not be legally bound by any amendment or interpretation that is not in writing.

20. EVALUATION PROCESS
During the evaluation process the City of Charleston reserves the right, where it may serve the City of Charleston’s best interest, to request additional information or clarification from Offerors, or to allow corrections of errors or omissions.

21. AWARD OF CONTRACT
A) Award of contract shall be made to the most responsive and responsible Offeror(s) whose Proposal, conforming to the Solicitation, is most advantageous to the City of Charleston, price and other factors considered.

B) The City of Charleston may, when in the best interest of the City, reject any or all Proposals or waive technicalities or informalities in any Proposals received.

C) The City of Charleston shall be the sole judge of the suitability of the items or services to be provided pursuant to this Solicitation.

D) The City may choose to award to more than one vendor if it is in the best interest of the City.

E) Final approval may rest with members of the City Council for the City of Charleston.

F) All things considered equal, a tie proposal will be resolved by the flip of a coin.

22. CONTRACT ADMINISTRATION
Questions or problems arising after award of this contract shall be directed to the Contracts Coordinator by calling (843) 965-4184. Copies of all correspondence concerning this contract shall be sent to the Contracts’ Coordinator, 75 Calhoun Street, Suite 3500 Charleston, SC 29401.
23. **NOTICE OF AWARD OF CONTRACT**
   The successful Offeror shall be notified of acceptance of its Proposal by a written Notice of Award of Contract. Successful Offeror(s) shall not undertake any work, and City shall not be responsible for payment for any work whatsoever undertaken by the successful Offeror(s) prior to issuance of the Notice to Proceed.

24. **NOTICE TO PROCEED**
   A Notice to Proceed shall be issued after the Contractor(s) has executed the contract and has submitted acceptable Insurance Certificate(s) and Endorsement(s) and Performance and Payment Bonds to the City as well as other submittals specified herein as required to be delivered before the Notice to Proceed is issued. The Contractor(s) shall not commence work until it has received a written Notice to Proceed from the City’s Director of Procurement.

25. **OTHER CONTRACTS**
   The City of Charleston may undertake or award other contracts for portions of the work or additional work, and the Contractor(s) shall fully cooperate with such other contractors and City of Charleston employees and carefully fit its own work to such work as may be directed by the City. The Contractor(s) shall not commit or permit any act which shall interfere with the performance of work by any other contractor or by City of Charleston employees.

26. **MODIFICATION**
   The City’s Director of Procurement shall have the unilateral right to modify any contract resulting from this Solicitation, within the general scope of work, when said modification is in the best interest of the City. The right to issue change orders is not dependent upon the consent of the successful Offeror(s). At the direction of the Director of Procurement the successful Offeror is obligated to perform the revised contract. Contract fees or prices shall be equitably adjusted where an issued change order so demands. No claim by the successful Offeror(s) for an adjustment hereunder shall be allowed if asserted after final payment under aforesaid contract.

27. **INDEPENDENT CONTRACTOR**
   Successful Offeror is an independent contractor and shall not be deemed the agent or employee of the City of Charleston for any purpose whatsoever.

28. **INSURANCE REQUIREMENTS**
   Upon the consummation of the contract for the services being solicited in this Solicitation and receipt of the Notice of Award by the successful Offeror (the “Contractor”), the Contractor shall, at all times during the term of the contract, carry insurance as required by the insurance requirements outlined in the insurance attachment which is attached hereto and incorporated by reference. The City shall not issue a Notice to Proceed until the Contractor has submitted acceptable insurance certificates(s) or endorsement(s), which must be submitted within five (5) calendar days after receipt of the Notice of Award, and which reflect that the required coverages are in place and that all premiums have been paid. Refusal or failure to submit such certificate(s) or endorsement(s) shall constitute grounds for the City to revoke its notice of award, forfeit proposal security, and award the contract to another contractor. The City may contact the Contractor’s insurer(s) or insurer(s)' agent(s) directly at any time regarding its coverages, coverage
amounts, or other such relevant and reasonable issues related to this contract. The Contractor(s) shall also require any sub-contractors to carry the same coverages in the same amounts. Faxed Insurance Certificate(s) and Endorsement(s) shall be accepted if received no later than the time of contract execution and the original documents are received within one (1) business day after receipt of the fax transmittals.

29. INDEMNIFICATION
Except for expenses or liabilities arising from the negligence of the City, the Contractor who enters into a contract with the City of Charleston as a result of this Solicitation (the "Contractor") hereby expressly agrees to indemnify and hold the City harmless against any and all expenses and liabilities arising out of the performance or default of this contract as follows:

The Contractor expressly agrees to the extent that there is a causal relationship between its negligent, reckless or intentionally wrongful action or inaction, or the negligent, reckless or intentionally wrongful action or inaction of any of its employees or any person, firm, or corporation directly or indirectly employed by the Contractor, and any damage, liability, injury, loss or expense (whether in connection with bodily injury or death or property damage or loss) that is suffered by the City and its employees or by any member of the public, to indemnify and save the City and its employees harmless against any and all liabilities, penalties, demands, claims, lawsuits, losses, damages, costs, and expenses arising out of the performance or default of this Contract. Such costs are to include defense, settlement and reasonable attorneys' fees incurred by the City and its employees. This promise to indemnify shall include bodily injuries or death occurring to Contractor's employees and any person directly or indirectly employed by Contractor (including without limitation any employee of any subcontractor), the City's employees, the employees of any other independent contractors, or occurring to any member of the public. When the City submits notice, Contractor shall promptly defend any aforementioned action. This obligation shall survive the suspension or termination of the contract. The limits of insurance coverage required herein shall not serve to limit this indemnity obligation. The recovery of costs and fees shall extend to those incurred in the enforcement of this indemnity.

30. OFFEROR'S QUALIFICATIONS
The City reserves the right to request satisfactory evidence of any Offeror's ability to furnish services in accordance with the terms and conditions listed herein. The City further reserves the right to make the final determination as to the Offeror's ability to provide said services. We reserve the right to investigate the qualifications of any respondent under consideration, require confirmations of information furnished, and require additional evidence of qualifications to perform the work described in this Solicitation, contact references, and request an audited financial statement in order to determine a potential contractor's capabilities.

31. ASSIGNMENT
The Contractor(s) shall not assign in whole or in part its duties under the contract without the prior written consent of the City of Charleston. The Contractor shall not assign any money due or to become due to it under this contract without the prior written consent of the City of Charleston.
32. **SUBCONTRACTORS**  
A) If any subcontractors shall be used for this project, the Contractor shall provide to the City’s Director of Procurement a list of names of any of the intended subcontractors, the subcontractor's applicable license number(s), and a description of the work to be done by each subcontractor, if requested.

B) The Contractor(s) shall not substitute other subcontractors without the written consent of the City’s Director of Procurement.

C) Contractor(s) shall be responsible for all services performed by a subcontractor. Responsibilities include, but are not limited to, compliance with any applicable licensing regulations.

D) If at any time the City’s Director of Procurement determines that any subcontractor is incompetent or undesirable, he shall notify the Contractor(s) accordingly, and the Contractor(s) shall take immediate steps for cancellation of the subcontract and replacement thereof with a subcontract that is approved by the City of Charleston.

E) Nothing contained in any contract resulting from this Solicitation shall create any contractual relationship between any subcontractor and the City of Charleston.

33. **SUSPENSION OF WORK**  
The City may order the Contractor in writing to suspend, delay, or interrupt all or any part of the Work for such period of time as the City may determine to be appropriate for the convenience of the City of Charleston, or for noncompliance with the contract requirements.

34. **TERMINATION**  
A) **For Convenience:** The City reserves the right to terminate the contract with the Contractor when it is in the best interest of the City, including, but not limited to non-appropriation of funds. If the contract is so terminated, the City shall provide the Contractor with a minimum of sixty (60) days written notice and shall compensate Contractor for all necessary and reasonable direct costs of performing the services actually accomplished as of the date of termination. No other costs shall be allowed for a termination for convenience. No damages shall be allowed for a termination for convenience.

B) **For Default:** If the Contractor fails to comply with the terms of the contract the City shall notify the Contractor in writing of the specifics regarding such noncompliance. If the Contractor fails to begin to cure the noncompliance within five (5) days after the notice, the City may terminate the contract by written notice to the Contractor with a minimum of thirty (30) days thereafter and Contractor shall only be compensated for services actually completed prior to termination, contractor shall not be entitled to any costs or damages resulting from a termination under this section.
35. **MATERIAL AND WORKMANSHIP; WARRANTIES AND REPRESENTATIONS**
   A) If equipment, materials and supplies are to be a part of the service provided, all equipment, materials, and supplies incorporated in the work covered by the Proposal and provided by the Contractor(s) are to be new and of the most suitable grade for the purpose intended. Unless otherwise specifically provided in this Solicitation, reference to any equipment, material, supply or patented process, by trade name, make or catalog number, shall not be construed as limiting competition. When requested, the Contractor(s) shall furnish to the City for approval the name of the manufacturer, the model number, and other identifying data and information respecting the performance, capacity, nature and rating of the machinery and mechanical and other equipment which the Contractor(s) contemplates incorporating in the work. When required by this Contract or when called for by the City the Contractor(s) shall provide full information concerning the material or supplies which he contemplates incorporating in the work. Machinery, equipment, material and supplies installed or used without the required prior approval shall be at the risk of subsequent rejection.

   B) By signing its proposal, the successful Offeror(s) shall be deemed to have represented that its staff is knowledgeable about and experienced in performing the work required in this Solicitation and warrants that it shall use best skill and attention to provide the above described work in a professional, timely manner.

   C) The City may, in writing, require the Contractor(s) to remove from the work any employee the City deems incompetent, careless or otherwise objectionable.

36. **COMPLIANCE WITH LEGAL REQUIREMENTS**
   All applicable Federal, State and local laws, ordinances, and rules and regulations of any authorities shall be binding upon the Contractor(s) throughout the pendency of this Project. The Contractor(s) shall be responsible for compliance with any such law, ordinance, rule or regulation, and shall hold the City harmless and indemnify same in the event of non-compliance as set forth in the Contract.

37. **PERMITS AND LICENSES**
   A) The Contractor(s) shall, without additional expense to the City of Charleston, be responsible for obtaining all necessary licenses and permits required by the State of South Carolina, or the City of Charleston or any other authority having jurisdiction.

   B) Contractors and subcontractors are responsible at all times for obtaining applicable work permits and licenses of any kind.

38. **DISPUTES**
   Any bona fide dispute concerning the bid, proposal, request for qualifications or Agreement shall be resolved by the courts of the State of South Carolina. In the event any litigation is commenced with respect to any matter set forth in the aforementioned documents, the prevailing party shall be entitled to recover reasonable attorneys' fees and all other reasonable direct costs associated with such litigation from the non-prevailing party.
39. **STATE AND LOCAL TAXES**
   A) Except as otherwise provided, contract prices shall *include* all applicable state and local taxes.

   B) If applicable, two percent (2%) income tax withholding shall be withheld from each and every payment pursuant to Sections 12-8-540 and 12-8-550 of the *South Carolina Code of Laws* (1976, as amended) for certain out-of-state contractors, and such sums shall be paid over to the South Carolina Department of Revenue (the "SCDOR"). When and if the City receives an executed SCDOR Form I-312, Nonresident Taxpayer Registration Affidavit - Income Tax Withholding, such withholding shall cease.

   C) Contractor shall calculate that portion of the contract which is subject to the nine percent (9%) South Carolina sales and/or use tax, which amount shall be itemized and shown on all invoices, and shall be paid to the SCDOR by Contractor. If Contractor is a non-South Carolina company, the City shall withhold said amount from all invoices and remit payment to the SCDOR, unless Contractor furnishes City with a valid South Carolina Use Tax Registration Certificate Number.

   D) Contractor shall indemnify and hold harmless the City for any loss, cost, or expense incurred by, levied upon or billed to the City as a result of Contractor's failure to pay any tax of any type due in connection with the contract.

40. **INCORPORATION BY REFERENCE**
   The contents of this Solicitation, including all drawings, attachments, specifications, exhibits, certificates, any addenda, Contractor's Proposal Response Form and Pricing List, and affidavits shall become part of the contract for this Project.

41. **PRIME CONTRACTOR RESPONSIBILITIES**
   The contractor shall be required to assume sole responsibility for the complete effort as required by this Solicitation. The City shall consider the contractor to be the sole point of contact with regard to contractual matters.

42. **OWNERSHIP OF MATERIAL**
   Ownership of all data, material and documentation originated and prepared for the City pursuant to this contract shall belong exclusively to the City.

43. **DRUG-FREE WORKPLACE**
   (Note: This clause applies to any resultant contract of $50,000 or more). The City of Charleston requires compliance with the South Carolina Drug Free Workplace Act. By submission of a signed proposal, you are certifying that you shall comply with this Act. See S.C. Code Section 44-107-30.

44. **FUNDING**
   Offerors shall agree that funds expended for the purposes of the contract must be appropriated by the City of Charleston for each fiscal year included within the contract period. Therefore, the contract shall automatically terminate without penalty or termination costs if such funds are not appropriated. In the event that funds are not appropriated for the contract, the Offeror shall not prohibit or otherwise limit the City’s
right to pursue and contract for alternate solutions and remedies as deemed necessary by
the City for the conduct of its affairs. The requirements stated in this paragraph shall
apply to any amendment or the execution of any option to extend the contract.

45. SUBMITTING CONFIDENTIAL INFORMATION
For every document Offeror submits in response to or with regard to this Solicitation that
is confidential or protected from disclosure, Offeror must separately mark with the word
"CONFIDENTIAL" or "PROTECTED" on every page, or portion thereof. By so
designating Offeror contends the information is exempt from public disclosure pursuant
to the South Carolina Freedom of Information Act, S.C. Code Ann. §§ 30-4-10 through
4-165 (2007 & Supp. 2015) or other relevant law. For every document Offeror submits in
response to or with regard to this Solicitation, Offeror must separately mark with the
words "TRADE SECRET" on every page, or portion thereof, that Offeror contends
contains a trade secret as that term is defined by the South Carolina Trade Secrets Act,
S.C. Code Ann. §39-8-10, et seq. All markings must be conspicuous; use color, bold,
derlining, or some other method in order to conspicuously distinguish the mark from
the other text. Offeror shall not mark its entire Proposal (bid, proposal, quote, etc.) as
confidential, trade secret, or otherwise protected! If a Proposal or any part thereof, is
improperly marked as confidential or trade secret or protected, the City may, in its sole
discretion, determine it non-responsive. If only portions of a page are subject to some
protection, Offeror shall not be allowed to mark the entire page. By submitting a Proposal
to this Solicitation, Offeror (1) agrees to the public disclosure of every page of every
document regarding this Solicitation that was submitted at any time prior to entering into
a contract (including, but not limited to, documents contained in a response, documents
submitted to clarify a response, and documents submitted during negotiations), unless the
page is conspicuously marked "TRADE SECRET" or "CONFIDENTIAL" or
"PROTECTED." (2) agrees that any information not marked, as required by these
bidding instructions, as a "TRADE SECRET" is not a trade secret as defined by the Trade
Secrets Act, and (3) agrees that, notwithstanding any claims or markings otherwise, any
prices, commissions, discounts, or other financial figures used to determine the award, as
well as the final contract amount, may be subject to public disclosure. In determining
whether to release documents, the City shall detrimentally rely on Offeror's marking of
documents, as required by these bidding instructions, as being either "CONFIDENTIAL"
or "TRADE SECRET" or "PROTECTED." By submitting a Proposal, Offeror agrees to
defend, indemnify and hold harmless the City of Charleston, its officers and employees,
from every claim, demand, loss, expense, cost, damage or injury, including attorney’s
fees, arising out of or resulting from the City withholding information that Offeror
marked as “CONFIDENTIAL” or “TRADE SECRET” or "PROTECTED."

46. RECORDS RETENTION & RIGHT TO AUDIT
The City shall have the right to audit the books and records of the Contractor as they
pertain to this contract. Such books and records shall be maintained for a period of three
(3) years from the date of final payment under the contract. The City may conduct, or
have conducted, performance audits of the Contractor. The City may conduct, or have
conducted, audits of specific requirements of this proposal as determined necessary by
the City. Pertaining to all audits, the Contractor shall make available to the City access to
its computer files containing the history of contract performance and all other documents
related to the audit. Additionally, any software used by the Contractor shall be made
available for auditing purposes at no cost to the City.
47. **COST**
Costs submitted with a Proposal shall be firm for a period of at least ninety (90) days from the closing date. All prices shall be firm-fixed type, unless stated otherwise.

48. **UNSUCCESSFUL OFFERORS**
Offerors not awarded a contract under this solicitation, may request return of their proposals within thirty (30) days after notification of award is mailed. All cost of returns shall be paid by the Offeror. If Federal Express, UPS, or other shipping number is not received with request, all materials shall be destroyed.

49. **PAYMENT FOR GOODS & SERVICES**
Payment for goods & services arising out of the contract resulting from this Solicitation and received by the City shall be processed within 30 days of receipt of a valid invoice.

50. **DISCUSSION/NEGOITIATION:**
By submission of a proposal, an Offeror agrees that during the period following issuance of a proposal and prior to final award of contract, the Offeror shall not discuss this Procurement with any party except members of the City’s Procurement Division or other parties specifically designated in this solicitation.

51. **NON-DISCRIMINATION**
The Contractor(s) shall not discriminate against any individuals based upon age, sex, race, disability, religion, sexual orientation or gender identity and shall abide by the requirements contained in Federal Executive Order Number 11246, as amended, including specifically the provisions of the equal opportunity clause. The City's Equal Employment Opportunity Plan Utilization Report is available on the city website on the Human Resources and Organization Development page at http://charleston-sc.gov/index.aspx?nid=246. To receive a paper copy of the report by mail, please contact Human Resources at (843) 724-7388.

52. **DEFAULT**
In case of default by the Contractor, the City reserves the right to purchase any or all items in default in the open market, charging the Contractor with any excessive costs. Should such charge be assessed, no subsequent response will be accepted from the defaulting Contractor until the assessed charge has been satisfied.

53. **FORCE MAJURE**
The Contractor shall not be liable for any excess costs if the failure to perform the contract arises out of causes beyond the control and without the fault or negligence of the contractor. Such causes may include, but are not restricted to acts of God or of the public enemy, acts of the Governments in either its sovereign or contractual capacity, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and unusually severe weather; but in every case the failure to perform must be beyond the control and without the fault or negligence of the contractor. If the failure to perform is caused by the default of a subcontractor, and if such default arises out of causes beyond the control of both the contractor and subcontractor, and without the fault or negligence of either of them, the contractor shall not be liable for any excess costs for failure to perform, unless the supplies or services to be furnished by the subcontractor were obtainable from other sources in sufficient time to permit the contractor to meet the required delivery schedule.
54. EXCEPTIONS AND DEVIATIONS
Any deviation from specifications indicated herein must be clearly pointed out; otherwise, it will be considered that items offered are in strict compliance with these specifications, and successful Offeror will be held accountable. Deviations must be explained by accompanied documentation identifying and justifying all exceptions and deviations. Unidentified deviations found during the evaluation of the response may be cause for rejection.

55. PROMPT PAYMENT DISCOUNT TERMS
Prompt payment discount terms will be calculated from the point of complete order acceptance for services and/or commodities ordered.

56. REJECTION
The City reserves the right to reject any proposal that contains prices for individual items or services that are unreasonable when compared with the same or other proposals if such action is in the best interest of the City.

57. ARBITRATION
Under no circumstances and with no exception will the City of Charleston act as Arbitrator between the Contractor and any Sub-Contractor.

58. GUARANTEE AND WARRANTIES
The Offeror shall state his normal warranty and any extended warranties where available. Excluding any manufacturer's warranties and in addition to other warranties as provided by law or herein, all labor and materials are warranted to be free from defects for a minimum period of twenty-four (24) months after the date of final payment by the City.

59. PUBLICITY RELEASES
Contractor agrees not to refer to any award of a contract in commercial advertising in such a manner as to state or imply that the products or services provided are endorsed or preferred by the user.

60. AMENDMENTS
All questions and written responses, interpretations, corrections or changes to the RFP will be made by Addendum. Addenda will be mailed or otherwise delivered to all Offerors who have notified the City Procurement Division of receipt of the proposal.

61. WITHDRAWALS
Proposals may be withdrawn by written request received from the Offeror prior to the time set for opening of Proposals, but not thereafter.

62. AFFIRMATIVE ACTION
The successful Offeror will take affirmative action in complying with all Federal and State requirements concerning fair employment and treatment of all employees, without regard or discrimination by reason of race, color, religion, sex, national origin or physical handicap.
63. **WAIVER**
   The City reserves the right to waive any Instruction to Offerors, General or Special Provisions, General of Special Conditions, or specifications deviation if deemed to be in the best interest of the City.

64. **RESPONSE PERIOD**
   All responses shall be good for a minimum period of ninety (90) calendar days.

65. **CONTRACT TERMS**
   The initial term of the Agreement shall be for one (1) year. The City reserves the right to extend the Agreement if the City determines the extension is in its best interest; said extension will be on an annual basis and shall not exceed four (4) additional one (1) year periods.
**NO PROPOSAL RESPONSE FORM**

<table>
<thead>
<tr>
<th>Proposal Number: 21-P027R</th>
<th>Proposals will be received until: September 28, 2021 @ 12:00pm</th>
</tr>
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<tbody>
<tr>
<td>Proposal Title: Realtor Services</td>
<td></td>
</tr>
<tr>
<td>Mailing Date: September 1, 2021</td>
<td>Direct Inquiries to: Robin B. Robinson</td>
</tr>
<tr>
<td>Vendor Name:</td>
<td>FEIN/SS#:</td>
</tr>
<tr>
<td>Vendor Address:</td>
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<td>City – State – Zip:</td>
<td></td>
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<tr>
<td>Telephone Number:</td>
<td>Fax Number:</td>
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**Minority or Women Owned Business:**  
Are you a certified Minority or Women-Owned business in the State of South Carolina?  
☐ Yes  ☐ No  
If so, please provide a copy of your certificate with your response.

<table>
<thead>
<tr>
<th>Authorized Signature:</th>
<th>Title:</th>
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<tbody>
<tr>
<td>Date:</td>
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</table>

I certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm, or person submitting a bid for the same materials, supplies, equipment or services and is in all respects fair and without collusion or fraud. I agree to abide by all conditions of this bid and certify that I am authorized to sign this bid for the bidder. **This signed page must be sent in if not sending in a submission.**

To submit a “No Proposal” response for this project, this form must be completed for your company to remain on our Offeror’s list for commodities/services referenced. If you do not respond, your name may be removed from the Offeror’s list.

Please check statement(s) applicable to your “No Proposal” response

- Specifications are restrictive; i.e. geared toward one brand or manufacturer only (explain below).
- Specifications are ambiguous (explain below).
- We are unable to meet specifications.
- Insufficient time to respond to the solicitation.
- Our schedule would not permit us to perform.
- We are unable to meet bond requirements.
- We are unable to meet insurance requirements.
- We do not offer this product or service.
- Remove us from your vendor list for this commodity/service.
- Other (specify below).

Comments:

________________________________________________________________________

________________________________________________________________________
CERTIFICATE OF FAMILIARITY

The undersigned, having fully familiarized himself with the information contained within this entire solicitation and applicable amendments, submits the attached proposal, and other applicable information to the City, which I verify to be true and correct to the best of my knowledge. I further certify that this proposal response is made without prior understanding, agreement, or connection with any corporation, firm or person submitting a proposal for the same materials, supplies, equipment or services in all respects, fair and without collusion or fraud. I agree to proposal by all conditions of this solicitation and certify that I am authorized to sign this proposal. I further certify all prices submitted shall remain effective for a minimum period of ninety (90) days, unless otherwise stated.

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Authorized Signature</th>
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<tbody>
<tr>
<td>As registered with the IRS</td>
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<tr>
<td>Correspondence Address</td>
<td>Printed Name</td>
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<tr>
<td>City, State, Zip</td>
<td>Title</td>
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<tr>
<td>Email</td>
<td>Telephone Number/Toll Free Also (If Available)</td>
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<td>Remittance Address</td>
<td>Fax Number</td>
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<tr>
<td>City, State, Zip</td>
<td>Date</td>
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<tr>
<td>Federal Tax ID (FEIN)/SS Number</td>
<td>SC Sales Tax Number</td>
</tr>
</tbody>
</table>

**Minority or Women-Owned Business:**
Are you a certified Minority or Women-Owned business in the State of SC?
☐ Yes ☐ No
If so, please provide a copy of your certificate with your response.
**INSURANCE REQUIREMENTS**

Contractors working for the City of Charleston are required to procure and maintain for the duration of their contract with the City insurance against claims for injuries to persons or damages to property which may arise from or in connection with work performed by the Contractor, his agents, representatives, employees or Subcontractors. The cost of such insurance shall be the responsibility of the Contractor.

A. The Contractor shall carry liability insurance with a reliable company licensed to do business in South Carolina. Coverage shall be at least broad as:

1. Insurance Services Office Commercial General Liability Coverage Form ("occurrence") CG 00 01 10 93.

2. Insurance Services Office Business Auto Coverage Form CA 00 01 6 92 covering automobile liability, code 1 "any auto".

B. Contractor shall carry workers’ compensation as required by the State of South Carolina and Employers Liability insurance (including applicable occupation disease provisions and all state endorsements.)

C. Contractor shall maintain limits no less than the following:

1. **GENERAL LIABILITY**: $1,000,000 combined single limit per occurrence for bodily injury, property damage, and personal injury with a $2,000,000 general aggregate limit.

2. **AUTOMOBILE LIABILITY**: $1,000,000 combined single limit per accident for bodily injury and property damage.

3. **WORKERS’ COMPENSATION**: Statutory limits are required by South Carolina state law, and employer’s liability limits of $100,000 per accident.

4. **PROFESSIONAL LIABILITY**: $1,000,000 per claim/$1,000,000 aggregate limit, with a deductible of $20,000.

Contractor shall obtain and maintain a professional liability insurance policy covering the performance of the professional services specified in this agreement. Evidence of such insurance shall be satisfactory in form and content to the owner, the City. This coverage shall be maintained through the duration of this project and for a minimum of 1 year after substantial completion of the project as determined by the City.

The Contractor and any of its subcontractors will cause the professional liability insurance required in this paragraph C.4:

(a) to be excess insurance over any project professional liability policy, and
(b) to be primary insurance in the event the project insurance described in Paragraph E is canceled or not maintained, in the event the policy's limits of liability are exhausted, or if the policy expires.

D. Required policies are to contain, or be endorsed to contain, the following provisions:

1. General Liability and Automobile Liability Coverages

   The City of Charleston, its officials, employees and volunteers are to be covered as additional insureds as respects: Liability arising out of activities performed by or on behalf of the Contractors; premises owned, occupied or used by the Contractor; or automobiles owned, leased, hired or borrowed by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to the City of Charleston, its officials, employees or volunteers. To accomplish this objective, the City of Charleston shall be named as an additional insured under the Contractor's general liability policy by attaching Insurance Services Office Commercial General Liability Endorsement CG2010 10 93 (Additional Insured - Owners, Lessees or Contractors - Form B) or its equivalent. Contractors' insurance coverage shall be primary insurance as respects the City of Charleston, its officials, employees and volunteers. Any insurance or self-insurance maintained by the City of Charleston, its officials, employees, or volunteers shall be in excess of the Contractor's insurance and shall not be required to contribute. To accomplish this objective, the following wording should be incorporated in the previously referenced additional insured endorsement.

   Other Insurance: This insurance is primary, and our obligations are not affected by any other insurance carried by the additional insured whether primary, excess, contingent or on any other basis.

   Any failure to comply with reporting provisions of the Contractor's policies shall not affect coverage provided to the City of Charleston, its officials, employees or volunteers.

2. Workers' Compensation

   The Contractor shall agree to waive all rights of subrogation against the City of Charleston, its officials, employees and volunteers for losses arising from work performed by the Contractor for the City of Charleston.

E. Any deductibles or self-insured retentions shall be the responsibility of the Contractor.

F. Each insured policy required by the City of Charleston shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days prior written notice has been given to the City of Charleston.

G. All coverages for Subcontractors shall be subject to all the requirements stated herein.
H. Insurance must be placed with an approved insurance company with current Best’s rating of A+, A, or A-. Exceptions to this requirement must be approved in writing by the Department of Risk Management.

I. Contractor shall furnish the City of Charleston with Certificates of Insurance noting the endorsements. The Certificates and endorsements for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. All certificates and endorsements are to be received and approved by the City of Charleston, Procurement Division, before work commences. The City of Charleston reserves the right to require complete, certified copies of all required insurance policies, at any time.

Required certificates should be mailed to:

City of Charleston
Procurement Division
75 Calhoun Street, Ste. 3500
Charleston, SC 29401
MWBE Compliance Provisions and Instructions
Minority/Women Business Enterprise Program Forms

This Project is covered under the City of Charleston’s Minority/Women Business Enterprise (MWBE) Program, administered by Ruth Jordan, MBE Manager, 2 George Street, Suite 3600, Charleston SC, 29401, (843) 724-7434.

The City has established goals for both Minority Business Enterprises (MBE) and Women Business Enterprises (WBE). An MBE is a small business owned and controlled by a minority. A WBE is a small business owned and controlled by a woman. The minority or woman must own fifty-one percent (51%) of the business and they must control the management and daily operations of the business in order to qualify.

Charleston City Council has adopted a policy setting 20% as the guidelines for combined minority-owned and women-owned business enterprise participation for this project. This MWBE requirement for participation in this Contract for services shall be made a part of any contract resulting from this solicitation. These requirements shall also apply to all subcontracts issued by the successful bidder(s).

All bidders must document the extent of their MWBE participation by completing the MWBE Compliance Provision Forms.

All MBE/WBE subcontractors must have a Certificate of Eligibility on file with the City’s Minority Business Enterprise Office. A list of certified minority and women-owned firms can be found on the City of Charleston’s website www.charleston-sc.gov under “BIDLINE” link or by contacting Ruth Jordan, MBE Manager, 2 George Street, Suite 3600, Charleston SC, 29401, (843) 724-7434, jordanr@charleston-sc.gov.

COMPLIANCE REQUIREMENTS:

1. The Bidder shall provide, with their bid form submittal, the following Affidavits properly executed which signify that the Bidder understands and agrees to abide by the City’s MWBE Compliance Provisions.


   AND

   □ Affidavit B – Work to be Performed by Minority and/or Women-owned Firms

   OR

   □ Affidavit C – Intent to Perform Contract with Own Workforce, in making this certification the Bidder states that the Bidder does not customarily subcontract elements of this type of Project and will perform all elements of the work with his/her own current work forces.

Failure to comply with any of the statements, certifications, or intentions stated in the affidavits, or the MBE/WBE compliance provisions shall constitute a breach of the Contract. Any such breach may result in termination of the Contract in accordance with the termination provisions contained in the Contract. It shall be solely at the option of the City of Charleston whether to terminate the contract for breach. In addition to terminating the Contract, the bidder may be prohibited from participation in future solicitations as determined by the City of Charleston.

__________________________
Name of Company:

__________________________
Signature

__________________________
Print Name

__________________________
Date

__________________________
Title

Witness
AFFIDAVIT A  
Page 1 of 2

City of Charleston, South Carolina Listing of the Good Faith Effort

Affidavit of ____________________________________________
(Name of Bidder)

I have made a good faith effort to comply with the City of Charleston’s MWBE compliance provisions under the following checked areas:
(A minimum of 6 areas must be checked in order to have achieved a "good faith effort")

○ 1. Contacted MWBE businesses that reasonably could have been expected to submit a quote and that were known to the Bidder, or available on Federal, State or local government maintained lists, at least 10 business days before the submittal date and notified them of the nature and scope of the work to be performed. Complete Affidavit A, Page 2.

○ 2. Followed up with contacted MWBE subsequent to the initial contact and at least 72 hours prior to submittal deadline/bid opening either by phone, facsimile or in person.

○ 3. Made the construction plans, specifications, and requirements available for review by prospective MWBE businesses, or providing these documents to them at least 10 business days before the submittal deadline/bid opening.

○ 4. Itemized elements of the work or combined elements of the work into economically feasible units to facilitate MWBE participation.

○ 5. Attended any pre-solicitation meetings scheduled by the City.

○ 6. Provided MWBE assistance with getting required bonding or insurance requirements or provided alternatives to bonding or insurance.

○ 7. Negotiated in good faith with interested MWBEs and did not reject them as unqualified without sound reasons based on their capabilities. (Any rejection of a minority or woman-owned business based on lack of qualifications shall include reasons for rejection documented in writing.)

○ 8. Provided MWBEs assistance with securing needed equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisted MWBEs in obtaining the same unit pricing with the Bidder's suppliers in order to help such businesses in establishing credit.

○ 9. Provided training or mentoring to at least two (2) MWBEs within 120 days prior to submittal deadline/bid opening. The training or mentoring program should be in conjunction with local trade groups, technical schools or community organizations that provide recruitment, education or skill levels.

○ 10. Negotiated joint venture, partnership or other similar arrangements with MWBEs in order to increase opportunities for MWBE participation.

○ 11. Provided quick pay agreements and policies to enable MWBE contractors and suppliers to meet cash-flow demands.

I hereby agree to enter into a formal agreement with the firms listed in Affidavit B Work to be performed by Minority Firms conditional upon execution of a contract with the Owner. Failure to abide by this provision will constitute a breach of the contract.

I hereby certify that I have read and agree to the terms of the Minority / Women-Owned Business Enterprise Program, and I am the Bidder or I am authorized to bind the Bidder to the commitment herein set forth.

Date: __________ Name of Authorized Officer (Print/Type): ___________________________  
Signature: ___________________________  
Title: ___________________________
AFFIDAVIT A
Page 2 of 2

City of Charleston, South Carolina Minority/Women-Owned Business Participation Efforts
(Use as many sheets as necessary)

I, ____________________________________________ , hereby certify that on this project we contacted the following minority/women-owned business enterprises as subcontractors, vendors, suppliers, or providers of professional services.

<table>
<thead>
<tr>
<th>1. Minority Firm Name and Contact</th>
<th>Minority Firm Address</th>
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<tbody>
<tr>
<td>Minority Firm Telephone Number</td>
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<td>Minority Firm Fax Number</td>
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<tr>
<td>DBE Certification Number</td>
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<td>Minority Group Type</td>
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<td>☐ Follow up Verification</td>
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I certify, under penalties of perjury, that I have examined the information in this affidavit, and to the best of my knowledge and belief, this information is true, correct and complete.

Date: ______________ Name of Authorized Officer (Print/Type): ________________________________

Sworn to before me this ___ day of ____________, 20__. Signature: ________________________________

Notary Public for the State of ________________________________
My Commission Expires: ________________________________
Print Name: ________________________________ Title: ________________________________
Phone Number: ________________________________ Address: ________________________________

Notary Seal:
AFFIDAVIT B

City of Charleston, South Carolina
Work to be Performed by Minority/Women-Owned Businesses

Affidavit of _________________________________. I hereby certify that on the
(Name of Bidder)
_____________________________________, Total Project Amount $_____________

(Project Name)
I will make a good faith effort to expend a minimum of ______% of the total dollar amount of the Contract
with minority/women-owned business enterprises. Minority/women-owned businesses will be employed as
subcontractors, vendors, suppliers, or providers of professional services. Such work will be subcontracted to
the following businesses listed below:

(Attach additional sheets if needed)

<table>
<thead>
<tr>
<th>Name and Phone Number</th>
<th>*Minority Code</th>
<th>Work Description</th>
<th>Dollar Value</th>
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</table>

Total MBE Participation: ______ % $_________

* Minority categories: African American (B); Hispanic (H); Asian American (A), American Indian (I);
Woman Owned (W); Other (D)

I will enter into a formal Contract with the above minority/women-owned business enterprises for the work
listed in the above schedule conditional upon execution of a Contract with the Owner.

I certify that I have read the terms of this commitment and I am the Bidder or authorized to bind the Bidder to
the commitment set forth herein. I certify, under penalties of perjury, that I have examined the information in
this affidavit, and to the best of my knowledge and belief, this information is true, correct and complete.

Date: ___________ Name of Authorized Officer (Print/Type):

Signature: ________________________________
Title: _________________________________

Sworn to before me this ____ day of ____________, 20__. Notary Public for the State of ______________________
My Commission Expires: __________________________ Notary Seal:

Print Name: ________________________________
Phone Number: ______________________________
Address: ________________________________
AFFIDAVIT C

City of Charleston, South Carolina
Intent to Perform Contract with Own Workforce.

Affidavit of ____________________________________________________________

(Name of Bidder)

I hereby certify that it is our intent to perform 100% of the work required for the ____________________________ contract.

(Name of Project)

In making this certification, the Bidder states that the Bidder does not customarily subcontract elements of this type Project, and normally performs and has the capability to perform and will perform all the elements of the work on this Project with his/her own current work forces, and

The Bidder agrees to provide any additional information or documentation requested by the Owner in support of the above statement.

I hereby certify that I have read this certification and I am the Bidder or I am authorized to bind the Bidder to the commitments contained herein. I certify, under penalties of perjury, that I have examined the information in this affidavit, and to the best of my knowledge and belief, this information is true, correct and complete.

Date: __________ Name of Authorized Officer (Print/Type): ________________________________

Signature: ______________________________________

Title: ______________________________________

Sworn to before me this ______ day of ____________, 20__.
Notary Public for the State of ______________________________
My Commission Expires: ______________________________
Print Name: ______________________________________
Phone Number: ____________________________________
Address: _______________________________________

__________________________________________
Notary Seal:

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**References**
Offerors must supply a minimum of three (3) references for which they have provided the same or similar services being requested in the Scope and Statement of Work. If the references have not used similar services, please outline the services that your company has provided to these clients.

| Name: |  
| Address: |  
| Phone/Fax: |  
| Email: |  

| Name: |  
| Address: |  
| Phone/Fax: |  
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| Name: |  
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| Phone/Fax: |  
| Email: |  

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GENERAL INFORMATION

The City of Charleston is seeking a real estate broker (Broker) specializing in residential site selection and related acquisitions to assist the City of Charleston’s Department of Housing & Community Development with identifying tracts of land, in-fill lots or dilapidated structures for the construction of affordable housing in support of its affordable housing programs. It is the intent of this RFP to have the successful firm enter into a professional services agreement with the City of Charleston to provide the real estate services outlined herein.

PROCUREMENT PROCESS
The RFP (Request for Proposal) is **not a bid**. In the event the City elects to negotiate a contract with the successful Vendor, any contract shall contain, at a minimum, the term and conditions (or substantially the same term and conditions) as hereinafter stated. The City reserves the right, in its sole discretion, to reject all submissions, reissue a subsequent RFP, terminate, restructure or amend this procurement process at any time. The final selection and contract negotiation rests solely with the City.

QUESTIONS
Every effort has been made to insure that all information needed by the Offeror is included herein; however, questions are allowed and encouraged to clear up any information as described herein, etc. The City will not accept telephone calls or visits regarding this RFP. **All questions shall be in writing and addressed to: Robin B. Robinson or Vera White, City of Charleston, Procurement Division, 75 Calhoun Street, Suite 3500, Charleston, South Carolina 29401, or email to: robinsonr@charleston-sc.gov or whitev@charleston-sc.gov. Written Questions may also be faxed to: 843-720-3872. All questions must be received before 12:00 pm on September 13, 2021.** No interpretation shall be binding upon the City unless in writing from the City’s Corporate Counsel.

ORAL STATEMENTS
No oral statement of any person shall modify or otherwise change, or affect the terms, conditions or specifications stated in the resulting contract. The City of Charleston shall not be legally bound by any amendment or interpretation that is not in writing.

NON-ENDORSEMENT
If a Proposal is accepted, the successful Offeror shall not issue any news releases or other statements pertaining to the award or servicing of the agreement that state or imply the City’s endorsement of the successful Offeror’s product or services.

PROPRIETARY INFORMATION
If an Offeror does not desire proprietary information in the Proposal to be disclosed, the Offeror shall identify all proprietary information in the Proposal. This identification will be done by individually marking each page with the words “Proprietary Information” or “Confidential” on which such proprietary information is found. If the Offeror fails to identify proprietary information, it agrees that by submission of its Proposal that those sections shall be deemed non-proprietary and made available upon request through the Freedom of Information Act.
UNAUTHORIZED COMMUNICATIONS
Respondents’ contact regarding this RFP with employees or officials of the City of Charleston will result in disqualification from this procurement process. Any oral communications are considered unofficial and non-binding with regard to this RFP. The only authorized contacts for this procurement are any designated Procurement staff.

CONTRACTOR SOLELY RESPONSIBLE FOR PERFORMANCE
Vendor shall be responsible for the performance of the services required by the contract. Vendor is an independent contractor and does not act as the City’s agent or employee.

DISQUALIFICATION OF OFFERORS
Offerors may be disqualified for any of the following reasons:
- Reason to believe collusion exists among the Offerors
- The Offeror is involved in any litigation against the City
- The Offeror is in arrears on any existing contract or has defaulted on a previous contract with the City
- Lack of financial stability
- Failure to perform under previous or present contracts with the City
- Is currently debarred by the State of South Carolina Procurement Services

SUSPENSION AND DEBARMENT
The Offeror certifies, by submission of this proposal, that neither it nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any federal, state or local agency. Where the Offeror is unable to certify to any of the statements in this certification, such Offeror shall attach an explanation to this proposal.

CONTRACT NEGOTIATIONS
The City will rank, based upon the evaluation criteria, all responsible and responsive Vendors. The City will begin negotiations with the top ranked Vendors and will continue with negotiation down the ranking until a satisfactory contract with the City is finalized, if any. The terms and conditions of the contract will be no less advantageous than the provisions of this RFP or the Vendor’s proposal. The City reserves the right to make a partial award or to split the award at its sole discretion.

CONTRACT TERMS
The initial term of the Agreement shall be for one (1) year. The City reserves the right to extend the Agreement if the City determines the extension is in its best interest; said extension will be on an annual basis and shall not exceed four (4) additional one (1) year periods.

VENDOR’S DUTY TO INSPECT & ADVISE AND DECLARE ALL COSTS
Each Vendor shall become fully acquainted with the City’s requirements and the scope of commodities and/or services to be provided. Vendor shall have a duty to request any information from the City as it deems necessary to prepare the RFP. No change order will be granted or additional compensation permitted if based upon information the Vendor knew or should have known as part of the Vendor’s duty to become acquainted with the City’s circumstances and requirements.
PROPOSAL PREPARATION
All proposals should be complete and carefully worded and must convey all the information requested by the City of Charleston. If significant errors are found in the Offeror’s proposal, or if the proposal fails to conform to the essential requirements of the RFP, the City, and the City alone, will be the judge as to whether that variance is significant enough to require rejection of the proposal.

RECEIPT OF PROPOSALS
Proposals must be submitted to and received by the City no later than the date and time specified within this RFP. Offerors mailing proposals should allow a sufficient mail delivery period to insure timely receipt (September 28, 2021 @ 12:00pm) of their proposal by the City. Proposals received after the scheduled due date and time will not be considered. Proposals must be completed and delivered in sufficient time to avoid disqualification for lateness due to difficulties in delivery. The time and date stamp clock in the City Procurement Division is the official clock for determining whether submittals are submitted on time.

Late Proposal documents will not be accepted under any circumstances.

REQUIRED FORMS AND SIGNATURE PAGES
Offerors shall include as an appendix, all ancillary forms required in this Request for Proposal (RFP). Required forms include, but are not limited to the following:

- RFP Cover Page
- Certificate of Familiarity
- W/MBE Good Faith Effort Form and appropriate Affidavit
- Any Addenda

NUMBER OF PROPOSALS SUBMITTED
Each Vendor must submit one (1) unbound Original and eight (8) bound copies of the Proposal are required for submission, plus one (1) electronic copy (Flash Drive) (Please have submittal on flash drive as 2 documents only: Proposal and Cost). Only original documents will be accepted; faxed or electronically mailed versions will not be accepted. The Vendor must mark on the envelope or wrapping containing the proposal, the RFP identification number specified in the RFP and note “Original” on the original proposal.

RESPONSE FORMAT AND ORGANIZATION
To assure similarity in proposal presentation and allow the evaluation team to easily compare competing proposals, Offerors shall include, in the order described, the material indicated below. It is not the intent of the City to constrain Offerors with regard to content, but to assure that the specific requirements set forth in this RFP are addressed in a uniform manner amenable to Evaluation and Selection Committee review. Offerors may include additional sections or appendices if desired, to present additional pertinent information. Offerors should submit information in a concise and responsive manner for every requirement and every question. Non-responsive or incomplete answers to information requests and/or City requirements may lead to disqualification of the Offeror’s submittal.

COMPLETION OF RESPONSES
Only information presented in the Proposal will be used to evaluate the truck that best fits the needs of the City.
Responses shall be completed in accordance with the requirements of this RFP. Statements made by an Offeror shall be without ambiguity, and with adequate elaboration, where necessary, for clear understanding.

**TERM OF AGREEMENT**
The Agreement for the successful Broker is one year from the award date with renewals of 3 one-year extensions, with the ability of either party to terminate the contract upon 30 days prior written notice prior to expiration of the then-current term.

**PROPOSAL FORMAT**
Proposals are to be prepared in a manner designed to provide the City with a straightforward presentation of the Offeror’s capability to satisfy the requirements of this RFP. The **Original shall be single sided and the copies can be bound in a single volume (double sided)** and all documentation submitted with the proposal should be bound in that single volume, where practical.

a) All proposal packages should be clearly marked “21-P027R Realtor Services” and **submitted in a sealed envelope.**

b) Technical and Price proposals should be submitted together in one box/mailing container; however, the price proposal should be in its own separate, sealed envelope, submitted with the original proposal. Please do not waste envelopes putting each copy of the proposal in a separate envelope.

c) Proposals **must be submitted by mail or hand delivered** to Robin B. Robinson, City of Charleston, Procurement Division, 75 Calhoun Street, Suite 3500, Charleston, SC 29401.

d) Proposals **must be received** in the City’s Procurement Office **no later than 12:00pm on September 28, 2021.** Late proposals will not be accepted for any reason.

e) **No more than one proposal may be submitted by any Vendor.**

f) The proposal must be signed by an official authorized to contractually bind the Vendor.

g) All forms from this solicitation requiring signature must be included in the proposal.

h) Offerors should submit proposals in the following format:

1. **Title Page:** Should show the RFP’s subject; the Offeror’s name; the name, address, telephone number and email address of a contact person; and the date of the proposal.

2. **Table of Contents:** Provide a Table of Contents to aid the evaluation of the proposal.

3. **Transmittal Letter:** Proposal should include a signed letter of transmittal briefly stating the Offeror’s understanding of the work to be undertaken, the commitment to perform the work within the time period, a statement of “why” the Offeror believes its firm to be the best qualified to perform the work and a statement that the proposal is a firm and irrevocable offer for ninety (90) calendar days.

4. **Detailed Proposal:** The purpose of the detailed proposal is for the Offeror to demonstrate its qualifications, competence, and capacity to provide Parking Management Services to the City in conformity with the requirements of this RFP.

Offerors should address all the points outlined in the Criteria Factors.
PROPOSAL EVALUATION PROCESS

The City will conduct a comprehensive, fair and impartial evaluation of all Proposals received in response to this request for competitive sealed proposal as defined in this section.

An Evaluation and Selection Committee will be established to evaluate the Proposals and select a proposal which represents the best value to the City. The Evaluation and Selection Committee will be comprised of City personnel and any other persons as designated by the City. This Committee will determine the responsiveness and acceptability of each proposal. The Evaluation and Selection Committee may request additional information from Offerors.

The City will conduct a comprehensive, fair and impartial evaluation of all Proposals received in response to this RFP. Each Proposal received will first be analyzed to determine overall responsiveness and completeness to this RFP. Each Proposal will then be evaluated based on each of the criteria as outlined in Proposal Evaluation Criteria Factors, and after which identified as either reasonably qualified or unqualified. A Proposal will be declared unqualified if it clearly fails to demonstrate, in any of the listed areas, a standard that the City believes necessary to meet the requirements set forth in this RFP.

Following their review of all submitted Proposals, the Selection Committee may select a shortlist of the highest ranked reasonably-qualified Offerors. Shortlisted Offerors will be invited to present their Proposal to the Evaluation and Selection Committee.

The City may issue a request for clarification to the shortlisted firms requesting additional information or clarifications. This request will also invite each of the Offerors to give a formal presentation to the Evaluation and Selection Committee and outline the format of the presentation.

The purpose of the presentations will be to allow Offerors to further present their proposal and allow members of the Evaluation and Selection Committee to ask questions of the proposed project team.

PROPOSAL EVALUATION CRITERIA FACTORS

The following weighted criteria will be used to evaluate the Proposals for purposes of selecting the Offeror(s) to negotiate with or to shortlist.

Criteria Factors

➤ Completeness of Response to RFP

➤ Proven Real Estate & Site Selection Track Record

➤ Knowledge of Site Acquisition Processes, Zoning

➤ Proven Site Acquisition Experience, Qualifications and Past & Present Performance

➤ Familiarity with the City of Charleston’s Real Estate Housing Market

➤ Fee Schedule/Commission Structure

It is the Offeror’s responsibility to effectively communicate their qualifications, services, and products to the City by thoroughly responding to each requirement contained in this RFP.
Real Estate Site Acquisition Services

The City of Charleston is seeking a real estate broker (Broker) specializing in residential site selection and related acquisitions to assist the City of Charleston’s Department of Housing & Community Development with identifying tracts of land, in-fill lots or dilapidated structures for the construction of affordable housing in support of its affordable housing programs. It is the intent of this RFP to have the successful firm enter into a professional services agreement with the City of Charleston to provide the real estate services outlined herein.

The real estate firm will be paid strictly on a commission basis and will be expected to work closely with the staff of the City of Charleston Housing and Community Development Department and Real Estate Division staff to provide reports no less frequently than monthly.

Background
The City of Charleston remains one of the most desirable places to live, work and raise a family. The Charleston area has seen an unprecedented increase in its population growth and demand for housing. The rise in housing demand creates the need for increased housing opportunities for households at all economic levels. The City of Charleston, in coordination with private, public, and non-profit housing developers have made significant contributions to the provision of affordable housing. However, the City of Charleston seeks to enhance the efforts made to date by expanding the supply of affordable rental and for-sale housing available on Charleston’s Peninsula, West of the Ashley, Daniel Island, James and Johns Island. The goal of including affordable housing in these areas is one that was articulated in the City of Charleston’s 2020 Consolidated Plan, the City of Charleston’s Housing for a Fairer Charleston Plan and most recently in the Comprehensive Plan. As the development of affordable housing remains one of the most pressing issues facing the Charleston community, we are poised to achieve the goals as outlined below by securing additional parcels or structures that would assist in advancing the efforts made to date under the First Time Homeownership Initiative as well as other housing programs managed by the City of Charleston. Those goals include:

1. Housing strategies designed to ensure that the breadth of housing opportunities continue to exist for generations to come.
2. Housing opportunities that address the needs of residents requiring rental housing and for-sale housing.
3. Housing opportunities provided across a broad range of family incomes, including families whose incomes are less than sixty (60%) percent of the Area Median Income (AMI).
4. Housing with a variety of price points to ensure economic integration within and between neighborhoods.
5. Housing with the highest quality build and appearance with products used to maintain the property over the life of the building.
6. A housing finance model that ensures economic sustainability for the end-user or end-buyer.
Site Characteristics Desired
The City will consider all sites, vacant or having existing structures, within the City limits. However, priority will be given to sites around/along the Lowline. Other sites should meet the following criteria:

- Close to public transportation
- Close to amenities—medical services, supermarkets, retail, etc.
- One-half (½) acre minimum size
- Minimal or no wetlands disturbed. Cost of land in relation to number of units produced
- Availability of utility services and infrastructure

The goal is to identify sites for current and future development of single-family detached, single-family attached and multifamily affordable housing.

Scope of Services
The successful individual or firm will provide the following services:

- Meet with appropriate City staff to discuss target areas.
- Develop strategies for the acquisition of properties located in the target areas.
- Identify and visit potential sites, review feasibility, obtain/review relevant documents and information including title reports, encumbrances, easements, zoning parcel maps, deeds, photographs, etc., about potential sites.
- Arrange site visits with appropriate staff members.
- Assist with contract negotiations.
- Handle all other customary activities and services associated with real estate transactions.

Broker Qualifications
Responders should have the following qualifications:

- Licensed Broker and in good standing with the State of South Carolina.
- City of Charleston business license.
- Excellent reputation in the real estate community.
- Knowledgeable of the Charleston real estate market, especially in the designated areas identified as target markets and experience with small and large site acquisitions.
- Knowledgeable in conducting research of public real estate records.
- Five years minimum real estate experience to assist the City with site acquisition.
- Knowledge of residential zoning requirements, wetlands determination and site regulations, etc.
- Excellent verbal and written communication skills.
- Knowledge and understanding of legal and jurisdictional requirements.

Fee Schedule
- Successful Broker must provide commission rate structure. If the property is listed and has a commission fee paid to the Buyer’s agent, the Broker must rely on that commission fee as their sole compensation for that site acquisition.
- Successful Broker should provide any/all costs associated with the provision of services to the City.
RFP Submittal Requirements
The following information must accompany the submittal:
Description of firm, including size of firm, location, number and nature of the professional staff
to be assigned to the City – include brief resumes for each key person’s experience and training.
Identify the “lead” person who would be in charge of coordinating and supervising services for
the City.

Description of experience (minimum five years previous experience with proven effectiveness)
your firm has in site acquisition.
Experience in assisting municipalities, if any, with similar work.
Describe current and pending litigation against the firm or individuals who would be providing
services to the City and any outstanding judgments and liens.
Describe the methods of identifying target sites.
A minimum of 3 references.
Fee schedule.

Confidentiality: By submitting a proposal, you and your firm and any affiliated firms agree that
if the City of Charleston selects you as the successful Broker, you shall keep confidential all
information provided to you by the City and you will not disclose to potential sellers or any other
parties that the City is the Principal for which you are seeking a location until such time as the
City shall give written permission for such disclosure or you are otherwise required by legal
process to make such disclosure.

Timeline
The Selection Schedule tentatively proposed for this project is listed below. Please note that all
dates are subject to change at the City’s sole discretion.

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFP issued</td>
<td>September 3, 2021</td>
</tr>
<tr>
<td>Close of Question/Answer Period</td>
<td>September 13, 2021</td>
</tr>
<tr>
<td>Proposal Submittal Deadline</td>
<td>September 28, 2021</td>
</tr>
<tr>
<td>Selection Committee Meeting – Week of</td>
<td>October 6, 2021</td>
</tr>
<tr>
<td>Panel Presentations (If necessary) – Week of</td>
<td>October 11, 2021</td>
</tr>
<tr>
<td>Final Selection Committee Meeting – Week of</td>
<td>October 11, 2021</td>
</tr>
<tr>
<td>Notification of Broker Selection – Week of</td>
<td>October 18, 2021</td>
</tr>
<tr>
<td>City Council Approval of Contractual Agreement</td>
<td>November 23, 2021</td>
</tr>
</tbody>
</table>
Vendor’s Checklist

1. Did you provide required information and sign the front page of the solicitation?
   ____ Yes ____ No

2. Did you sign the Certificate of Familiarity form?
   ____ Yes ____ No

3. Did you sign the City of Charleston M/WBE Compliance Provisions forms?
   ____ Yes ____ No

4. Did you sign the applicable Affidavit?
   ____ Yes ____ No

5. Did you mark your “Original” Proposal and provide the required # of copies?
   ____ Yes ____ No

6. Did you complete and include all pricing sheets?
   ____ Yes ____ No

7. Did you include the required references?
   ____ Yes ____ No

8. Did you provide a copy of insurance and all other documentation requested?
   ____ Yes ____ No

9. Did you include and sign any addenda?
   ____ Yes ____ No

10. Did you double check to make sure you have included everything that is requested?
    ____ Yes ____ No

If you have any concerns, please do not wait until after opening to raise them. At that point, it is too late. If this solicitation includes a pre-bid conference or a question & answer period, raise your questions during this time. Please read the proposal carefully.

This checklist is included only as a reminder to help Offerors avoid common mistakes. Responsiveness will be evaluated against the solicitation, not against this checklist. You do not need to return this checklist with your response.
INSURANCE REQUIREMENTS

Contractors working for the City of Charleston are required to procure and maintain for the duration of their contract with the City insurance against claims for injuries to persons or damages to property which may arise from or in connection with work performed by the Contractor, his agents, representatives, employees or Subcontractors. The cost of such insurance shall be the responsibility of the Contractor.

A. The Contractor shall carry liability insurance with a reliable company licensed to do business in South Carolina. Coverage shall be at least broad as:

1. Insurance Services Office Commercial General Liability Coverage Form ("occurrence") CG 00 01 10 93.

2. Insurance Services Office Business Auto Coverage Form CA 00 01 6 92 covering automobile liability, code 1 "any auto".

B. Contractor shall carry workers' compensation as required by the State of South Carolina and Employers Liability insurance (including applicable occupation disease provisions and all state endorsements.)

C. Contractor shall maintain limits no less than the following:

1. GENERAL LIABILITY: $1,000,000 combined single limit per occurrence for bodily injury, property damage, and personal injury with a $2,000,000 general aggregate limit.

2. AUTOMOBILE LIABILITY: $1,000,000 combined single limit per accident for bodily injury and property damage.

3. WORKERS' COMPENSATION: Statutory limits are required by South Carolina state law, and employer's liability limits of $100,000 per accident.

4. PROFESSIONAL LIABILITY: $1,000,000 per claim/$1,000,000 aggregate limit, with a deductible of $20,000.

Contractor shall obtain and maintain a professional liability insurance policy covering the performance of the professional services specified in this agreement. Evidence of such insurance shall be satisfactory in form and content to the owner, the City. This coverage shall be maintained through the duration of this project and for a minimum of 1 year after substantial completion of the project as determined by the City.

The Contractor and any of its subcontractors will cause the professional liability insurance required in this paragraph C.4:
(a) to be excess insurance over any project professional liability policy, and
(b) to be primary insurance in the event the project insurance described in Paragraph E is canceled or not maintained, in the event the policy’s limits of liability are exhausted, or if the policy expires.

D. Required policies are to contain, or be endorsed to contain, the following provisions:

1. General Liability and Automobile Liability Coverages

The City of Charleston, its officials, employees and volunteers are to be covered as additional insureds as respects: Liability arising out of activities performed by or on behalf of the Contractors; premises owned, occupied or used by the Contractor; or automobiles owned, leased, hired or borrowed by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to the City of Charleston, its officials, employees or volunteers. To accomplish this objective, the City of Charleston shall be named as an additional insured under the Contractor’s general liability policy by attaching Insurance Services Office Commercial General Liability Endorsement CG2010 10 93 (Additional Insured - Owners, Lessees or Contractors - Form B) or its equivalent. Contractors’ insurance coverage shall be primary insurance as respects the City of Charleston, its officials, employees and volunteers. Any insurance or self-insurance maintained by the City of Charleston, its officials, employees, or volunteers shall be in excess of the Contractor’s insurance and shall not be required to contribute. To accomplish this objective, the following wording should be incorporated in the previously referenced additional insured endorsement.

Other Insurance: This insurance is primary, and our obligations are not affected by any other insurance carried by the additional insured whether primary, excess, contingent or on any other basis.

Any failure to comply with reporting provisions of the Contractor’s policies shall not affect coverage provided to the City of Charleston, its officials, employees or volunteers.

2. Workers’ Compensation

The Contractor shall agree to waive all rights of subrogation against the City of Charleston, its officials, employees and volunteers for losses arising from work performed by the Contractor for the City of Charleston.

E. Any deductibles or self-insured retentions shall be the responsibility of the Contractor.

F. Each insured policy required by the City of Charleston shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days prior written notice has been given to the City of Charleston.

G. All coverages for Subcontractors shall be subject to all the requirements stated herein.
H. Insurance must be placed with an approved insurance company with current Best's rating of A+, A, or A-. Exceptions to this requirement must be approved in writing by the Department of Risk Management.

I. Contractor shall furnish the City of Charleston with Certificates of Insurance noting the endorsements. The Certificates and endorsements for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. All certificates and endorsements are to be received and approved by the City of Charleston, Procurement Division, before work commences. The City of Charleston reserves the right to require complete, certified copies of all required insurance policies, at any time.

Required certificates should be mailed to:

    City of Charleston
    Procurement Division
    75 Calhoun Street, Suite 3500
    Charleston, SC 29401
CITY OF CHARLESTON

RESPONSE TO RFP NO. 21-P027R REALTOR SERVICES

SEPTEMBER 28, 2021

PREPARED BY:

PETER S. FENNELLY, SIOR, MCR, SLCR
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BRIDGE COMMERCIAL

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TRANSMITTAL LETTER

September 28, 2021

Robin B. Robinson
City of Charleston Procurement Division
75 Calhoun Street, Suite 3500
Charleston, SC 29401

Re: Response to RFP No. 21-P027R

Dear Robin:

Bridge Commercial is pleased to submit our response for RFP No. 21-P027R, the Request for Proposal for Real Estate Services for Acquisition Services for the City of Charleston. Bridge Commercial provides an excellent platform with significant experience in site selection for residential, multifamily and affordable housing development. We thoroughly understand the process of identifying land for development and existing properties for adaptive reuse. The team members selected for this assignment are very familiar with the City’s zoning ordinances and have represented developers in the acquisition of land for multifamily development downtown, West Ashley, James Island, Johns Island, Clements Ferry corridor and Daniel Island. Bridge Commercial is highly active in the City of Charleston, where we have a long and successful track record of assisting our clients in finding off-market opportunities. Our team appreciates the need for more affordable housing and we welcome the opportunity to work with the City to create new housing solutions that will benefit our community for decades to come. We are confident that Bridge Commercial is the most qualified brokerage firm in the region to perform these advisory and acquisition services.

Our members have worked on behalf of federal (ex US Bankruptcy Court), state (ex MUSC, SCRA), and local (ex College of Charleston) entities with boards and well-defined processes. We understand complex assignments having disposed of some of the largest, most complex properties in Charleston including the Magnolia development and the Navy Hospital involving specific timelines, rigorous reporting, and strict confidentiality requirements. We pride ourselves on being best in class for taking on complex assignments and tailoring our approach to meet our clients’ specific needs.

The City of Charleston is a top priority for Bridge Commercial and this assignment will receive our highest level of commitment. Unlike many other commercial real estate firms doing business in Charleston, we are headquartered here, and all of our shareholders reside in the Charleston area. Our company is comprised of citizens also heavily involved in the community with members previously serving on boards and executive committees for the Charleston County Aviation Authority, Charleston County Tax Appeals Board, Urban Land Institute, Charleston Regional Development Authority and many others.

Bridge Commercial is a top real estate service firm trusted by some of the largest corporations locally, regionally, and nationally. We are proud to have served many corporate entities including Volvo, Mercedes Benz Vans, Cummins, SAIC and Boeing, in our group of clients. We also market and sell properties to a wide range of investors from large institutions to local investors. Examples include nationally focused groups such as STAG Industrial of Boston, internationally focused groups such as North America Sekisui House of Japan, regionally focused groups such as Greystar, and locally focused groups such as Woodfield Development of Charleston.

As President of Bridge Commercial, I lead the firm with Seth Clark and Daniel Pellegrino, as project leads, serving together as your main points of contact. As a real estate professional for over 30 years, I understand the importance of client satisfaction and performance and have dedicated my career to serving my clients.

Bridge Commercial is willing to enter into a contract to perform the designated services outlined in the Request for Proposal No. 21-P027R. I will personally oversee and coordinate our team’s efforts for the City of Charleston. This submittal is a firm and irrevocable qualification for 90 calendar days of submittal.

Peter S. Fennelly, SIOR, MCR, SLCR
ABOUT BRIDGE & PROJECT TEAM
ABOUT BRIDGE

Bridge Commercial is a regionally-focused commercial real estate firm headquartered in Charleston, South Carolina. We provide commercial real estate solutions across the Southeast. Bridge's brokers are best-in-class and known nationally for their experience and expertise. The firm offers a variety of services including tenant representation, owner representation, investment sales, strategic planning, site selection, and consulting services.

Bridge brokers are dedicated professionals in specific asset classes such as office, industrial, retail, and mixed use (multi-family apartments, senior housing, student housing, hotel, and large residential land tracts). They collaborate internally and form teams on behalf of every client, providing clients with the full strength of the organization.

Bridge provides their clients with the best real-time data and analytics available. The firm combines the best technology with aggressive real-time market data collection. We are relentless in our collection and databasing of building lease data, building and land sales data, and current construction data.

The principals of Bridge occupy leadership positions in key commercial organizations including SIOR, CoreNet, ULI, and IACJC. Additionally, we stay on top of local industry trends and associations through committing our time to industry organizations such as the Maritime Association, the Propeller Club, ULI, CFO Council, Charleston Defense Contractor Association, and Chamber of Commerce.

Bridge's mission is to best serve our clients with the combination of collaborative teamwork, experienced and dedicated talent, and the leveraging of technology and innovation.

HISTORY

Bridge Commercial was formed in November 2017 by a group of seasoned brokers with a long track record of success and collaboration in the Charleston market. Bridge is headquartered in Charleston County and, while we transact across the country, in multiple property types, the majority of our transactions occur in the Charleston area.

YEARS OF SERVICE

The brokers at Bridge Commercial total over 175 years of experience in the commercial real estate brokerage business.

FIRM SIZE

Currently, Bridge has a dedicated team of 20 people including 15 brokers who specialize in all facets of commercial real estate. We also have a property management department, operations manager, and an in-house marketing team.

DEPTH OF SERVICES

Bridge is a full-service commercial real estate firm providing a range of services including: landlord representation, tenant representation, site selection, investment sales, consulting and property management. Bridge Commercial represents buyers, sellers, landlords and tenants.

Our brokers are experts in all commercial product types including industrial, office, land, multi-family, retail, mixed-use, retail, and multi-family. Bridge is one of few (if any) brokerages which generate their own market research reports using data collected directly from brokers and landlords as opposed to using third party data services. That gives Bridge a leg up in our data driven understanding of the market.

REACH

Bridge Commercial is best suited to reach all buyers from local firms to international firms. We pride ourselves on bringing institutional-quality work product to locally driven business. We routinely transact with some of the largest firms in the world but also maintain a major presence with locally based buyers and sellers.
TEAM CREDENTIALS & AFFILIATIONS

SIOR
Society of Industrial & Office REALTORS®

CCIM
Certified Commercial Investment Member

Urban Land Institute
Urban Land Institute

CoreNet Global

International Council of Shopping Centers
International Council of Shopping Centers

National Association of REALTORS®

CSCMP
Council of Supply Chain Management

Charleston Metro Chamber of Commerce
Charleston Metro Chamber of Commerce

The Propeller Club

CDCA

Martime Association
WHY CHOOSE BRIDGE COMMERCIAL?

ONE STOP SHOP

WE HAVE EXPERIENCE WITH SITE SELECTION

WE EXECUTE STRATEGIC PLANNING ON A HIGH LEVEL

WELL CONNECTED ON A NATIONAL LEVEL BUT FOCUSED LOCALLY

OUR LAND ADVISORY TEAM PROVIDES MORE SERVICES THAN TRADITIONAL BROKERAGE

OUR PROCESS IS TRANSPARENT & COLLABORATIVE WITH CLIENTS

WE HAVE A DEEP KNOWLEDGE OF THE MARKET & ASSISTING WITH SITE SELECTION FOR MULTIFAMILY
REAL ESTATE BROKERAGE & MARKETING TEAM EXPERIENCE

OUR TEAM SIMPLIFIES THE PROCESS & DELIVERS RESULTS

Our clients' needs rapidly change from acquisition to ownership to disposition, and our experts keep pace. We adapt to your need for value, security, and speed, and collaborate across service lines to provide the right team of specialists, working together, to achieve your goals.

- We keep the process moving forward and on track
- We advise on more than just real estate
- We represent your interests
- We provide data to make the best decision
- We are your spokesperson while maintaining confidentiality.
- We save you time; hitting the deadlines.

Our site acquisition experience, coupled with our multi-disciplined team, delivers the desired results for our clients.

BRIDGE is the most qualified candidate to work with the city of Charleston on this assignment.

LAND & MULTIFAMILY EXPERTISE

EXPERIENCE WITH ASSOCIATE MUNICIPALITIES

EXPERIENCE WITH SITE SELECTION & LAND ACQUISITION

KNOWLEDGE OF SITE DEVELOPMENT & ZONING

NO PENDING LITIGATION
TEAM PROFILES

PETER S. FENNELLY, SIOR, MCR, SLCR

PRESIDENT
OFFICE AND INDUSTRIAL BROKERAGE
CORPORATE TENANT REPRESENTATION

Direct: +1 843 535 8600
Mobile: +1 843 425 0186
peter.fennelly@bridge-commercial.com
www.bridge-commercial.com/peter.fennelly

AREA OF EXPERTISE
Peter Fennelly specializes in the leasing and sales of office and industrial properties. Additionally, he focuses on corporate tenant representation and advises on workplace strategies.

As President of Bridge Commercial, Peter oversees the business and provides leadership to the entire team.

PROFESSIONAL ACCOMPLISHMENTS
- Completed over 12 million square feet of real estate transactions.
- Costar Power Broker.
- Served as SIOR Chapter President in 2007 and Vice President in 2006 as well as multiple committees in 2003, 2004, and 2005.
- Speaker at the Charleston Commercial Market Forecast in 2013.

BUSINESS BACKGROUND
With over 30 years of experience, Peter has been involved in all facets of commercial real estate including leasing, negotiation, financial analysis and strategic planning.

Peter began his commercial real estate profession in Princeton, New Jersey, where he was directly involved in establishing a corporate real estate firm specializing in the acquisition and disposition of office, industrial and R&D properties on behalf of corporations throughout central New Jersey.

Prior to moving to Charleston, Peter was Senior Vice President for Colliers' San Diego office where he focused on corporate real estate. He also worked for The Staubach Company in Atlanta specializing in tenant representation.

Peter is an avid yachtswoman and tri-athlete, competing in three America's Cup Campaigns.

EDUCATION & QUALIFICATIONS
University of Rhode Island, BS, Accounting

AFFILIATIONS & MEMBERSHIPS
Society of Office and Industrial REALTORS® (SIOR)
CoreNet Global
Council of Supply Chain Management (CSCMP)
Urban Land Institute (ULI)
Charleston Chamber of Commerce

- OVER 30 YEARS OF INDUSTRY EXPERIENCE IN MULTIPLE MARKETS ACROSS THE U.S.
- EXPERTISE IN THE LEASING AND SALES OF OFFICE AND INDUSTRIAL PROPERTIES.
SETH CLARK
VICE PRESIDENT
LAND & INVESTMENT SALES
Direct: +1 843 990 7870
Mobile: +1 843 338 3804
seth.clark@bridge-commercial.com
www.bridge-commercial.com/seth.clark

AREA OF EXPERTISE
Seth Clark represents clients in the acquisition and disposition of land and income producing properties. Land assignments range from complex, urban infill redevelopments to large raw land tracts. Investment sales experience includes multifamily, student housing, office, hotel, retail, resorts and marinas. His clients are institutional investors, developers, national homebuilders, private equity firms, lenders and the bankruptcy courts.

PROFESSIONAL ACCOMPLISHMENTS
- Completed over $500 million in land and investment sales transactions.
- Exclusively marketing one of South Carolina’s largest mixed-use developments consisting of 5,000 acres and entitled for over 6 million square feet of commercial and 9,000 homes.
- Retained by the U.S. Bankruptcy Courts of SC & NY to dispose of numerous properties and experienced in 363 sales.
- Recognized leader in the sale of many high-profile properties in the Charleston region.

BUSINESS BACKGROUND
COLLIERS INTERNATIONAL
Charleston, SC 2009 – 2017
Mr. Clark provided investment real estate counsel to owners, investors and developers. He was a member of the Colliers International Multifamily Advisory Group where he took a leading role growing the platform representing clients in the acquisition, disposition and development of multifamily properties across South Carolina. Received the Colliers International South Carolina Transaction of the Year Award.

COLLETON RIVER DEVELOPMENT COMPANY
Hilton Head Island, SC 2007 – 2009
Mr. Clark with his partners developed and executed a business plan to dispose of the company’s final phases of developer-owned real estate holdings consisting of residential lots and future development parcels totaling approximately $65 million.

CENTEX DESTINATION PROPERTIES
Jacksonville, FL 2005 – 2007
Mr. Clark was part of a small team that led efforts to entitle, brand, market and sell various resort communities across Florida. Projects included oceanfront condominiums, marinas, golf clubs and a hotel valued in excess of $550 million.

OVER 15 YEARS OF EXPERIENCE IN COMMERCIAL REAL ESTATE BROKERAGE AND DEVELOPMENT.

EXPERTISE IN SITE SELECTION, ENTITLEMENT, PREDEVELOPMENT PLANNING, UNDERWRITING, DEVELOPMENT AND SALES.

EDUCATION & QUALIFICATIONS
Florida State University,
BA, Multinational Business and Management

AFFILIATIONS & MEMBERSHIPS
Urban Land Institute (ULI)
National Association of REALTORS® (NAR)
International Council of Shopping Centers (ICSC)
DANIEL PELLEGRINO

VICE PRESIDENT
INVESTMENT SALES, LAND DEVELOPMENT, HOTEL AND RETAIL SPECIALIST

Direct  +1 843 535 8600
Mobile  +1 850 728 1050
daniel.pellegrino@bridge-commercial.com
www.bridge-commercial.com/daniel-pellegrino

AREA OF EXPERTISE

Daniel Pellegrino focuses on local, regional and national user groups in the real estate needs, ranging from site selection to land development advisement. Additionally, he specializes in investment sales from urban, niche product to Class A Institutional product for hotel, multifamily, retail, office and resorts.

Daniel excels at providing his clients a unique perspective and the real time data they need to make the best real estate decision.

PROFESSIONAL ACCOMPLISHMENTS

- Completed over $500 million in land and investment sales transactions.
- Exclusively marketing one of South Carolina’s largest mixed-use developments consisting of 5,000 acres and entitled for over 6 million square feet of commercial and 9,000 homes.
- Retained by the U.S. Bankruptcy Courts of SC & NY to dispose of numerous properties and experienced in 363 sales.
- Recognized leader in the sale of many high-profile properties in the Charleston region.

BUSINESS BACKGROUND

Mr. Pellegrino joined Colliers International’s Charleston office in 2007 as a brokerage associate, where he worked in all facets of the commercial real estate industry.

COLLIERS INTERNATIONAL

Charleston, SC 2007-2017

Mr. Pellegrino joined Colliers International’s Charleston office in 2007 as a brokerage associate, where he learned all facets of the commercial real estate industry. Mr. Pellegrino carved a niche as an expert in complex development transactions as well as hotel, multifamily, retail, office, and resorts. Mr. Pellegrino received the Colliers International South Carolina Transaction of the Year Award.

PERSONAL ACCOMPLISHMENTS:

- Devine Ju Jitsu Black Belt awarded
- Florida High School Sports Hall of Fame for Accomplishments in Track and Field

EDUCATION & QUALIFICATIONS

Georgetown University,
School of Foreign Service,
BA, Political Science Security Studies

AFFILIATIONS & MEMBERSHIPS

Urban Land Institute (ULI)
International Council of Shopping Centers (ICSC)

* OVER 12 YEARS OF EXPERIENCE IN THE COMMERCIAL REAL ESTATE INDUSTRY.

* EXCELS AT INVESTMENT REAL ESTATE SERVICES FROM URBAN NICHE PRODUCT TO CLASS A INSTITUTIONAL PRODUCT FOR HOTEL, MULTIFAMILY, RETAIL, RESORTS AND OFFICE.
NED SPRATT

BROKERAGE INTERN
LAND BROKERAGE

Direct  +1 843 990 7878
Mobile  +1 843 704 998 1891
ned.spratt@bridge-commercial.com
www.bridge-commercial.com/ned.spratt

AREA OF EXPERTISE
Ned Spratt assists in information gathering to help in the problem solving and planning hurdles that may arise in the processes of acquisition and disposition. Ned’s keen eye for potential environmental hurdles and abilities help navigate them in the most sustainable and efficient manner. He has been a great asset in his short time with Bridge. After starting with Bridge in June of this year, he has quickly learned the ins and outs of gathering the right information to answer questions before they come to light and having a plan in place when they do. Ned has attended a few of the most recent Young Brokers meetings and is looking forward to continuing his career, expanding his relationships, and furthering the growth of his knowledge within the industry.

BUSINESS BACKGROUND
Ned began his commercial real estate career in June 2021 when he joined Bridge Commercial as a brokerage intern. He supports the land development team, in addition to assisting other brokers.

PERSONAL ACCOMPLISHMENTS:
• Licensed Coast Guard Captain
• Red Card Certified by the National Wildfire Coordinating Group
• Founding member of Sewanee Trout Unlimited Branch

EDUCATION & QUALIFICATIONS
Sewanee University of the South, BA, Natural Resources & Watershed Sciences

AFFILIATIONS & MEMBERSHIPS
Charleston Young Professionals (CYP)
Charleston Chamber of Commerce
Young Brokers Network (YBN)

NED'S EXPERTISE:
• Map Design
• Land ID and Research
• Landowner Communications and Client Relations
• Problem Solving
• Strategic Planning
TEAM PROFILES

ALICIA NIILAND
MARKETING SPECIALIST

Direct: +1 843 535 8600
Mobile: +1 850 860 2101
alicia.niland@bridge-commercial.com
www.bridge-commercial.com/alicia-niland

AREA OF EXPERTISE
Alicia specializes in executing and creating new marketing strategies for the Bridge Commercial team. Alicia also provides administrative support and market research for the brokerage associates.

Alicia’s expertise includes:
- Digital and Print Marketing
- Graphic Design
- Event Coordination
- Public Relations
- SEO
- Social Media
- Email Marketing
- Budgeting

SOFTWARE PROGRAMS
- Adobe InDesign
- Adobe Photoshop
- Adobe Premiere
- Microsoft Office
- Pictometry
- ArcGIS
- Squarespace

BUSINESS BACKGROUND
Alicia began her commercial real estate career in September 2017 when she joined Colliers International as a marketing coordinator. She supported the retail team in addition to assisting other brokers.

Alicia joined Bridge Commercial in November 2017 as marketing specialist. She earned her Salesman License in 2019 and is working to earn her Certified Commercial Investment Member (CCIM) designation.

Alicia is actively engaged as a committee or board member in many industry affiliations including Commercial Real Estate Women (CREW), the South Carolina International Trade Conference and SCEDA.

Alicia is native to Charleston.

EDUCATION & QUALIFICATIONS
- Clemson University, BA, Political Science

AFFILIATIONS & MEMBERSHIPS
- South Carolina International Trade Conference Board Member
- Commercial Real Estate Women (CREW) Communications Committee Member
- International Council of Shopping Centers (ICSC)
- Clemson Alumni Association
- Charleston County Clemson Club
- Charleston Young Professionals (CYP)
- Charleston Chamber of Commerce
- Young Brokers Network

- OVER 4 YEARS OF MARKETING EXPERIENCE IN THE COMMERCIAL REAL ESTATE INDUSTRY.
- SPECIALIZES IN THE CREATION AND EXECUTION OF NEW MARKETING STRATEGIES FOR THE BRIDGE COMMERCIAL TEAM.
MEGAN MACBRYDE
MARKETING SPECIALIST

Direct: +1 843 990 7870
Mobile: +1704 975 4120
megan.macbryde@bridge-commercial.com
www.bridge-commercial.com/megan-macbryde

AREA OF EXPERTISE
As a Marketing Specialist at Bridge Commercial, Megan is involved in all phases of assigned marketing campaigns including proposal submissions, content creation, digital advertising, and public relations.

Megan's expertise includes:
- Digital and Print Marketing
- Graphic Design
- Event Coordination
- Public Relations
- SEO
- Social Media
- Email Marketing
- Budgeting

SOFTWARE PROGRAMS
- Adobe InDesign
- Adobe Photoshop
- Adobe Premiere
- Microsoft Office
- Pictometry
- ArcGIS
- Squarespace

BUSINESS BACKGROUND
Megan began her commercial real estate profession in Charlotte, North Carolina, where she was a Brokerage Associate at Colliers International. Prior to becoming a Marketing Specialist at Bridge Commercial, she moved to Charleston, South Carolina and was promoted to Marketing Coordinator within the Charleston office of Colliers International.

Megan was with Colliers International for four and a half years, and has now been with Bridge Commercial for three years. She takes continuing education classes every quarter to further her marketing knowledge.

EDUCATION & QUALIFICATIONS
University of North Carolina at Charlotte, BA in Communication

AFFILIATIONS & MEMBERSHIPS
- Chamber of Commerce
- Charleston Young Professionals (CYP)

• OVER 6 YEARS OF INDUSTRY EXPERIENCE IN MULTIPLE MARKETS IN THE SOUTHEAST REGION
• CREATES, MANAGES AND EXECUTES ALL PHASES OF ASSIGNED MARKETING CAMPAIGNS
SITE ACQUISITION EXPERIENCE
PAST PERFORMANCE
FIRM'S SITE SELECTION EXPERIENCE

The team at Bridge Commercial has considerable
expertise in selecting land for development, identifying
opportunities for developers and providing services
that include site analysis, due diligence, and packaging.

REFERENCES:

MIKE SCHWartz
Woodfield Development LLC
Phone: 619-561-2176
mschwartz@bridgecommercial.com

TRACY DOBAN
Humana Foundation
Phone: 859-258-4995
tdoban@bridgecommercial.com

BRIDGET BATES
Highfield Development
Phone: 513-962-3333
bbates@bridgecommercial.com

DAVID BANIS
Phone: 813-856-7232
dbanis@bridgecommercial.com

CLIENTS

DAVIS DEVELOPMENT
DOMINİUM
E COVER
F JAMIESON COMPANY
RANGEWATER
SOUTHERN LAND COMPANY
SPANDRELL
WOODFIELD

Bridge Commercial experiences repeat business with clients
because of our proven track record to get the job done.
Bridge Commercial has more experience assisting clients in land acquisition for multifamily development than any other brokerage company.
The City of Charleston
Procurement Division
75 Calhoun Street, Suite 3500
Charleston, South Carolina 29401
P) 843-724-7312 F) 843-720-3872
www.charleston-sc.gov

Proposal Number: 21-P027R  Proposals will be received until: September 28, 2021 @ 12:00pm
Proposal Title: Realtor Services
Mailing Date: September 1, 2021  Direct Inquiries to: Robin B. Robinson
Vendor Name: Bridge Corporate Solutions, LLC  FEIN/SS#: 82-3212209
Vendor Address: 25 Calhoun Street, Suite 220
City – State – Zip: Charleston, SC 29401
Telephone Number: 843-535-8600  Fax Number: 843-535-8601

Minority or Women Owned Business:
Are you a certified Minority or Women-Owned business in the State of South Carolina?  □ Yes □ No
If so, please provide a copy of your certification with your response.

Authorized Signature: [Signature]  Title: President
Date: 09/27/2021

I certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm, or person submitting a bid for the same materials, supplies, equipment or services and is in all respects fair and without collusion or fraud. I agree to abide by all conditions of this bid and certify that I am authorized to sign this bid for the bidder. This signed page must be included with bid submission.

IMPORTANT

1. This solicitation seeks proposals responding to the Scope of Work for Realtor Services. This solicitation does not commit the City of Charleston to award a contract, to pay any costs incurred in the preparation of applications submitted, or to procure or contract for the services. The City reserves the right to accept or reject any, all or any part of any proposal received as a result of this Solicitation, or to cancel in part or in its entirety this Solicitation if it is in the best interest of the City to do so. The City shall be the sole judge as to whether proposals submitted meet all requirements contained in this solicitation.

2. Offeror may mail, or hand-deliver response to the Procurement Division. Do Not Fax in the proposal response. Please show the solicitation number on the outside of any mailing package. The City of Charleston assumes no responsibility for unmarked or improperly marked envelopes. If directing any other correspondence to the Procurement Division not related to the solicitation, please do not include the solicitation number on the envelope. If the Bidder chooses not to respond to this solicitation, it is recommended to return the “No Proposal Response Form” to our office.

3. DEADLINE FOR SUBMISSION OF OFFER: Any proposal or offer received after the Procurement Director or his designee has declared that the time set for opening has arrived, shall be rejected unless the offer has been delivered to the designated purchasing office or the governmental bodies’ mail room which services that purchasing office prior to the proposal opening.

4. Questions regarding this solicitation must be submitted in writing to Robin B. Robinson or Vera White no later than 12:00pm on September 13, 2021. Questions may either be faxed to 843-720-3872 or emailed to Robin Barrett Robinson, robinsonr@charleston-sc.gov or Vera White, whitev@charleston-sc.gov.

1
CERTIFICATE OF FAMILIARITY

The undersigned, having fully familiarized himself with the information contained within this entire solicitation and applicable amendments, submits the attached proposal, and other applicable information to the City, which I verify to be true and correct to the best of my knowledge. I further certify that this proposal response is made without prior understanding, agreement, or connection with any corporation, firm or person submitting a proposal for the same materials, supplies, equipment or services in all respects, fair and without collusion or fraud. I agree to proposal by all conditions of this solicitation and certify that I am authorized to sign this proposal. I further certify all prices submitted shall remain effective for a minimum period of ninety (90) days, unless otherwise stated.

Bridge Corporate Solutions, LLC
Company Name
As registered with the IRS
25 Calhoun Street, Suite 220
Correspondence Address
Charleston, SC 29401
City, State, Zip
peter.fennelly@bridge-commercial.com
Email
843-535-8600
Telephone Number/Toll Free Also (If Available)

Authorized Signature

Peter S. Fennelly
Printed Name
President
Title

25 Calhoun Street, Suite 220
Remittance Address
Charleston, SC 29401
City, State, Zip
82-3212209
Federal Tax ID (FEIN)/SS Number

SC Sales Tax Number

Minority or Women-Owned Business:
Are you a certified Minority or Women-Owned business in the State of SC?
☐ Yes   ☒ No
If so, please provide a copy of your certificate with your response.
MWBE Compliance Provisions and Instructions
Minority/Women Business Enterprise Program Forms

This Project is covered under the City of Charleston’s Minority/Women Business Enterprise (MWBE) Program, administered by Ruth Jordan, MBE Manager, 2 George Street, Suite 3600, Charleston SC, 29401, (843) 724-7434.

The City has established goals for both Minority Business Enterprises (MBE) and Women Business Enterprises (WBE). An MBE is a small business owned and controlled by a minority. A WBE is a small business owned and controlled by a woman. The minority or woman must own fifty-one percent (51%) of the business and they must control the management and daily operations of the business in order to qualify.

Charleston City Council has adopted a policy setting 20% as the guidelines for combined minority-owned and women-owned business enterprise participation for this project. This MWBE requirement for participation in this Contract for services shall be made a part of any contract resulting from this solicitation. These requirements shall also apply to all subcontracts issued by the successful bidder(s).

All bidders must document the extent of their MWBE participation by completing the MWBE Compliance Provision Forms.

All MBE/WBE subcontractors must have a Certificate of Eligibility on file with the City’s Minority Business Enterprise Office. A list of certified minority and women-owned firms can be found on the City of Charleston’s web site www.charleston-sc.gov under “BIDLINE” link or by contacting Ruth Jordan, MBE Manager, 2 George Street, Suite 3600, Charleston SC, 29401, (843) 724-7434, jordandr@charleston-sc.gov.

COMPLIANCE REQUIREMENTS:

1. The Bidder shall provide, with their bid form submittal, the following Affidavits properly executed which signify that the Bidder understands and agrees to abide by the City’s MWBE Compliance Provisions.

   - Affidavit B – Work to be Performed by Minority and/or Women-owned Firms
   - Affidavit C – Intent to Perform Contract with Own Workforce, in making this certification the Bidder states that the Bidder does not customarily subcontract elements of this type of Project and will perform all elements of the work with his/her own current work force.

Failure to comply with any of the statements, certifications, or intentions stated in the affidavits, or the MWBE/WBE compliance provisions shall constitute a breach of the Contract. Any such breach may result in termination of the Contract in accordance with the termination provisions contained in the Contract. It shall be solely at the option of the City of Charleston whether to terminate the contract for breach. In addition to terminating the Contract, the bidder may be prohibited from participation in future solicitations as determined by the City of Charleston.

Name of Company: Bridge Corporate Solutions, LLC

Signature ____________________________ Date 09/27/2021

Print Name Peter S. Fennelly President

Title

Witness
AFFIDAVIT C

City of Charleston, South Carolina
Intent to Perform Contract with Own Workforce.

Affidavit of Bridge Corporate Solutions, LLC
(Name of Bidder)

I hereby certify that it is our intent to perform 100% of the work required for the Realtor Services for the City of Charleston contract.

(Name of Project)

In making this certification, the Bidder states that the Bidder does not customarily subcontract elements of this type Project, and normally performs and has the capability to perform and will perform all the elements of the work on this Project with his/her own current work forces, and

The Bidder agrees to provide any additional information or documentation requested by the Owner in support of the above statement.

I hereby certify that I have read this certification and I am the Bidder or I am authorized to bind the Bidder to the commitments contained herein. I certify, under penalties of perjury, that I have examined the information in this affidavit, and to the best of my knowledge and belief, this information is true, correct and complete.

Date: 09/27/2021 Name of Authorized Officer (Print/Type): Peter S. Fenelly

Signature: [Signature]
Title: President

Sworn to before me this 27th day of September, 2021
Notary Public for the State of South Carolina
My Commission Expires: ______________________
Print Name: MEGAN E BALOT
Phone Number: 843-471-1220
Address: 25 Calhoun St
Charleston, SC 29401
NOTARY SEAL: MEGAN E BALOT
## References

Offerors must supply a minimum of three (3) references for which they have provided the same or similar services being requested in the Scope and Statement of Work. If the references have not used similar services, please outline the services that your company has provided to these clients.

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
<th>Phone/Fax</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mike Schwarz</td>
<td>PO Box 1127, Isle of Palms, SC 29451</td>
<td>843-290-3914</td>
<td><a href="mailto:mschwarz@wfinvest.net">mschwarz@wfinvest.net</a></td>
</tr>
<tr>
<td>Tracy Doran</td>
<td>474 Wando Park Boulevard, Suite 102, Mt. Pleasant, SC 29464</td>
<td>843-856-4120/843-972-1711</td>
<td><a href="mailto:tdoran@humanitiesfoundation.org">tdoran@humanitiesfoundation.org</a></td>
</tr>
<tr>
<td>Brent Gibadlo</td>
<td>212 Brighton Boulevard, Summerville, SC 29486</td>
<td>843-970-9391/843-847-1799</td>
<td><a href="mailto:brent.gibadlo@brookfieldpropertiesdevelopment.com">brent.gibadlo@brookfieldpropertiesdevelopment.com</a></td>
</tr>
<tr>
<td>Dan Battista</td>
<td>5757 Palm Boulevard, Isle of Palms, SC 29451</td>
<td>843-856-7470/843-469-2320</td>
<td><a href="mailto:dbattista@loweenterprises.com">dbattista@loweenterprises.com</a></td>
</tr>
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</table>

<table>
<thead>
<tr>
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<th>Address</th>
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</tr>
</thead>
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</tbody>
</table>
CITY OF CHARLESTON
RESPONSE TO RFP NO. 21-P027R REALTOR SERVICES
JULY 16, 2020

PETER S. FENNELLY, SIOR, MCR, SLCR
President
DIR: +1 843 425 0186
peter.fennelly@bridge-commercial.com

SETH CLARK
Vice President
DIR: +1 843 338 3804
seth.clark@bridge-commercial.com

DANIEL PELLEGRINO
Vice President
DIR: +1 850 728 1050
daniel.pellegrino@bridge-commercial.com

BRIDGE COMMERCIAL
25 Calhoun Street, Suite 220
Charleston, SC 29401
Tel: +1 843 535 8600

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BRIDGE-COMMERCIAL.COM
**FEE SCHEDULE**

The Proposed Sales Commission schedule shall be established as a sliding scale Sales Commission schedule paid by Client as follows:

If a Sales Transaction is completed, then: (1) For the first $4,000,000 of the Purchase Price, for any single purchase or sale, the Sales Commission shall be four percent (4%) of the Purchase Price; and (2) For any amount of the Purchase Price in excess of $4,000,000, for any single purchase or sale, the Sales Commission shall be three percent (3%) of the Purchase Price.

$1.00 - $4,000,000 - 4%
$4,000,001 + - 3%

**For example:**

$5,000,000 Total Purchase Price - Total Sales Commission - $190,000

$1.00 - $4,000,000 ($4,000,000 x .04) = $160,000
$4,000,000 + ($1,000,000 x .03) = $30,000
$160,000 + $300,000 = $190,000
**FEE SCHEDULE**

The Proposed Sales Commission schedule shall be established as a sliding scale Sales Commission schedule paid by Client as follows:

If a Sales Transaction is completed, then: (1) For the first $4,000,000 of the Purchase Price, for any single purchase or sale, the Sales Commission shall be four percent (4%) of the Purchase Price; and (2) For any amount of the Purchase Price in excess of $4,000,000, for any single purchase or sale, the Sales Commission shall be three percent (3%) of the Purchase Price.

$1.00 - $4,000,000 - 4%
$4,000,001 - 3%

**For example:**

$5,000,000 Total Purchase Price - Total Sales Commission - $190,000

$1.00 - $4,000,000 ($4,000,000 x .04) = $160,000
$4,000,000 + ($1,000,000 x .03) = $30,000

$160,000 + $30,000 = $190,000

In the event Client purchases a Property that is listed, and the Seller is offering a cooperating broker’s commission to a Buyer’s Agent, then Bridge Commercial will be compensated a Sales Commission by Seller pursuant to the listing agreement and Client will not owe a Sales Commission in accordance with the Commission Schedule above.
TO: John J. Tecklenburg, Mayor
FROM: Wes Ratterree  DEPT. Information Technology
SUBJECT: RECORDS MGMT SYSTEM ANNUAL MAINTENANCE AND SUPPORT RENEWAL
REQUEST: APPROVAL OF RENEWAL OF POLICE DEPARTMENT'S RECORDS MANAGEMENT SYSTEM (RMS) ANNUAL MAINTENANCE AND SUPPORT WITH CENTRAL SQUARE TECHNOLOGIES, SOLE SOURCE VENDOR.

COMMITTEE OF COUNCIL: Ways & Means  DATE: January 11, 2022

COORDINATION: This request has been coordinated with: (attach all recommendations/reviews)

<table>
<thead>
<tr>
<th>Department</th>
<th>Yes</th>
<th>N/A</th>
<th>Signature of Individual Contacted</th>
<th>Attachment</th>
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<tr>
<td>Information Technology</td>
<td>X</td>
<td>N/A</td>
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<tr>
<td>Procurement</td>
<td></td>
<td>X</td>
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<td></td>
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</tbody>
</table>

FUNDING: Was funding previously approved? Yes [X] No [ ] N/A [ ]

If yes, provide the following: Dept./Div.: IT Account #: 235000-52206

Balance in Account $1,890,912.92 Amount needed for this item $296,124.81

Does this document need to be recorded at the RMC's Office?  Yes [ ] No [X]

NOTES: Provides continued annual maintenance and support for the critical operations of the Police Department's Records Management System. Includes Mobile Field Reporting, Mapping and Computer Aided Dispatch module support.

CFO's Signature: [Signature]

FISCAL IMPACT:

Mayor's Signature: [Signature]  John J. Tecklenburg, Mayor

ORIGINATING OFFICE PLEASE NOTE: A FULLY STAFFED/APPROVED (except Mayor's Signature) PACKAGE IS DUE IN THE CLERK OF COUNCIL'S OFFICE NO LATER THAN 10:00AM THE DAY OF THE CLERK'S AGENDA MEETING.
SOLE SOURCE JUSTIFICATION FORM

DEPARTMENT: Information Technology

PRODUCT: RMS Annual Software Maintenance and Support

REQUISITION NUMBER: PR220009

VENDOR: Central Square Technologies

DATE: January 3, 2022

1. Please state the use for this/these product(s).

Required annual software maintenance and support renewal for the Police Department's Records Management System (RMS) in support of 911/Dispatch operations. Includes Mobile Field Reporting, Mapping, and CAD support.

2. Can the above product(s) be purchased from more than one distributor? If so, please list their company name and telephone number.

No. Central Square is the developer of the software and the only source for the maintenance and support.

3. Please explain in detail why this product is considered a sole source. (i.e. accessories, replacement parts, disposable supplies, compatibility with existing equipment, or a change in this product would invalidate results of research). Please estimate completion date of research.

Central Square is the developer of the software and the only source for the maintenance and support.

4. Have you evaluated comparable products within the last two years?

___ YES  or  NO ___

If yes, please state the complete results of the evaluation.

If no, do you wish to evaluate this product? Explain why this item is the only acceptable product, on the market, for your utilization at this time.

This is a renewal for an existing system.

SIGNATURE: ______________________  TITLE: CIO
# Invoice

**Invoice No:** 335286  
**Date:** 10/29/2021  
**Page:** 1 of 9

**Billing Inquiries:** Accounts.Receivable@centralsquare.com

**Bill To**
City of Charleston  
City of Charleston (OSSI)  
Maria Jacknin  
Dept of Information Technology  
2 George Street, Suite 2800  
Charleston SC 29401  
United States

**Ship To**
City of Charleston  
City of Charleston (OSSI)  
Maria Jacknin  
Dept of Information Technology  
2 George Street, Suite 2800  
Charleston SC 29401  
United States

<table>
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<td>5818LG</td>
<td>City of Charleston</td>
<td></td>
<td>USD</td>
<td>Net 30</td>
<td>12/31/2021</td>
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</tbody>
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**Description**  
**Units**  
**Rate**  
**Extended**

1. JMS-MS DISPLAY - Annual Maintenance Fee  
   Maintenance: Start:1/1/2022, End: 12/31/2022  
   1  
   $7,912.06  
   $7,912.06

2. ONESolution On-Line (Network) Booking - Annual Maintenance Fee  
   Maintenance: Start:1/1/2022, End: 12/31/2022  
   1  
   $2,241.75  
   $2,241.75

3. ONESolution MFR Client-Arrest - Annual Maintenance Fee  
   ONESolution MFR Client-Arrest  
   Maintenance: Start:1/1/2022, End: 12/31/2022  
   1  
   $3,638.25  
   $3,638.25

4. ONESolution MFR Client - Annual Maintenance Fee  
   ONESolution MFR Client  
   Maintenance: Start:1/1/2022, End: 12/31/2022  
   1  
   $9,702.00  
   $9,702.00

5. ONESolution MCT Client-No CAD Interface - Annual Maintenance Fee  
   ONESolution MCT Client-No CAD Interface  
   Maintenance: Start:1/1/2022, End: 12/31/2022  
   1  
   $4,851.00  
   $4,851.00

6. ONESolution Canine Tracking - Annual Maintenance Fee  
   Maintenance: Start:1/1/2022, End: 12/31/2022  
   1  
   $55.57  
   $55.57

7. ONESolution MFR Client-Canine - Annual Maintenance Fee  
   Maintenance: Start:1/1/2022, End: 12/31/2022  
   1  
   $2,222.64  
   $2,222.64

8. ONESolution MFR Client - Annual Maintenance Fee  
   Maintenance: Start:1/1/2022, End: 12/31/2022  
   1  
   $3,111.70  
   $3,111.70

9. ONESolution MFR Client-Arrest - Annual Maintenance Fee  
   Maintenance: Start:1/1/2022, End: 12/31/2022  
   1  
   $1,166.89  
   $1,166.89
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<th>Rate</th>
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<td>ONESolution MCT Client-No CAD Interface - Annual Maintenance Fee</td>
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<tr>
<td>ONESolution MCT Client-No CAD Interface - Annual Maintenance Fee</td>
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<td>ONESolution CAD Resource Monitor Display License With Maps - Annual Maintenance Fee</td>
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Superion, LLC, a CentralSquare Company  
1000 Business Center Drive  
Lake Mary, FL 32746

Billing Inquiries: Accounts.Receivable@centralsquare.com

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Lake Mary, FL 32746

Billing Inquiries: Accounts.Receivable@centralsquare.com

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Please include invoice number(s) on your remittance advice, made payable to Superion, LLC

ACH:
Routing Number 121000356
Account Number 1416612641
E-mail payment details to: Accounts.Receivable@centralsquare.com

Check:
12709 Collection Center Drive
Chicago, IL 60683

Subtotal                                                                 | $271,674.13

Tax                                                                           | $0.00

Invoice Total                                                              | $271,674.13

Payments Applied                                                        | $0.00

Balance Due                                                             | $271,674.13
CPR COMMITTEE and/or COUNCIL AGENDA

TO: John J. Tecklenburg, Mayor
FROM: Joe Swaim / Andrew Jones DEPT. Stormwater Management
SUBJECT: CONCORD STREET PUMP STATION UPFIT CONSTRUCTION MANAGER AT RISK (CMAR) SERVICES CONTRACT
REQUEST: Approval of a Construction Manager at Risk services contract with Black & Veatch Corporation in the amount of $1,699,540.00 for design services, project implementation plan, project and/or program management, grant funding assistance, permitting research, permitting services, design and construction administrative services, CMAR representative services, to update and rehabilitate the Concord Street Pump Station.

COMMITTEE OF COUNCIL: Ways & Means DATE: January 11, 2022

COORDINATION: This request has been coordinated with: (attach all recommendations/reviews)

<table>
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<tr>
<th>Coordinating Officer</th>
<th>Yes</th>
<th>N/A</th>
<th>Signature of Individual Contacted</th>
<th>Attachment</th>
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<td>CPR Committee Chair</td>
<td></td>
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<td>Corporate Counsel</td>
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<tr>
<td>MBE Manager</td>
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FUNDING: Was funding previously approved? Yes ☒ No ☐ N/A ☐
If yes, provide the following:
- Dept/Div: SW Mgmt-Proj. Mgmt
- Acct #: 05XXXX-58206
- Balance in Account: $1,699,540.00
- Amount needed for this item: $1,699,540.00

NEED: Identify any critical time constraint(s).

CFO's Signature: [Signature]

FISCAL IMPACT: Approval of this contract will obligate $1,699,540.00 of the $5,996,000.00 project budget. The funding source for this project is the Drainage Fund.

Mayor's Signature: [Signature] John J. Tecklenburg, Mayor

ORIGINATING OFFICE PLEASE NOTE: A FULLY STAFFED/APPROVED (except Mayor's Signature) PACKAGE IS DUE IN THE CLERK OF COUNCIL'S OFFICE NO LATER THAN 10:00 A.M THE DAY OF THE CLERK'S AGENDA MEETING.
December 17, 2021

City of Charleston
Department of Stormwater Management
2 George Street, Suite 2100
Charleston, South Carolina 29401

Attention: Joe Swaim, Senior Engineering Project Manager, City of Charleston

Subject: Concord Street Pump Station Update Project Proposal

Dear Mr. Swaim,

Included herein are three (3) copies of Black & Veatch's Proposal for the City of Charleston Concord Street Pump Station Update Project. The contents of the Proposal include the following documents:

1. Agreement between Owner and Engineer for Professional Services;
2. Exhibit A, Engineer's Scope of Services;
3. Exhibit B, Owner's Responsibilities;
4. Exhibit C, Payments to Engineer for Services and Reimbursable Expenses;
5. Exhibit D, Duties, Responsibilities and Limitations of Authority of resident Project Representative;
6. Exhibit G, Insurance;
7. Certificate of Liability Insurance;
8. Fee Estimate; and
9. Project Schedule

If you have any questions or comments, please do not hesitate to contact me.

Very truly yours,

Black & Veatch Corporation

Kirby Dobberfuhl, P.E.
Black & Veatch

Enclosure(s):
Concord Street Pump Station Update Project Proposal – Three (3) copies
AGREEMENT
BETWEEN OWNER AND ENGINEER
FOR
PROFESSIONAL SERVICES

THIS IS AN AGREEMENT effective as of ________________, ________ ("Effective Date") between
the City of Charleston ("OWNER") and Black & Veatch Corporation ("ENGINEER").

OWNER intends to retain the Engineer to provide turnkey design services, a project implementation plan, project and/or
program management, grant funding assistance, permitting research, permitting services, design and construction
administrative services, Construction Manager at Risk (CMAR) client representative services, to update and rehabilitate the
Concord Street Pump Station. Additional professional services maybe part of future phases of this contract. The Scope of
Work ("Project") is more fully defined in Exhibit A which is attached hereto and incorporated as if fully written herein.

OWNER and ENGINEER in consideration of their mutual covenants as set forth herein agree as follows:
ARTICLE 1 - SERVICES OF ENGINEER

1.01 Scope

A. ENGINEER shall provide the Basic and Additional Services set forth herein and in Exhibit A.

B. Upon this Agreement becoming effective, ENGINEER is authorized to begin Basic Services as set forth in Exhibit A.

C. If authorized by OWNER, ENGINEER shall furnish Resident Project Representative(s) with duties, responsibilities and limitations of authority as set forth in Exhibit D.

ARTICLE 2 - OWNER'S RESPONSIBILITIES

2.01 General

A. OWNER shall have the responsibilities set forth herein and in Exhibit B.

ARTICLE 3 - TIMES FOR RENDERING SERVICES

3.01 General

A. ENGINEER's services and compensation under this Agreement have been agreed to in anticipation of the orderly and continuous progress of the Project through completion. Unless specific periods of time or specific dates for providing services are specified in this Agreement, ENGINEER's obligation to render services hereunder will be for a period which may reasonably be required for the completion of said services.

B. If in this Agreement specific periods of time for rendering services are set forth or specific dates by which services are to be completed are provided, and if such periods of time or dates are changed through no fault of ENGINEER, the rates and amounts of compensation provided for herein shall be subject to equitable adjustment. If OWNER has requested changes in the scope, extent, or character of the Project, the time of performance of ENGINEER’s services shall be adjusted equitably.

C. For purposes of this Agreement the term “day” means a calendar day of 24 hours.

3.02 Suspension

A. If OWNER fails to give prompt written authorization to proceed with any phase of services after completion of the immediately preceding phase, or if ENGINEER’s services are delayed through no fault of ENGINEER, ENGINEER may, after giving seven days written notice to OWNER, suspend services under this Agreement.

B. If ENGINEER’s services are delayed or suspended in whole or in part by OWNER, or if ENGINEER’s services are extended by Contractor’s actions or inactions for more than 90 days through no fault of ENGINEER, ENGINEER shall be entitled to equitable adjustment of rates and amounts of compensation provided for elsewhere in this Agreement to reflect, reasonable costs incurred by ENGINEER in connection with, among other things, such delay or suspension and reactivation and the fact that the time for performance under this Agreement has been revised.

ARTICLE 4 - PAYMENTS TO ENGINEER

4.01 Methods of Payment for Services and Reimbursable Expenses of ENGINEER

A. For Basic Services. OWNER shall pay ENGINEER for Basic Services performed or furnished under Exhibit A, Part 1, as set forth in Exhibit C.

B. For Additional Services. OWNER shall pay ENGINEER for Additional Services performed or furnished under Exhibit A, Part 2, as set forth in Exhibit C.

C. For Reimbursable Expenses. In addition to payments provided for in paragraphs 4.01.A and 4.01.B, OWNER shall pay ENGINEER for Reimbursable Expenses incurred by ENGINEER and ENGINEER’s Consultants as set forth in Exhibit C.

4.02 Other Provisions Concerning Payments

A. Preparation of Invoices. Invoices will be prepared in accordance with ENGINEER's standard invoicing practices and will be submitted to OWNER by ENGINEER, unless otherwise agreed. The amount billed in each invoice will be calculated as set forth in Exhibit C.

B. Payment of Invoices. Invoices are due and payable within 30 days of receipt. If OWNER fails to make any payment due ENGINEER for services and expenses within 30 days after receipt of ENGINEER’s invoice therefor, the amounts due ENGINEER will be increased at the rate of 1.0% per month (or the maximum rate of interest
permitted by law, if less) from said thirtieth day. In addition, ENGINEER may, after giving seven days written notice to OWNER, suspend services under this Agreement until ENGINEER has been paid in full all amounts due for services, expenses, and other related charges. Payments will be credited first to interest and then to principal.

C. Disputed Invoices. In the event of a disputed or contested invoice, only that portion so contested may be withheld from payment, and the undisputed portion will be paid.

D. Payments Upon Termination.

1. In the event of any termination under paragraph 6.06, ENGINEER will be entitled to invoice OWNER and will be paid in accordance with Exhibit C for all services performed or furnished and all Reimbursable Expenses incurred through the effective date of termination.

2. In the event of termination by OWNER for convenience for cause, ENGINEER, in addition to invoicing for those items identified in subparagraph 4.02.D.1, shall be entitled to invoice OWNER and shall be paid a reasonable amount for services and expenses directly attributable to termination, both before and after the effective date of termination, such as reassignment of personnel, costs of terminating contracts with ENGINEER’s Consultants, and other related close-out costs, using methods and rates for Additional Services as set forth in Exhibit C.

E. Records of ENGINEER’s Costs. Records of ENGINEER’s costs pertinent to ENGINEER’s compensation under this Agreement shall be kept in accordance with generally accepted accounting practices. To the extent necessary to verify ENGINEER’s charges and upon OWNER’s timely request, copies of such records will be made available to OWNER at no cost.

F. Legislative Actions. In the event of legislative actions after the Effective Date of the Agreement by any level of government that impose taxes, fees, or costs on ENGINEER’s services or other costs in connection with this Project or compensation therefor, such new taxes, fees, or costs shall be invoiced to and paid by OWNER as a Reimbursable Expense to which a Factor of 1.0 shall be applied. Should such taxes, fees, or costs be imposed, they shall be in addition to ENGINEER’s estimated total compensation.

ARTICLE 5 - OPINIONS OF COST

5.01 Guaranteed Maximum Price (GMP)

A. ENGINEER’s opinions of probable Construction Cost provided for herein are to be made on the basis of ENGINEER’s experience, qualifications, and collaboration with the OWNER’s CMAR contractor and represent the CMAR contractor’s Guaranteed Maximum Price (GMP). ENGINEER is responsible for providing necessary updates to insure OWNER is aware of any potential cost overruns during the design phase. If OWNER has provided a specific construction budget for the Project and the CMAR’s proposed GMP exceeds the budget, ENGINEER shall use reasonable efforts to collaborate with the CMAR to suggest proposed revisions to reduce the GMP within OWNER’s budget at no additional cost. However, since ENGINEER has no control over the cost of labor, materials, equipment, or services furnished by others, ENGINEER cannot and does not guarantee that proposals, bids, including the CMAR’s proposed GMP or actual Construction Cost will not vary from opinions of probable Construction Cost prepared by ENGINEER. In the circumstance the OWNER elects to bid any portion of the project reference Section 5.02 and 5.03.

5.02 Opinions of Probable Construction Cost

A. In the circumstance the OWNER elects to use design-bid-build method for a portion or the entirety of the project, ENGINEER’s opinions of probable Construction Cost provided for herein are to be made on the basis of ENGINEER’s experience and qualifications and represent ENGINEER’s best judgment as an experienced and qualified professional generally familiar with the industry. However, since ENGINEER has no control over the cost of labor, materials, equipment, or services furnished by others, or over the Contractor’s methods of determining prices, or over competitive bidding or market conditions, ENGINEER cannot and does not guarantee that proposals, bids, or actual Construction Cost will not vary from opinions of probable Construction Cost prepared by ENGINEER. If OWNER wishes greater assurance as to probable Construction Cost, OWNER shall employ an independent cost estimator as provided in Exhibit B.

5.03 Opinions of Total Project Costs

A. If the lowest bona fide proposal or bid (assuming a min. of 2 bids) following design-bid-build exceeds the final opinion of probable construction cost by more than 35%, the ENGINEER shall without additional charge to the OWNER, not to exceed $25,000, modify the contract documents one time for each proposed
or bid contract document for design-bid-build set, using ENGINEER’s best efforts to bring the project within the final opinion of probable construction cost. The ENGINEER’s redesign responsibility shall also include the permitting, advertising and reprinting costs associated with the redesign, and provide itemized receipts of hours and cost documenting redesign work documenting justification. The OWNER shall approve all itemized hours and cost.

ARTICLE 6 - GENERAL CONSIDERATIONS

6.01 Standards of Performance

A. The standard of care for all professional engineering and related services performed or furnished by ENGINEER under this Agreement will be the care and skill ordinarily used by members of ENGINEER’s profession practicing under similar circumstances at the same time and in the same locality. ENGINEER makes no warranties, express or implied, under this Agreement or otherwise, in connection with ENGINEER’s services.

B. ENGINEER shall be responsible for the technical accuracy of its services and documents resulting therefrom, and OWNER shall not be responsible for discovering deficiencies therein. ENGINEER shall correct such deficiencies without additional compensation.

C. ENGINEER shall perform or furnish professional engineering and related services in all phases of the Project to which this Agreement applies. ENGINEER shall serve as OWNER’s prime professional for the Project. ENGINEER may employ such ENGINEER’s Consultants as ENGINEER deems necessary to assist in the performance or furnishing of the services. ENGINEER shall not be required to employ any ENGINEER’s Consultant unacceptable to ENGINEER.

D. ENGINEER and OWNER shall comply with applicable Laws or Regulations and OWNER-mandated standards. This Agreement is based on these requirements as of its Effective Date. Changes to these requirements after the Effective Date of this Agreement may be the basis for modifications to OWNER’s responsibilities or to ENGINEER’s scope of services, times of performance, or compensation.

E. OWNER shall make decisions and carry out its other responsibilities in a timely manner and shall bear all costs incident thereto so as not to delay the services of ENGINEER.

F. Prior to the commencement of the Construction Phase, OWNER shall notify ENGINEER of any variations from the language indicated in Exhibit E, “Notice of Acceptability of Work,” or of any other notice or certification that ENGINEER will be requested to provide to OWNER or third parties in connection with the Project. OWNER and ENGINEER shall reach agreement on the terms of any such requested notice or certification, and OWNER shall authorize such Additional Services as are necessary to enable ENGINEER to provide the notices or certifications requested.

G. ENGINEER shall not be required to sign any documents, no matter by whom requested, that would result in the ENGINEER’s having to certify, guarantee or warrant the existence of conditions whose existence the ENGINEER cannot ascertain. OWNER agrees not to make resolution of any dispute with the ENGINEER or payment of any amount due to the ENGINEER in any way contingent upon the ENGINEER’s signing any such certification.

H. During the Construction Phase, ENGINEER shall not supervise, direct, or have control over Contractor’s work, nor shall ENGINEER have authority over or responsibility for the means, methods, techniques, sequences, or procedures of construction selected by Contractor, for safety precautions and programs incident to the Contractor’s work in progress, nor for any failure of Contractor to comply with Laws and Regulations applicable to Contractor’s furnishing and performing the Work.

I. ENGINEER neither guarantees the performance of any Contractor nor assumes responsibility for any Contractor’s failure to furnish and perform the Work in accordance with the Contract Documents except for Contractors contracted with ENGINEER.

J. ENGINEER shall not be responsible for the acts or omissions of any Contractor(s), subcontractor or supplier, or of any of the Contractor’s agents or employees or Contractors or any other persons (except ENGINEER’s own employees) at the Site or otherwise furnishing or performing any of the Contractor’s work; or for any decision made on interpretations or clarifications of the Contract Documents given by OWNER without consultation and advice of ENGINEER.

K. The General Conditions for any construction contract documents prepared hereunder are to be the “Standard General Conditions of the Construction Contract” as prepared by the Engineers Joint Contract Documents Committee (Document No. 1910-8, 1996 Edition).
6.02 Authorized Project Representatives

A. Contemporaneous with the execution of this Agreement, ENGINEER and OWNER shall designate specific individuals to act as ENGINEER’s and OWNER’s representatives with respect to the services to be performed or furnished by ENGINEER and responsibilities of OWNER under this Agreement. Such individuals shall have authority to transmit instructions, receive information, and render decisions relative to the Project on behalf of each respective party.

6.03 Design without Construction Phase Services

A. Should OWNER provide Construction Phase services with either OWNER’s representatives or a third party, ENGINEER’s Basic Services under this Agreement will be considered to be completed upon completion of the Final Design Phase or Bidding or Negotiating Phase as outlined in Exhibit A.

B. It is understood and agreed that if ENGINEER’s Basic Services under this Agreement do not include Project observation, or review of the Contractor’s performance, or any other Construction Phase services, and that such services will be provided by OWNER, then OWNER assumes all responsibility for interpretation of the Contract Documents and for construction observation or review and waives any claims against the ENGINEER that may be in any way connected thereto.

6.04 Use of Documents

A. All Documents are instruments of service in respect to the Project, and upon payment therefor, OWNER shall retain an ownership and property interest therein whether or not the Project is completed. Any further use of the documents referenced herein is at the OWNER’s sole risk.

B. ENGINEER may reasonably rely on OWNER-furnished data that are delivered to the ENGINEER pursuant to Exhibit B.

D. 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 party delivering the electronic files. ENGINEER shall not be responsible to maintain documents stored in electronic media format after acceptance by OWNER.

E. When transferring documents in electronic media format, ENGINEER 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 ENGINEER at the beginning of this Project.

F. OWNER may make and retain copies of Documents for information and reference in connection with use on the Project by OWNER. Such Documents are not intended or represented to be suitable for reuse by OWNER or others on extensions of the Project or on any other project. Any such reuse or modification without written verification or adaptation by ENGINEER, as appropriate for the specific purpose intended, will be at OWNER’s sole risk and without liability or legal exposure to ENGINEER or to ENGINEER’s Consultants. OWNER shall indemnify and hold harmless ENGINEER and ENGINEER’s Consultants from all claims, damages, losses, and expenses, including attorneys’ fees arising out of or resulting therefrom.

G. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

6.05 Insurance

A. ENGINEER shall procure and maintain insurance as set forth in Exhibit G, “Insurance.” ENGINEER shall cause Engineering Consultants to procure and maintain like insurance as set forth in Exhibit G, Insurance.

B. OWNER shall require Contractor to purchase and maintain general liability and other insurance as specified in the Contract Documents and to cause ENGINEER and ENGINEER’s Consultants to be listed as additional insureds with respect to such liability and other insurance purchased and maintained by Contractor for the Project

C. OWNER and ENGINEER shall each deliver to the other certificates of insurance evidencing the coverages indicated in Exhibit G. Such certificates shall be furnished prior to commencement of ENGINEER’s services and at renewals thereafter during the life of the Agreement.

D. All policies of property insurance shall contain provisions to the effect that ENGINEER’s and ENGINEER’s Consultants’ interests are covered and 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 additional insureds thereunder.

F. At any time, OWNER may request that ENGINEER, at OWNER’s sole expense, provide additional insurance coverage, increased limits, or revised deductibles that are more protective than those specified in Exhibit G. If so requested by OWNER, with the concurrence of ENGINEER, and if commercially available, ENGINEER shall obtain and shall require ENGINEER’s Consultants to obtain such additional insurance coverage, different limits, or revised deductibles for such periods of time as requested by OWNER, and Exhibit G will be supplemented to incorporate these requirements.

6.06 Termination

A. The obligation to provide further services under this Agreement may be terminated:

1. For cause,

   a. By either party upon 30 days written notice in the event of substantial failure by the other party to perform in accordance with the terms hereof through no fault of the terminating party.

   b. By ENGINEER:

      1) upon seven days written notice if ENGINEER believes that ENGINEER is being requested by OWNER to furnish or perform services contrary to ENGINEER’s responsibilities as a licensed professional; or

      2) upon seven days written notice if the ENGINEER’s services for the Project are delayed or suspended for more than 90 days for reasons beyond ENGINEER’s control.

      3) ENGINEER shall have no liability to OWNER on account of such termination.

   c. Notwithstanding the foregoing, this Agreement will not terminate as a result of such substantial failure if the party receiving such notice begins, within seven days of receipt of such notice, to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt thereof; provided, however, that if and to the extent such substantial failure cannot be reasonably cured within such 30 day period, and if such party has diligently attempted to cure the same and thereafter continues diligently to cure the same, then the cure period provided for herein shall extend up to, but in no case more than, 60 days after the date of receipt of the notice.

2. For convenience,

   a. By OWNER effective upon the receipt of written notice to ENGINEER.

B. The terminating party under paragraphs 6.06.A.1 or 6.06.A.2 may set the effective date of termination at a time up to 30 days later than otherwise provided to allow ENGINEER to demobilize personnel and equipment from the Site, to complete tasks whose value would otherwise be lost, to prepare notes as to the status of completed and uncompleted tasks, and to assemble Project materials in orderly files.

6.07 Controlling Law

A. This Agreement is to be governed by the laws of the State of South Carolina.

6.08 Successors, Assigns, and Beneficiaries

A. OWNER and ENGINEER each is hereby bound and the partners, successors, executors, administrators and legal representatives of OWNER and ENGINEER (and to the extent permitted by paragraph 6.08.B the assigns of OWNER and ENGINEER) are hereby bound to the other party to this Agreement and to the partners, successors, executors, administrators and legal representatives (and said assigns) of such other party, in respect of all covenants, agreements and obligations of this Agreement.

B. Neither OWNER nor ENGINEER may assign, sublet, or transfer any rights under or interest (including, but without limitation, moneys that are due or may become due) in this Agreement without the written consent of the other, except to the extent that any assignment, subletting, or transfer is mandated or restricted by law. 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 this Agreement.

C. Unless expressly provided otherwise in this Agreement:

1. Nothing in this Agreement shall be construed to create, impose, or give rise to any duty owed by OWNER or ENGINEER to any Contractor, Contractor’s subcontractor, supplier, other individual
or entity, or to any surety for or employee of any of them.

2. All duties and responsibilities undertaken pursuant to this Agreement will be for the sole and exclusive benefit of OWNER and ENGINEER and not for the benefit of any other party. The OWNER agrees that the substance of the provisions of this paragraph 6.08.C shall appear in the Contract Documents.

6.09 Dispute Resolution

A. OWNER and ENGINEER agree to negotiate all disputes between them in good faith for a period of 30 days from the date of notice of a dispute prior to exercising their rights under this Agreement or under law.

6.10 Hazardous Environmental Condition

A. OWNER represents to Engineer that to the best of its knowledge a Hazardous Environmental Condition does not exist.

B. OWNER has disclosed to the best of its knowledge to ENGINEER the existence of all Asbestos, PCB’s, Petroleum, Hazardous Waste, or Radioactive Material located at or near the Site, including type, quantity and location.

C. If a Hazardous Environmental Condition is encountered or alleged, ENGINEER shall have the obligation to notify OWNER and, to the extent of applicable Laws and Regulations, appropriate governmental officials.

D. It is acknowledged by both parties that ENGINEER’s scope of services does not include any services related to a Hazardous Environmental Condition. In the event ENGINEER or any other party encounters a Hazardous Environmental Condition, ENGINEER may, at its option and without liability for consequential or any other damages, suspend performance of services on the portion of the Project affected thereby until OWNER: (i) retains appropriate specialist consultant(s) or contractor(s) to identify and, as appropriate, abate, remediate, or remove the Hazardous Environmental Condition; and (ii) warrants that the Site is in full compliance with applicable Laws and Regulations.

E. OWNER acknowledges that ENGINEER is performing professional services for OWNER and that ENGINEER is not and shall not be required to become an “arranger,” “operator,” “generator,” or “transporter” of hazardous substances, as defined in the Comprehensive Environmental Response, Compensation, and Liability Act of 1990 (CERCLA), which are or may be encountered at or near the Site in connection with ENGINEER’s activities under this Agreement.

F. If ENGINEER’s services under this Agreement cannot be performed because of a Hazardous Environmental Condition, the existence of the condition shall justify ENGINEER’s terminating this Agreement for cause on 30 days’ notice.

6.11 Allocation of Risks

A. Indemnification

1. To the fullest extent permitted by law, ENGINEER shall indemnify and hold harmless OWNER, OWNER’s officers, directors, partners, and employees from and against any and all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) to the extent caused by the negligent acts or omissions of ENGINEER or ENGINEER’s officers, directors, partners, employees, and ENGINEER’s Consultants in the performance and furnishing of ENGINEER’s services under this Agreement.

2. OWNER shall be responsible for its acts of negligence in accordance with and to the extent provided in the S.C. Tort Claims Act, as amended.

6.12 Notices

A. Any notice required under this Agreement will be in writing, addressed to the appropriate party at its address on the signature page and given personally, or by registered or certified mail postage prepaid, or by a commercial courier service. All notices shall be effective upon the date of receipt.

6.13 Survival

A. All express representations, indemnifications, or limitations of liability included in this Agreement will survive its completion or termination for any reason.

6.14 Severability

A. Any provision or part of the Agreement held to be void or unenforceable under any Laws or Regulations shall
be deemed stricken, and all remaining provisions shall continue to be valid and binding upon OWNER and ENGINEER, who agree that the Agreement 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.

6.15 Waiver

A. Non-enforcement of any provision by either party shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Agreement.

6.16 Headings

A. The headings used in this Agreement are for general reference only and do not have special significance.

ARTICLE 7 - DEFINITIONS

7.01 Defined Terms

A. Wherever used in this Agreement (including the Exhibits hereto) and printed with initial or all capital letters, the terms listed below have the meanings indicated, which are applicable to both the singular and plural thereof:

1. Addenda--Written or graphic instruments issued prior to the opening of Proposals or Bids which clarify, correct, or change the Proposal or Bidding Documents.

2. Additional Services--The services to be performed for or furnished to OWNER by ENGINEER in accordance with Exhibit A, Part 2 of this Agreement.

3. Agreement--This "Standard Form of Agreement between OWNER and ENGINEER for Professional Services," including those Exhibits listed in Article 8 hereof.

4. Application for Payment--The form acceptable to ENGINEER which is to be used by Contractor in requesting progress or final payments for the completion of its Work and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

5. 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.

6. Basic Services--The services to be performed for or furnished to OWNER by ENGINEER in accordance with Exhibit A, Part 1, of this Agreement.

7. Bid--The offer or proposal of the bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

8. Bidding Documents--The advertisement or invitation to Bid, instructions to bidders, the Bid form and attachments, the Bid bond, if any, the proposed Contract Documents, and all Addenda, if any.

9. Change Order--A document recommended by ENGINEER, which is signed by Contractor and OWNER to authorize 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 Construction Agreement.

10. Construction Agreement--The written instrument which is evidence of the agreement, contained in the Contract Documents, between OWNER and Contractor covering the Work.

11. Construction Contract--The entire and integrated written agreement between the OWNER and Contractor concerning the Work.

12. Construction Cost--The cost to OWNER of those portions of the entire Project designed or specified by ENGINEER. Construction Cost does not include costs of services of ENGINEER or other design professionals and consultants, cost of land, rights-of-way, or compensation for damages to properties, or OWNER's costs for legal, accounting, insurance counseling or auditing services, or interest and financing charges incurred in connection with the Project, or the cost of other services to be provided by others to OWNER pursuant to Exhibit B of this Agreement. Construction Cost is one of the items comprising Total Project Costs.

13. Construction Manager at Risk ("CMAR") means a Contractor who is selected prior to completion of design under an alternative delivery method.

13. Contract Documents--Documents that establish the rights and obligations of the parties engaged in construction and include the Construction
Agreement between OWNER and Contractor, Addenda (which pertain to the Contract Documents), Contractor's Proposal or Bid (including documentation accompanying the Proposal or Bid and any post-Proposal or post-Bid documentation submitted prior to the notice of award) when attached as an exhibit to the Construction Agreement, the notice to proceed, the bonds, appropriate certifications, the General Conditions, the Supplementary Conditions, the Specifications and the Drawings as the same are more specifically identified in the Construction Agreement, together with all Written Amendments, Change Orders, Work Change Directives, Field Orders, and ENGINEER's written interpretations and clarifications issued on or after the Effective Date of the Construction Agreement. Approved Shop Drawings and the reports and drawings of subsurface and physical conditions are not Contract Documents.

14. Contract Price--The moneys payable by OWNER to Contractor for completion of the Work in accordance with the Contract Documents and as stated in the Construction Agreement.

15. Contract Times--The numbers of days or the dates stated in the Construction Agreement to: (i) achieve Substantial Completion, and (ii) complete the Work so that it is ready for final payment as evidenced by ENGINEER's written recommendation of final payment.

16. Contractor--An individual or entity with whom OWNER enters into a Construction Agreement. For clarity it is understood that Contractor and CMAR shall refer to the same entity when OWNER utilizes the CMAR method of project delivery.

17. Correction Period--The time after Substantial Completion during which Contractor must correct, at no cost to OWNER, any Defective Work, normally one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee or specific provision of the Contract Documents.

18. Design-bid-build--The traditional delivery method where design and construction are sequential and contracted for separately with two contractors.

18. Defective--An adjective which, when modifying the word Work, refers to Work that is unsatisfactory, faulty, or deficient, in that it does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents, or has been damaged prior to ENGINEER's recommendation of final payment.

19. Documents--Data, reports, Drawings, Specifications, Record Drawings, and other deliverables, whether in printed or electronic media format, provided or furnished in appropriate phases by ENGINEER to OWNER pursuant to this Agreement.

20. 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 are not Drawings so defined.

21. Effective Date of the Construction Agreement--The date indicated in the Construction Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Construction Agreement is signed and delivered by the last of the two parties to sign and deliver.

22. Effective Date of the Agreement--The date indicated in this 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.

23. ENGINEER's Consultants--Individuals or entities having a contract with ENGINEER to furnish services with respect to this Project as ENGINEER's independent professional associates, consultants, subcontractors, or vendors. The term ENGINEER includes ENGINEER's Consultants.

24. Field Order--A written order issued by ENGINEER which directs minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

25. Guaranteed Maximum Price (GMP)--The total maximum price that includes all reimbursable costs and fees, except for material changes in the scope of work, for completion of a construction manager contractor contract that is provided by the selected contractor and accepted by the OWNER.

25. General Conditions--That part of the Contract Documents which sets forth terms, conditions, and procedures that govern the Work to be performed or furnished by Contractor with respect to the Project.

26. Hazardous Environmental Condition--The presence at the Site of Asbestos, PCB's, Petroleum,
Hazardous Waste, or Radioactive Materials in such quantities or circumstances that present a substantial danger to persons or property exposed thereto in connection with the Work.

27. 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.

28. Laws and Regulations; Laws or Regulations--Any and all applicable laws, rules, regulations, ordinances, codes, standards, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

29. PCB’s--Polychlorinated biphenyls.

30. Proposal—Written offer from a Contractor to provide qualifications, perform the work, furnish all labor, materials, equipment and/or services for the prices and terms quoted by the Contractor.

30. 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.

31. Radioactive Materials--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.

32. Record Drawings--The Drawings as issued for construction on which the ENGINEER, upon completion of the Work, has shown changes due to Addenda or Change Orders and other information which ENGINEER considers significant based on record documents furnished by Contractor to ENGINEER and which were annotated by Contractor to show changes made during construction.

33. Reimbursable Expenses--The expenses incurred directly by ENGINEER in connection with the performing or furnishing of Basic and Additional Services for the Project for which OWNER shall pay ENGINEER as indicated in Exhibit C.

34. Resident Project Representative--The authorized representative of ENGINEER, if any, assigned to assist ENGINEER at the Site during the Construction Phase. The Resident Project Representative will be ENGINEER’s agent or employee and under ENGINEER’s supervision. As used herein, the term Resident Project Representative includes any assistants of Resident Project Representative agreed to by OWNER. The duties and responsibilities of the Resident Project Representative are as set forth in Exhibit D.

35. 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.

36. 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 ENGINEER to illustrate some portion of the Work.

37. Site--Lands or areas indicated in the Contract Documents as being furnished by OWNER upon which the Work is to be performed, rights-of-way and easements for access thereto, and such other lands furnished by OWNER which are designated for use of Contractor.

38. Specifications--That part of the Contract Documents consisting of written technical descriptions of materials, equipment, systems, standards, and workmanship as applied to the Work and certain administrative details applicable thereto.

39. 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.

40. Supplementary Conditions--That part of the Contract Documents which amends or supplements the General Conditions.

41. Total Project Costs--The sum of the Construction Cost, allowances for contingencies, the total costs of services of ENGINEER or other design professionals and consultants, cost of land, rights-of-way, or compensation for damages to properties, or OWNER’s costs for legal, accounting, insurance
counseling or auditing services, or interest and financing charges incurred in connection with the Project, or the cost of other services to be provided by others to OWNER pursuant to Exhibit B of this Agreement.

42. Work--The entire completed construction or the various separately identifiable parts thereof required to be provided under the Contract Documents with respect to this Project. Work includes and is the result of performing or furnishing pre-construction services and collaboration with OWNER or OWNER representative, labor, construction services, and documentation necessary to produce such construction and furnishing, installing, and incorporating all materials and all equipment into such construction, all as required by the Contract Documents.

43. Work Change Directive--A written directive to Contractor issued on or after the Effective Date of the Construction Agreement and signed by OWNER upon recommendation of the 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 directed 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.

44. Written Amendment--A written amendment of the Contract Documents signed by OWNER and Contractor on or after the Effective Date of the Construction Agreement and normally dealing with the non-engineering or non-technical rather than strictly construction-related aspects of the Contract Documents.

ARTICLE 8 - EXHIBITS AND SPECIAL PROVISIONS

8.01 Exhibits Included

A. Exhibit A, "ENGINEER’s Services," consisting of twenty one (21) pages.

B. Exhibit B, "OWNER’s Responsibilities," consisting of three (3) pages.

C. Exhibit C, “Payments to Engineer for Services and Reimbursable Expenses,” and “Appendices 1 and 2” consisting of twelve (12) pages.

D. Exhibit D, “Duties, Responsibilities and Limitations of Authority of Resident Project Representative,” consisting of six (6) pages.

E. Exhibit E, “Notice of Acceptability of Work,” is intentionally omitted.

F. Exhibit F is intentionally omitted.


8.02 Total Agreement

A. This Agreement (consisting of pages 1 to 12 inclusive, together with the Exhibits identified above) and Attachment A, the Scope of Work constitutes the entire agreement between OWNER and ENGINEER and supersedes all prior written or oral understandings. This Agreement may only be amended, supplemented, modified, or canceled by a duly executed written instrument.
IN WITNESS WHEREOF, the parties hereto have executed this Agreement, the Effective Date of which is indicated on page 1.

OWNER:

City of Charleston

By: John J. Tecklenburg.

Title: Mayor

Date Signed:

Address for giving notices:

City of Charleston Department of Stormwater Management

2 George Street, Suite 2100

Charleston, South Carolina 29401

Designated Representative (paragraph 6.02.A):

Matthew Fountain, P.E.

Title: Director of Stormwater Management

Phone Number: (843) 724-3754

Facsimile Number: (843) 973-7261

E-Mail Address: fountainm@charleston-sc.gov

ENGINEER:

Black & Veatch Corporation

By: William J. Wells

Title: Associate Vice President

Date: December 10, 2021 Signed

Address for giving notices:

550 King Street, Suite 400

Charleston, SC 29403

Designated Representative (paragraph 6.02.A):

Kirby Dobberfuhl

Title: Project Manager

Phone Number: 843-693-0211

Facsimile Number: 843-266-0669

E-Mail Address: dobberfulhk@bv.com
EXHIBIT A
TO
CONTRACT FOR ENGINEERING SERVICES

OWNER: City of Charleston, South Carolina
ENGINEER: Black & Veatch Corporation (BV)
Project Name: Concord Street Pump Station Update Project

SCOPE OF SERVICES

PART 1 – BASIC SERVICES
PROJECT DESCRIPTION

The ENGINEER will serve as City of Charleston (OWNER) professional engineering representative in those phases of the Project to which this Contract applies and will provide consultation and advice to the OWNER during the performance of their services. The ENGINEER will provide design and construction phase services for the Concord Street Pump Station Update Project. The ENGINEER will also serve as the OWNER’s representative for the selection of a Construction Manager at Risk (CMAR) to provide pre-construction services. The OWNER has selected a two-step Request for Qualification (RFQ) and Request for Proposal (RFP) selection process to procure the Construction Manager at Risk (CMAR).

The project is located on the Charleston Peninsula at 316 Concord Street adjacent to the International African- American Museum (IAAM). An existing pump station provides drainage service to approximately 240 acres of urban area from Meeting Street to Market Street.

Work is expected to include familiarization with the pump station equipment, understanding the pump station operation and the intent of the operations, understanding tidal influence to the pump station’s conveyance system, developing CMAR contracting documents, assistance in procurement of contractor, providing engineering services following open-book construction management practices, and providing any required inspection services.

The major project components include:

- Refurbish/replace pump station main pumps
- Replace dewatering pumps

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• Improve debris and silt management at the bottom of the wetwell
• Improve the lifting method of the dewatering pumps
• Update electrical components,
• Add a new emergency standby engine-generator
• Provide necessary structural rehabilitation
• Update monitoring equipment
• Update controls and SCADA to be compatible with improvements,
• Potential outfall rehabilitation
• Maintain partial pump station operation during improvements.

Work shall begin upon execution of this Agreement.
The anticipated notice to proceed date is February 7, 2022.

SCOPE OF BASIC SERVICES TO BE PERFORMED BY ENGINEER ON THE PROJECT

Phase 0100 Project Management & Coordination

1. Project Initiation:
   a. Project Initiation Meeting to review scope, review project staffing and organization, establish lines of communication, review pertinent available data, present project schedule, present initial work plan.

2. Administrative & Coordination:
   a. Project information and decision needs including the anticipated source, expected response,
   b. Schedule and any issues or problems that could delay the expected response,
   c. Anticipated Phases and accomplishments for the coming reporting period,
      i. Questions, comments, problematic issues and suggestions,
   d. Identification of out of scope task work, and
   e. Invoicing issues and proposals to address such issues.
   f. Conduct project review meetings at milestones in the detailed Phase descriptions in this Scope of Services.
   g. Prepare and distribute meeting minutes for project review meetings.
   h. Risk Management – A risk assessment will be performed, and a risk register prepared to identify and quantify, in terms of cost and schedule implications, perceived risks for the proposed construction. Update risk register on a monthly basis and review risk register with the CMAR.
i. Prepare monthly project status report for OWNER’s Project Manager to accompany engineering services invoice. Status reports to include the following:
   i. Overview of work completed
   ii. Discussion of project issues
   iii. Project budget update

3. Data Collection & Review:
   a. Develop a data request for the OWNER to include any necessary operating information, previous engineering studies, existing design information, existing record drawings, project budget, etc.
   b. Perform site visits, as required, to review project site and determine any field conditions that must be considered during design.

Phase 0205 Procurement of Contractor for Short-Term Repair Work

1. Owner shall provide written authorization prior to proceeding with this phase. Prepare a Scope of Work (SOW) for a contract for the short-term repair. Include a list of repair tasks for the Concord Pump Station in the SOW. Provide a standard list of trades required to perform these repair maintenance tasks so that the short-term repair contractor can provide rates for these personnel under a separate optional contract line item. Format the SOW similar to the following:
   a. General Information
   b. Management
   c. Repair Tasks
      i. Outfall chamber access hatch repair including concrete repair and rebar repair/replacement
      ii. Sluice gate operator replacement
      iii. New hydraulic power pack
      iv. Clean, paint and grease the sluice gate
      v. Inspection of existing main pumps and power cables
   d. Attachments
      i. Figures

2. OWNER to provide Contract Documents for the repair work.
3. Perform site visits to the Concord pump station to determine existing conditions. Coordinate with OWNER.
4. Provide through subcontract consultation services on the existing systems. Note: An allowance for existing system subconsultant services has been included in the associated project budget $10,000. These services will be provided by Davis & Floyd and RCI.
5. Provide professional services to assist OWNER with development of the repair scope to support the short-term scope of work tasks. Figures and specifications to support the bid package will be of sufficient detail for licensed ENGINEER seal/signature.

6. Provide bid phase services to the OWNER for a public, competitively procured low-bid selection process.

7. It is assumed that this is considered maintenance work, and that no permits will be required to perform this work.

8. Resident Project Representative (RPR). Provide the services of an RPR at the Site to assist the Engineer and to provide more extensive observation of Contractor’s work. Duties, responsibilities, and authority of the RPR are as set forth in Exhibit D. The furnishing of such RPR’s services will not limit, extend, or modify Engineer’s responsibilities or authority except as expressly set forth in Exhibit D. Engineer will perform services during the construction phase of the short-term repair work. By performing these services, Engineer shall not have authority or responsibility to supervise, direct, or control the Contractor’s work or the Contractor’s means, methods, techniques, sequences, or procedures of construction. Engineer shall not have authority or responsibility for safety precautions and programs incident to the Contractor’s work or for any failure of the Contractor to comply with laws, regulations, rules, ordinances, codes, or orders applicable to the Contractor furnishing and performing the work.

**Phase 0110 Perform Due-Diligence & Basis of Design Report**

1. Phase 111 - Due-Diligence Review:
   a. Review and comment upon the *Concord Street Pump Station Preliminary Engineering Report* by Davis & Floyd (June 2021).
   b. Review and be familiar with the site improvements associated with International African-American Museum (IAAM) construction.
      i. Review the utility transformer and ductbank connection constructed as part of this separate project.
      ii. Review the geotechnical report used for this project.
   c. Understand existing pump station operation, procedures, and fully understand their intended operational purpose
   d. Review the City’s staff and maintenance capabilities
   e. Preliminary permitting research for all governing agencies.
   f. Review code requirements for standby power requirements. Provide summary of existing systems and provide summary of items requiring standby power.
   g. Environmental Impact (wetland impact, wetland remediation, etc.)
   h. Review the existing systems in place to mitigate safety risks related to fall hazards.

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i. Evaluate site conditions.

j. CMAR to perform field investigations of the outfall pipe as part of preconstruction services to mitigate unknowns for repair.

k. Update conceptual design elements, as required. The *Concord Street Pump Station Preliminary Engineering Report* will serve as the basis of the design elements for this project. Updates required as output from the Due Diligence Phase will be communicated and memorialized in a Basis of Design Report.

2. **Phase 112 – Technical Memo for Debris Management** Prepare a technical memo to evaluate alternate feasible solutions and recommendation(s) for debris management in the wetwell.
   a. The alternatives that will be considered include:
      i. Benching modifications
         1. Channel flush with inlet invert sloped directly to dewatering pumps
         2. Baffle walls
         3. Specialized benching geometry layout based on CFD model results
      ii. Screening system in the wetwell
         1. Basic screen utilizing a mobile crane system to manage large debris
      iii. Dewatering pumps replaced with dredging pumps
         1. Intended to manage coarse grit and larger particles that are not captured by screening system.
      iv. Sump agitation system for dewatering baffle area
         1. Jet mixing system to mitigate deposition of sediment resulting in build-up of a deposited bed in the dewatering baffle chamber.
   b. Review for compliance with Hydraulic Institute standards, and recommend improvements based on self-cleaning best design practices.
   c. **Phase 212 Computation Fluid Dynamics (Additional Services)** After presenting feasible solutions from item a) and b) of Phase 212, ENGINEER shall get written authorization from the OWNER prior to proceeding with phase 212 c). Complete a computation fluid dynamics (CFD) model and evaluation of the sump to confirm the recommended self-cleaning modifications. This will include three different flow cases. Note: An allowance for CFD services has been included in Part 2 Additional Services of the project budget of $18,000.
      i. Digitise the 3D geometry of the wetwell.
      ii. Setup and run flow model of existing layout.
      iii. Process results of the existing layout and review:
          1. 3D views of streamlines colored by velocity profiles
          2. Velocity contours on sections though the model
          3. Velocity close to walls
          4. Shear stress on walls
      iv. Run particle tracking simulations
      v. Prepare a draft CFD Report
vi. Test the following options for modifications:
   1. Benching modifications
   2. Jet mixing
   3. Baffle walls
   4. Other to be determined

vii. Prepare a final CFD Report to be incorporated into the technical memo.

d. Provide opinion of probable construction cost for each alternative with AACE estimate accuracy of Class 4.

e. Provide summary technical memo outlining alternatives.

3. **Phase 113 – Basis of Design Report** The Basis of Design Report (BODR) shall include (in addition to the updated design elements mentioned above):
   a. Pumping and Control Related Criteria:
      i. Pump flows and design parameters.
      ii. Design calculations for processes, and hydraulics project components.
      iii. Process flow diagram.
      iv. Equipment tagging conventions.
      v. Preliminary control system block diagram.
      vi. Tidal parameters on pump station operation.
      vii. Preliminary major process piping and instrumentation diagrams (P&IDs).

   b. Conceptual site layout, including process structure layouts, process piping, major valves and future standby generator.

   c. Preliminary hydraulic profile.

   d. Code Classification Table.

   e. Power distribution functional diagram.

   f. Determine operational scenario for a standby generator. Determine generator capacity, generator size, fuel source, fuel container capacity, size, location, platform elevation/waterproofing method, wire sizing, conduit size, and automatic transfer switch needed for a future standby generator.

   g. Layouts of process piping and major equipment.

   h. Building code evaluation and structural program.

   i. Improvements to the retrieval system.

   j. Architectural program.

   k. HVAC systems, program and functions.

   l. Fall safety improvements.

   m. Site utility analysis including capacity of existing lines and potential connection locations.

   n. Develop preliminary drawings to include the preliminary site plan and updated hydraulic profile.

   o. Provide preliminary constructability review to identify potential construction risks.
p. Define major demolition activities, critical tie-in requirements, requirements for bypass
pumping/piping and/or temporary facilities, and impacts on existing facilities.
q. Develop an initial construction sequencing/phasing plan that allows for operation of
existing processes. Sequence shall minimize construction time while maintaining
adequate available capacity of existing processes.

r. Provide opinion of probable construction cost with AACE estimate accuracy of Class 4.

4. Conduct a review meeting to summarize the BODR findings. Following this meeting, comments
will be incorporated, and deliverables will be distributed in conjunction with the overall project
deliverables. The BODR shall serve as a milestone wherein certain features shall be fixed after a
period of Owner review.

5. The BODR document will be used for solicitation and procurement of a CMAR contractor for pre-
construction services, and will be used the basis for the CMAR’s non-binding construction cost
estimate as a requirement of the CMAR RFP.

6. Provide through subcontract consultation services to develop the due-diligence evaluation and
BODR. Note: An allowance for subconsultant services has been included in the associated
project budget $36,250. These services will be provided by Liollio, Waggoner Ball, Davis & Floyd
and RCI.

Phase 0115 Site Survey and Subsurface Utility Engineering (SUE) Services

1. Provide, through a subcontract with Cornerstone Surveying & Engineering, Inc. (MWBE), site
surveying services including topographical and existing utility location information in the areas
of the pump station impacted by the project. Locations of utilities as provided by City staff shall
be deemed “for informational purposes only.” The ENGINEER shall positively identify each
aboveground utility that may be impacted as to its horizontal location. ENGINEER shall provide
SUE QL-D services for underground utilities. Site surveying services shall also include all exposed
structures, land features, property corners (as required), State, County and Town ROWs and any
existing utility easements.

2. The subcontract with Cornerstone Surveying & Engineering, Inc. (MWBE) for site surveying
services shall also include arboricultural consulting services in the form of a Visual Tree
Assessment for trees within the areas of the pump station impacted by the project. A report
outlining data on tree species, tagged ID#, DBH (diameter at breast height), health status and
tree management recommendations shall be provided upon completion of the tree evaluation.

3. Locations of delineated wetlands shall also be captured on the site survey.

4. Note: An allowance for subconsultant services has been included in the associated project
budget $23,000.

5. Subsurface Utility Engineering (SUE) is anticipated to be provided through CMAR to achieve SUE
QL-A/B.
Phase 0220 Geotechnical Investigation (Additional Services)

1. Owner shall provide written authorization to proceed with this phase. Provide, through a subcontract with Soil Consultants, Inc. (MWBE), geotechnical engineering services including exploratory work and laboratory and field testing based on preliminary drawings and designs, and including professional interpretations of exploratory and test data. The services will include:
   a. Initial geotechnical exploratory work, such as soil borings, penetration tests, soundings, subsurface explorations, laboratory tests of soils and rock samples that are required to provide information for design, and other field and laboratory tests and analyses that are required to provide design information.
   b. An initial geotechnical report by a qualified geologist or geotechnical firm interpreting the data collected from the exploratory work and testing and making assessments of the site conditions that can be anticipated from this initial exploratory work.

2. After final design has proceeded to the point where it can be accomplished, provide a final geotechnical report evaluating the initial geotechnical investigation, field and laboratory test results, and the initial geotechnical report. The final evaluation shall be based on the actual design, including sizes, locations, and loadings of structures; types, and extent of excavations; and shall consider both design parameters and constructability. If, in the opinion of the reviewing professional or ENGINEER and the OWNER, additional geotechnical data are required for the preparation of the final report, these data shall be provided under an amendment to the Agreement and the subcontract. The final report shall indicate the anticipated performance of the subsurface material to be encountered on the project both during and after construction, under the loading conditions, use, and types of excavations anticipated.

3. Note: An allowance for subconsultant services has been included in the associated project budget $15,000.

Phase 0225 Hazardous Materials Investigation (Additional Services)

1. Written authorization is required from OWNER prior to proceeding with this Phase. Provide, through a subcontract, hazardous materials investigation services to include:
   b. Lead-Based Paint Assessment using X-Ray Fluorescence (XRF) technology.
   c. Visual Polychlorinated Biphenyl (PCB) Assessment and sampling of suspected PCB materials which can be safely sampled.
e. No environmental soil sampling/testing for the presence of synthetic or volatile organic compounds and/or heavy metals will be performed.

2. The purpose of these assessments will be to identify asbestos containing materials (ACMs), lead-based paints and PCBs, and mercury sources to comply with state and federal regulations prior to the planned renovation and demolition activities within the Concord Street Pump Station.

3. Note: An allowance for subconsultant services has been included under Part 2 Additional Services in the associated project budget $10,000.

Phase 0130 Construction Manager At-Risk (CMAR) Approach and Contracting Documents

1. Conduct a kickoff meeting with OWNER’s staff to outline the overall CMAR approach to the project in order to align the project team’s technical objectives with legal, procurement, and potential grant/funding requirements.

2. Assist the City in development of a CMAR approach that best suits project expectations and goals including:
   a. Maintaining partial pump station operation during construction.
   b. Enhancing operational resiliency and durability of the Concord Street Pump Station.
   c. Effective coordination with IAAM.
   d. Optimizing project schedule to limit hurricane season exposure.

3. Develop a Quality Assurance Plan for the approval of the work based on inspection and testing reports for all inspections and tests performed by the Contractor to ensure results comply with contract documents, permits, and building codes.

4. Advise/assist OWNER in selection of CMAR contract documents that best match City’s procurement requirements.

5. Phase 230 Construction Manager At Risk (CMAR) Contract Documents (Additional Services)
   Written authorization is required from OWNER prior to proceeding with this Phase. Draft CMAR contract documents for OWNER’s legal and procurement review and finalization. CMAR contract documents will include a generic “template” for future CMAR projects by the City, and a customized set of contract documents for this project.

Phase 0135 Construction Manager At Risk Request For Qualification

1. Prepare the RFQ document to receive Statements of Qualification (SOQs) from potential CMAR contractors. The RFQ format may include the following sections:
   a. CMAR Experience Requirements
   b. Evaluation Criteria & Selection Schedule
   c. Conceptual Project Scope for CMAR
d. CMAR Project Team and Experience
   e. Safety Requirements
   f. Financial Information
   g. Bonding, Licenses, Insurance Requirements

2. Prepare the RFQ selection plan in accordance with OWNER procurement requirements.
3. Assist OWNER with advertisement of the CMAR RFQ in accordance with OWNER procurement requirements. Assist OWNER with identification of prospective CMAR contractors for submission of SOQs.
4. Receive requests of interpretations of RFQ documents and issue addenda to the documents when required.
5. Receive SOQ submissions from potential CMAR contractors and distribute to OWNER.
6. Review submitted SOQ documents and evaluate for compliance with RFQ minimum requirements. Review and provide assistance with review of CMAR contractor’s safety information (i.e. OSHA 300 logs), financial information, and follow-up investigation of project and client references.
7. Assist OWNER with developing a shortlist of CMAR contractors that meet the RFQ minimum requirements.

Phase 0240 FEMA Hazard Mitigation Grant Program (Additional Services)

1. Written authorization is required from Owner prior to proceeding with this Phase. This Phase will be performed on a time and materials basis with a not-to-exceed limit.
2. Conduct video telephone consultations and meetings with State and Federal agencies concerning the project to determine their requirements and the amount of financial assistance potentially available, if any. Submit a letter report of findings to OWNER.
3. Data Collection – ENGINEER shall work in cooperation with the OWNER’s staff to collect data necessary to complete the HMGP application. The Phase is to gather all pertinent information in order to complete the FEMA process.
4. Support the OWNER in development of an application to the Federal Emergency Management Agency Hazard Mitigation Grant Program for the Concord Pump Station Project. Items included in the application preparation shall include:
   a. Application Preparation
   b. Agency Coordination
   c. Legislative Coordination
   d. Public Participation
   e. Approval for Submittal Process
   f. Coordination/Follow Up
g. Submit Eligibility Offer
h. Final Approval
i. Identify Pledged Revenue Sources
j. Implementation Schedules

5. In the FEMA Hazard Mitigation Grant Assistance Program, cost-effectiveness is a primary eligibility requirement and is demonstrated using a benefit-cost analysis (BCA) completed with FEMA’s BCA software. Because the BCA demonstrating cost-effectiveness represents a major requirement for any FEMA grant submittal, the Black & Veatch team will first complete a preliminary BCA to provide an approximation of the project’s cost-effectiveness using FEMA methodology. The results of this analysis will be communicated to the City in a short technical memorandum and a 1-hour follow-up meeting to achieve concurrence on whether to proceed with completing a Notice of Interest.
   a. Provide, through a subcontract with Davis & Floyd, an evaluation of risk of flooding by developed a model of the service area with flood depths at buildings, roads, and utility disruption.
   b. Engineer will prepare the benefit cost analysis.

6. Schedule – The deadline for submission of the FEMA-HMGP pre-application is December 1, 2022. The deadline for submission of the FEMA-HMGP application is January 28, 2023. The application preparation phase will conclude by submission date. Coordination and follow up will continue until the letter of eligibility or non-eligibility is received by OWNER. It is anticipated that pre-award selection would be made by August of 2023.

Phase 0145 Public Outreach

1. The ENGINEER, through a subcontract with Liollio Architecture, will coordinate and lead public meetings and prepare all materials, presentations, and equipment for the public meetings. The Consultant will conduct public meetings and perform other forms of outreach as necessary for the project. The duration for this task is as shown in the enclosed schedule. Basic services will cover 200 work days of service.

2. The ENGINEER will develop and maintain information for the project website in coordination with the Stormwater Outreach Coordinator.

3. Phase 245 Public Outreach (Additional Services) Owner shall provide written approval to provide services beyond those of the basic services duration.

Phase 1000 Level 1 Design

1. Level 1 services will occur concurrently with the CMAR Contractor Procurement Phase.

2. Level 1 documents will generally include:

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a. Drawings:
   i. Prepare site plan (to include site survey), grading, and yard piping drawings
   ii. Prepare hydraulic profile
   iii. Piping layouts, sections, and vertical control drawings
   iv. Prepare major and secondary system P&IDs
   v. Exterior wall appearance, materials, and construction recommendations
   vi. Prepare I&C control block diagram
   vii. Preliminary landscape architecture plans and site renderings (via subcontract with Waggoner & Ball)

b. Specifications:
   i. Instrument device schedules and I/O lists
   ii. Equipment control block descriptions
   iii. Valve/gate lists

c. Other items:
   i. Preliminary structural design
   ii. Architectural wall sections
   iii. Process equipment specifications and data sheets
   iv. Architectural renderings
   v. Reflected ceiling plans

d. Initial geotechnical investigation report.

e. Results of environmental assessment sampling/testing.

f. Provide opinion of probable construction cost with AACEI estimate accuracy of Class 3.

3. **Phase 1211 – Optional Debris Removal Solution (Additional Services)** The ENGINEER shall get written authorization from the Owner prior to proceeding with the additional services under Phase 1211.

4. Provide one electronic copy of drawings and specifications to OWNER for review. OWNER comments will be received during the Level 1 review meeting and incorporated into subsequent design submittals. Revise documents as necessary to reflect decisions taken at this level. The level 1 documents shall serve as a milestone wherein certain features shall be fixed after a period of Owner review.

4. The Level 1 set of documents will be completed prior to the selection of the CMAR for pre-construction services. Level 1 documents will be used as the basis of pre-construction services.
Phase 1005 CMAR Contractor Procurement

1. Prepare the RFP document to receive proposals from the RFQ short-listed CMAR contractors in accordance with OWNER procurement requirements. Legal services and specialized legal representation for RFP will be provided by OWNER.
2. Develop a pre-construction services scope of work for the CMAR contractor to propose upon.
3. Develop RFP documents for publicly advertised solicitation of CMAR pre-construction services by OWNER. The RFP will contain price-based selection criteria, and will be coordinated with by OWNER and grant-agency (e.g. FEMA HMGP) solicitation requirements. The RFP format may include the following sections:
   a. Evaluation Criteria & Selection Schedule
   b. Conceptual Project Scope for CMAR
   c. Pre-Construction Services Approach
   d. CMAR approach to inspect wetwell and outfall during pre-construction to perform due-diligence inspection
   e. Construction Services Approach
   f. CMAR approach for early out package to complete the dewatering pump replacement
   g. Project Schedule
   h. Construction Cost Estimate (non-binding)
   i. CMAR Fees and Markups (Self-Perform and Subcontractor)
4. Assist City in response to questions during the proposal process.
5. Review proposal responses for completeness and provide expert opinion on content. City shall be ultimately responsible for scoring and final selection.
6. Following selection of the winning Proposal, prepare and distribute unsigned copies of the CMAR Pre-Construction Services contract, review CMAR’s bonds, and transmit the documents to the OWNER for signature and distribution.

Phase 2000 Level 2 Design & Pre-Construction Services

1. Work collaboratively with the City and selected CMAR contractor to further refine the Level 1 design information to progress the project to Level 2 (approximately a 60% design level). The Level 2 design documents shall be suitable for the selected CMAR contractor to develop and submit a Guaranteed Maximum Price (GMP) to the Owner for construction of the project.
2. Pre-Construction Services
   a. Collaboratively interact with and provide assistance to the OWNER and selected CMAR contractor throughout the duration of Pre-Construction Services both in office
environment and onsite at the pump station. Solicit input from the CMAR contractor on deliverables, such as:

i. Constructability review
ii. Risk assessment and risk register updates
iii. Cost evaluations and cost estimating
iv. Development of value engineering (VE) proposals
v. Construction scheduling / sequencing
vi. Maintenance of pump station operations
vii. Routine maintenance and major maintenance schedule and costs
viii. Subcontract procurement process development
ix. Clarification and assumptions to be defined within the GMP

b. Evaluate CMAR contractor’s proposed for open-book pricing format, and provide guidance to CMAR and OWNER on how the open-book format will translate into measurement and payment during construction activities.

c. Review CMAR contractor’s Quality Control Plans, site plans, health and safety plans, submittal registers, activity hazard analysis and other plans and submittals required by the project and recommend acceptance or rejection.

3. Level 2 Design:

a. Level 2 documents will generally include:

i. Drawings:
   1. Sequence of construction
   2. Architectural roof plans
   3. Sections and details showing major process and sub process equipment
   4. Structural framing plans and sections
   5. Final structural details
   6. Landscaping and site irrigation plans
   7. Power and lighting plans
   8. Electrical fixture schedules
   9. HVAC system layouts and equipment schedules
   10. Architectural schedules
   11. Fall safety improvements
   12. Duct bank and roadway lighting arrangements
   13. Final landscape architecture plans and site renderings (via subcontract with Waggoner & Ball)

ii. Specifications:
   1. Schedule requirements
   2. Complete piping and equipment specifications
3. Preliminary commodity specifications
5. Complete instrument device schedule
6. Complete I/O List
7. Complete equipment control descriptions

iii. Optional scope to be approved by Owner prior to proceeding:

1. **Phase 2210 – Optional Engine Generator Design (Additional Services)**
   This generator will be placed on an elevated platform and will require screening to comply with requirements of the City of Charleston’s Board of Architectural Review (BAR). Due to the size of the generator, the screen enclosure will require a structural support system. The ENGINEER shall get written authorization from the Owner prior to proceeding with the additional services under Phase 2210.

2. **Phase 2211 – Optional Wetwell Modifications (Additional Services)**
   The ENGINEER shall get written authorization from the Owner prior to proceeding with the additional services under Phase 2211.

   b. OWNER and CMAR comments will be received in the overall project Level 2 review meeting and incorporated into subsequent design submittals.

4. Provide one electronic copy of drawings and specifications to OWNER and CMAR for review. OWNER comments will be received during the Level 2 review meeting and incorporated into a GMP set of documents upon which CMAR contractor will develop and submit a Guaranteed Maximum Price (GMP) to the Owner for construction of the project. The level 2 documents shall serve as a milestone wherein certain features shall be fixed after a period of Owner review.

5. It is expected that the CMAR will continuously develop an updated opinion of probable construction cost for review by OWNER and ENGINEER throughout pre-construction services.

**Phase 2005 CMAR GMP Negotiation**

1. It is anticipated that there will be two GMP negotiation packages. The two anticipated packages are:
   a. Replacement of the dewatering pumps.
   b. All other remaining work.

2. Review and respond to RFI’s from the CMAR contractor throughout the GMP negotiation process. Review CMAR cost information, and compare to industry standards (unit pricing, productivity, etc.) for acceptability and competitiveness.
3. Assuming a GMP is successfully negotiated, assist City with CMAR contractor construction contract finalization. CMAR construction activities may begin as soon as Notice to Proceed (NTP) is provided by the OWNER.

4. Engineer will provide an estimated 149 hours of service for Phase 2005.

5. **Phase 2205 CMAR GMP Negotiations (Additional Services)** Owner shall provide written approval to provide additional services beyond the basis service.

**Phase 3000 Level 3 & Final Design**

1. Prepare and submit Level 3 design document (approximately 90% design completion) documents for review by OWNER and CMAR contractor.

2. Level 3 documents will generally include:
   a. **Drawings:**
      i. Site details
      ii. Process/civil section and details
      iii. Structural framing and sections
      iv. Structural schedules and details
      v. Site power plan
      vi. Electrical schematics and one-lines
      vii. PLC one-lines
      viii. I&C installation details
   b. **Specifications:**
      i. Commodity specifications
      ii. Electrical specifications
      iii. I&C specifications
   c. Optional scope to be approved by Owner prior to proceeding:
      i. **Phase 3210 – Optional Engine Generator Design (Additional Services)** This generator will be placed on an elevated platform and will require screening to comply with requirements of the City of Charleston’s Board of Architectural Review (BAR). Due to the size of the generator, the screen enclosure will require a support system. The ENGINEER shall get written authorization from the Owner prior to proceeding with the additional services under Phase 3210.

3. Distribute electronic PDF file of the Level 3 submittal to the OWNER and CMAR for review.

4. **Phase 3100 - Final Design** Conduct a review meeting(s) with the OWNER and CMAR. OWNER and CMAR comments will be incorporated into a 100% Final set of design documents.
   a. Optional scope to be approved by Owner prior to proceeding:
b. **Phase 3220 – Optional Engine Generator Design (Additional Services)** This generator will be placed on an elevated platform and will require screening to comply with requirements of the City of Charleston’s Board of Architectural Review (BAR). Due to the size of the generator, the screen enclosure will require a support system. The ENGINEER shall get written authorization from the Owner prior to proceeding with the additional services under Phase 3220.

5. Distribute six (6) total hard copies, as well as electronic PDF files, of the 100% complete documents to the OWNER and CMAR.

6. Because the GMP will be based upon Level 2 documents, a change order will be required to incorporate the 100% Final set of design documents into the construction contract (this is change order may or may not include a change in contract price).

**Phase 4000 Permitting**

1. Prepare and submit all necessary local, state and federal permits and certifications for the project construction:
   a. South Carolina Department of Transportation Encroachment Permit
   b. South Carolina Department of Health and Environmental Control (SCDHEC)
   c. Ocean & Coastal Management (OCRM) Coastal Zone Consistency (CZC)
   d. City of Charleston Engineering Permit Application
   e. City of Charleston Stormwater MS4 Permit and Stormwater Pollution Prevention Plan (SWPPP) approval
   f. City of Charleston Building Permit
   g. All City of Charleston Review committee and boards (Board of Architectural Review (BAR), Design Review Committee (DRC) Technical Review Committee (TRC))

2. Architectural-related permitting services will be performed by Liollio under subcontract.

3. Attend meetings with the City, subcontractor and regulatory agencies as requested and necessary for consultation relating to the construction of the project.

**Phase 5000 Bidding (Additional Services)**

1. Written authorization is required from Owner prior to proceeding with this Phase. This Phase will be performed on a time and materials basis with a not-to-exceed limit. The level of effort for bidding and preaward services involving a well qualified bidder and suppliers will include 340 work hours. Note: An allowance for subconsultant services has been included in the associated project budget $3,500.

2. Provide opinion of probable construction cost with AACE estimate accuracy of Class 2.

3. Bid Services

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City of Charleston, SC  
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Black & Veatch Corporation
a. Front End Documents ~ Assist and advise Owner to finalize front end documents and identify:
   i. Project advertisement date
   ii. Date to receive bids
   iii. Format of bid sets
   iv. Concerns about sensitivity of documents and methods of distribution
   v. Method of document reproduction and distribution of bid sets
   vi. Number of bid sets to be reproduced
   vii. Amount to be charged for bid sets
   viii. Refundable amount (if any)
   ix. Method of advertisement
   x. Reproduction and distribution needs for associated documents such as:
      1. Geotechnical report
      2. Reference documents
      3. Addenda

b. Invitations to Bid ~ Assist and advise Owner in placing the Invitation to Bid. Identify potential contractors and suppliers, review with Owner, and distribute copies of Invitation to Bid. Maintain a record of prospective bidders to whom invitations have been sent.

c. Reproduction ~ Support Owner’s procedures for reproducing bid documents with these services included:
   i. Provide for Owner’s use in reproducing bidding documents one electronic copy of:
      1. Construction contract drawings
      2. Technical specifications
      3. Front end documents
      4. Geotechnical report
      5. Addenda

d. Distribution ~ Support Owner’s procedures for distribution of construction contract documents by providing these services that are included:
   i. Receive deposits for construction contract documents.
   ii. Process refunds to prospective bidders.
   iii. Distribute construction contract bidding documents, geotechnical report, and addenda to prospective bidders and suppliers
   iv. Distribute plan holders list to recipients of contract documents prior to bid opening.

e. Prebid Conference ~ Conduct, at a date and time selected and a place provided by Owner, a prebid conference to:
   i. Confirm the types of information required by the contract documents and the format in which bids should be presented.
ii. Review special project requirements and contract documents in general.

iii. Receive requests for interpretations that will be issued to plan holders.

iv. Prepare minutes of conference and issue to plan holders.

f. Interpretation of bidding documents ~ Interpret bidding documents. Prepare and issue addenda to the construction contract documents when required.

g. Bid Opening ~ Conduct bid opening or assist Owner during bid opening. Answer questions, make preliminary tabulation of bids, and review questionnaires and bids for completeness.

4. Preaward Services Included in Engineering Services Contract

a. Questionnaire ~ Examine the questionnaire to identify any supplier whose equipment or materials may not conform to the construction contract documents. This examination will be based on the knowledge and experience of the Engineer.

b. Qualifications of Apparent Successful Bidder ~ Review and evaluate the qualifications of the apparent successful bidder and the proposed major or specialty subcontractors. The review and evaluation will include financial resources, and check references on previous experience.

c. Bid Tabulations ~ Prepare and distribute formal bid tabulation sheets, evaluate bids, and make written recommendations to Owner concerning contract award.

d. Discuss cost saving alternatives with the lowest responsive bidder to identify cost-saving construction alternatives that can bring the project back within budget, with Owner’s consent. Review, evaluate, and submit comments to Owner concerning equipment performance data submitted by the Contractor. Review, evaluate, and submit comments to Owner concerning

e. As Bid Construction Contract Documents ~ Refine construction contract documents according to addenda.

f. Distribute two (2) sets of the construction contract documents to the successful bidder.

g. Prepare and distribute five (5) sets of conforming copies of the construction contract documents. These services will include review of the Contractor’s bonds and forwarding to Owner for approval, furnishing the Contractor unsigned construction contract documents, and transmitting the construction contract documents to Owner for signature and distribution. Engineer’s review of bonds is only for the purpose of determining if the Contractor provided the bonds required by the contract documents, and is not a legal review to determine if the Contractor’s bonds comply with all applicable requirements.

PERIODS OF SERVICE

Refer to Gantt chart schedule attached.

City of Charleston, SC
Concord Street Pump Station Update Project
Rev 4 - Scope of Services – December 2021 A-19 Black & Veatch Corporation
PART 2.0 ADDITIONAL SERVICES, NOT PART OF SCOPE OF SERVICES

Additional Services Requiring Owner's Written Authorization

If authorized in writing by Owner, Engineer shall furnish or obtain from others Additional Services of the types listed below.

1. Additional services listed under Part 1:
   Phase 0205,
   Phase 0212,
   Phase 0220,
   Phase 0225,
   Phase 0230,
   Phase 0240,
   Phase 0245,
   Phase 1211,
   Phase 2205,
   Phase 2210,
   Phase 2211,
   Phase 3210,
   Phase 3220, and
   Phase 5000

2. General
   a. Security Assessments.
   b. Prequalification of vendors.
   c. Additional meetings with local, State, or Federal agencies to discuss the project.
   d. Additional appearances at public hearings or before special boards.
   e. Preparation for litigation, arbitration, or other legal or administrative proceedings; and
      appearances in court or at arbitration sessions in connection with bid protests, change
      orders, or construction incidents.
   f. Construction Engineering and Inspection (CEI) Services
   g. Facility and Equipment Training
   h. Prepare and submit local, state and federal permits and certifications for:
      i. United State Army Corp of ENGINEERS (USACE)
      ii. Application and Critical Area and Wetlands Permitting

3. Changes in the general scope, extent, or character of the project, including, but not limited to:
   a. Changes in scope.
b. OWNER's schedule, design, or character of construction.

c. Method of financing.
Owner’s Responsibilities

Article 2 of the Agreement is amended and supplemented to include the following agreement of the parties.

In addition to other responsibilities of Owner as set forth in this Agreement, Owner shall at its expense:

Provide Engineer with all criteria and full information as to Owner’s requirements for the Project, including design objectives and constraints, space, capacity and performance requirements, flexibility, and expandability, and any budgetary limitations; and furnish copies of all design and construction standards which Owner will require to be included in the Drawings and Specifications; and furnish copies of Owner’s standard forms, conditions, and related documents for Engineer to include in the Bidding Documents, when applicable.

Furnish to Engineer any other available information pertinent to the Project including reports and data relative to previous designs, or investigation at or adjacent to the Site.

Following Engineer’s assessment of initially-available Project information and data and upon Engineer’s request, furnish or otherwise make available such additional Project related information and data as is reasonably required to enable Engineer to complete its Basic and Additional Services. Such additional information or data would generally include the following:

1. Property descriptions.
2. Zoning, deed, and other land use restrictions.
3. Property, boundary, easement, right-of-way, and other special surveys or data, including establishing relevant reference points.
4. Explorations and tests of subsurface conditions at or contiguous to the Site, drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site, or hydrographic surveys, with appropriate professional interpretation thereof.
5. Environmental assessments, audits, investigations, and impact statements, and other relevant environmental or cultural studies as to the Project, the Site, and adjacent areas.

6. Data or consultations as required for the Project but not otherwise identified in the Agreement or the Exhibits thereto.

Give prompt written notice to Engineer whenever Owner observes or otherwise becomes aware of the presence at the Site of any Constituent of Concern, or of any other development that affects the scope or time of performance of Engineer’s services, or any defect or nonconformance in Engineer’s services, the Work, or in the performance of any Contractor.

Authorize Engineer to provide Additional Services as set forth in Part 2 of Exhibit A of the Agreement as required.

Arrange for safe access to and make all provisions for Engineer to enter upon public and private property as required for Engineer to perform services under the Agreement.

Examine all alternate solutions, studies, reports, sketches, Drawings, Specifications, proposals, and other documents presented by Engineer (including obtaining advice of an attorney, insurance counselor, and other advisors or consultants as Owner deems appropriate with respect to such examination) and render in writing timely decisions pertaining thereto.

Provide reviews, approvals, and permits from all governmental authorities having jurisdiction to approve all phases of the Project designed or specified by Engineer and such reviews, approvals, and consents from others as may be necessary for completion of each phase of the Project.

Provide, as required for the Project:

7. Accounting, bond and financial advisory, independent cost estimating, and insurance counseling services.

8. Legal services with regard to issues pertaining to the Project as Owner requires, Contractor raises, or Engineer reasonably requests.

9. Such auditing services as Owner requires to ascertain how or for what purpose Contractor has used the moneys paid.

10. Placement and payment for advertisement for Bids in appropriate publications.

Advise Engineer of the identity and scope of services of any independent consultants employed by Owner to perform or furnish services in regard to the Project, including, but not limited to, cost estimating, project peer review, value engineering, and constructability review.

City Of Charleston
Concord Street Pump Station Update Project
REV 4 Scope of Services – December 2021

Black & Veatch Corporation
Furnish to Engineer data as to Owner’s anticipated costs for services to be provided by others (including, but not limited to, accounting, bond and financial, independent cost estimating, insurance counseling, and legal advice) for Owner so that Engineer may assist Owner in collating the various cost categories which comprise Total Project Costs.

If Owner designates a construction manager or an individual or entity other than, or in addition to, Engineer to represent Owner at the Site, define and set forth as an attachment to this Exhibit B the duties, responsibilities, and limitations of authority of such other party and the relation thereof to the duties, responsibilities, and authority of Engineer.

If more than one prime contract is to be awarded for the Work designed or specified by Engineer, designate a person or entity to have authority and responsibility for coordinating the activities among the various prime Contractors, and define and set forth the duties, responsibilities, and limitations of authority of such individual or entity and the relation thereof to the duties, responsibilities, and authority of Engineer as an attachment to this Exhibit B that is to be mutually agreed upon and made a part of this Agreement before such services begin.

Attend the pre-bid conference, bid opening, pre-construction conferences, construction progress and other job related meetings, and Substantial Completion and final payment inspections.

Provide the services of an independent testing laboratory to perform all inspections, tests, and approvals of Samples, materials, and equipment required by the Contract Documents, or to evaluate the performance of materials, equipment, and facilities of Owner, prior to their incorporation into the Work with appropriate professional interpretation thereof.

Provide Engineer with the findings and reports generated by the entities providing services to Owner pursuant to this paragraph.
Payments to Engineer for Services and Reimbursable Expenses

Article 2 of the Agreement is amended and supplemented to include the following agreement of the parties:

ARTICLE 2 – OWNER’S RESPONSIBILITIES

C2.01 Compensation For Basic Services – Lump Sum Method of Payment

Owner shall pay Engineer for Basic Services set forth in Exhibit A as follows:

1. A Lump Sum amount of $1,162,469 for compensation based on the following assumed distribution of compensation:

<table>
<thead>
<tr>
<th>Phase</th>
<th>Part 1 - Basic Services (Lump Sum)</th>
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<tbody>
<tr>
<td>Phase 0100 - Project Management &amp; Coordination</td>
<td>$ 120,917</td>
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<tr>
<td>Phase 0205 - Procurement of Contractor for Short Term Maintenance</td>
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<td>(Additional Services)</td>
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<td>Phase 0110 - Perform Due-Diligence &amp; Basis of Design Report</td>
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<td>Phase 111 - Due-Diligence review</td>
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<td>Phase 112 - Technical Memo For Debris Management</td>
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<td>Phase 113 - Basis of Design Report</td>
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<td>Phase 0220 - Geotechnical Investigation (Additional Services)</td>
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<td>Phase 0225 - Hazardous Materials Investigation (Additional Services)</td>
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<td>Phase 0130 - CMAR Approach and Contracting Documents</td>
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<td>Phase 2211 - Optional Wetwell Modifications (Additional Services)</td>
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<td>Phase 2005 - CMAR GMP Negotiations</td>
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<td>Phase 8000 - Facility and Equipment Training (Additional Services)</td>
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<tr>
<td>Total</td>
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</table>

2. Engineer may alter the distribution of compensation between individual phases noted herein to be consistent with services actually rendered, but shall not exceed the total Lump Sum amount unless approved in writing by the Owner.

3. The Lump Sum includes compensation for Engineer’s services and services of Engineer’s Consultants, if any. Appropriate amounts have been incorporated in the Lump Sum to account for labor, overhead, profit, and Reimbursable Expenses.

4. The portion of the Lump Sum amount billed for Engineer’s services will be based upon Engineer’s estimate of the proportion of the total services actually completed during the billing period to the Lump Sum.

C2.02 Compensation For Basic Services (other than Resident Project Representative and Post-Construction) – Standard Hourly Rates Method of Payment

Owner shall pay Engineer for Basic Services set forth in Exhibit A, except for services of Engineer’s Resident Project Representative and Post-Construction Phase services, if any, as follows:

1. An amount equal to the cumulative hours charged to the Project by each class of Engineer’s employees times Standard Hourly Rates for each applicable billing class for all services performed on the Project, plus Reimbursable Expenses and Engineer’s Consultant’s charges, if any.

2. Engineer’s Reimbursable Expenses Schedule and Standard Hourly Rates are attached to this Exhibit C as Appendices 1 and 2.

3. The total compensation for services under Paragraph C2.02 is estimated to be $0.

4. Engineer may alter the distribution of compensation between individual phases of the work noted herein to be consistent with services actually rendered, but shall not exceed the total estimated compensation amount unless approved in writing by Owner.
5. The total estimated compensation for Engineer’s services included in the breakdown by phases as noted in Paragraph C2.02.3 incorporates all labor, overhead, profit, Reimbursable Expenses and Engineer’s Consultant’s charges.

6. The amounts billed for Engineer’s services under Paragraph C2.02 will be based on the cumulative hours charged to the Project during the billing period by each class of Engineer’s employees times Standard Hourly Rates for each applicable billing class, plus Reimbursable Expenses and Engineer’s Consultant’s charges.

7. The Standard Hourly Rates and Reimbursable Expenses Schedule will be adjusted annually (as of January 2022) to reflect equitable changes in the compensation payable to Engineer.

*C2.03 Compensation For Reimbursable Expenses*

Owner shall pay Engineer for all Reimbursable Expenses at the rates set forth in Appendix 1 to this Exhibit C.

Reimbursable Expenses include the following categories: transportation and subsistence incidental thereto; obtaining bids or proposals from Contractor(s); providing and maintaining field office facilities including furnishings and utilities; toll telephone calls and mobile phone charges; reproduction of reports, Drawings, Specifications, Bidding Documents, and similar Project-related items in addition to those required under Exhibit A, and, if authorized in advance by Owner, overtime work requiring higher than regular rates. In addition, if authorized in advance by Owner, Reimbursable Expenses will also include expenses incurred for computer time and the use of other highly specialized equipment.

The amounts payable to Engineer for Reimbursable Expenses will be the Project-related internal expenses actually incurred or allocated by Engineer, plus all invoiced external Reimbursable Expenses allocable to the Project, the latter multiplied by a factor of 1.00.

*C2.04 Other Provisions Concerning Payment*

Whenever Engineer is entitled to compensation for the charges of Engineer’s Consultants, those charges shall be the amounts billed by Engineer’s Consultants to Engineer times a factor of 1.05.

Factors. The external Reimbursable Expenses and Engineer’s Consultant’s factors include Engineer’s overhead and profit associated with Engineer’s responsibility for the administration of such services and costs.

Estimated Compensation Amounts
1. Engineer’s estimate of the amounts that will become payable for specified services are only estimates for planning purposes, are not binding on the parties, and are not the minimum or maximum amounts payable to Engineer under the Agreement.

2. When estimated compensation amounts have been stated herein and it subsequently becomes apparent to Engineer that a compensation amount thus estimated will be exceeded, Engineer shall give Owner written notice thereof. Promptly thereafter Owner and Engineer shall review the matter of services remaining to be performed and compensation for such services. Owner shall either agree to such compensation exceeding said estimated amount or Owner and Engineer shall agree to a reduction in the remaining services to be rendered by Engineer, so that total compensation for such services will not exceed said estimated amount when such services are completed. If Engineer exceeds the estimated amount before Owner and Engineer have agreed to an increase in the compensation due Engineer or a reduction in the remaining services, the Engineer shall be paid for all services rendered hereunder.

To the extent necessary to verify Engineer’s charges and upon Owner’s timely request, Engineer shall make copies of such records available to Owner at cost.

C2.05 Compensation For Resident Project Representative and Post-Construction Basic Services – Standard Hourly Rates Method of Payment

A. Owner shall pay Engineer for Resident Project Representative and Post-Construction Basic Services as follows:

1. Resident Project Representative Services. For services of Engineer’s Resident Project Representative, if any, under Exhibit A, an amount equal to the cumulative hours charged to the Project by each class of Engineer’s employees times Standard Hourly Rates for each applicable billing class for all Resident Project Representative services performed on the Project, plus related Reimbursable Expenses and Engineer’s Consultant’s charges, if any. The total compensation under this Paragraph is estimated to be $0 based upon Contract Times as set forth herein.

2. Post-Construction Phase Services. For Post-Construction Phase services under Exhibit A, an amount equal to the cumulative hours charged to the Project by each class of Engineer’s employees times Standard Hourly Rates for each applicable billing class for all services performed on the Project, plus related Reimbursable Expenses and Engineer’s Consultant’s charges, if any. The total compensation under this Paragraph is estimated to be $0.

B. Compensation For Reimbursable Expenses
1. For those Reimbursable Expenses that are not accounted for in the compensation for Basic Services under Paragraph C.2.01, and are directly related to the provision of Resident Project Representative or Post-Construction Basic Services, Owner shall pay Engineer at the rates set forth in Appendix 1 to this Exhibit C.

2. Reimbursable Expenses include the following categories: transportation and subsistence incidental thereto; obtaining bids or proposals from Contractor(s); providing and maintaining field office facilities including furnishings and utilities; subsistence and transportation of Resident Project Representative and assistants; toll telephone calls and mobile phone charges; reproduction of reports, Drawings, Specifications, Bidding Documents, and similar Project-related items in addition to those required under Exhibit A, and, if authorized in advance by Owner, overtime work requiring higher than regular rates. In addition, if authorized in advance by Owner, Reimbursable Expenses will also include expenses incurred for computer time and the use of other highly specialized equipment.

3. The amounts payable to Engineer for Reimbursable Expenses, if any, will be those internal expenses related to the Resident Project Representative or Post-Construction Basic Services that are actually incurred or allocated by Engineer, plus all invoiced external Reimbursable Expenses allocable to such services, the latter multiplied by a factor of 1.00.

4. The Reimbursable Expenses Schedule will be adjusted annually (as of January 2022) to reflect equitable changes in the compensation payable to Engineer.

C. Other Provisions Concerning Payment Under this Paragraph C.2.04

1. Whenever Engineer is entitled to compensation for the charges of Engineer’s Consultants, those charges shall be the amounts billed by Engineer’s Consultants to Engineer times a factor of 1.05.

2. Factors. The external Reimbursable Expenses and Engineer’s Consultant’s factors include Engineer’s overhead and profit associated with Engineer’s responsibility for the administration of such services and costs.

3. Estimated Compensation Amounts
   
   a. Engineer’s estimate of the amounts that will become payable for specified services are only estimates for planning purposes, are not binding on the parties, and are not the minimum or maximum amounts payable to Engineer under the Agreement.

   b. When estimated compensation amounts have been stated herein and it subsequently becomes apparent to Engineer that a compensation amount thus estimated will be exceeded, Engineer shall give Owner written notice thereof. Promptly thereafter
Owner and Engineer shall review the matter of services remaining to be performed and compensation for such services. Owner shall either agree to such compensation exceeding said estimated amount or Owner and Engineer shall agree to a reduction in the remaining services to be rendered by Engineer, so that total compensation for such services will not exceed said estimated amount when such services are completed. If Engineer exceeds the estimated amount before Owner and Engineer have agreed to an increase in the compensation due Engineer or a reduction in the remaining services, the Engineer shall be paid for all services rendered hereunder.

4. To the extent necessary to verify Engineer’s charges and upon Owner’s timely request, Engineer shall make copies of such records available to Owner at cost.

C2.06 Compensation For Additional Services – Standard Hourly Rates Method of Payment

A. Owner shall pay Engineer for Additional Services, if any, as follows:

1. General. For services of Engineer’s employees engaged directly on the Project pursuant to Exhibit A, except for services as a consultant or witness, an amount equal to the cumulative hours charged to the Project by each class of Engineer’s employees times Standard Hourly Rates for each applicable billing class for all Additional Services performed on the Project, plus related Reimbursable Expenses and Engineer’s Consultant’s charges, if any.

2. The total compensation for services under Paragraph C2.06 is estimated to be $537,071 based on the following assumed distribution of compensation:

<table>
<thead>
<tr>
<th>Phase</th>
<th>Part 2 - Additional Services (Written Authorization)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 0100 - Project Management &amp; Coordination</td>
<td></td>
</tr>
<tr>
<td>Phase 0205 - Procurement of Contractor for Short Term Maintenance (Additional Services)</td>
<td>$ 72,101</td>
</tr>
<tr>
<td>Phase 0110 - Perform Due-Diligence &amp; Basis of Design Report</td>
<td></td>
</tr>
<tr>
<td>Phase 111 - Due-Diligence review</td>
<td></td>
</tr>
<tr>
<td>Phase 112 - Technical Memo For Debris Management</td>
<td></td>
</tr>
<tr>
<td>Phase 113 - Basis of Design Report</td>
<td></td>
</tr>
<tr>
<td>Phase 0115 - Site Survey and Subsurface Utility Engineering (SUE) Services</td>
<td></td>
</tr>
<tr>
<td>Phase</td>
<td>Part 2 - Additional Services (Written Authorization)</td>
</tr>
<tr>
<td>-----------------------------------------------------</td>
<td>-----------------------------------------------------</td>
</tr>
<tr>
<td>Phase 0220 - Geotechnical investigation (Additional Services)</td>
<td>$ 19,866</td>
</tr>
<tr>
<td>Phase 0225 - Hazardous Materials Investigation (Additional Services)</td>
<td>$ 13,196</td>
</tr>
<tr>
<td>Phase 0130 - CMAR Approach and Contracting Documents</td>
<td></td>
</tr>
<tr>
<td>Phase 0135 - CMAR Request for Qualification</td>
<td></td>
</tr>
<tr>
<td>Phase 0240 - FEMA Hazard Mitigation Grant Program (Additional Services)</td>
<td>$ 61,018</td>
</tr>
<tr>
<td>Phase 0145 - Public Outreach</td>
<td></td>
</tr>
<tr>
<td>Phase 0212 - Computation Fluid Dynamics (Additional Services)</td>
<td>$ 18,000</td>
</tr>
<tr>
<td>Phase 0230 - CMAR Contract Documents (Additional Services)</td>
<td>$ 20,873</td>
</tr>
<tr>
<td>Phase 0245 - Public Outreach (Additional Services)</td>
<td>$ 21,530</td>
</tr>
<tr>
<td>Phase 1000 - Detailed Design Level 1</td>
<td></td>
</tr>
<tr>
<td>Base Scope</td>
<td></td>
</tr>
<tr>
<td>Phase 1211 - Optional Debris Removal Solution (Additional Services)</td>
<td>$ 20,124</td>
</tr>
<tr>
<td>Phase 1005 - CMAR Contractor Procurement</td>
<td></td>
</tr>
<tr>
<td>Phase 2000 - Detailed Design Level 2 &amp; Pre-Construction Services</td>
<td></td>
</tr>
<tr>
<td>Base Scope</td>
<td></td>
</tr>
<tr>
<td>Phase 2210 - Optional Engine Generator Design (Additional Services)</td>
<td>$ 99,785</td>
</tr>
<tr>
<td>Phase 2211 - Optional Wetwell Modifications (Additional Services)</td>
<td>$ 30,102</td>
</tr>
<tr>
<td>Phase 2005 - CMAR GMP Negotiations</td>
<td></td>
</tr>
<tr>
<td>Phase 2205 - CMAR GMP Negotiations (Additional Services)</td>
<td>$ 28,954</td>
</tr>
<tr>
<td>Phase 3000 - Detailed Design Level 3 and Final Design</td>
<td></td>
</tr>
<tr>
<td>Base Scope</td>
<td></td>
</tr>
<tr>
<td>Phase 3210 - Optional Engine Generator Design (Additional Services)</td>
<td>$ 41,955</td>
</tr>
<tr>
<td>Phase 3100 - Final Detailed Design (Level 4)</td>
<td></td>
</tr>
<tr>
<td>Phase</td>
<td>Part 2 - Additional Services (Written Authorization)</td>
</tr>
<tr>
<td>-------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>Base Scope</td>
<td></td>
</tr>
<tr>
<td>Phase 3220 - Optional Engine Generator Design (Additional Services)</td>
<td>$27,165</td>
</tr>
<tr>
<td>Phase 4000 - Permitting</td>
<td></td>
</tr>
<tr>
<td>Phase 5000 - Bidding (Additional Services)</td>
<td>$62,400</td>
</tr>
<tr>
<td>Phase 6000 - Construction Engineering and Inspection (CEI) Services (Additional Services)</td>
<td></td>
</tr>
<tr>
<td>Phase 8000 - Facility and Equipment Training (Additional Services)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$537,071</td>
</tr>
</tbody>
</table>

3. Engineer may alter the distribution of compensation between individual phases with written approval from Owner but shall not exceed the total amount unless approved in writing by the Owner.

B. Compensation For Reimbursable Expenses

1. For those Reimbursable Expenses that are not accounted for in the compensation for Basic Services under Paragraph C2.01 and are directly related to the provision of Additional Services, Owner shall pay Engineer at the rates set forth in Appendix 1 to this Exhibit C.

2. Reimbursable Expenses include the following categories: transportation and subsistence incidental thereto; obtaining bids or proposals from Contractor(s); providing and maintaining field office facilities including furnishings and utilities; toll telephone calls and mobile phone charges; reproduction of reports, Drawings, Specifications, Bidding Documents, and similar Project-related items in addition to those required under Exhibit A; and, if authorized in advance by Owner, overtime work requiring higher than regular rates. In addition, if authorized in advance by Owner, Reimbursable Expenses will also include expenses incurred for computer time and the use of other highly specialized equipment.

3. The amounts payable to Engineer for Reimbursable Expenses, if any, will be the Additional Services-related internal expenses actually incurred or allocated by Engineer, plus all invoiced external Reimbursable Expenses allocable to such Additional Services, the latter multiplied by a factor of 1.00.
4. The Reimbursable Expenses Schedule will be adjusted annually (as of January 2022) to reflect equitable changes in the compensation payable to Engineer.

C. Other Provisions Concerning Payment For Additional Services

1. Whenever Engineer is entitled to compensation for the charges of Engineer’s Consultants, those charges shall be the amounts billed by Engineer’s Consultants to Engineer times a factor of 1.05.

2. Factors. The external Reimbursable Expenses and Engineer’s Consultant’s Factors include Engineer’s overhead and profit associated with Engineer’s responsibility for the administration of such services and costs.

3. To the extent necessary to verify Engineer’s charges and upon Owner’s timely request, Engineer shall make copies of such records available to Owner at cost.
Reimbursable Expenses Schedule

Current agreements for engineering services stipulate that the Reimbursable Expenses are subject to review and adjustment per Exhibit C. Reimbursable expenses for services performed on the date of the Agreement are:

<table>
<thead>
<tr>
<th>Description</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>8&quot;x11&quot; Copies/ Impressions</td>
<td>$0.30/page</td>
</tr>
<tr>
<td>Plan Sheet Copies</td>
<td>$0.20/sq. ft.</td>
</tr>
<tr>
<td>Reproducible Copies (Mylar)</td>
<td>$2.00/sq. ft.</td>
</tr>
<tr>
<td>Reproducible Copies (Paper)</td>
<td>$0.50/sq. ft.</td>
</tr>
<tr>
<td>Mileage (auto)</td>
<td>$0.55/mile</td>
</tr>
<tr>
<td>Mileage (Field Truck)</td>
<td>$0.55/mile</td>
</tr>
<tr>
<td>Field Survey Equipment</td>
<td>n/a</td>
</tr>
<tr>
<td>Confined Space Equipment</td>
<td>at cost</td>
</tr>
<tr>
<td>Resident Project Representative</td>
<td>at cost</td>
</tr>
<tr>
<td>Computer CPU Charge</td>
<td>n/a</td>
</tr>
<tr>
<td>Specialized Software</td>
<td>at cost</td>
</tr>
<tr>
<td>Personal Computer Charge</td>
<td>n/a</td>
</tr>
<tr>
<td>Long Distance Phone Calls</td>
<td>n/a</td>
</tr>
<tr>
<td>Mobile Phone</td>
<td>n/a</td>
</tr>
<tr>
<td>Meals and Lodging</td>
<td>at cost</td>
</tr>
</tbody>
</table>
This is Appendix 2 to EXHIBIT C, consisting of 1 pages, referred to in and part of the Agreement between Owner and Engineer for Professional Services dated ______________, ____.

Standard hourly rates are subject to review and adjustment annually as of January 2022. Hourly rates effective on the date of this Contract are as follows:

<table>
<thead>
<tr>
<th>Category</th>
<th>Rate: $/hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior Project Director</td>
<td>$300</td>
</tr>
<tr>
<td>Design-Build Director</td>
<td>$280</td>
</tr>
<tr>
<td>Project Director</td>
<td>$225</td>
</tr>
<tr>
<td>Senior Quality Control</td>
<td>$220</td>
</tr>
<tr>
<td>Project Manager</td>
<td>$200</td>
</tr>
<tr>
<td>Risk Manager/Technical Advisor</td>
<td>$200</td>
</tr>
<tr>
<td>Senior Engineer</td>
<td>$200</td>
</tr>
<tr>
<td>Engineering Manager</td>
<td>$185</td>
</tr>
<tr>
<td>Discipline Engineer</td>
<td>$180</td>
</tr>
<tr>
<td>Senior Technician/Project Controller</td>
<td>$160</td>
</tr>
<tr>
<td>Project Engineer</td>
<td>$155</td>
</tr>
<tr>
<td>Design Engineer</td>
<td>$145</td>
</tr>
<tr>
<td>Technician</td>
<td>$120</td>
</tr>
<tr>
<td>Accountant</td>
<td>$120</td>
</tr>
<tr>
<td>Sr. Administrative Assistant</td>
<td>$115</td>
</tr>
<tr>
<td>Administrative Assistant</td>
<td>$75</td>
</tr>
</tbody>
</table>
Duties, Responsibilities, and Limitations of Authority of Resident Project Representative

Paragraph 1.01A of the Agreement is amended and supplemented to include the following agreement of the parties:

D1.01 Resident Project Representative

A. Engineer shall furnish a Resident Project Representative ("RPR"), assistants, and other field staff to assist Engineer in observing progress and quality of the Work. The RPR, assistants, and other field staff under this Exhibit D may provide full time representation or may provide representation to a lesser degree. Engineer will furnish a Special Inspections Representative. The Special Inspection Representative will observe the Contractor's work and perform Special Inspections. The Special Inspections Representative shall not have responsibility for the superintendence of construction site conditions, safety, safe practices or unsafe practices or conditions, operation, equipment, or personnel other than employees of the Engineer. This service will in no way relieve the Contractor of complete supervision and inspection of the work or the Contractor's obligation for complete compliance with the drawings and specifications. The Contractor shall have sole responsibility for safety and for maintaining safe practices and avoiding unsafe practices or conditions. Specific services performed by the Special Inspections Representative and Special Inspectors and durations of their services are as follows:

a. Part Time Special Inspections Representative for 50 work days at ten (10) hours per week.

B. Through such additional observations of Contractor’s work in progress and field checks of materials and equipment by the RPR and assistants, Engineer shall endeavor to provide further protection for Owner against defects and deficiencies in the Work. However, Engineer shall not, during such visits or as a result of such observations of Contractor’s work in progress, supervise, direct, or have control over the Contractor’s Work nor shall Engineer have authority over or responsibility for the means, methods, techniques, sequences, or procedures of construction selected or used by Contractor, for security or safety at the Site, for safety precautions and programs incident to the Contractor’s work in progress, for any failure of Contractor to comply with Laws and Regulations applicable to Contractor’s performing and furnishing the Work, or responsibility for Contractor’s failure to furnish and perform the Work.
in accordance with the Contract Documents. In addition, the specific terms set forth in Exhibit A of the Agreement are applicable.

C. The duties and responsibilities of the RPR are as follows:

1. General: RPR is Engineer’s 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 Contractor’s work in progress shall in general be with Engineer and Contractor, keeping Owner advised as necessary. RPR’s dealings with subcontractors shall only be through or with the full knowledge and approval of Contractor. RPR shall generally communicate with Owner with the knowledge of and under the direction of Engineer.

2. 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.

3. 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.

4. Liaison:
   a. Serve as Engineer’s liaison with Contractor, working principally through Contractor’s superintendent, 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.

5. 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.

6. Shop Drawings and Samples:
   a. Receive Samples which are furnished at the Site by Contractor, and notify Engineer of availability of Samples for examination.
b. Advise Engineer and Contractor of the commencement of any portion of the Work requiring a Shop Drawing or Sample submittal for which RPR believes that the submittal has not been approved by Engineer.

7. 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.

8. 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.

9. Inspections, Tests, and System Startups:

a. Consult with Engineer in advance of scheduled major inspections, tests, and systems startups of important phases of the Work.

b. 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.

c. Observe, record, and report to Engineer appropriate details relative to the test procedures and systems start-ups.

d. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Project, record the results of these inspections, and report to Engineer.

e. Conduct onsite observations of the general progress of the testing and inspections to assist Engineer in determining if Structural Tests and Special Inspections are proceeding in accordance with the Special Inspections Program.
f. Verify that the Contractor has contacted the Special Inspectors or Testing Agencies and advised them of Contractor’s schedule. Assist in coordinating scheduling of inspections or tests to minimize impacts to the progress of the Work.

g. Coordinate onsite structural testing services during construction. Copies of testing results will be forwarded to Special Inspectors for review and information.

h. Observe the execution of the Special Inspections Program and review the resulting reports, commenting to Engineer, as appropriate.

10. Records:

a. Review daily diary or log book of events at the jobsite. The daily diary log book is to be created by General Contractor.

b. Maintain records for use in preparing Project documentation.

c. Upon completion of the Work, furnish original set of all RPR Project documentation to Engineer.

11. 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. Furnish to Engineer and Owner copies of all inspection, test, and system start-up reports.

d. 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 Constituent of Concern.

e. Submit to Engineer, with a copy to AHJ, interim Special Inspections progress reports containing a summary of the Contractor’s progress, general condition of the work, problems, and resolutions or proposed resolutions to problems.

f. Notify Engineer regarding work which is reported to be defective, or which fails any required inspections, tests, or approvals; and advise Engineer of status of corrective action. Record date of receipt of inspection reports and test reports. Maintain records for examination by Owner, AHJ, Inspectors, Contractor or Engineer.
g. Collect, and organize test data and inspection reports provided by the Inspectors and provide a comprehensive Final Report containing a table of contents. Distribute the Final Report in accordance with the Special Inspections Program.

3. *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.

4. *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.

5. 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.

6. *Final Notice of Acceptability of the Work*. Conduct a final inspection to determine if the completed Work of Contractor is acceptable so that Engineer may recommend, in writing, final payment to Contractor. Accompanying the recommendation for final payment, Engineer shall also provide a notice in the form as Exhibit E (the “Notice of Acceptability of Work”) that the Work is acceptable to the best of Engineer’s knowledge, information, and belief and based on the extent of the services provided by Engineer under this Agreement.

D. Resident Project Representative 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 Agreement or 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.
Insurance

Paragraph 6.05 of the Agreement is amended and supplemented to include the following agreement of the parties.

Contractors working for the City of Charleston are required to procure and maintain for the duration of their contract with the City insurance against claims for injuries to persons or damages to property which may arise from or in connection with work performed by the Contractor, his agents, representatives, employees or Subcontractors. The cost of such insurance shall be the responsibility of the Contractor.

A. The Contractor shall carry liability insurance with a reliable company licensed to do business in South Carolina. Coverage shall be at least broad as:

1. Insurance Services Office Commercial General Liability Coverage Form (“occurrence”) CG 00 01.

2. Insurance Services Office Business Auto Coverage Form CA 00 01 covering automobile liability, code 1 “any auto”.

B. Contractor shall carry workers’ compensation as required by the State of South Carolina and Employers Liability insurance (including applicable occupation disease provisions and all state endorsements).

C. Contractor shall maintain limits no less than the following:

1. **GENERAL LIABILITY**: $1,000,000 combined single limit per occurrence for bodily injury, property damage, and personal injury with a $2,000,000 general aggregate limit.

2. **AUTOMOBILE LIABILITY**: $1,000,000 combined single limit per accident for bodily injury and property damage.

3. **WORKERS’ COMPENSATION**: Statutory limits are required by South Carolina state law, and employer’s liability limits of $100,000 per accident.
4. **PROFESSIONAL LIABILITY:** $1,000,000 per claim/$1,000,000 aggregate limit, with a deductible of $20,000.

Contractor shall obtain and maintain a professional liability insurance policy covering the performance of the professional services specified in this agreement. Evidence of such insurance shall be satisfactory in form and content to the owner, the City. This coverage shall be maintained through the duration of this project and for a minimum of 1 year after substantial completion of the project as determined by the City.

The Contractor and any of its subcontractors will cause the professional liability insurance required in this paragraph C.4:

(a) to be excess insurance over any project professional liability policy, and

(b) to be primary insurance in the event the project insurance described in Paragraph E is canceled or not maintained, in the event the policy’s limits of liability are exhausted, or if the policy expires.

D. Required policies are to contain, or be endorsed to contain, the following provisions:

1. **General Liability and Automobile Liability Coverages**

   The City of Charleston, its officials, employees and volunteers are to be covered as additional insureds as respects: Liability arising out of activities performed by or on behalf of the Contractors; premises owned, occupied or used by the Contractor; or automobiles owned, leased, hired or borrowed by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to the City of Charleston, its officials, employees or volunteers. To accomplish this objective, the City of Charleston shall be named as an additional insured under the Contractor’s general liability policy by attaching Insurance Services Office Commercial General Liability Endorsement CG2010 (Additional Insured - Owners, Lessees or Contractors - Form B) or its equivalent. Contractors’ insurance coverage shall be primary insurance as respects the City of Charleston, its officials, employees and volunteers. Any insurance or self-insurance maintained by the City of Charleston, its officials, employees, or volunteers shall be in excess of the Contractor’s insurance and shall not be required to contribute. To accomplish this objective, the following wording should be incorporated in the previously referenced additional insured endorsement.
Other Insurance: This insurance is primary, and our obligations are not affected by any other insurance carried by the additional insured whether primary, excess, contingent or on any other basis.

Any failure to comply with reporting provisions of the Contractor’s policies shall not affect coverage provided to the City of Charleston, its officials, employees or volunteers.

2. Workers’ Compensation

The Contractor shall agree to waive all rights of subrogation against the City of Charleston, its officials, employees and volunteers for losses arising from work performed by the Contractor for the City of Charleston.

E. Any deductibles or self-insured retentions shall be the responsibility of the Contractor.

F. Each insured policy required by the City of Charleston shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days prior written notice has been given to the City of Charleston.

G. All coverages for Subcontractors shall be subject to all the requirements stated herein. Insurance must be placed with an approved insurance company with current Best’s rating of A+, A, or A-. Exceptions to this requirement must be approved in writing by the Department of Risk Management.
H. Contractor shall furnish the City of Charleston with Certificates of Insurance noting the endorsements. The Certificates and endorsements for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. All certificates and endorsements are to be received and approved by the City of Charleston, Procurement Division, before work commences. The City of Charleston reserves the right to require complete, certified copies of all required insurance policies, at any time, and Contractor shall make such policies available for review at Contractor’s place of business upon such request.

Required certificates should be mailed to:

City of Charleston

Department of Stormwater Management

2 George Street, Suite 2100

Charleston, SC 29401
CERTIFICATE OF LIABILITY INSURANCE

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 have ADDITIONAL INSURED provisions or 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
Lockton Companies
444 W. 47th Street, Suite 900
Kansas City MO 64112-1906
(816) 960-9000

INSURED
BLACK & VEATCH CORPORATION
11401 LAMAR
OVERLAND PARK KS 66221
DOBBENFUHL, KIRBY

INSURER(S) AFFORDING COVERAGE
INSURER A: Zurich American Insurance Company
INSURER B: Lexington Insurance Company

COVERAGE
CERTIFICATE NUMBER: 18075078

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 ADD SUB INS NO POLICY NUMBER POLICY EFF (MM/DD/YYYY) POLICY Exp (MM/DD/YYYY) LIMITS
A X COMMERCIAL GENERAL LIABILITY N N GLO 4641358 11/1/2021 11/1/2022 $ 2,000,000
GLO 1365630

A X AUTOMOBILE LIABILITY N N BAP-4641355 (AOS) 11/1/2021 11/1/2022

B N PROFESSIONAL LIABILITY N N 026030198 11/1/2021 11/1/2022 $10,000,000 PER CLAIM
$10,000,000 ANNUAL AGGREGATE

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 105, Additional Remarks Schedule, may be attached if more space is required)

CERTIFICATE HOLDER
18075078
CITY OF CHARLESTON
2 GEORGE STREET
CHARLESTON, SC 29401

CANCELLATION
See Attachments

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

© 1988-2015 ACORD CORPORATION. All rights reserved.
POLICY NUMBER: GLO 4641358, GLO 1365630
COMMERCIAL GENERAL LIABILITY
CG 20 10 04 13

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED - OWNERS, LESSEES OR CONTRACTORS - SCHEDULED PERSON OR ORGANIZATION

This endorsement modifies insurance provided under the following:
COMMERCIAL GENERAL LIABILITY COVERAGE PART

SCHEDULE

<table>
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<tr>
<th>Name Of Additional Insured</th>
<th>Location(s) Of Covered Operations</th>
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<tbody>
<tr>
<td>AS REQUIRED BY WRITTEN CONTRACT</td>
<td>AS REQUIRED BY WRITTEN CONTRACT</td>
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</tbody>
</table>

Information required to complete this Schedule if not shown above will be shown in the Declarations.

A. Section II - Who Is An Insured is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by:
1. Your acts or omissions; or
2. The acts or omissions of those acting on your behalf;
in the performance of your ongoing operations for the additional insured(s) at the location(s) designated above.
However:
1. The insurance afforded to such additional insured only applies to the extent permitted by law; and
2. If coverage provided to the additional insured is required by a contract or agreement, the insurance afforded to such additional insured will not be broader than that which you are required by the contract or agreement to provide for such additional insured.

B. With respect to the insurance afforded to these additional insureds, the following additional exclusions apply:
This insurance does not apply to "bodily injury" or "property damage" occurring after:
1. All work, including materials, parts or equipment furnished in connection with such work, on the project (other than service, maintenance or repairs) to be performed by or on behalf of the additional insured(s) at the location of the covered operations has been completed; or
2. That portion of "your work" out of which the injury or damage arises has been put to its intended use by any person or organization other than another contractor or subcontractor engaged in performing operations for a principal as a part of the same project.

C. With respect to the insurance afforded to these additional insureds, the following is added to Section III - Limits Of Insurance:
   If coverage provided to the additional insured is required by a contract or agreement, the most we will pay on behalf of the additional insured is the amount of insurance:
   1. Required by the contract or agreement; or

2. Available under the applicable Limits of Insurance shown in the Declarations;
   whichever is less.

This endorsement shall not increase the applicable Units of Insurance shown in the Declarations.
Waiver Of Subrogation (Blanket) Endorsement

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Named Insured: BLACK & VEATCH CORPORATION

This endorsement modifies the insurance provided under the following:

Commercial General Liability Coverage Part

The following is added to the Transfer Of Rights Of Recovery Against Others To Us Condition:

If you are required by a written contract or agreement, which is executed before a loss, to waive your rights of recovery from others, we agree to waive our rights of recovery. This waiver of rights shall not be construed to be a waiver with respect to any other operations in which the insured has no contractual interest.
POLICY NUMBER: BAP 4641355 (AOS)  

COMMERCIAL AUTO  
CA 20 48 02 99  

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.  

DESIGNATED INSURED  

This endorsement modifies insurance provided under the following:  

BUSINESS AUTO COVERAGE  
GARAGE COVERAGE FORM  
MOTOR CARRIER COVERAGE FORM  
TRUCKERS COVERAGE FORM  

With respect to coverage provided by this endorsement, the provisions of the Coverage Form apply unless modified by this endorsement.  

This endorsement identifies person(s) or organization(s) who are "insureds" under the Who Is An Insured Provision of the Coverage Form. This endorsement does not alter coverage provided in the Coverage Form.  

This endorsement changes the policy effective on the inception date of the policy unless another date is indicated below.  

Endorsement Effective: 11/1/2021  
Named Insured: BLACK & VEATCH CORPORATION  

SCHEDULE  

Name of Person(s) or Organization(s): AS REQUIRED PER WRITTEN CONTRACT  

(If no entry appears above, information required to complete this endorsement will be shown in the Declarations as applicable to the endorsement.)  

Each person or organization shown in the Schedule is an "insured" for Liability Coverage, but only to the extent that person or organization qualifies as an "insured" under the Who Is An Insured Provision contained in Section II of the Coverage Form.)
Waiver of Transfer Of Rights Of Recovery Against Others To Us

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This endorsement is issued by the company named in the Declarations. It changes the policy on the effective date listed above at the hour stated in the Declarations.

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

Named Insured: BLACK & VEATCH CORPORATION

Address (including ZIP code): 11401 LAMAR OVERLAND PARK KS 66211

This endorsement modifies insurance provided under the:

Business Auto Coverage Form
Truckers Coverage Form
Garage Coverage Form
Motor Carrier Coverage Form

SCHEDULE

Name of the Person or Organization:
AS REQUIRED BY WRITTEN CONTRACT

We waive any right of recovery we may have against the designated person or organization shown in the schedule because of payments we make for injury or damage caused by an "accident" or "loss" resulting from the ownership, maintenance, or use of a covered "auto" for which a Waiver of Subrogation is required in conjunction with work performed by you for the designated person or organization. The waiver applies only to the designated person or organization shown in the schedule.
WAIVER OF OUR RIGHT TO RECOVER FROM OTHERS ENDORSEMENT

We have the right to recover our payments from anyone liable for an injury covered by this policy. We will not enforce our right against the person or organization named in the Schedule. (This agreement applies only to the extent that you perform work under a written contract that requires you to obtain this agreement from us.)

This agreement shall not operate directly or indirectly to benefit anyone not named in the Schedule.

Schedule

AS REQUIRED PER WRITTEN CONTRACT

This endorsement changes the policy to which it is attached and is effective on the date issued unless otherwise stated. (The information below is required only when this endorsement is issued subsequent to preparation of the policy.)

Effective Policy No. WC 4641353 (AOS), WC 4641354 (ID, MA, WI), WC 1365632, WC 1365631 (NE)
Insured: BLACK & VEATCH CORPORATION
Effective Date: 11/1/2021
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<td>Project Quality Assurance Plan Review</td>
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<td>Phase I-100 Procurement of Construction for Next 30 Days</td>
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Projects: De Long Pump Site
Date: 3/16/2021
CPR COMMITTEE and/or COUNCIL AGENDA

TO: John J. Tecklenburg, Mayor
FROM: Steve Kirk / Andrew Jones DEPT. Stormwater Management
SUBJECT: SPRING-FISHBURREN DRAINAGE IMPROVEMENTS PHASE 5-PUMP PROCUREMENT CONTRACT
REQUEST: Approval of a pump procurement contract with Xylem Water Solutions in the amount of $5,959,684.00 for the supply of three variable speed axial or mixed flow vertical column pumps with diesel engine drives (120,000 gpm) for the future pump station as part of the Spring-Fishburne Phase 5 project.

With the approval of the project budget, Staff is authorized to award and/or amend contracts $40,000.00 or less, to the extent project contingency funds exist in the Council Approved Budget.

COMMITTEE OF COUNCIL: Ways & Means DATE: January 11, 2022
COORDINATION: This request has been coordinated with: (attach all recommendations/reviews)

CPR Committee Chair Yes N/A Signature of Individual Contacted Attachment
Corporate Counsel X
Dir. of SW Management
MBE Manager

FUNDING: Was funding previously approved? Yes [X] No N/A

If yes, provide the following: Dept/Div SW Mgmt-Proc. Mgmt Acct # 050361-58015

Balance in Account $5,959,684.00 Amount needed for this item $5,959,684.00

NEED: Identify any critical time constraint(s).

FISCAL IMPACT: Approval of this procurement contract will institute a project budget of $38,452,663.00 of which $5,959,684.00 will be obligated by this contract. Funding sources for this project are: King St. Gateway TIF ($26,003,011.00) and the SC Transportation Infrastructure Bank ($12,449,652.00).

CFO's Signature: 

FISCAL IMPACT: Approval of this procurement contract will institute a project budget of $38,452,663.00 of which $5,959,684.00 will be obligated by this contract. Funding sources for this project are: King St. Gateway TIF ($26,003,011.00) and the SC Transportation Infrastructure Bank ($12,449,652.00).

Mayor's Signature: John J. Tecklenburg, Mayor

ORIGINATING OFFICE PLEASE NOTE: A FULLY STAFFED/APPROVED (except Mayor’s Signature) PACKAGE IS DUE IN THE CLERK OF COUNCIL’S OFFICE NO LATER THAN 10:00 A.M THE DAY OF THE CLERK’S AGENDA MEETING.
<table>
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<tr>
<th>Year</th>
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**TOTAL FUNDING:** 38,452,663.00

**PROJECT SUMMARY**

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“Procurement Documents and Specifications” for Spring/Fishburne US17 Drainage Improvements Pump Procurement
August 2021

OWNER:
City of Charleston
Department of Stormwater Management
2 George Street, Suite 2100
Charleston, SC 29401

PREPARED BY:
Davis & Floyd, Inc.
3229 West Montague Avenue
North Charleston, SC 29418
(843) 554-8602

Job No.: 030295.00
January 5, 2022

Steve Kirk, PE
City of Charleston
Department of Stormwater Management
2 George St
Suite 2100
Charleston, SC 29401

via e-mail: KIRKS@charleston-sc.gov

Re: Recommendation of Award
Spring/Fishburne US 17 Drainage Improvements
Pump Procurement

Dear Mr. Kirk:

On September 29, 2021, four (4) proposals on the referenced project were opened and read aloud. The proposals were reviewed and scored by the City's Selection Committee and the Best Value Candidate, Xylem Water Solutions, USA, was selected. The Engineering team has reviewed the proposal and the offered add/alternates and recommends the following options for Procurement:

**Base Scope:** $4,928,600

- **Adder 1:** 5-yr warranty (2 additional years over the base warranty) ($239,200) – Not recommended for purchase.
- **Adder 2:** 2-yr operational spares ($165,900) – Purchase recommended.
- **Adder 3:** Power Module String Test ($267,100) – Purchase Recommended.
- **Adder 4:** Temporary Exhaust ($94,200) – Purchase recommended.
- **Adder 5:** Additional pump performance testing ($10,000, per pump) – Purchase not recommended.
- **Adder 6:** Deduct for smaller floor opening (-$60,900) – Deduct will not be exercised due to the larger floor opening being constructed.
- **Adder 7:** Refreshing for packaging and protection system ($5,900, up to two) – Recommend that the City carry budget to have these done in the event that the pumps, engines, and other equipment need to remain outside for an extended duration.
In Summary:

Base Price: $4,928,600.00
Adder 1: $0.00
Adder 2: $165,900.00
Adder 3: $267,100.00
Adder 4: $94,200.00
Adder 5: $0.00
Adder 6: $0.00
Adder 7: $11,800.00
Total: $5,467,600.00 (Taxes not included)

Please advise if you have any questions regarding this matter.

Very truly yours,

DAVIS & FLOYD, INC.

Michael D. Sutton, PE
Project Manager

c: file
Proposal/Contract

TO
City of Charleston Department of Stormwater Management

ADDRESS

ATTENTION

Xylem Water Solutions USA, Inc. agrees to sell to Purchaser and Purchaser agrees to purchase from Company the product(s) described below:

PRODUCT(S): SEE ITEM (1) FOR DESCRIPTION AND PRICING

PRICE POLICY CLAUSE: PRICES ARE FIRM FOR THE QUOTED SHIPMENT

TAXES: NONE INCLUDED

TERMS OF PAYMENT:
10% UPON APPROVAL OF SUBMITTALS
25% NET AT ORDERING OF IMPELLER CASTINGS
55% UPON SHIPMENT FROM FACTORY
10% UPON STARTUP, NOT TO EXCEED 90 DAYS FROM SHIPMENT

SHIPPING DATE: EXPECTED LEAD TIME IS 12 WEEKS FOR SUBMITTALS, PUMPS 52 WEEKS AFTER APPROVAL OF SUBMITTALS AND RELEASE TO MANUFACTURE. ENGINE & ACCESSORIES TO BE AGREED UPON AFTER AWARD

DELIVERY TERMS: INCOTERMS 2020 FOB JOBSITE

OTHER TERMS: SEE ITEM (II)

This offer will remain in effect through February 04, 2022 unless changed in the interim upon written notice from Company. Documents and related correspondence shall be sent to: See Address Below

Field services furnished by Company employees, whenever specified, are governed by the provisions of Company form 5621-0100.

This document and any other documents specifically referred to as being a part hereof, constitute the entire contract on the subject matter, and it shall not be modified except in writing signed by both parties.

This order is subject to the Standard Terms and Conditions of Sale - Xylem Americas effective on the date the order is accepted which terms are available at http://www.xyleminc.com/en-us/Pages/terms-conditions-of-sale.aspx and incorporated herein by reference and made a part of the agreement between the parties.

PURCHASER'S ACCEPTANCE
The Proposal / Contract is hereby accepted.

(____________)
Name of Purchaser

By __________________________
Title __________________________
Date __________________________

PROPOSAL / CONTRACT - Xylem Water Solutions USA, Inc.

By __________________________
Title: Application Engineer
Date: 1/04/2022
PHONE: 262-548-8173

ACCEPTANCE - Xylem Water Solutions USA, Inc.

By __________________________
Date __________________________

Modifications or changes are not valid until accepted by Xylem Water Solutions USA, Inc.
Item I: Description of Equipment and Services

Base Scope

A. Quantity (3) Xylem Flygt Vertical Column Pump, model 94x66 WCAX. Pump will be below floor discharge, non-removable element, enclosed line shaft design. The Pump is complete with baseplate, foundation plates, hold-down studs and hardware, rigid adjustable coupling & guard. Pump Rating is as Follows:

- Rated Operating Condition – 122,300 gpm @ 14 ft of TDH while running at 300 RPM

Pump Construction Consists of the Following:

- ASTM A48, CL30 Cast Iron Suction Bell
- ASTM A743, CA6NM Stainless Steel Impeller and Cone
- ASTM A395 Gr. 65-45-12 Ductile Cast Iron Diffuser
- ASTM A582 Type 416 Stainless Steel Pump Shaft
- ASTM A743 CA40 Stainless Steel Wear Rings
- ASTM A36 Motor Support, Baseplate and Curb Ring
- 94” Suction Diameter
- 66” Discharge Diameter
- Bronze Backed, Grease Lubricated Bearings
- Farval Grease Lubrication System manufactured by Bidjur Delimon

B. Quantity (3) CAT Model C32, 950 Hp, 1800 rpm Diesel Engine including the following accessories/components:

- Air Inlet System
  - Dual side mounted turbochargers: inlet 152.4 mm (6 in.) hose connection.
  - Air cleaner – installed, dual element
  - Air Inlet Shutoffs
    1. Dual shutoffs. Installs air shut-off on air inlet manifolds, at top of engine.
    2. 24 volt, contains indicator switch, energized to shutoff.

- Charging System
  - Charging alternator - 24v-95 amp
  - Left hand alternator mounting
  - 105 amp circuit breaker & mounting
  - Battery charger - 10 amp, Qty 2

- Control System
  - Electronic governing, PTO speed control
  - Programmable Ratings
  - Cold mode start strategy
  - Automatic Altitude compensation
  - Power compensation for fuel temperature
  - Programmable low and high idle and TEL
  - Electronic diagnostics and fault logging
  - Engine monitoring and protection system
  - (speeds, temperature, pressure)
  - J1939 Broadcast (diagnostic, engine status and control)

- IEM (Industrial Electric Manufacturing) free-standing floor mounted control panel consisting of:
  - Enclosure - NEMA 4X, 316 stainless steel, rated for outdoor operation up to 2 years, freestanding, includes interior rear and side panels. approx. dimensions 72”H x 30”W x 18”D
  - Enclosure air conditioner, external side mounted, NEMA 4X, 120VAC, approx. 1000 BTU
- HMI touchscreen
  1. 15" minimum, with runtime software
- Data port / convenience receptacle, door mounted
- Stack indicator light tower, roof mount
- Emergency stop button, guarded
- Qty 10 Misc. indicator lights, selector switches, and pushbutton operators mounted on door (10 total max estimated)
- Surge arrester for 120VAC 1 phase source, 20KA, back panel mounted for control panel application
- UPS - Uninterruptible Power Supply, 120VAC input
- Power supply, 120VAC input: 24VDC output
- Power supply, 24VDC wide range input: 24VDC output, input from engine start batteries
- Best battery/power source diode pair
- PLC system package
- Allen Bradley / Rockwell, Compact Logix platform, consisting of:
  1. CPU
  2. Digital input module, 16 point
  3. Digital output module, 16 point
  4. Analog input module, 8 point
  5. Analog output module, 2 point
- Ethernet switch, with 2 fiber ports (TBD), unmanaged Gateway module
- CDL Cat Data Link module
- Mounting and wiring of below customer supplied & supported parts:
  1. Caterpillar Remote I/O module
  2. Caterpillar "speed brick" remote speed control interface module (accepts 4-20mA input from PLC)
- Speed switch/transmitter (as required)
- Interior panel light, with on/off switch
- Misc. small controls items: control power breakers, terminal blocks, etc...
- Special non-IEM standard control wire, MTW type, with special color coding per spec

- Cooling System
  - Thermostats and housing, outlet LH vertical orientation
  - Jacket water pump, gear driven, centrifugal, RH
  - Coolant level sensor
  - Young Touchstone radiator & fan
    1. Heresite Coated Core, Galvanized Frame, 150 mph Wind/Zone 4 Structure w/o Calcs,
       10" Single SEDD Tank (Shipped Loose), Low Level Gauge Switch (Shipped Loose), C2 Custom Tall Tanks Cortec Inside & Outside w/ Custom Connections, C2 SBRA 6 fin 11 row core, Plenum-Mounted Fuel Cooler MOC-6
  - Fan drive, idler pulleys & belts
  - Custom air & water lines
  - Custom belt guard
  - FW Murphy VS94 vibration switch
  - Jacket water heater 480V - Kim Hot Start Model CSM30604-000
  - Engine coolant

- Exhaust System
  - Exhaust manifold, dry, heat shields on each corner
  - Dual turbo, rear turbo exhaust, full marmon connection 127 mm (5 in.),
  - Maximum load 10 kg for direct connection to turbo
  - Water cooled center sections
  - Critical grade 12in spark arresting silencer - MSA22-12S1-14662 Maxim Silencer, with 12" ANSI flange inlet and outlet, type1, end in/end out. for use in either horizontal or vertical orientation.
  - Made of 304 stainless steel
• Flywheel & Flywheel Housing
  o Flywheel housing - SAE NO. 0
  o Flywheel - SAE NO. 0
  o FW Murphy VS94 vibration switch

• Fuel System
  o Mechanical Electronic Unit Injection (MEUI) system
  o Fuel Filter and Water Separator, Primary (10 micron)
  o Fuel Filter, Secondary (2 micron high performance)
  o Fuel priming pump 24V electric
  o Qty (1) Trumont 4,000 Gallon Fuel tank

1. Cylindrical UL-2085 2 hour rated fuel tank, insulated with 3” light weight concrete, painted white
2. Approximate Dimensions: 90” Dia X 180”L, approximate weight 14,500lbs, emergency vents included
3. (1) Ladder for access to top of tank, includes step-through handrails above tank top
4. (1) 24” Manway
5. (1) CL-GAUGE 2” Krueger Mechanical fuel level gauge
6. Full length dip tube for Engine supply. Engine return fitting, (2) Additional full-length dip tubes for Engine supply, (2) additional engine return fittings (total of 3 each), for use with 3 engines, 2” standard fittings with fitting reducers if necessary.
7. 3” NPT, Mushroom Style, Dessicant Type, Screened Atmospheric Vent Cap
8. MORRISON Provide (1) Morrison 715S-TT5-3MSS-0 remote stainless steel spill box with mounting pedestal and (2) 3” NPT connection ports on rear of box
9. MORRISON Provide 3” dry disconnect fittings & dust caps for installation on spill box assembly
10. NOTE Customer / others responsible for piping and ball valve for fill line
11. Remote Alarm Panel (4 alarms) with silence button, 120VAC
12. Mount 1978 in MORRISON 715S-TT5-3MSS-0 and label 1978 High 95%, High 90%, Low 50%, and Fuel In Basin
13. NOTE Customer / others to Wire High, Low, and Fuel In Basin Alarms to 1978 Remote Alarm Panel
14. Dual High/Low Fuel Level 50% Low, 90% High, standard - specify for other levels
15. High Fuel Level Switch (95% standard, specify for other level) includes additional fitting,
16. Overfill prevention valve, can shut off at 1” below tank top, shut off at 95%. OPV comes with drop tube
17. 3” or 4” NPT Fitting on tank for remote fill inlet (install one option 2674 here)
18. 3” or 4” NPT Fitting on tank for tank top fill inlet (install one option 2674 here) with an OPV and cap
19. 3” NPT Extra Fitting w/ (2346) Pipe Plug (in tank for sticking port)
20. 4” NPT Extra Fitting w/ (2347) Pipe Plug (spares in tank)
21. (2) 2”NPT fittings with (1) full length, (1) half-length dip tubes for customer provided polisher, located on opposite ends of tank
22. 1” NPT Foot Valve (enters 2” NPT pipe)
23. Note Foot valves provided on supply dip tubes and fuel polisher supply dip tube
24. 4-20MA sender, for full tank height, fits in 2”NPT, 2 wire VDC with 48” leads, watertight
25. Tank includes 2”NPT for sender
26. GROUND LUG Weld a threaded bolt to the tank and install a ground lug - for subbase tanks and day tanks
27. Tank to include labels on both sides: "Diesel Fuel, No Smoking, No Open Flames" and NFPA hazard label
28. Float switch for use in turning off return pumps
29. Emergency Vent
Qty (1) Tramont 600 Gal Day Tank
   1. Day Tank System UL-142, ULC-S601 with Tramont System 2000Plus, UL-508 listed
   2. Special tank dimensions: 84"L X 36"D X 50"H
   3. Double Wall for TRS/E/X - 600
   4. Special basin dimensions: 96"L X 48"D X 47"H
   5. Basin containment is minimum 150%
   6. Automatic Duplex Pumping System (standard includes 2nd 2GPM pump, 1/2" check valves and duplex cover
   7. 7GPM-DV Reverse Pumping System (TRS only) includes critical high switch with plug-in relay, starting relay, & 7" dip tube (Cover not included)
   8. 7GPM-DV (1060V) 7 GPM Viking pump with 1/2HP, 115VAC, 1 phase motor, 60PSI (upgrade to standard)
   9. 7GPM-DV (2650) 1/2" solenoid for max 4GPM supply (install prior to supply pump or directly at fuel inlet if pump remote)
   10. 7GPM-DV (2230) strainer - installed prior to solenoid on supply pump inlet
   11. 7GPM-DV (2620) 3/4" NPT Check Valve installed on reverse pump outlet
   12. Yellow Plug-In Pump Running Relay
   13. Steel weather protective Horizontal Special Dimension Tank Cover
   14. 2" NPT, Mushroom Style, Desiccant Type, Screened Atmospheric Vent Cap
   15. 5" NPT Emergency Pressure Relief Vent Cap
   16. 2"NPT Lockable Manual Fill Cap with 6" pipe riser (tank requires 2"NPT - option 2375)
   17. 2" NPT Extra Fitting (for option 2060-B)
   18. Krueger fuel level gauge, red bobber style
   19. 2" NPT Extra Fitting (for option 3661)
   20. 2"NPT fittings with (1) half length, (1) half-length dip tubes for customer provided polisher, located opposite ends of tank
   21. 1" NPT Foot Valve (enters 2" NPT pipe)
   22. Note Foot valves provided for engine supply, reverse pump
   23. Note supply and fuel polisher supply dip tubes
   24. Double Wall Access Piping for Inner Tank Drain
   25. Properly Sized Fire Safe Ball Valve (for inner tank drain)
   26. 4-20MA sender, for tanks 37" to 60" Tall, fits in 2"NPT, 2 wire VDC with 48" leads, watertight
   27. Tank includes 2"NPT for sender
   28. Tank to include labels on both sides: "Diesel Fuel, No Smoking, No Open Flames" and NFPA hazard label
   29. GROUND LUG Weld a threaded bolt to the tank and install a ground lug - for subbase tanks and day tanks
   30. Any additional fittings as required

Qty (1) Reverso Fuel Polisher for main fuel tank, shipped loose
   1. Automatic fuel polishing system – 210 GPH industrial model - 110V w/ digital controller
   2. NEMA 4x - S.S. enclosure for AFP-210 GPH - 120 V unit
   3. Shutoff valve AFP-210 2 valves inlet/outlet
   4. MAGKIT-02 - Fuel Magnet Kit – for FPS 210 Series – AGX

Qty (1) Reverso Fuel Polisher for day tank, shipped loose
   1. Automatic fuel polishing system – 150 GPH industrial model - 110V w/ digital controller
   2. NEMA 4x - S.S. enclosure for AFP-150 GPH, 110 V unit
   3. MAGKIT-01 - fuel magnet kit – for FPS 150 series - AGX
   4. Shutoff valve afp-150 2 valves inlet/outlet
• Instrumentation
  o 5 gauge Electronic instrument panel - RH mounted
  o Magnetic pickup - Shipped Loose

• Lube System
  o Crankcase breather, rear mounted
  o Oil cooler, RH
  o Oil filler in RH front gear case,
  o Oil level gauge, RH
  o Oil filter, RH
  o Oil pan rear sump
  o Lubricating oil
  o *Lube oil heater 120V - Kim Hot Start
  o *Prelube pump - VARNA Products, LLC
  o CF-15 w/3 Phase 208-230/460VAC, 1.5 HP Motor
  o *Custom prelude pump lines & mounting

• Mounting System
  o Front & rear engine support
  o Fabricated custom non-UL base and support plate – radiator, engine, HPTO

• Power Take-Offs
  o Crankshaft pulley,
  o Twin Disc - HP 1200 Long Shaft Hydraulically actuated and self-adjusting wet clutch, with no hydraulic pump towers. Includes integral mechanical brake release with standard unit mounted charge / lube pump with integral sump. TDEC600 color display with J1939 canbus trunk.
  o First fill of lube oil
  o Oil Cooler – Fin/ Fan 208V oil cooler, Heresite Coated
  o Rexnord Falk Wraptex 80R R31 flexible output coupling

• Starting System
  o Electric starting motor - dual 24 Volt
  o Batteries – Qty 4 x 8D part# 153-5720, 1500CCA, 210 amp hour
  o Battery rack – Qty 2
  o Battery cables – Qty 2 - 1880 mm (74 in) long

• Tooling - 1 x Set per Section 11300 2.8.1
  o 1 279-3473 Caterpillar Turning Tool
  o 1 175-3700 DT Connector Service Kit, Wedge Removal Tool
  o 1 509-6474 Deutsch Terminal Tool Set (7 Pieces)
  o 1 7X-1710 Probe, Kit
  o 1 175-7546 Oil Filter Cutter Gp
  o 1 1U-5718 Vacuum Pump - Oil Sample
  o 1 538-5051 Caterpillar ET - (Engine Technician) Service Tool
  o 1 NEXG5007 Caterpillar ET Software 1-year subscription
  o Computer not included

• General
  o Paint, Caterpillar Yellow
  o Vibration damper
  o Lifting eyes
  o Automatic variable timing, electronic
  o Literature
C. Quantity (3) Deran Model M36A Right Angle Gear
   - Input Speed – 1800 rpm, Output Speed – 300 rpm
   - 6:1 Ratio
   - Vertical Solid Shaft
   - Non-Reverse Type: Roller Sprag (>200% Maximum Reverse Torque)
   - Fan Cooled, Heresite Coated
   - 1.5 Service Factor
   - Q-11 Gear Set
   - VS94 Vibration Switch
   - A25TABS Temperature Switch
   - Norman Filter Assembly with Differential Pressure Gauge
   - WIKA Pressure Gauge
   - WEISS Temperature Gauge

D. Pump Testing and Inspections to Consist of the Following:
   - Hydrostatic Testing of pressurized components
   - Performance test of one pump with a shop motor, Un-Witnessed, per specification
   - CMTR’s for the major components
   - Bump Test Pedestal
   - Field Testing per Spec
   - Laser Alignment

E. Vibration Analysis performed by 3 separate firms
   - CAT
   - Xylem Vibration Analysis Expert
   - Mechanical Solutions Inc.

F. Field Service for Installation Assistance
   - 1 Trip, 2 Days per unit included in scope
   - Any additional field service required will be billed at the following rates
     o Pump Field Service Technician – $2000/Trip, $1500/Day
     o Engine Field Service Technician – $2375/Trip, $2375/Day
     o IEM Field Service Technician – $1,800/trip, $1800, Day

G. 1 set of special Tools
   - Includes Dismantling beam assembly, signed and sealed by SC PE

H. Spare Parts Per Spec section 11101, 2.5

I. Warranty - 36 Month or 4,000 hrs, Starts within 18 months from shipment

J. Performance, Payment, and bid bond per specifications

K. Delivery of pumps, Engines, Right Angle Gears and accessories Incoterms 2020 FOB Jobsite
   - Includes G-force detection

Items A-K Net Sell Price: $ 4,928,600  US Dollars
Optional Adders

1. 5 Year Warranty – **$239,200**
   - 2 additional years added to the base 3 year warranty

2. 2 Year operational Spares – **$165,900**
   - Items listed below are suggested, spare parts scope can be modified/changed if items are deemed unnecessary. Please contact Xylem if you would like to revise the list.
   - Pump
     - N/A, Required spare parts per 11101, 2.5 are included in the base scope
   - Power Module
     - Qty (27) - 1R1808 Oil Filter
     - Qty (1) - RS0010 10 x Oil Sample Bottles
     - Qty (15) - 1R0755 Fuel Filter Secondary
     - Qty (15) - 326-1641Fuel Filter Primary
     - Qty (3) - 1063973Secondary Air Filter
     - Qty (3) - 1327168Primary Air Filter
     - Qty (3) - RS9001 Coolant Sample Bottle
     - Qty (2) - RS8003 Fuel Sample - Storage
     - Qty (1) - 278-5428 Turbocharger GP(RH)
     - Qty (1) - 278-5427 Turbocharger GP(LH)
     - Qty (12) - 3740750 Injector
     - Qty (1) - 520200 Water Pump
     - Qty (1) - 5669549 Alternator Group
     - Qty (1) - 2071556Starter
     - Qty (1) - 4H7869 Gasket
     - Qty (1) - 3E0075 Mag Switch
   - IEM
     - One of each unique type of PLC controller modules, Allen Bradley / Rockwell, Compact Logix platform, consisting of:
       i. CPU
       ii. Digital input module, 16 point
       iii. Digital output module, 16 point
       iv. Analog input module, 8 point
       v. Analog output module, 2 point
       vi. Box of 10 of each unique type of control fuses.
       vii. One of each type of LED indicator lights
   - Twin Disc, One unit for each of the following:
     - 1027916 Flexible Coupling ARCUSAFLEX
     - PX1040498 Color Display WITH J1939 CAN BUS TRUNK
     - K1037413 Seal & Gasket Kit
     - K1037416 Clutch & Brake Kit
     - Filter
     - TDEC 600
     - Complete HPTO 1200
   - Right Angle Gear
     - N/A, does not require spare parts in a 2 year time frame
   - Any additional items not listed above do not require spare parts in a 2 year time frame.
3. **Power Module String Test - $267,100**
   - Utilizing the engine mounted control panel/Freestanding IEM Panel
   - 2-hour function test - start / run / stop test
   - 48-hour test heat run utilizing water dyno for unit #1.
   - 6-hour each, test heat run for Unit #2 & 3, utilizing water dyno
   - Fuel and water for testing
   - Labor and setup for testing
   - VCI preservation at completion of testing
   - Testing performed at Fabick Power Systems in Green Bay, WI
   - IEM Field service (travel expenses included) - Factory testing in Green Bay, WI
   - 21 IEM Field service days, technician, standard domestic rate, 3 trips total
   - 5 Field service days, engine/programmer, standard domestic rate, 1 trips total

4. **Temporary Exhaust, Maxim - $94,200**
   - 6.000 EA M-35-500 Clamp, V-band manifold, 5", 304 SS Caterpillar
   - 3.000 EA M-15-14657-S WYE, 1-PLY, Cat C32, 6X6X12 WYE, 6X6X12 WYE connector for Caterpillar C32 with 5" 20D flared flanges, 5" SR 90D elbows, 6" expansion joints and floating 12" ANSI flange. 46.25" spread X 47" OAH. made of 304/321 stainless steel, drawing #14657.
   - 3.000 EA WYE Exhaust Blanket
   - 9.000 EA M-47-FF-1200-S NBG kit, ANSI,12", fiber full face gasket 1800 DEG.,304 SS hardware
   - 3.000 EA MSA22-12S1-14662 Silencer, MSA22,12", spark arrestor MSA22, 12" critical grade (25-32 dBA) spark arresting silencer with 12" ANSI flange inlet and outlet. type1, end in/end out. for use in either horizontal or vertical orientation. made of 304 stainless steel. (Included in Engine Pricing)
   - 6.000 EA M-29-3000-S Mounting bracket, two piece, 30" single foot, 304 SS
   - 3.000 EA M-41-1275-S Flange, PLT,12" pipe,150#,1/2"THK,304-SS suits dual cert. 304/304L
   - 3.000 EA M-25-1275-1-120-S Outlet extension,12" TB X FXD ANSI FLG 12" outlet extension with 12" ANSI flange O/E AND 12.75" OD O/E. 120" OAL. made of 304 stainless steel.
   - 3.000 EA M-22-1275-S Rain cap, standard,12.75 ID", 304SS
   - 3.000 EA M-25-11-1275-34-S Outlet extension, FXD ANSI FLG E/E,12" 12.75" outlet extension with 12" ANSI flanges E/E. made of 304 stainless steel. 34" OAL
   - 3.000 EA Temporary Exhaust Support
   - 3.000 EA 3 – 5 Year ESC Utilizing the engine mounted control panel

5. **Adder for additional performance tests in accordance with the specifications, per pump - $10,000**

6. **Deduct for reduced floor opening – ($60,900)**
   - Based on a minimum floor opening of 102" x 98"

7. **Adder for refreshing of packaging and protection system for an additional 6-month of storage per refresh (up to two) (Bid Form Item C) - $5,900**
Item II: Proposal Comments and Clarifications

1. Xylem's scope of supply ends at the discharge flange of the pump and at the terminal boxes of the engine. No hardware is provided at or beyond these points, unless stated explicitly in Item 1. Installation, wiring, expansion joints, anchor bolts, miscellaneous piping not integral with the pumping equipment, external lubrication systems and instrumentation, loading and unloading and movement of equipment at site, removal of the existing equipment, assembly of equipment at site, field testing & commissioning, switch gear, and other miscellaneous items required for installation and proper operation of the proposed equipment which are not specifically noted above are not included with this proposal.

2. Additional comments and exceptions noted in Form 01300 – F1 – REV.04
NOTE:
1 All dimensions are *Approximate* and are subject to change.
2 Floor opening is noted by dimensions M & G. Minimum floor opening is 102" x 08".
3 Baseplate overhang is noted by dimension H. Sockets on backoverhang is 11". (Estimated anchor bolt Qty = 20, 1.75" dia in 2" dia holes. Cl. of anchor bolt holes to inside edge of socket is 8.75")

All dimensions are in " in ".

<table>
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<tr>
<th>DEAL NO.</th>
<th>CP21019</th>
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<tbody>
<tr>
<td>Client</td>
<td>City of Charleston</td>
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<tr>
<td>Project</td>
<td>Spring/Flushing</td>
</tr>
<tr>
<td>Pump Type</td>
<td>94x66 W/CAX</td>
</tr>
<tr>
<td>Title</td>
<td>Dimensional Drawing - CW Pump</td>
</tr>
<tr>
<td>Drawing No.</td>
<td>Rev. 1</td>
</tr>
<tr>
<td></td>
<td>Xylem Flygt AC</td>
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</table>
Flygt A-C Series
Large Vertical Column Pumps

THE MOST ENERGY-EFFICIENT PUMPS ON THE MARKET

FLYGT
a xylem brand
Flygt A-C Series Large Vertical Column Pumps

Flygt (formerly Allis Chalmers Pump, Inc.) has over 130 years of design and manufacturing experience in pumps and pumping systems. Flygt innovation has kept pace with today’s demand for higher efficiency, greater reliability and state of the industry manufacturing standards. Numerous impeller designs are available in single and multiple stage configurations to cover a wide range of operating conditions to better meet your needs. Flygt designs offer industry leading efficiencies of up to 92%. The rugged heavy duty construction, cast bowl components and conservative mechanical design minimize vibration and provide for long term trouble free operation. The experience, capability, on-time delivery, support during installation/maintenance and performance of equipment has earned Flygt the reputation as one of the most reliable pump manufacturers in the world.

Flygt A-C Series vertical column pumps are custom engineered for each individual project with the materials and features to meet the project requirements. Typical applications for vertical column pumps are in Power Generation, Water & Waste Water, General Industrial, Irrigation and Flood Control. Pump sizes ranging from 24 inches up to 144+ inches in diameter allow Flygt to tailor fit the pump to meet the specific requirements of your application.

1. DRIVER PEDESTAL
Heavy duty fabrication designed with openings to provide access to the pump coupling and stuffing box.

2. STUFFING BOX
Packed with graphite impregnated PTFE material, it reduces resistance and prolongs shaft sleeve life. An easily accessible split gland simplifies packing adjustment and replacement.

3. SHAFT TUBE
Protects the shaft from the pumped fluid and provides a passage for bearing lubrication. One end of the shaft tube is provided with an o-ring sliding fit to allow for thermal expansion and for ease of disassembly and reinstallation. Pumps can also be provided without shaft tubes (open line shafting) for self lubricated applications.

4. INTERMEDIATE COUPLING
(When required) Solid sleeve design provides a rigid transmission of power and torque through the shafts. The coupling is positively driven via coupling keys and transmits thrust loads via the split thrust ring design.
Customized Pumping Solutions

Flygt A-C Series pumps are available in above floor or below floor configurations; two floor installations, with thrust bearings in the pump or motor; and nearly unlimited material configurations. Flygt also offers the option for a true pull-out element configuration (as shown below) on our semi-enclosed impeller pumps. The pull-out design substantially reduces maintenance and downtime costs by allowing removal of the inner element without disturbing the suction bell, column pipes, discharge elbow and discharge piping. Column size for a given capacity is not affected by the “pull-out” design and there is no sacrifice in pumping performance. The sliding and conical fits assure proper alignment upon reassembly. The inner element is completely removable through the top of the pump thus eliminating the need to drain or enter the sump during maintenance. When the time comes to restore system efficiency, simply replace the wear components and your pump is ready for many more years of reliable performance.

5. BEARINGS
Upper and lower bearings are rigidly mounted from the top of the pump and diffuser.
The impeller is overhung from the diffuser bearing offering increased efficiency and a reduced chance of clogging. Bearing spacing is conservatively designed using a lateral critical speed analysis. When required, intermediate bearings are installed and supported via the bearing spiders which are fitted to the column pipe. Bearings are typically either fluted rubber or elastomeric sleeve type bearings designed for water lubrication. Grease lubricated bearings are an option when desired.

6. SHAFT SLEEVES
Provided at all bearing locations and the stuffing box to prevent the shaft from wearing. The hardened alloy sleeves extend service life and are designed for easy replacement.

7. IMPELLER
Single suction, mixed flow, and rugged cast construction. Impellers are cast in a single piece. The vanes are formed by accurately set cores thus assuring even thickness and vane spacing. Impellers are balanced to an ISO/ANSI G2.5 quality level.

8. IMPELLER CONE
Separately cast component of same material as impeller for long wear life and reduced downtime. Design permits economical renewal of clearances.
PERFORMANCE TESTING - with testing capabilities up to 300,000 gpm (68,000 m³/hr) the performance of your pump can be accurately verified before it leaves the factory.

CRITICAL SPEED ANALYSIS - performed on every rotor to ensure that the first critical speed is well above the pump operating speeds.

MECHANICAL DESIGN ANALYSIS - performed on every pump to determine the proper shaft size, bearing spans, wall thickness, bolting sizes & quantities, and other critical design features.

FEA & CFD ANALYSIS - in-house Finite Element Analysis and Computerized Fluid Dynamics analysis are available to ensure that there are no system resonant frequency or hydraulic concerns.

START-UP ANALYSIS - determines the optimal starting sequence between the pump, motor and control valve, and confirms the ability of the drive to start the pump under any number of possible circumstances. Available upon request.

EXPERIENCED CUSTOM DESIGNS - every order is custom designed to match the specific pump configuration, mechanical design, hydraulic requirements and materials of construction dictated by the application and the contract documents.

PUMP QUALITY - all pump components and assemblies are inspected and documented in accordance with Flygt ISO 9000 certified quality program. Any special contract requirements are incorporated into the Inspection and Test Plan developed for each contract.

MODEL TEST DATA - the high efficiency hydraulics for each pump design have been extensively model tested over the full range of impeller diameters/tilts. Model testing in a closed loop system provides accurate measurement of all pump performance characteristics along with NPSHr values, hydraulic thrust values and the development of three quadrant curves (Karman-Knapp curves).
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APPENDICES

Appendix A  Procurement Drawings
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ADVERTISEMENT FOR PROPOSALS
CITY OF CHARLESTON
DEPARTMENT OF STORMWATER MANAGEMENT
CHARLESTON, SC
SPRING/FISHBURNE US 17 DRAINAGE PROJECT
PUMP PROCUREMENT

General Notice

The City of Charleston Department of Stormwater Management (Owner) is requesting Proposals for the following Project:

SPRING/FISHBURNE US 17 DRAINAGE PROJECT
PUMP PROCUREMENT

Proposals for the Project will be received at the Department of Stormwater Management located at 2 George Street, Suite 2100, until Wednesday, September 15 at 2 pm local time. At that time the Proposals received will be publicly opened and read.

The Project includes the following Work:

Supply of three (3) variable speed axial or mixed flow vertical column pumps with diesel engine drives, each capable of pumping 120,000 gallons per minute (gpm), and appurtenances and services as described in the attached specifications.

Obtaining the Proposal Documents

Information and Proposal Documents for the Project can be found by contacting the email address below:

documents-chs@davisfloyd.com

or by contacting Maya Thomas at 843-554-8602.

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

Pre-proposal Conference

A mandatory pre-proposal conference for the Project will be held virtually on Tuesday, August 17, 2021. Proposals will not be accepted from Vendors that do not attend the mandatory pre-proposal meeting.

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

Date: August 10, 2021
# INSTRUCTIONS TO PROPOSERS FOR PROCUREMENT CONTRACTS

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INSTRUCTIONS TO PROPOSERS FOR PROCUREMENT CONTRACT

ARTICLE 1—DEFINED TERMS

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

A. Issuing Office—The office from which the Procurement Documents are to be issued and where the Proposal procedures are to be administered.

ARTICLE 2—PROCUREMENT DOCUMENTS

2.01 Vendors must obtain a complete set of the Procurement Contract Documents as listed in the Procurement Agreement. Complete sets of Procurement Documents may be obtained as stated in the advertisement.

2.02 Vendors must use a complete set of the Procurement Documents in preparing the Proposal; neither Buyer nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Procurement Documents.

2.03 Buyer and Engineer make copies of Procurement Documents available on the above terms only for obtaining Proposals for furnishing Goods and Special Services, and do not authorize or confer a license for any other use.

ARTICLE 3—QUALIFICATIONS OF VENDORS

3.01 Buyer may at any time conduct such investigations as Buyer deems necessary to establish the responsibility, qualifications, and financial ability of Vendors, and after the opening of Proposals may require a Vendor to submit documentation of its qualifications, including but not limited to financial data and documentation of previous experience providing goods and services comparable to the specified Goods and Special Services.

3.02 Vendor is to carefully review those portions of the Proposal Form requiring Vendor’s representations and certifications.

3.03 Vendor shall submit a qualifications statement with the Bid, including financial data and documentation of previous experience providing comparable goods and services, to demonstrate Vendor’s qualifications to furnish the specified Goods and Special Services. These qualifications statements, as listed in Attachment A, will be evaluated and scored, with the proposal providing the “Best Value” to the City awarded accordingly.

ARTICLE 4—SITE VISIT; PRE-PROPOSAL CONFERENCE

4.01 Buyer recommends that Vendor visit the Point of Destination and the site where the Goods are to be installed and Special Services will be provided, taking into account observable local and site
conditions that may affect the delivery, cost, progress, and furnishing of the Goods and Special Services. Arrangements for such a visit may be made through Engineer.

4.02 A mandatory pre-proposal conference will be held at the time and location indicated in the advertisement.

4.03 Interpretations or clarifications considered necessary by Engineer in response to questions arising at the pre-proposal conference will be issued by Addenda delivered to all parties recorded by Engineer as having received the Procurement Documents. Only answers in the Addenda will be binding. Oral statements, interpretations, and clarifications may not be relied upon in the preparation of a proposal and will not be binding or legally effective.

ARTICLE 5—INTERPRETATIONS AND ADDENDA

5.01 All questions about the meaning or intent of the Procurement Documents are to be submitted to Engineer in writing at:

Michael Sutton, PE
msutton@davisfloyd.com

5.02 Interpretations or clarifications considered necessary by Engineer in response to such written questions will be issued by Addenda posted to the proposal website to all parties recorded as having received the Procurement Bidding Documents. Questions received less than 10 days prior to the date for opening of proposals will not be answered. Only answers in the Addenda will be binding. Oral statements, interpretations, and clarifications may not be relied upon in the preparation of a proposal and will not be binding or legally effective.

5.03 Addenda may be issued to clarify, correct, or change the Procurement Documents as deemed advisable by Buyer or Engineer.

ARTICLE 6—BID SECURITY

6.01 A Bid must be accompanied by security made payable to Buyer in an amount of ten percent (10%) of Vendor’s maximum price (determined by adding the base proposal and all alternates) and in the form of a Bid bond issued by a surety meeting the requirements of Paragraph 5.01 of the General Conditions. Such Bid bond will be issued in the form included in the Procurement Bidding Documents.

6.02 The Bid security of the apparent Successful Vendor will be retained until Buyer (Project Owner) awards the Procurement Contract to such Vendor, and such Vendor has executed the Procurement Contract, furnished the required contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Vendor fails to execute and deliver the Procurement Contract and furnish the required contract security within 15 days after the Notice of Award, Buyer (Project Owner) may consider Vendor to be in default and annul the Notice of Award, and the Bid security of that Vendor will be forfeited, in whole in the case of a penal sum bid bond, and to the extent of Buyer’s damages in the case of a damages-form bond. Such forfeiture will be Buyer’s exclusive remedy if Vendor defaults.

6.03 The Bid security of other Vendors that Buyer believes to have a reasonable chance of receiving the award may be retained by Buyer until the earlier of 7 days after the Effective Date of the
Procurement Contract or 61 days after the Bid opening, whereupon Bid security furnished by such Vendors will be released.

6.04 Bid security of other Vendors that Buyer believes do not have a reasonable chance of receiving the award will be released within 7 days after the Bid opening.

ARTICLE 7—PROCUREMENT CONTRACT TIMES

7.01 See applicable provisions in the Procurement Agreement.

ARTICLE 8—LIQUIDATED DAMAGES

8.01 Any provisions for liquidated damages, such as those for Seller’s failure to attain a specified Milestone such as the delivery of the Goods, are set forth in the Procurement Agreement.

ARTICLE 9—CONFIDENTIALITY OF PROPOSAL INFORMATION

9.01 Confidential information is information in the proposal, or in documents submitted by Vendor with the Bid or submitted subsequent to the opening of proposals in support of the proposal, that Vendor clearly and prominently labels in writing to be a trade secret, proprietary, or confidential. Bids will be opened and accompanying documents, if any, will be maintained in a manner that endeavors to avoid disclosing confidential information to third parties, to the extent allowed by Laws and Regulations.

9.02 Vendor shall clearly and prominently mark confidential information with the word “CONFIDENTIAL” on each page or sheet or on the cover of bound documents. Place “CONFIDENTIAL” stamps or watermarks so that they do not obscure any of the required information on the document, either in the original or in a way that would obscure any of the required information in a photocopy of the document.

9.03 If Buyer is requested to disclose confidential information, becomes legally compelled to disclose confidential information, or is required by a regulatory body, governing agency, or controlling authority to disclose confidential information, or make any other disclosure that is prohibited or otherwise constrained by these Procurement Requirements, Buyer will provide Vendor with prompt notice so Vendor may seek a protective order or other appropriate remedy. Vendor will be solely responsible for submitting to the regulatory body, governing agency, or controlling authority any arguments, briefs, memoranda, motions, authorities, or other information in opposition to disclosure.

9.04 Buyer’s obligations with respect to confidential information are nullified by the following exceptions:

A. Confidential information becomes a part of the public domain through publication or otherwise, through no fault of the Buyer;

B. Buyer can demonstrate through suitable documentation that the confidential information was already in the Buyer’s possession, and not previously marked as confidential, or was otherwise publicly available prior to the date of submittal;

C. The confidential information is subsequently and independently disclosed to the Buyer by a third party who has a lawful right to disclose such information;
D. Buyer concludes in good faith that the information is not confidential, or that disclosure is required or justified; or
E. Buyer is required to disclose the confidential information by court order or by applicable Laws and Regulations.

9.05 Notwithstanding any other provision of the Procurement Bidding Documents, it is stipulated and agreed that by accepting a Bid, Buyer has not and does not waive its legal immunity (if any) from suit or liability.

ARTICLE 10—"OR-EQUAL" ITEMS

10.01 The Procurement Contract, if awarded, will be based on material and equipment specified in the Procurement Bidding Documents. If any items are proposed that are not specified, then the Vendor will list them on the exceptions list.

ARTICLE 11—PREPARATION OF PROPOSALS

11.01 The Proposal Form is included with the Procurement Documents.
11.02 All blanks on the Form must be completed and the Form must be signed by an individual authorized to act on behalf of the Vendor. Alterations must be initialed by an individual authorized to act on behalf of the Vendor. A price must be indicated for each item in the Form.
11.03 Vendor must acknowledge all Addenda by filling in the number and date of each Addendum in the Form and sign where indicated to verify that the Addenda were received. A Form that does not acknowledge receipt of all Addenda may be considered non-responsive.
11.04 Vendor shall:
   A. Sign the Form as indicated in the Form.
   B. Include evidence of authority to sign.
   C. Provide information on the individual to be contacted for any communications regarding the Proposal.
   D. Provide evidence of the Vendor’s authority and qualification to do business in the locality of the Project, to the extent required, or indicate the ability to obtain such authority and qualification prior to award of the Procurement Contract.
11.05 The responsibilities of each Vendor submitting a Bid are described in the Vendor’s representations and certifications set forth in Article 6 of the Bid Form.

ARTICLE 12—BASIS OF PROPOSAL; COMPARISON OF PROPOSALS

12.01 Lump Sum
   A. Vendor shall submit a Proposal on a lump sum basis as set forth in the Form.

12.02 Award
   A. Proposals will be evaluated for Best Value to the City per the criteria specified on the Form.
   B. The Decision by the Selection Committee will be final.
ARTICLE 13—SUBMITTAL OF PROPOSALS

13.01 Vendor shall refer to the advertisement for specific identification of the date, time, and place where Proposals are to be submitted. Bids can be submitted electronically.

13.02 Vendor must submit six (6) separate unbound copies of the completed Bid Form, and, if required, the Bid Security and the other documents required to be submitted under the terms of Article 4 of the Bid Form.

13.03 A Bid must be submitted no later than the date and time prescribed and at the place indicated in the advertisement or invitation to bid. Submit the Bid in an envelope plainly marked with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted) and the name and address of Vendor. Enclose the Bid security and other documents required to be submitted with the Bid as listed in the Bid Form. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation “BID ENCLOSED.”

ARTICLE 14—MODIFICATION OR WITHDRAWAL OF PROPOSALS

14.01 If, within 24 hours after Proposals are opened, any Vendor files a duly signed written notice with Buyer and promptly thereafter demonstrates to the reasonable satisfaction of Buyer that there was a material and substantial mistake in the preparation of its Bid, that Vendor may withdraw its Bid, and the Bid security will be returned.

ARTICLE 15—OPENING OF PROPOSALS

15.01 Proposals will be opened publicly.

ARTICLE 16—PROPOSALS TO REMAIN SUBJECT TO ACCEPTANCE

16.01 All Proposals will remain subject to acceptance for the period stated in the Proposal Form, but Buyer may, in its sole discretion, release any Proposal and return the Bid security prior to the end of this period.

ARTICLE 17—EVALUATION OF PROPOSALS AND AWARD OF PROCUREMENT CONTRACT

17.01 Buyer reserves the right to reject any and all Proposals, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Proposals. Buyer also reserves the
right to waive all informalities not involving price, time, or changes in the Goods and Special Services.

17.02 Buyer will reject the Proposal of any Vendor that Buyer finds, after reasonable inquiry and evaluation, to not be responsible.

17.03 In evaluating Proposals, Buyer will consider whether they comply with the prescribed requirements, and such alternates, unit prices, and other data as may be requested in the Proposal Form or may be requested from Vendors prior to a Notice of Award.

17.04 If Buyer awards the Procurement Contract, such award will be to the responsible Vendor submitting the Best Value to the Owner.

ARTICLE 18—BONDS AND INSURANCE

18.01 Article 5 of the General Conditions and Article 5 of the Supplementary Conditions set forth Buyer’s requirements as to performance and payment bonds and insurance. When the Successful Vendor delivers the signed Procurement Agreement to Buyer, it must be accompanied by such bonds and acceptable evidence of insurance.

ARTICLE 19—SIGNING OF PROCUREMENT AGREEMENT

19.01 —When Buyer issues a Notice of Award to the Successful Vendor, it will be accompanied by the unsigned counterparts of the Procurement Agreement along with the other Procurement Contract Documents identified in the Procurement Agreement. Within 15 days thereafter, Successful Vendor must execute and deliver the required number of counterparts of the Procurement Agreement and any bonds and insurance documentation required to be delivered by the Procurement Contract Documents to Buyer. Within 10 days thereafter, Buyer will deliver one fully executed counterpart of the Procurement Agreement to Successful Vendor, together with printed and electronic copies of the Procurement Contract Documents as stated in Paragraph 2.02 of the General Conditions.

ARTICLE 20—PROCUREMENT CONTRACT TO BE ASSIGNED

20.01 Vendor’s attention is directed to the provisions of Article 5 of the Procurement Agreement which provide for the assignment of the Procurement Contract to a construction contractor designated by the Buyer to Install the purchased equipment. Successful Vendor (Seller) will be required to perform the Procurement Contract after it has been assigned to the construction contractor (Contractor Assignee) in accordance with the provisions in the Procurement Contract. Timing of the assignment is addressed in the Procurement Agreement. Forms documenting the assignment of the Procurement Contract and for the agreement of the Seller’s surety to such assignment are included as attachments to the Procurement Agreement.
PROPOSAL FORM FOR PROCUREMENT CONTRACT

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PROPOSAL FORM FOR PROCUREMENT CONTRACT

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

ARTICLE 1—BUYER AND BIDDER

1.01 This Proposal is submitted to:

CITY OF CHARLESTON
DEPARTMENT OF STORMWATER MANAGEMENT
CHARLESTON, SC
2 George Street
Suite 2100

1.02 The undersigned Vendor proposes and agrees, if this Proposal is accepted, to enter into a Procurement Contract with Buyer in the form included in the Procurement Documents, and to furnish the Goods and Special Services as specified or indicated in the Procurement Documents, for the prices and within the times indicated in this Proposal, and in accordance with the other terms and conditions of the Procurement Documents.

ARTICLE 2—BASIS OF BID

2.01 Lump Sum Price

A. Vendor will furnish the Goods and Special Services in accordance with the Procurement Contract Documents for the following Procurement Contract Price(s):

1. Lump Sum Price (Base Bid and Alternates)

<table>
<thead>
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<tr>
<td>Lump Sum Bid Price for Base Bid</td>
<td>$4,683,100.00</td>
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<tr>
<td>Alternate A: Open Line Shaft [Add] [Deduct]</td>
<td>$-63,500.00</td>
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<tr>
<td>Alternate B: 5-year Warranty [Add] [Deduct]</td>
<td>$NA see comment</td>
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<tr>
<td>Alternate C: Refreshing of packaging and protection system for an additional 6-months of storage per refresh (up to two) [Add] [Deduct]</td>
<td>$5,900.00</td>
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ARTICLE 3—TIME OF COMPLETION

3.01 Bidder agrees that the furnishing of Goods and Special Services will conform to the schedule of Procurement Contract Times set forth in Article 2 of the Procurement Agreement.

ARTICLE 4—ATTACHMENTS TO THIS PROPOSAL

4.01 The following documents are attached to and made a condition of this Proposal:

A. Required Bid security in the form prescribed in the Instructions to Proposers.

B. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such authority within the time for acceptance of Bids.
B. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such authority within the time for acceptance of Bids.

C. Equipment Data Sheets.

D. Required Vendor Statement of Qualifications with supporting data as outlined in Attachment A.

ARTICLE 5—VENDOR’S ACKNOWLEDGMENTS

5.01 Vendor accepts all terms and conditions of the Instructions to Proposers. This Proposal will remain subject to acceptance for 60 days after the Proposal opening, or for such longer period that Vendor may agree to in writing upon request of Buyer.

5.02 Vendor has examined and carefully studied the Procurement Documents, the related data identified in the Procurement Documents, and the following Addenda, receipt of which is hereby acknowledged:

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<td>ADDENDUM NO. 1</td>
<td>9/02/2021</td>
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<td>ADDENDUM NO. 2</td>
<td>9/21/2021</td>
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<td>ADDENDUM NO. 3</td>
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<td>ADDENDUM NO. 4</td>
<td>9/27/2021</td>
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ARTICLE 6—VENDOR’S REPRESENTATIONS AND CERTIFICATIONS

6.01 Vendor’s Representations

A. In submitting this Proposal, Vendor represents that:

1. Vendor has examined and carefully studied the Procurement Contract Documents.

2. If required by the Instructions to Proposers to visit the Point of Destination and the site where the Goods are to be installed or Special Services will be provided, or if, in Vendor’s judgment, any observable local or site conditions may affect the delivery, cost, progress, or furnishing of the Goods and Special Services, then Vendor has visited the Point of Destination and site where the Goods are to be installed or Special Services will be provided (as applicable) and become familiar with and is satisfied as to the observable local and site conditions that may affect delivery, cost, progress, and furnishing of the Goods and Special Services.

3. Vendor is familiar with and is satisfied as to all Laws and Regulations that may affect the cost, progress, and performance of Seller’s obligations under the Procurement Contract.

4. Vendor has carefully studied, considered, and correlated the information known to Vendor with respect to the effect of such information on the cost, progress, and performance of Seller’s obligations under the Procurement Contract.

5. Vendor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Vendor has discovered in the Procurement Contract Documents, and the written resolution (if any) thereof by Engineer is acceptable to Vendor.
6. The Procurement Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance of Seller's obligations under the Procurement Contract.

7. The submission of a Proposal will constitute an incontrovertible representation by Vendor that Vendor has complied with every requirement of the Proposal Requirements, that without exception the Proposal (including all prices) is premised upon furnishing the Goods and Special Services as required by the Procurement Contract Documents.

6.02 Vendor's Certifications

A. Vendor certifies that:

1. This Proposal is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;

2. Vendor has not directly or indirectly induced or solicited any other Vendor to submit a false or sham Proposal;

3. Vendor has not solicited or induced any individual or entity to refrain from proposing; and

4. Vendor has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Procurement Contract. For the purposes of this Paragraph 6.02.A.4:
   a. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the proposal process;
   b. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the proposal process to the detriment of Buyer, (b) to establish prices at artificial non-competitive levels, or (c) to deprive Buyer of the benefits of free and open competition;
   c. "collusive practice" means a scheme or arrangement between two or more Vendors, with or without the knowledge of Buyer, a purpose of which is to establish prices at artificial, non-competitive levels; and
   d. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the proposal process.
This Proposal is offered by:

Vendor: Xylem Inc.

By: (Individual's signature)  
Date: 9/1/2021 (date signed)  
Name: James D. Peterson (typed or printed)  
Title: Director, Global Marketing & Engineering (typed or printed)  
(If Bidder is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:  
Title: Applications Engineer (typed or printed)

Address for giving notices:
Xylem, Flygt A-C Custom Pump  
N27 W23293 Roundy Drive  
Pewaukee, WI 53072

Designated Representative:  
Name: Patrick Hill (typed or printed)  
Title: Sales Engineer (typed or printed)

Address:  
Tencarva Municipal - A Division of Tencarve Machinery Company  
1405 Old Dairy Drive  
Columbia, SC 29201

Phone:  
Email:  
License No.:  
Classification:  
Limitation:  

EJCDC® P-400, Form for Procurement Contract.
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ATTACHMENT A STATEMENT OF QUALIFICATIONS

SUBMITTAL AND EVALUATION OF STATEMENTS OF QUALIFICATIONS

1.1 Statement of Qualifications Format

A. Submit Statement of Qualifications in the following format:

1. Title Page showing the RFQ’s subject; the Proposer’s name; the name, mailing address, email, and telephone number of the Proposer’s representative (for communication purposes); and the date of the submittal.

2. Table of Contents

3. Signed Transmittal Letter briefly stating the Proposer’s understanding of the Goods and Special Services to be provided and why the Proposer believes it to be best qualified to provide the Goods and Special Services required.

4. Qualification Form

1.2 Owner’s Evaluation Process

1. The proposals will be evaluated by a committee appointed by the City.

2. The Decision Criteria (Articles 9-17 on the Qualification Form below) will be assigned a Criteria Weight ranging from 1-5, with 1 being the lowest and 5 the highest.

3. Each Vendor’s proposal will be evaluated, and each Criteria category will be assigned a score, based on a sliding scale (0: None, 3: Low, 6: Mid, 9: High, 12: Very High), relative to the Vendor’s ability to meet the identified criteria.

4. These scores will constitute a matrix with Criteria Weights multiplied by score and added together to produce an overall score for each vendor.

5. The vendor with the highest score will be deemed the one providing the best value to the City.

6. This vendor will be the first respondent to enter negotiations with the City for the procurement contract.

1.3 Evaluation and Selection Process

1. Owner reserves the right to reject or disregard any Statement of Qualifications, in whole or in part, based on Owner’s sole discretion.

2. The evaluation and selection process entails the exercise of judgment and subjective analysis and decision-making. By submitting a Statement of Qualifications, Proposer waives any right to protest or object to the evaluation or selection process; Owner’s administration or conduct of the process; or any final decisions or selections made by Owner.
3. STATEMENT OF QUALIFICATIONS FORM

ARTICLE 2—GENERAL INFORMATION

2.1 Provide contact information for the Business:

<table>
<thead>
<tr>
<th>Legal Name of Business:</th>
<th>Xylem Water Solutions USA, Inc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporate Office</td>
<td></td>
</tr>
<tr>
<td>Name:</td>
<td>Joseph Johnston</td>
</tr>
<tr>
<td>Title:</td>
<td>President</td>
</tr>
<tr>
<td>Business address of corporate office:</td>
<td>1 International Drive</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Local Office</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Name:</td>
<td>James D. Peterson</td>
</tr>
<tr>
<td>Title:</td>
<td>Director, Global Marketing &amp; Engineering</td>
</tr>
<tr>
<td>Business address of local office:</td>
<td>N27 W23293 Roundy Dr</td>
</tr>
</tbody>
</table>

2.2 Provide information on the Business’s organizational structure:

<table>
<thead>
<tr>
<th>Form of Business:</th>
<th>□ Sole Proprietorship □ Partnership ✔ Corporation</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Limited Liability Company □ Joint Venture comprised of the following companies:</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

Provide a separate Qualification Statement for each Joint Venturer.

Date Business was formed: 2011
State in which Business was formed: Delaware
Is this Business authorized to operate in the Project location? ✔ Yes □ No □ Pending

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

<table>
<thead>
<tr>
<th>Name of business:</th>
<th>Affiliation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of business:</th>
<th>Affiliation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of business:</th>
<th>Affiliation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address:</td>
<td></td>
</tr>
</tbody>
</table>
2.4 Provide information regarding the Business’s officers, partners, and limits of authority.

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Limit of Authority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joseph Jonston</td>
<td>President</td>
<td>$</td>
</tr>
<tr>
<td>Peter Bilelis</td>
<td>Vice President &amp; Secretary</td>
<td>$</td>
</tr>
<tr>
<td>Matthew Fisher</td>
<td>Vice President &amp; Treasurer</td>
<td>$</td>
</tr>
<tr>
<td>James D. Peterson</td>
<td>Vice President</td>
<td></td>
</tr>
</tbody>
</table>

ARTICLE 3—LICENSING

3.1 Provide information regarding licensure for Business:

<table>
<thead>
<tr>
<th>Name of License</th>
<th>Licensing Agency</th>
<th>License No</th>
<th>Expiration Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ARTICLE 4—DIVERSE BUSINESS CERTIFICATIONS

4.1 Provide information regarding Business's Diverse Business Certification, if any. Provide evidence of current certification. * N/A - Xylem does not have any diverse business certifications

<table>
<thead>
<tr>
<th>Certification</th>
<th>Certifying Agency</th>
<th>Certification Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Disadvantaged Business Enterprise</td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐ Minority Business Enterprise</td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐ Woman-Owned Business Enterprise</td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐ Small Business Enterprise</td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐ Disabled Business Enterprise</td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐ Veteran-Owned Business Enterprise</td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐ Service-Disabled Veteran-Owned Business</td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐ HUBZone Business (Historically Underutilized) Business</td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐ Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ARTICLE 5—SAFETY

5.1 Provide information regarding Business’s safety organization and safety performance.

<table>
<thead>
<tr>
<th>Name of Business’s Safety Officer</th>
<th>Jena Lynch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety Certifications</td>
<td></td>
</tr>
<tr>
<td>Certification Name</td>
<td>Issuing Agency</td>
</tr>
<tr>
<td>Certified Safety Professional</td>
<td>BCSP</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Year</th>
<th>2020</th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company</td>
<td>EMR</td>
<td>TRFR</td>
<td>MH</td>
</tr>
<tr>
<td>Xylem</td>
<td>* See note above</td>
<td>1.28</td>
<td>156,504</td>
</tr>
</tbody>
</table>

ARTICLE 6—FINANCIAL

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

<table>
<thead>
<tr>
<th>Financial Institution</th>
<th>See link for Xylem Inc Annual Report on Form 10-K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business address:</td>
<td></td>
</tr>
<tr>
<td>Date of Business’s most recent financial statement:</td>
<td>□ Attached</td>
</tr>
<tr>
<td>Date of Business’s most recent audited financial statement:</td>
<td>□ Attached</td>
</tr>
<tr>
<td>Financial indicators from the most recent financial statement</td>
<td></td>
</tr>
<tr>
<td>Contractor’s Current Ratio (Current Assets ÷ Current Liabilities)</td>
<td></td>
</tr>
<tr>
<td>Contractor’s Quick Ratio ((Cash and Cash Equivalents + Accounts Receivable + Short Term Investments) ÷ Current Liabilities)</td>
<td></td>
</tr>
</tbody>
</table>
ARTICLE 7—SURETY INFORMATION

7.1 Provide information regarding the surety company that will issue required bonds on behalf of the Business, including but not limited to performance and payment bonds.

<table>
<thead>
<tr>
<th>Surety Name:</th>
<th>Arch Insurance Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surety is a corporation organized and existing under the laws of the state of:</td>
<td>Missouri</td>
</tr>
<tr>
<td>Is surety authorized to provide surety bonds in the Project location?</td>
<td>Yes ☑ No</td>
</tr>
<tr>
<td>Is surety listed in “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies” published in Department Circular 570 (as amended) by the Bureau of the Fiscal Service, U.S. Department of the Treasury?</td>
<td>Yes ☑ No</td>
</tr>
<tr>
<td>Mailing Address (principal place of business):</td>
<td>Harborside 3, 210 Hudson St</td>
</tr>
<tr>
<td></td>
<td>Suite 300</td>
</tr>
<tr>
<td></td>
<td>Jersey City, NJ 07311</td>
</tr>
<tr>
<td>Physical Address (principal place of business):</td>
<td>Same as mailing address</td>
</tr>
<tr>
<td>Phone (main):</td>
<td>201-743-4000</td>
</tr>
<tr>
<td>Phone (claims):</td>
<td>201-743-4000</td>
</tr>
</tbody>
</table>

ARTICLE 8—INSURANCE

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

<table>
<thead>
<tr>
<th>Name of insurance provider, and type of policy (CLE, auto, etc.):</th>
<th>Insurance Provider</th>
<th>Type of Policy (Coverage Provided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>See attached Sample of Certificate of Liability Insurance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are providers licensed or authorized to issue policies in the Project location?</td>
<td>Yes ☑ No</td>
<td></td>
</tr>
<tr>
<td>Does provider have an A.M. Best Rating of A-VII or better?</td>
<td>Yes ☑ No</td>
<td></td>
</tr>
<tr>
<td>Mailing Address (principal place of business):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Address (principal place of business):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phone (main):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phone (claims):</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ARTICLE 9—EXPERIENCE

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

| Average number of current full-time employees: | 17,000 |
| Estimate of revenue for the current year: | See link for Xylem Inc Annual Report on Form 10-K |
| Estimate of revenue for the previous year: | |

9.2 Provide information regarding the Business's previous contracting experience.

<p>| Years of experience with projects like the proposed project: | 120+ years |
| As a manufacturer: | 1872 to 2011 Allis-Calmers, ITT Corp., ITT Industries, ITT Corp 2011 to present Xylem Inc. |
| Has Business, or a predecessor in interest, or an affiliate identified in Paragraph 1.03: | |
| ☐ Yes ☑ No |
| Been disqualified as a bidder by any local, state, or federal agency within the last 5 years? | |
| ☑ Yes ☐ No |
| Been barred from contracting by any local, state, or federal agency within the last 5 years? | |
| ☑ Yes ☐ No |
| Been released from a bid in the past 5 years? ☐ Yes ☑ No |
| Defaulted on a project or failed to complete any contract awarded to it? ☑ Yes ☐ No |
| Refused to construct or refused to provide materials defined in the contract documents or in a change order? ☐ Yes ☑ No |
| Been a party to any currently pending litigation or arbitration? ☐ Yes ☑ No |
| Provide full details in a separate attachment if the response to any of these questions is Yes. |</p>
<table>
<thead>
<tr>
<th>Item</th>
<th>Paragraph</th>
<th>Comment</th>
<th>Code</th>
<th>Accepted</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.04 Liquidated Damages</td>
<td>See Agreement Paragraph 2.04</td>
<td>EX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>5.01 - Assignment of contract - A.3.f.2</td>
<td>Please add at end of paragraph “but in no event later than 60 days after receipt of invoice</td>
<td>EX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Article 9 - Mutual Waiver</td>
<td>See Agreement Article 9</td>
<td>EX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Paragraph</td>
<td>Comment</td>
<td>Code</td>
<td>Accepted</td>
<td>Actions</td>
</tr>
<tr>
<td>------</td>
<td>-----------</td>
<td>-------------------------------------------------------------------------</td>
<td>------</td>
<td>----------</td>
<td>---------</td>
</tr>
<tr>
<td>1</td>
<td>7.07</td>
<td>Please remove “including the loss of use resulting therefrom”</td>
<td>EX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>15.04</td>
<td>add to the end of the paragraph, “however, to the extent the Purchase Order provides a remedy for a given default, it is the sole and exclusive remedy available in lieu of any/all other remedies available at law, in equity, or otherwise.”</td>
<td>EX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Paragraph</td>
<td>Comment</td>
<td>Code</td>
<td>Accepted</td>
<td>Actions</td>
</tr>
<tr>
<td>------</td>
<td>-----------</td>
<td>----------------------------------------------</td>
<td>------</td>
<td>----------</td>
<td>---------</td>
</tr>
<tr>
<td>1</td>
<td>3.5</td>
<td>Programming software licenses not included</td>
<td>EX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Paragraph</td>
<td>Comment</td>
<td>Code</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>-----------</td>
<td>-------------------------------------------------------------------------</td>
<td>------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1.3.4</td>
<td>Vibration readings at the factory are for reference only, if prototype testing is performed</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2.2.3.2</td>
<td>NPSHr test is not available due to the open sump design of our test pit. Historical data will be used.</td>
<td>EX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2.2.3.8</td>
<td>Similar to item 2, an NPSHr test is not available due to the open sump design of our test. However, we can provide NPSHr at one point near runout</td>
<td>EX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>2.2.4.10</td>
<td>Additional soleplate for the Right Angle Gear is not required. The RAG pedestal will be attached to the pump support which will have a soleplate.</td>
<td>EX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>2.2.4.19.d</td>
<td>Shaft sleeves will be provided in lieu of the hard surfacing of the shaft.</td>
<td>EX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>2.2.4.21</td>
<td>Xylem's design not incorporate a tail shaft bearing.</td>
<td>EX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>2.2.4.23</td>
<td>Line shaft couplings will be forged out of A668 CLD</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>2.2.4.24</td>
<td>Balancing will be performed at our material vendors facility</td>
<td>EX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>2.2.4.26</td>
<td>Pump diffuser will be cast out of A395, GR 65-45-12. This grade has a higher tensile and yield strength.</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>2.2.4.28</td>
<td>Our design does not incorporate suction guide vanes</td>
<td>EX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>2.2.4.29</td>
<td>Similar to item 8, xylems design doesn't no incorporate a tail shaft bearing. Also The impeller cone will be cast in the same material as the impeller, A743 CA6NM</td>
<td>EX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Paragraph</td>
<td>Comment</td>
<td>Code</td>
<td>Accepted</td>
<td>Actions</td>
</tr>
<tr>
<td>------</td>
<td>-----------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------</td>
<td>----------</td>
<td>---------</td>
</tr>
<tr>
<td>12</td>
<td>2.2.3.31</td>
<td>Xylems design uses a rigid adjustable coupling to set the proper impeller to cone running clearance. It requires that the impeller &amp; shaft assembly be lowered until it makes contact with the impeller cone, and then the element is lifted by bolting the coupling halves together to take up the gap set to achieve the proper running clearance. This design would allow for a closer/more accurate running clearance which leads to higher efficiencies.</td>
<td>EX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>2.2.4.17</td>
<td>Xylem does not coat anything that is in contact with the grout. This could effect the bond between the grout and the underside of the soleplate</td>
<td>EX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>3.2.2.5</td>
<td>The performance of the pump will be certified by the factory performance test. A drawdown test can be performed in the field but will be for reference only.</td>
<td>EX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Paragraph</td>
<td>Comment</td>
<td>Code</td>
<td>Accepted</td>
<td>Actions</td>
</tr>
<tr>
<td>------</td>
<td>-----------</td>
<td>---------</td>
<td>------</td>
<td>----------</td>
<td>---------</td>
</tr>
<tr>
<td>1</td>
<td>1.5.8</td>
<td>Twin Disc does NOT approve the use of VPI. The unit can be filled with oil for protection in lieu of specified VPI.</td>
<td>EX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2.2.13.1 - 2.1.13.6</td>
<td>The exhaust piping shown in drawings supplied are not accurate based upon the requested C32 EPA Tier 2 engine specified as a C32. Temporary Exhaust system provided as an adder. See optional adder #4 of proposal # CP21019-REV.01. Permanent exhaust system to be by others.</td>
<td>EX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2.2.13</td>
<td>Temporary Exhaust system provided as an adder. See optional adder #4 of proposal # CP21019-REV.01. Permanent exhaust system to be by others.</td>
<td>EX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>independent third party testing such as exhaust, noise, emissions, are to be performed by others.</td>
<td>EX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>2.1.9.11, 2.1.15</td>
<td>The 8D batteries provided in the quotation are Caterpillar 8D size with a 210 amp hour rating - NOT 290 amp hour as specified.</td>
<td>EX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>3.2.4</td>
<td>Field testing NOT included per specification</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>2.2.1</td>
<td>Reference to noted “P” model. Twin Disc will NOT approve for in-line application</td>
<td>EX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>2.2.6.1</td>
<td>Reference to flywheel housing ventilation or HPTO housing ventilation as these parts are not available for this model engine.</td>
<td>EX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>2.2.11</td>
<td>The brake capacity of the HP1200 is not rated for the requested value 5,000 foot-pounds of torque.</td>
<td>EX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>2.3.3</td>
<td>A low level gauge switch is included for placement onto the SEDD (expansion) tank, as are provisions to add a sight gauge.</td>
<td>NOT</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 01300-F1

<table>
<thead>
<tr>
<th>Item</th>
<th>Paragraph</th>
<th>Comment</th>
<th>Code</th>
<th>Accepted</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5.01</td>
<td>Please change to &quot;This Proposal will remain subject to acceptance for 45 days after the Proposal opening.&quot; Contact Xylem in regards to extension</td>
<td>EX</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.2.8 Certification of Acceptance and Incorporation

3.2.8.1 This Document, consisting of 10 pages, is entered into the Contract and made part of the purchase order to acquire the proposed equipment.

3.2.8.2 This certification is not valid unless signed by the Owner or Owner's Representative and the Contractor or Contractor's Representative having the authority to bind each party.

OWNER  City of Charleston

By:  
Name:  
Initials:  
Title:  
Address:  

CONTRACTOR

By:  
Name:  
Title:  
Address:  
<table>
<thead>
<tr>
<th>Item</th>
<th>Paragraph</th>
<th>Comment</th>
<th>Code</th>
<th>Accepted</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.1.1</td>
<td>Existing MCS Main System Controller PLC and HMI hardware/software modifications, testing and all support provided by others. Scope is limited to the LCS Local Control System PLC panel.</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2.1.3</td>
<td>Protocol to be ALL Bradley compatible ethernet/IP to interface directly with supplied Rockwell/Allen Bradley copactLogix PLC CPU</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2.2.6.1.m-n</td>
<td>At time of quote, information was not available to determine how each alarm point would be read by PLC from customer supplied equipment/sensor. Most alarms will either be a digital input to the PLC, or read via Cat Data Link gateway coms. After supplied info is review, if additional PLC I/O modules are required to gather all alarms, adder cost may be required.</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>2.3.1</td>
<td>Variables listed in sections: 2.3.1.1, 2.3.1.2 (some), 2.3.1.6, and 2.3.1.7 are monitored/controlled by others. For example, determination of when pump(s) is required to run (items 2.3.1.1 - 2.3.1.3) are all monitored and controlled by existing MCS master PLC as described in spec. section 2.1.4 and 2.5</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Paragraph</td>
<td>Comment</td>
<td>Code</td>
<td>Accepted</td>
<td>Actions</td>
</tr>
<tr>
<td>------</td>
<td>-----------</td>
<td>---------</td>
<td>------</td>
<td>----------</td>
<td>---------</td>
</tr>
<tr>
<td>1</td>
<td>1.3.1.3</td>
<td>Detailed written narrative sequence of operation and detailed full control schematics showing all interface with devices outside of supplied LCS control panel supplied in lieu of PLC program &quot;Flow Charts&quot; drawings</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2.1</td>
<td>Enclosure will meet NEMA 4K standards. Entire panel built to UL-508 Standards</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2.1.15</td>
<td>All analog instruments data are displayed on HMI touchscreen mounted on panel door. Data is gathered via standard PLX digital/analog input modules (i.e. 4-20 mA, 0-5 VDC, etc.) or via open standard industry protocol such as Modbus from customer supplied sensing devices/transmitters/panels.</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>2.1.3</td>
<td>No Intrinsically safe requirements for this project</td>
<td>NOT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>2.2.2.1</td>
<td>Enclosure may be made of thinner 12 GA standard gage steel sufficient for rigid supporting of the relatively light weight controls equipment mounted in panel. Panel will be UL listed/approved construction. Saginaw standard enclosure part number SCE-72EL3018SS6FS proposed.</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>2.2.2.1</td>
<td>Spec Section 17070-501 equipment schedule spec says 4X stainless steel, not carbon steel. 316 Stainless Steel quoted</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Specification Section: SECTION 11300 DIESEL ENGINE DRIVEN POWER MODULES

<table>
<thead>
<tr>
<th>Item</th>
<th>Paragraph</th>
<th>Comment</th>
<th>Code</th>
<th>Accepted</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>2.3.4</td>
<td>Radiator is sized for 50% Ethylene Glycol.</td>
<td>NOT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>2.3.5</td>
<td>150 mph Wind/Zone Structure w/o calcs included.</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>2.3.7</td>
<td>No solder is used for sealing.</td>
<td>NOT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>2.3.8</td>
<td>Steel header plates are $\frac{3}{8}''$ thick.</td>
<td>NOT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>2.3.10</td>
<td>Upper and lower tanks are separate from frame for easy removal and inspection.</td>
<td>NOT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>2.3.12</td>
<td>Provisions included for adding vents and drains.</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>2.3.15</td>
<td>Standard filler cap included.</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>2.3.16</td>
<td>Plenum Mounted MOC-6 Fuel Cooler included.</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>2.3.17</td>
<td>Provisions for drain valves included.</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>2.3.19</td>
<td>Radiator sized according to site conditions and Cat specification DM9030.</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>2.3.20</td>
<td>Single core with two, 4'', beaded tube connections in each tank for ATAAC circuit. ATAAC tanks are Cortec coated and include provision for drain valve. Single core with one 3.5'' water inlet connection and one 4'' outlet connection for JW circuit with provision for venting and drain valves. Neither piping nor clamps nor hose connections are included for JW or ATAAC circuits.</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>2.3.21</td>
<td>A safety tolerance was added to account for fouling.</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>2.3.22</td>
<td>Radiator sized according to site conditions and Cat specification DM9030.</td>
<td>CL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>2.3.23, 2.3.24</td>
<td>Contractor shall ensure an external static of $\frac{3}{8}''$ H2O or less at radiator</td>
<td>NOT</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**BID BOND (DAMAGES FORM)**

<table>
<thead>
<tr>
<th>Bidder</th>
<th>Surety</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name:</strong> Xylem Water Solutions USA, Inc.</td>
<td><strong>Name:</strong> Atlantic Specialty Insurance Company</td>
</tr>
<tr>
<td><strong>Address (principal place of business):</strong> N27 W23293 Roundy Drive Pewaukee, WI 53072</td>
<td><strong>Address (principal place of business):</strong> 605 Highway 169 North Plymouth, MN 55441</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Owner</th>
<th>Bid</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name:</strong> The City of Charleston</td>
<td><strong>Project (name and location):</strong> Spring/Fishburne US 17 Drainage Project</td>
</tr>
<tr>
<td><strong>Address (principal place of business):</strong> 2 George Street Suite 2100 Charleston, SC 29401</td>
<td><strong>Bid Due Date:</strong> 9/29/2021</td>
</tr>
</tbody>
</table>

**Bond**

- **Bond Amount:** Ten Percent of Amount Bid (10% of Amt. Bid)
- **Date of Bond:** 9/21/2021

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth in this Bid Bond, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

<table>
<thead>
<tr>
<th>Bidder</th>
<th>Surety</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>By:</strong> (Full formal name of Bidder)</td>
<td><strong>By:</strong> (Full formal name of Surety) (Corporate seal)</td>
</tr>
<tr>
<td><strong>Name:</strong> James Patterson</td>
<td><strong>Name:</strong> Cynthia Farrell</td>
</tr>
<tr>
<td><strong>(Signature)</strong> (Printed or typed)</td>
<td><strong>(Signature)</strong> (Attach Power of Attorney)</td>
</tr>
<tr>
<td><strong>Title:</strong> Director, ENG. &amp; MKT.</td>
<td><strong>Title:</strong> Attorney-In-Fact</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Attest</th>
<th>Note: Addresses are to be used for giving any required notice. (2) Provide execution by any additional parties, such as joint venturers, if necessary.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>By:</strong> (Signature)</td>
<td><strong>Title:</strong> Witness</td>
</tr>
<tr>
<td><strong>Name:</strong> James O. Rychel</td>
<td><strong>Name:</strong> Anne Potter</td>
</tr>
<tr>
<td><strong>(Signature)</strong> (Printed or typed)</td>
<td><strong>(Signature)</strong> (Printed or typed)</td>
</tr>
<tr>
<td><strong>Title:</strong> Applications Engineer</td>
<td><strong>Title:</strong></td>
</tr>
</tbody>
</table>

EJCDC® C-435, Bid Bond (Damages Form). Copyright © 2018 National Society of Professional Engineer, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.
1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder any difference between the total amount of Bidder's Bid and the total amount of the Bid of the next lowest, responsible Bidder that submitted a responsive Bid, as determined by Owner, for the work required by the Contract Documents, provided that:

1.1. If there is no such next Bidder, and Owner does not abandon the Project, then Bidder and Surety shall pay to Owner the bond amount set forth on the face of this Bond, and

1.2. In no event will Bidder's and Surety's obligation hereunder exceed the bond amount set forth on the face of this Bond.

1.3. Recovery under the terms of this Bond will be Owner's sole and exclusive remedy upon default of Bidder.

2. Default of Bidder occurs upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation will be null and void if:

3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or

3.2. All Bids are rejected by Owner, or

3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions will not in the aggregate exceed 120 days from Bid due date without Surety’s written consent.

6. No suit or action will be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety, and in no case later than one year after the Bid due date.

7. Any suit or action under this Bond must be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder must be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Postal Service registered or certified mail, return receipt requested, postage pre-paid, and will be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

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

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

EJCDC® C-435, Bid Bond (Damages Form).
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Power of Attorney

KNOW ALL MEN BY THESE PRESENTS, that ATLANTIC SPECIALTY INSURANCE COMPANY, a New York corporation with its principal office in Plymouth, Minnesota, do hereby constitute and appoint: Debra A. Deering, Sandra Diaz, Cynthia Farrell, Anne Potter, Peter Healy, Susan A. Welch, Frances Rodriguez, Akhlaq Noorhassan, Francesca Kazmierczak, Jennifer Jakaitis, Nancy Schnee, Kemal Baskanovic, each individually if there be more than one named, its true and lawful Attorney-in-Fact, to make, execute, seal and deliver, for and on its behalf as surety, any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof; provided that no bond or undertaking executed under this authority shall exceed in amount the sum of unlimited and the execution of such bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof. In pursuance of these presents, shall be as binding upon said Company as if they had been fully signed by an authorized officer of the Company and sealed with the Company seal. This Power of Attorney is made and executed by authority of the following resolutions adopted by the Board of Directors of ATLANTIC SPECIALTY INSURANCE COMPANY on the twenty-fifth day of September, 2012:

Resolved: That the President, any Senior Vice President or Vice-President (each an "Authorized Officer") may execute for and on behalf of the Company any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof, and affix the seal of the Company thereto; and that the Authorized Officer may at any time remove any such Attorney-in-Fact and revoke all power and authority given to any such Attorney-in-Fact.

Resolved: That the Attorney-in-Fact may be given full power and authority to execute for and on the name and on behalf of the Company any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof, and that the Authorized Officer may appoint and authorize an Attorney-in-Fact to execute on behalf of the Company any and all such instruments and to affix the Company seal thereto; and that the Authorized Officer may at any time remove any such Attorney-in-Fact and revoke all power and authority given to any such Attorney-in-Fact.

This power of attorney is signed and sealed by facsimile under the authority of the following Resolution adopted by the Board of Directors of ATLANTIC SPECIALTY INSURANCE COMPANY on the twenty-fifth day of September, 2012:

Resolved: That the signature of an Authorized Officer, the signature of the Secretary or the Assistant Secretary, and the Company seal may be affixed by facsimile to any power of attorney or to any certificate relating thereon appointing an Attorney-in-Fact for purposes only of executing and sealing any bond, undertaking, recognizance or other written obligation in the nature thereof, and any such signature and seal where so used, being hereby adopted by the Company as the original signature of such officer and the original seal of the Company, to be valid and binding upon the Company with the same force and effect as though manually affixed.

IN WITNESS WHEREOF, ATLANTIC SPECIALTY INSURANCE COMPANY has caused these presents to be signed by an Authorized Officer and the seal of the Company to be affixed this twenty-seventh day of April, 2020.

STATE OF MINNESOTA
HENNEPIN COUNTY

On this twenty-seventh day of April, 2020, before me personally came Paul J. Brehm, Senior Vice President of ATLANTIC SPECIALTY INSURANCE COMPANY, so personally known to me to be the individual and officer described in and who executed the preceding instrument, and he acknowledged the execution of the same, and being by me duly sworn, that he is the said officer of the Company aforesaid, and that the seal affixed to the preceding instrument is the seal of said Company and that the said seal and the signature as such officer was duly affixed and subscribed to the said instrument by the authority and at the direction of the Company.

I, the undersigned, Secretary of ATLANTIC SPECIALTY INSURANCE COMPANY, a New York Corporation, do hereby certify that the foregoing power of attorney is in full force and has not been revoked, and the resolutions set forth above are now in force.
Signed and sealed. Dated 21st day of September 2021

[Signature]
Kara Barrow, Secretary

This Power of Attorney expires January 31, 2023

Please direct bond verifications to surety@intactinsurance.com
Atlantic Specialty Insurance Company
Period Ended 12/31/2020

Dollars displayed in thousands

<table>
<thead>
<tr>
<th>Admitted Assets</th>
<th>Liabilities and Surplus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investments:</td>
<td></td>
</tr>
<tr>
<td>Bonds</td>
<td>$ 1,500,023</td>
</tr>
<tr>
<td>Preferred Stocks</td>
<td></td>
</tr>
<tr>
<td>Common Stocks</td>
<td>715,363</td>
</tr>
<tr>
<td>Mortgage Loans</td>
<td></td>
</tr>
<tr>
<td>Real Estate</td>
<td></td>
</tr>
<tr>
<td>Contract Loans</td>
<td></td>
</tr>
<tr>
<td>Derivatives</td>
<td></td>
</tr>
<tr>
<td>Cash, Cash Equivalents &amp; Short Term Investments</td>
<td>147,400</td>
</tr>
<tr>
<td>Other Investments</td>
<td>23,375</td>
</tr>
<tr>
<td>Total Cash &amp; Investments</td>
<td>2,449,629</td>
</tr>
<tr>
<td>Premiums and Considerations Due</td>
<td>275,120</td>
</tr>
<tr>
<td>Reinsurance Receivable</td>
<td>99,375</td>
</tr>
<tr>
<td>Receivables from Parent, Subsidiary or Affiliates</td>
<td>52,038</td>
</tr>
<tr>
<td>All Other Admitted Assets</td>
<td>62,320</td>
</tr>
<tr>
<td>Total Admitted Assets</td>
<td>2,373,992</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Liabilities</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Losses</td>
<td>474,666</td>
</tr>
<tr>
<td>Loss Adjust. Expense Reserves</td>
<td>1,531,980</td>
</tr>
<tr>
<td>Total Loss &amp; LAE Reserves</td>
<td>1,531,980</td>
</tr>
<tr>
<td>Unearned Premium Revenue</td>
<td>599,480</td>
</tr>
<tr>
<td>Total Reinsurance Liabilities</td>
<td>19,171</td>
</tr>
<tr>
<td>Commissions, Other Expenses, and Taxes due</td>
<td>64,803</td>
</tr>
<tr>
<td>Dividends</td>
<td>-</td>
</tr>
<tr>
<td>Payable to Parent, Subs or Affiliates</td>
<td>-</td>
</tr>
<tr>
<td>All Other Liabilities</td>
<td>237,642</td>
</tr>
<tr>
<td>Total Liabilities</td>
<td>2,050,760</td>
</tr>
</tbody>
</table>

State of Minnesota
County of Hennepin

I, Kara Barrow, Secretary of Atlantic Specialty Insurance Company do hereby certify that the foregoing statement is a correct exhibit of the assets and liabilities of the said Company, on the 31st day of December, 2020, according to the best of my information, knowledge and belief.

Secretary

Subscribed and sworn to, before me, a Notary Public of the State of Minnesota on this 2nd day of March, 2021.

Notary Public

[Signature]

Kerri Riechers, Notary Public
XYLEM WATER SOLUTIONS U.S.A., INC.

UNANIMOUS CONSENT OF THE BOARD OF DIRECTORS

WHEREAS, the undersigned, constituting all of the members of the Board of Directors of Xylem Water Solutions U.S.A., Inc., a Delaware corporation formed pursuant to the laws of the State of Delaware (the “Corporation”), do hereby consent, pursuant to Section 141(f) of the General Corporation Law of the State of Delaware, to the adoption of the resolutions set forth below, with the same effect as if said actions were taken by unanimous approving vote at a meeting at which all of the directors were present in person:

RESOLVED: That the lawful actions taken by the current and former officers of the Corporation, in the name of and on behalf of the Corporation are hereby adopted, ratified, and approved.

RESOLVED FURTHER: That the following named persons are appointed as officers of the Corporation in the capacities indicated opposite their respective names, to serve as officers from this date forward until their resignation, removal, termination of employment with the Corporation or its affiliates, or death or until their successors are duly appointed.

<table>
<thead>
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</tr>
<tr>
<td>Peter Van Winkle</td>
<td>Vice President</td>
</tr>
</tbody>
</table>

RESOLVED: That any previous appointments of officers for the Corporation are hereby revoked.

RESOLVED FURTHER: That this Unanimous Written Consent may be executed in any number of counterparts, each of which when so executed shall be deemed to be an original and all of which when taken together shall constitute one and the same document, and that the different directors of the Corporation need not be signatories to the same counterpart.

This Unanimous Written Consent of the Board of Directors is effective on March 1, 2020.

Peter Bilelis
Peter Bilelis (Feb 13, 2020)
Matt Fisher
Matt Fisher (Feb 13, 2020)
Matthew Fisher
Joseph Johnston
Power of Attorney

KNOW ALL MEN BY THESE PRESENTS, that ATLANTIC SPECIALTY INSURANCE COMPANY, a New York Corporation with its principal office in Plymouth, Minnesota, does hereby constitute and appoint: Debra A. Deming, Sandra Elas, Cynthia Farrell, Anne Feister, Peter Healy, Susan A. Welsh, Frances Rodriguez, Alina Nowakowski, Francesca Krammertz, Jennifer Jaksaitis, Nancy Schrow, Kennil Brizanovic, each individually if there be more than one named, its true and lawful Attorney-in-Fact, to make, execute, seal and deliver, for and on its behalf, all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof; provided that no bond or undertaking executed under this authority shall exceed in amount the sum of unlimited the execution of such bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof in pursuance of these presents, shall be as binding upon said Company as if they had been fully signed by an authorized officer of the Company and sealed with the Company seal. This Power of Attorney is made and executed by authority of the following resolutions adopted by the Board of Directors of ATLANTIC SPECIALTY INSURANCE COMPANY on the twenty-fifth day of September, 2012:

Resolved: That the President, any Senior Vice President or Vice-President (each an “Authorized Officer”) may execute for and in behalf of the Company any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof, and affix the seal of the Company thereto; and that the Authorized Officer may appoint and authorize an Attorney-in-Fact to execute for and in behalf of the Company any and all such instruments and to affix the Company seal thereto; and that the Authorized Officer may at any time remove any such Attorney-in-Fact and revoke all power and authority given to any such Attorney-in-Fact.

Resolved: That the Attorney-in-Fact may be given full power and authority to execute for and in the name and on behalf of the Company any and all bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof, and any such instrument executed by any such Attorney-in-Fact shall be binding upon the Company as if signed and sealed by an Authorized Officer and, further, the Attorney-in-Fact is hereby authorized to verify any affidavits required to be attached to, bonds, recognizances, contracts of indemnity, and all other writings obligatory in the nature thereof.

This power of attorney is signed and sealed by facsimile under the authority of the following Resolution adopted by the Board of Directors of ATLANTIC SPECIALTY INSURANCE COMPANY on the twenty-fifth day of September, 2012:

Resolved: That the signature of an Authorized Officer, the signature of the Secretary or the Assistant Secretary, and the Company seal may be affixed by facsimile to any power of attorney or to any certificate relating thereto appointing an Attorney-in-Fact for purposes only of executing and sealing any bond, undertaking, recognizance or other written obligation in the nature thereof, and any such signature and seal where so used, being hereby adopted by the Company as the original signature of such officer and the original seal of the Company, to be valid and binding upon the Company with the same force and effect as though manually affixed.

IN WITNESS WHEREOF, ATLANTIC SPECIALTY INSURANCE COMPANY has caused these presents to be signed by an Authorized Officer and the seal of the Company to be affixed this twenty-seventh day of April, 2020.

By
Paul J. Brein, Senior Vice President

STATE OF MINNESOTA
HENNEPIN COUNTY

On this twenty-seventh day of April, 2020, before me personally came Paul J. Brein, Senior Vice President of ATLANTIC SPECIALTY INSURANCE COMPANY, to me personally known to be the individual and officer described in and who executed the preceding instrument, and he acknowledged the execution of the same, and being by me duly sworn, that he is the said officer of the Company aforesaid, and that the seal affixed to the preceding instrument in the seal of said Company and that the said seal and the signature as such officer was duly affixed and subscribed to the said instrument by the authority and at the direction of the Company.

I, the undersigned, Secretary of ATLANTIC SPECIALTY INSURANCE COMPANY, a New York Corporation, do hereby certify that the foregoing power of attorney is in full force and has not been revoked, and the resolutions set forth above are now in force.
Dated 21st day of September, 2021

Signed and sealed.

This Power of Attorney expires January 31, 2025.

By
Kara Barrows, Secretary

Please direct bond verifications to surety@intactinsurance.com

Xylem, Flygt A-C Custom Pump
N27 W23293 Roundy Drive
Pewaukee, WI 53072

Page 107 of 151
Atlantic Specialty Insurance Company
Period Ended 12/31/2020

<table>
<thead>
<tr>
<th>Admitted Assets</th>
<th>Liabilities and Surplus</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Liabilities</td>
</tr>
<tr>
<td>Investments</td>
<td></td>
</tr>
<tr>
<td>Bonds</td>
<td>$ 1,500,023</td>
</tr>
<tr>
<td>Preferred Stocks</td>
<td>-</td>
</tr>
<tr>
<td>Common Stocks</td>
<td>716,035</td>
</tr>
<tr>
<td>Mortgage Loans</td>
<td>-</td>
</tr>
<tr>
<td>Real Estate</td>
<td>-</td>
</tr>
<tr>
<td>Contract Loans</td>
<td>-</td>
</tr>
<tr>
<td>Derivatives</td>
<td>-</td>
</tr>
<tr>
<td>Cash, Cash Equivalents &amp; Short Term Investments</td>
<td>147,000</td>
</tr>
<tr>
<td>Other Investments</td>
<td>33,375</td>
</tr>
<tr>
<td>Total Cash &amp; Investments</td>
<td>2,418,059</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Premiums and Considerations Due</td>
<td>274,120</td>
</tr>
<tr>
<td>Reinsurance Receivables</td>
<td>59,375</td>
</tr>
<tr>
<td>Receivable from Parent, Subsidiary or Affiliates</td>
<td>20,220</td>
</tr>
<tr>
<td>All Other Admitted Assets</td>
<td>62,320</td>
</tr>
<tr>
<td>Total Admitted Assets</td>
<td>2,873,992</td>
</tr>
</tbody>
</table>

| Liabilities and Surplus              |                         |
| Loss Reserves                        | $ 373,484               |
| Loss Adjustment Expense Reserves     | 377,656                 |
| Total Loss & ALAE Reserves           | 1,151,259               |
| Unearned Premium Reserve            | 592,401                 |
| Total Reinsurance Liabilities       | 13,771                  |
| Commissions, Other Expenses, and Taxes due | 54,583 |
| Deferred                            |                         |
| Payable to Parent, Sibs or Affiliates |                         |
| All Other Liabilities               | 537,642                 |
| Total Liabilities                   | 2,050,707               |
|                                       |                         |
| Capital and Surplus                  |                         |
| Common Stock                         | 9,001                   |
| Preferred Stock                      |                         |
| Surplus Nabes                        |                         |
| Unassigned Surplus                   | 91,944                  |
| Other Including Dvrs Contributed     | 722,341                 |
| Capital & Surplus                    | 823,289                 |
| Total Liabilities and C&S           | 2,873,992               |

State of Minnesota
County of Hennepin

I, Kara Barrow, Secretary of Atlantic Specialty Insurance Company do hereby certify that the foregoing statement is a correct exhibit of the assets and liabilities of the said Company, on the 31st day of December, 2020, according to the best of my information, knowledge and belief.

[Signature]
Secretary

Subscribed and sworn to, before me, a Notary Public of the State of Minnesota on this 2nd day of March, 2021.

[Signature]
Notary Public
XYLEM WATER SOLUTIONS U.S.A., INC.

*****

UNANIMOUS CONSENT OF THE BOARD OF DIRECTORS

WHEREAS, the undersigned, constituting all of the members of the Board of Directors of Xylem Water Solutions U.S.A., Inc., a Delaware corporation formed pursuant to the laws of the State of Delaware (the "Corporation"), do hereby consent, pursuant to Section 141(f) of the General Corporation Law of the State of Delaware, to the adoption of the resolutions set forth below, with the same effect as if said actions were taken by unanimous approving vote at a meeting at which all of the directors were present in person:

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This Unanimous Written Consent of the Board of Directors is effective on March 1, 2020.

Peter Bilelis
Peter Bilelis (Feb 23, 2020)

Matthew Fisher
Matthew Fisher (Feb 24, 2020)

Joseph Johnston
AGREEMENT BETWEEN BUYER AND SELLER
FOR PROCUREMENT CONTRACT
AGREEMENT BETWEEN BUYER AND SELLER
FOR PROCUREMENT CONTRACT

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AGREEMENT BETWEEN BUYER AND SELLER FOR PROCUREMENT CONTRACT

This Procurement Agreement is by and between the City of Charleston ("Buyer") and Xylem Water Solutions USA, Inc. ("Seller").

Terms used in this Procurement Agreement have the meanings stated in the General Conditions of the Procurement Contract and the Supplementary Conditions of the Procurement Contract.

Buyer and Seller hereby agree as follows:

ARTICLE 1—PROCUREMENT CONTRACT

1.01 Goods and Special Services

Seller shall furnish the Goods and Special Services as specified or indicated in the Procurement Contract Documents. The Goods and Special Services are generally described as follows:

Supply of three (3) variable speed axial or mixed flow vertical column pumps with diesel engine drives, each capable of pumping 120,000 gallons per minute (gpm), and appurtenances and services as described in the attached specifications.

1.02 The Project

A. The Project, of which the Goods and Special Services are a part, is generally described as follows: The Spring/Fishburne US 17 Drainage Project.

1.03 Engineer

A. Buyer has retained Davis & Floyd ("Engineer"), to prepare Procurement Contract Documents and act as Buyer's representative. Engineer assumes all duties and responsibilities and has the rights and authority assigned to Engineer in the Procurement Contract Documents in connection with Seller's furnishing of Goods and Special Services.

1.04 Point of Destination

A. The Point of Destination is designated as: 135 Lockwood Drive, Charleston, SC.

ARTICLE 2—PROCUREMENT CONTRACT TIMES

2.01 Time of the Essence

A. All time limits for Milestones, including the submittal of Shop Drawings and Samples, the delivery of Goods, and the furnishing of Special Services as stated in the Procurement Contract Documents, are of the essence of the Procurement Contract.

2.02 Schedule of Procurement Contract Times

A. The following schedule sets forth the Procurement Contract Times:
<table>
<thead>
<tr>
<th>Milestone</th>
<th>Date or Days</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submit Shop Drawings</td>
<td>10 Weeks</td>
<td></td>
</tr>
<tr>
<td>Deliver acceptable Goods to Point of Destination</td>
<td>52 Weeks after approved shop</td>
<td></td>
</tr>
<tr>
<td></td>
<td>drawings</td>
<td></td>
</tr>
<tr>
<td>Commence Special Services for Goods</td>
<td>At delivery</td>
<td>If commencement is linked to delivery, “delivery” means date of Buyer’s acknowledgment of receipt.</td>
</tr>
<tr>
<td>Complete Special Services for Goods</td>
<td>As needed.</td>
<td></td>
</tr>
<tr>
<td>Readiness for Final Inspection and Acceptance of Goods and Special</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td>Services</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.03  *Shop Drawings and Samples*

A.  *Submittal of Shop Drawings and Samples*: Seller shall submit all Shop Drawings and Samples required by the Procurement Contract Documents to Engineer for its review and approval.

B.  *Engineer’s Review*: It is the intent of the parties that Engineer will conduct its review of Shop Drawings and Samples and issue its approval, or a denial accompanied by substantive comments regarding information needed to gain approval, within 21 days after Seller's submittal of such Shop Drawings and Samples, or within such longer period that is needed because of the quantity and quality of such submittals. Resubmittals will be limited whenever possible.

2.04  *Liquidated Damages*

A.  Buyer and Seller recognize that time is of the essence as stated in Paragraph 2.01, and that Buyer will suffer financial and other losses if the Goods are not delivered to the Point of Destination and ready for receipt of delivery by Buyer within the time specified in Paragraph 2.02, plus any extensions thereof allowed in accordance with this Procurement Contract. The parties also recognize that the timely performance of services by others involved in the Project is materially dependent upon Seller's specific compliance with the delivery requirements of Paragraph 2.02. Further, the parties recognize the time, expense, and difficulties involved in proving, in a legal or arbitration proceeding, the loss (whether direct, consequential, or otherwise) suffered by Buyer if complete, acceptable Goods are not delivered on time. Accordingly, instead of requiring any such proof, Buyer and Seller agree that as liquidated damages for delay (but not as a penalty) Seller shall pay Buyer $1000.00 for each day that expires after the time specified in Paragraph 2.02 for delivery of acceptable Goods for the first 30 days, $2000.00 per day for the second 30 days, $3000.00 per day for the third 30
days, and so forth for each day past the contractual delivery date. In no event shall liquidated damages exceed 10% of the Agreement price. Liquidated damages will be the Seller’s sole liability and buyer’s sole remedy for delays associated with the equipment delivery milestones as set forth in 2.02 A, above. Performance Warranties, guarantees, and indemnifications remain in effect as described in Article 9 of the General Conditions.

ARTICLE 3—PROCUREMENT CONTRACT PRICE

3.01  Procurement Contract Price and Total Price

A. The Procurement Contract Price is comprised of the Lump Sum and Unit Price amounts set forth in the following paragraphs.

B. Buyer shall pay Seller a Lump Sum of $TBD for furnishing the Goods and Special Services (other than any Unit Price Goods and Special Services) in accordance with the Procurement Contract Documents. Such Lump Sum amount accounts for the following Buyer-accepted alternates: Extended warranty (5-years)

C. For all Unit Price Goods and Special Services furnished by Seller in accordance with the Procurement Contract Documents, Buyer shall pay Seller an amount equal to the sum of the extended prices (established for each separately identified unit price item by multiplying the unit price times the actual quantity of that item).

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Unit</th>
<th>Estimated Quantity</th>
<th>Unit Price</th>
<th>Extended Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td>$</td>
</tr>
</tbody>
</table>

Total of all Extended Prices for Unit Price items (subject to final adjustment based on actual quantities) $

1. The extended prices set forth as of the Effective Date of the Procurement Contract for unit price items are based on estimated quantities.

2. The estimated quantities of items of Unit Price Goods and Special Services are not guaranteed and are solely for the purpose of determining an initial Procurement Contract Price. Payments to Seller for Unit Price Goods and Special Services will be based on actual quantities.

3. Each unit price will be deemed to include an amount considered by Seller to be adequate to cover Seller’s overhead and profit for each separately identified unit price item.
4. Engineer will determine the actual quantities and classifications of unit price items furnished by Seller. Engineer will review with Seller the Engineer’s preliminary determinations on such matters before rendering a written decision (by recommendation of an Application for Payment or otherwise). Engineer’s written decision will be final and binding upon Buyer and Seller (except as modified by Engineer to reflect changed factual conditions or more accurate data), subject to the provisions of Article 12 of the General Conditions.

5. The final adjustment of Procurement Contract Price with respect to Unit Price Goods and Special Services will be set forth in a Change Order.

D. The Total Price is $_______________. Such Total Price is comprised of the Lump Sum amount (taking into account any accepted alternates), Unit Price Goods and Special Services amount (if any) (subject to final adjustment), and Buyer’s Contingency Allowance (if any) (subject to final adjustment).

3.02 Procurement Contract Price and Total Price—Based on Attached Proposal

A. For furnishing the Goods and Special Services in accordance with the Procurement Contract Documents, Buyer shall pay Seller the prices stated in Seller’s Bid, attached hereto as an exhibit, subject to final adjustments for Unit Price Goods and Special Services and Buyer’s Contingency Allowance, if any.

ARTICLE 4—PAYMENT PROCEDURES

4.01 Submittal and Processing of Applications for Payment

A. Seller shall submit Applications for Payment in accordance with Article 13 of the General Conditions and the following paragraphs. Engineer and Buyer will process such Applications for Payment in accordance with said Article 13.

4.02 Progress Payments; Final Payment

A. Seller may submit an Application for Payment requesting the stated percentage of Procurement Contract Price upon attainment of each of the following Payment Line Items:

<table>
<thead>
<tr>
<th>Payment Line Item (Lump Sum)</th>
<th>Percentage of Lump Sum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Receipt of Approval of Shop Drawings and Samples</td>
<td>10</td>
</tr>
<tr>
<td>2. Completion of acceptable factory testing (if any)]</td>
<td>5</td>
</tr>
<tr>
<td>3. Delivery of Goods to Point of Destination in accordance with the Procurement Contract Documents</td>
<td>70</td>
</tr>
<tr>
<td>4. Completion of Special Services in accordance with Procurement Contract Documents</td>
<td>10</td>
</tr>
<tr>
<td>5. Final Payment: [Correction of non-conformities, provision of final Operations and Maintenance manuals, submittal of warranties and other final documentation required by the Procurement Contract Documents]</td>
<td>5</td>
</tr>
</tbody>
</table>
Total Procurement Contract Price (Lump Sum) | 100

B. For Unit Price Goods and Special Services, if any, or for payments owed to Seller as a result of authorizations by Buyer under the Buyer’s Contingency Allowance (if any), Seller shall submit a separate Application for Payment, no more frequently than monthly, that states (1) the actual quantities of such Unit Price Goods and Special Services that have been furnished, and the applicable unit prices; and (2) the services or items performed or furnished under the Buyer’s Contingency Allowance, and the amounts owed. If practical, and at Seller’s option, Seller may apply for such unit price and Buyer’s Contingency Allowance payments in a separate section of an Application for Payment submitted under Paragraph 4.02.A for lump sum items.

C. Buyer shall pay Seller the amount owed under an Application for Payment within 30 days after Engineer’s presentation to Buyer of the Application for Payment and Engineer’s recommendation.

ARTICLE 5—ASSIGNMENT OF PROCUREMENT CONTRACT

5.01 Assignment of Contract

A. Buyer has the right to assign this Procurement Contract for furnishing Goods and Special Services, but only to a person or entity with sufficient apparent ability to satisfy all of Buyer’s obligations under this Procurement Contract, and Seller hereby consents to such assignment. Forms documenting the assignment of the Procurement Contract, and consent of Seller’s surety to the assignment, have been executed by Buyer, Seller, and Seller’s surety, and are attached as exhibits to this Procurement Agreement. If so assigned, the following provisions apply:

1. The Procurement Contract is initially executed in the name of the entity identified herein as Buyer, and will be assigned by such Buyer (as assignor) to a construction contractor (Contractor/Assignee) designated by such Buyer. The assignment will occur on the effective date of the construction contract between such Buyer (Project Owner) and the Contractor/Assignee, which is expected to occur on or about TBD. Commencing on the date of acceptance of assignment by the Contractor/Assignee, all references in the Procurement Contract to “Buyer” shall mean the designated Contractor/Assignee.

2. The assignment of this Procurement Contract relieves the assignor from all further obligations and liabilities under this Procurement Contract. After assignment, Seller shall become a subcontractor or supplier to the Contractor/Assignee and, except as noted herein, all rights, duties, and obligations of Buyer under the Procurement Contract become the rights, duties, and obligations of the Contractor/Assignee.

3. After assignment:
a. The Procurement Drawings and Procurement Specifications, and any modifying Addenda will become “Contract Documents” under the construction contract.

b. If the Procurement Drawings or Procurement Specifications, as “Contract Documents” under the construction contract, are duly modified under such construction contract, then Seller and Contractor/Assignee shall enter into a corresponding Change Order under the applicable provisions of this Procurement Contract.

c. The Procurement Drawings and Procurement Specifications may not be modified by Seller or Contractor/Assignee, singly or in tandem, except as such Procurement Drawings or Procurement Specifications, as “Contract Documents” under the construction contract, have been duly modified under such construction contract.

d. All performance warranties, guarantees, and indemnifications required by the Procurement Contract will continue to run for the benefit of assignor (Project Owner) and, in addition, for the benefit of the Contractor/Assignee. However, if assignor (Project Owner) and Contractor/Assignee make the same warranty or guarantee claim, then Seller shall only be liable once for such claim. Other than its remedies under such warranties, guarantees, and indemnifications, assignor will not retain direct rights under this Procurement Contract, but will have rights and remedies as a party to the construction contract, whose scope of work will encompass the Procurement Drawings, Procurement Specifications, and modifying Addenda; provided, however, that any limitations on Seller’s liability in this Procurement Contract will continue to bind the original Buyer (assignor) after assignment.

e. The Contractor/Assignee shall have all the rights of the Buyer under the Performance Bond and Payment Bond.

f. Seller shall submit all Applications for Payment directly to Contractor/Assignee.

1) Contractor/Assignee shall review each Application for Payment promptly, determine the amount that Contractor/Assignee approves for payment, and then include the amount approved in the next application for payment submitted to Project Owner (or Engineer) under the construction contract.

2) Contractor/Assignee shall pay Seller within 10 days of receipt of payment from the Project Owner under the construction contract.

3) After assignment Engineer will review, approve, or deny the content of Applications for Payment under the Procurement Contract only to the extent that Contractor/Assignee, as construction contractor, has incorporated such content into
payment applications that Engineer reviews under the construction contract.

g. The Contractor/Assignee shall have all the rights of the Buyer under any pending Claim by Buyer.

h. All Claims and supporting documentation will be submitted directly by the claimant party (either Buyer or Seller), to the other party, without submittal to Engineer.

1) The other party will render a response in writing within 30 days of receipt of the last submittal of claimant.

2) If the other party does not render a written response to a Claim within 30 days after receipt of the last submittal of the claimant, the other party shall be deemed to have approved the Claim in its entirety.

3) The other party’s written response to a Claim, or the approval of the Claim in its entirety as a function of failure to respond within 30 days, will be final and binding upon Buyer and Seller 30 days after it is issued, unless within such 30 days of issuance either Buyer or Seller appeals the result by initiating the mediation of the Claim in accordance with the dispute resolution procedures set forth in Paragraph 12.02 of the General Conditions.

4) Any Claim by Seller that Contractor/Assignee may choose to submit, present, or forward to Project Owner must be submitted to Buyer within sufficient time for Contractor/Assignee to preserve its rights under the construction contract, notwithstanding any procedures or time limits in this Procurement Contract.

i. Seller’s recovery of additional cost, time, or both cost and time for any Claim attributable to the Project Owner will be limited to the proportionate recovery by Contractor/Assignee against Project Owner for such Claim. Seller will cooperate and assist Contractor/Assignee in pursuing any Claim by Contractor/Assignee against Project Owner on behalf of Seller, including the timely preparation and delivery of supporting documentation.

j. If the pursuit of any claim by Contractor/Assignee against Project Owner on Seller’s behalf requires the expenditure by Contractor/Assignee of legal or consulting fees, or results in litigation, arbitration, or any dispute resolution procedures, Seller agrees to pay for a proportionate share of attorneys’ fees, consultant fees, and litigation, arbitration, and other resolution costs incurred by Contractor/Assignee in pursuing the claim on behalf of Seller, based upon the amount claimed by Seller as compared to the total value of the claim pursued by the Contractor/Assignee.
k. All rights, duties, and obligations of Engineer to Contractor/Assignee and Seller under this Procurement Contract will cease.

l. Subject to the foregoing provisions, all references in the Procurement Contract to submitting items to Engineer, or to Engineer having tasks or obligations, will be read after such an assignment as requiring submittal to Contractor/Assignee, or as Contractor/Assignee having such tasks or obligations (which Contractor/Assignee may delegate when appropriate).

m. If the Procurement Contract includes a Buyer’s Contingency Allowance, upon assignment such allowance will be automatically reduced to the amount previously authorized by Buyer (Project Owner), and cease to be operational.

B. No other assignment by a party hereto of any rights under or interests in the Procurement Contract will be binding on another party hereto without the written consent of the party sought to be bound. Specifically, but without limitation, Procurement Contract payments or other money that may become due, and Procurement Contract payments or other money that are due, may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by Laws and Regulations). Unless specifically stated to the contrary in any written consent to such an assignment, such an assignment will not release or discharge the assignor from any duty or responsibility under the Procurement Contract Documents.

ARTICLE 6—PROCUREMENT CONTRACT DOCUMENTS

6.01 List of Procurement Contract Documents

A. The Procurement Contract Documents consist of the following:

1. This Procurement Agreement.
2. General Conditions of the Procurement Contract.
3. Supplementary Conditions of the Procurement Contract.
4. Procurement Specifications as listed in the Procurement Specifications Table of Contents.
5. Procurement Drawings (not attached but incorporated by reference):
6. Addenda Numbers TBD
7. Bonds:
   a. Performance bond (together with power of attorney).
   b. Payment bond (together with power of attorney).
8. Exhibits to this Procurement Agreement (enumerated as follows):
   a. Exhibit A, Assignment of Contract, Consent to Assignment, and Acceptance of Assignment.
b. Exhibit B, Surety’s Consent to Assignment.

c. Documentation submitted by Seller [TBD].

9. The following which may be delivered or issued on or after the Effective Date of the Procurement Contract and are not attached hereto:

a. Change Orders;

b. Change Directives; and

c. Field Orders.

B. The documents listed in Paragraph 6.01.A are attached to this Procurement Agreement (except as expressly noted otherwise above).

C. There are no Procurement Contract Documents other than those listed above.

D. The Procurement Contract Documents may only be amended or supplemented as provided in Paragraph 11.01 of the Procurement General Conditions.

ARTICLE 7—SELLER’S REPRESENTATIONS AND CERTIFICATIONS

7.01 Seller’s Representations

A. In order to induce Buyer to enter into this Procurement Agreement, Seller makes the following representations:

1. Seller has examined and carefully studied the Procurement Contract Documents.

2. If required by the Instructions to Bidders to visit the Point of Destination and the site where the Goods are to be installed or Special Services will be provided, or if, in Seller’s judgment, any observable local or site conditions may affect the delivery, cost, progress, or furnishing of the Goods and Special Services, then Seller has visited the Point of Destination and site where the Goods are to be installed or Special Services will be provided (as applicable) and become familiar with and is satisfied as to the observable local and site conditions that may affect delivery, cost, progress, and furnishing of the Goods and Special Services.

3. Seller is familiar with and is satisfied as to all Laws and Regulations that may affect the cost, progress, and performance of Seller’s obligations under the Procurement Contract.

4. Seller has carefully studied, considered, and correlated the information known to Seller with respect to the effect of such information on the cost, progress, and performance of Seller’s obligations under the Procurement Contract.

5. Seller has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Seller has discovered in the
Procurement Contract Documents, and the written resolution (if any) thereof by Engineer is acceptable to Seller.

6. The Procurement Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance of Seller’s obligations under the Procurement Contract.

7. Seller’s entry into this Procurement Contract constitutes an incontrovertible representation by Seller that without exception all prices in the Procurement Agreement are premised upon furnishing the Goods and Special Services as required by the Procurement Contract Documents.

7.02 Seller’s Certifications

A. Seller certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Procurement Contract. For the purposes of this Paragraph 7.02:

1. “corrupt practice” means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Procurement Contract execution;

2. “fraudulent practice” means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Procurement Contract to the detriment of Buyer, (b) to establish bid or contract prices at artificial non-competitive levels, or (c) to deprive Buyer 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 Buyer, 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 Procurement Contract.

ARTICLE 8—CONFIDENTIALITY

8.01 Confidential Information

A. Confidential information is information in documents submitted by Seller that Seller clearly and prominently labels in writing to be a trade secret, proprietary, or confidential. Such documents, if any, will be maintained in a manner that endeavors to avoid disclosing confidential information to third parties, to the extent allowed by Laws and Regulations.

B. Seller shall clearly and prominently mark confidential information with the word “CONFIDENTIAL” on each page or sheet or on the cover of bound documents. Place “CONFIDENTIAL” stamps or watermarks so that they do not obscure any of the required information on the document, either in the original or in a way that would obscure any of the required information in a photocopy of the document.
8.02 Disclosure of Confidential Information

A. If Buyer is requested to disclose confidential information, or becomes legally compelled (by oral questions, interrogatories, requests for information or documents, subpoena, civil or criminal investigative demand, public information requests, or other requests under Laws and Regulations) to disclose confidential information, or is required by a regulatory body, governing agency, or controlling authority to disclose confidential information, or make any other disclosure that is prohibited or otherwise constrained by the Procurement Contract, Buyer will provide Seller with prompt notice so Seller may seek an appropriate protective order or other remedy. Seller will be solely responsible for submitting to the regulatory body, governing agency, or controlling authority any arguments, briefs, memoranda, motions, authorities, or other information in opposition to disclosure.

B. Buyer’s obligations with respect to confidential information are nullified by the following exceptions:

1. Confidential information becomes a part of the public domain through publication or otherwise, through no fault of the Buyer;

2. Buyer can demonstrate through suitable documentation that the confidential information was already in the Buyer’s possession, and not previously marked as confidential, or was otherwise publicly available prior to the Effective Date of the Procurement Contract;

3. The confidential information is subsequently and independently disclosed to the Buyer by a third party who has a lawful right to disclose such information;

4. Buyer has a good faith belief that disclosure is required or justified; or

5. Buyer is required to disclose the confidential information by court order or by applicable Laws and Regulations.

8.03 Waiver of Immunity

A. Notwithstanding any other provision of the Procurement Contract, it is stipulated and agreed that by accepting confidential information, Buyer has not and does not waive its legal immunity (if any) from suit or liability.

ARTICLE 9—MUTUAL WAIVER

9.01 Parties mutually agree to waive any claim for consequential damages, including but not limited to, lost profits, lost revenue, and lost business opportunities for delays occurring during manufacture and delivery prior to receipt of Goods at the Point of Destination. The aggregate liability of each party, whether under contract law, in tort (including negligence), or otherwise, is limited to the Agreement price (“Cap”). This Cap does not apply to: (a) costs, losses, or damages asserted by third parties for destruction of tangible property, (b) bodily injury, sickness, or death of any persons; or (c) gross negligence or willful misconduct. To the extent this Agreement provides rights and/or remedies respective to a Party’s failure to
satisfy a given obligation, those rights and/or remedies will be the sole and
exclusive rights and/or remedies available to the Parties for the given failure, to
the exclusion of any/all rights and remedies available at law, in equity, or
otherwise.

9.01 Not Used
IN WITNESS WHEREOF, Buyer and Seller have signed this Procurement Agreement. Counterparts have been delivered to Buyer and Seller.

The Effective Date of the Procurement Contract is ________________________________

<table>
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<tr>
<th>Buyer</th>
<th>Seller</th>
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<td>By: (individual's signature)</td>
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<td>(If Seller is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)</td>
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Phone: ________________________________

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

Phone: ________________________________

Email: ________________________________
Xylem Ref. Number: CP21019-REV.02  
Date: December 1, 2021  
Project: Spring/Fishburne Drainage Improvement Project

Proposal/Contract

TO
City of Charleston Department of Stormwater Management

ADDRESS

ATTENTION

Xylem Water Solutions USA, Inc. agrees to sell to Purchaser and Purchaser agrees to purchase from Company the product(s) described below:

PRODUCT(S): SEE ITEM (1) FOR DESCRIPTION AND PRICING

PRICE POLICY CLAUSE: PRICES ARE FIRM FOR THE QUOTED SHIPMENT

TAXES: NONE INCLUDED

TERMS OF PAYMENT: 10% UPON APPROVAL OF SUBMITTALS
25% NET AFTER ORDERING OF MAJOR CASTINGS
25% NET AFTER RECEIPT OF MAJOR CASTINGS
40% UPON SHIPMENT FROM FACTORY

SHIPPING DATE: TO BE AGREED UPON PRIOR TO AWARD. EXPECTED DELIVERY IS 52 WEEKS AFTER APPROVAL OF SUBMITTALS AND RELEASE TO MANUFACTURE

DELIVERY TERMS: INCOTERMS 2020 FOB JOBSITE

OTHER TERMS: SEE ITEM (II)

This offer will remain in effect for 45 days unless changed in the interim upon written notice from Company. Documents and related correspondence shall be sent to: See Address Below

Field services furnished by Company employees, whenever specified, are governed by the provisions of Company form 5621-0100.

This document and any other documents specifically referred to as being a part hereof, constitute the entire contract on the subject matter, and it shall not be modified except in writing signed by both parties.

This order is subject to the Standard Terms and Conditions of Sale – Xylem Americas effective on the date the order is accepted which terms are available at http://www.xyleminc.com/en-us/Pages/terms-conditions-of-sale.aspx and incorporated herein by reference and made a part of the agreement between the parties.

PURCHASER’S ACCEPTANCE
The Proposal / Contract is hereby accepted.

(Name of Purchaser)

PROPOSAL / CONTRACT – Xylem Water Solutions USA, Inc.
By ____________________________  (Name of Purchaser)

TITLE: Application Engineer

Date 11/22/2021  PHONE: 262-548-8173

ACCEPTANCE – Xylem Water Solutions USA, Inc.

By ____________________________

Title ____________________________

Date ____________________________

Xylem Water Solutions USA, Inc.
N27 W23293 Roundy Drive
Pewaukee WI, 53072

Modifications or changes are not valid until accepted by Xylem Water Solutions USA, Inc.
Item I: Description of Equipment and Services

Base Scope

A. Quantity (3) Xylem Flygt Vertical Column Pump, model 94x66 WCAX. Pump will be below floor discharge, non-removable element, enclosed line shaft design. The Pump is complete with baseplate, foundation plates, hold-down studs and hardware, rigid adjustable coupling & guard. Pump Rating is as Follows:

- Rated Operating Condition – 122,300 gpm @ 14 ft of TDH while running at 300 RPM

Pump Construction Consists of the Following:

- ASTM A48, CL30 Cast Iron Suction Bell
- ASTM A743, CA6NM Stainless Steel Impeller and Cone
- ASTM A395 Gr. 65-45-12 Ductile Cast Iron Diffuser
- ASTM A582 Type 416 Stainless Steel Pump Shaft
- ASTM A743 CA40 Stainless Steel Wear Rings
- ASTM A36 Carbon Steel Elbow and Columns
- ASTM A36 Motor Support, Baseplate and Curb Ring
- 94" Suction Diameter
- 66" Discharge Diameter
- Bronze Backed, Grease Lubricated Bearings
- Farvel Grease Lubrication System

B. Quantity (3) CAT Model C32, 950 Hp, 1800 rpm Diesel Engine including the following accessories/components:

- Air Inlet System
  - Dual side mounted turbochargers: inlet 152.4 mm (6 in.) hose connection.
  - Air cleaner – installed, dual element
  - Air Inlet Shutoffs
    1. Dual shutoffs. Does not include junction box. Installs air shut-offs on air inlet manifolds, at top of engine.
    2. 24 volt, contains indicator switch, energized to shutoff.

- Charging System
  - Charging alternator - 24v-95 amp
  - Left hand alternator mounting
  - 105 amp circuit breaker & mounting
  - Battery charger - 10 amp, Qty 2

- Control System
  - Electronic governing, PTO speed control
  - Programmable Ratings
  - Cold mode start strategy
  - Automatic Altitude compensation
  - Power compensation for fuel temperature
  - Programmable low and high idle and TEL
  - Electronic diagnostics and fault logging
  - Engine monitoring and protection system
  - (speeds, temperature, pressure)
  - J1939 Broadcast (diagnostic, engine status and control)

- IEM (Industrial Electric Manufacturing) free-standing floor mounted control panel consisting of:
  - Enclosure - NEMA 4X, 316 stainless steel, indoor, freestanding, includes interior rear and side panels. approx. dimensions 72"H x 30"W x 18"D
- Enclosure air conditioner, external side mounted, NEMA 4X, 120VAC, approx. 1000 BTU
- HMI touchscreen
  1. 15" minimum, with runtime software
- Data port / convenience receptacle, door mounted
- Stack indicator light tower, roof mount
- Emergency stop button, guarded
- Qty 10 Misc. indicator lights, selector switches, and pushbutton operators mounted on door (10 total max estimated)
- Surge arrestor for 120VAC 1 phase source, 20KA, back panel mounted for control panel application
- UPS - Uninterruptible Power Supply, 120VAC input
- Power supply, 120VAC input: 24VDC output
- Power supply, 24VDC wide range input: 24VDC output, input from engine start batteries
- Best battery/powser source diode pair
- PLC system package
- Allen Bradley / Rockwell, Compact Logix platform, consisting of:
  1. CPU
  2. Digital input module, 16 point
  3. Digital output module, 16 point
  4. Analog input module, 8 point
  5. Analog output module, 2 point
- Ethernet switch, with 2 fiber ports (TBD), unmanaged Gateway module
- CDL Cat Data Link module
- Mounting and wiring of below customer supplied & supported parts:
  1. Caterpillar Remote I/O module
  2. Caterpillar "speed brick" remote speed control interface module (accepts 4-20mA input from PLC)
- Speed switch/transmitter (as required)
- Interior panel light, with on/off switch
- Misc. small controls items: control power breakers, terminal blocks, etc...
- Special non-IEM standard control wire, MTW type, with special color coding per spec

- Cooling System
  - Thermostats and housing, outlet LH vertical orientation
  - Jacket water pump, gear driven, centrifugal, RH
  - Coolant level sensor
  - Young Touchstone radiator & fan
    1. Heresite Coated Core, Galvanized Frame, 150 mph Wind/Zone 4 Structure w/o Calcs, 10" Single SEDD Tank (Shipped Loose), Low Level Gauge Switch (Shipped Loose), C2 Custom Tall Tanks Corteo Inside & Outside w/ Custom Connections, C2 SBRA 6 fin 11 row core, Plenum Mounted Fuel Cooler MOBO-6
  - Fan drive, idler pulleys & belts
  - Custom air & water lines
  - Custom belt guard
  - FW Murphy VS94 vibration switch
  - Jacket water heater 480V - Kim Hot Start
  - Engine coolant

- Exhaust System
  - Exhaust manifold, dry, heat shields on each corner
  - Dual turbo, rear turbo exhaust, full marmon connection 127 mm (5 in.),
  - Maximum load 10 kg for direct connection to turbo
  - Water cooled center sections
  - Critical grade 12 in spark arresting silencer - MSA22-12S1-14662 Maxim Silencer, with 12" ANSI flange inlet and outlet. Type 1, end in/end out. for use in either horizontal or vertical orientation. Made of 304 stainless steel
- Flywheel & Flywheel Housing
  - Flywheel housing - SAE NO. 0
  - Flywheel - SAE NO. 0
  - FW Murphy VS94 vibration switch
- Fuel System
  - Mechanical Electronic Unit Injection (MEUI) system
  - Fuel Filter and Water Separator, Primary (10 micron)
  - Fuel Filter, Secondary (2 micron high performance)
  - Fuel priming pump 24V electric
  - Qty (1) Tramont 4,000 Gallon Fuel tank
    1. Cylindrical UL-2085 2 hour rated fuel tank, insulated with 3" light weight concrete, painted white
    2. Approximate Dimensions: 90" Dia X 180"L, approximate weight 14,500lbs, emergency vents included
    3. (1) Ladder for access to top of tank, includes step-through handrails above tank top
    4. (1) 24" Manway
    5. (1) CL-GAUGE 2" Krueger Mechanical fuel level gauge
    6. Full length dip tube for Engine supply. Engine return fitting, (2) Additional full-length dip tubes for Engine supply, (2) additional engine return fittings (total of 3 each), for use with 3 engines
    7. 3" NPT, Mushroom Style, Screened Atmospheric Vent Cap
    8. MORRISON Provide (1) Morrison 515 remote painted steel spill box with mounting pedestal and (2) 3" NPT connection ports on rear of box
    9. MORRISON Provide 3" dry disconnect fittings & dust caps for installation on spill box assembly
    10. NOTE Customer / others responsible for piping and ball valve for fill line
    11. Remote Alarm Panel (4 alarms) with silence button, 120VAC
    12. Mount 1978 in 515 MORRISON and label 1978 High 95%, High 90%, Low 50%, and Fuel In Basin
    13. NOTE Customer / others to Wire High, Low, and Fuel In Basin Alarms to 1978 Remote Alarm Panel
    14. Dual High/Low Fuel Level 50% Low, 90% High, standard - specify for other levels
    15. High Fuel Level Switch (95% standard, specify for other level) includes additional fitting.
    16. Overfill prevention valve, can shut off at 1" below tank top, shut off at 95%. OPV comes with drop tube
    17. 3" or 4" NPT Fitting on tank for remote fill inlet (install one option 2674 here)
    18. 3" or 4" NPT Fitting on tank top fill inlet (install one option 2674 here)
    19. 3" NPT Extra Fitting w/ (2346) Pipe Plug (in tank for sticking port)
    20. 4" NPT Extra Fitting w/ (2347) Pipe Plug (spares in tank)
    21. (2) 2" NPT fittings with (1) full length, (1) half-length dip tubes for customer provided polisher, located on opposite ends of tank
    22. 1" NPT Foot Valve (enters 2" NPT pipe)
    23. Note Foot valves provided on supply dip tubes and fuel polisher supply dip tube
    24. 4-20MA sender, for tanks 37" to 60" Tall, fits in 2" NPT, 2 wire VDC with 48" leads, watertight
    25. Tank includes 2" NPT for sender
    26. GROUND LUG Weld a threaded bolt to the tank and install a ground lug - for subbase tanks and day tanks
    27. Tank to include labels on both sides: "Diesel Fuel, No Smoking, No Open Flames" and NFPA hazard label
- Qty (1) Tramont 600 Gal Day Tank
  1. Day Tank System UL-142, ULC-S601 with Tramont System 2000Plus, UL-508 listed
  2. Special tank dimensions: 84"L X 36"D X 50"H
3. Double Wall for TRS/E/X - 600
4. Special basin dimensions: 96°L X 48°D X 47°H
5. Basin containment is minimum 150%
6. Automatic Duplex Pumping System (standard includes 2nd 2GPM pump, 1/2” check valves and duplex cover - not weatherproof)
7. 7GPM-DV Reverse Pumping System (TRS only) includes critical high switch with plug-in relay, starting relay, & 7” dip tube (Cover not included)
8. 7GPM-DV (1060V) 7 GPM Viking pump with 1/2HP, 115VAC, 1 phase motor, 60PSI (upgrade to standard)
9. 7GPM-DV (2650) 1/2” solenoid for max 4GPM supply (install prior to supply pump or directly at fuel inlet if pump remote)
10. 7GPM-DV (2230) strainer - installed prior to solenoid on supply pump inlet
11. 7GPM-DV (2620) 3/4” NPT Check Valve installed on reverse pump outlet
12. Yellow Plug-In Pump Running Relay
13. Steel weather protective Horizontal Special Dimension Tank Cover
14. 2” NPT, Mushroom Style, Screened Atmospheric Vent Cap
15. 5” NPT Emergency Pressure Relief Vent Cap
16. 2”NPT Lockable Manual Fill Cap with 6” pipe riser (tank requires 2”NPT - option 2375)
17. 2” NPT Extra Fitting (for option 2060-B)
18. Krueger fuel level gauge, red bobber style
19. 2” NPT Extra Fitting (for option 3661)
20. (2) 2”NPT fittings with (1) full length, (1) half-length dip tubes for customer provided polisher, located on opposite ends of tank
21. 1” NPT Foot Valve (enters 2” NPT pipe)
22. Note Foot valves provided for engine supply, reverse pump
23. Note supply and fuel polisher supply dip tubes
24. Double Wall Access Piping for Inner Tank Drain
25. Properly Sized Fire Safe Ball Valve (for inner tank drain)
26. 4-20MA sender, for tanks 37” to 60” Tall, fits in 2”NPT, 2 wire VDC with 48” leads, watertight
27. Tank includes 2”NPT for sender
28. Tank to include labels on both sides: "Diesel Fuel, No Smoking, No Open Flames" and NFPA hazard label
29. GROUND LUG Weld a threaded bolt to the tank and install a ground lug - for subbase tanks and day tanks
   o Qty (1) Reverso Fuel Polisher for main fuel tank, shipped loose
      1. Automatic fuel polishing system - 210 GPH industrial model - 110V w/ digital controller
      2. NEMA 4X - S.S. enclosure for AFP-210 GPH - 120 V unit
      3. Shut off valve AFP-210 2 valves inlet/outlet
      4. MAGKIT-02 - Fuel Magnet Kit – for FPS 210 Series – AGX
   o Qty (1) Reverso Fuel Polisher for day tank, shipped loose
      1. Automatic fuel polishing system - 150 GPH industrial model - 110V w / digital controller
      2. NEMA 4x - S.S. enclosure for AFP-150 GPH, 110 V unit
      3. MAGKIT-01 - fuel magnet kit – for FPS 150 series - AGX
      4. Shut off valve afp-150 2 valves Inlet/outlet

   • Instrumentation
      o 5 gauge Electronic instrument panel - RH mounted
      o Magnetic pickup - Shipped Loose
   • Lube System
      o Crankcase breather, rear mounted
      o Oil cooler, RH
      o Oil filler in RH front gear case,
      o Oil level gauge, RH
- Oil filter, RH
- Oil pan rear sump
- Lubricating oil
- *Lube oil heater 120V - Kim Hot Start
- *Prelube pump - VARNA Products, LLC
- CF-15 w/ 3 Phase 208-230/460VAC, 1.5 HP Motor
- *Custom prelude pump lines & mounting

**Mounting System**
- Front & rear engine support
- Fabricated custom non-UL base and support plate – radiator, engine, HPTO

**Power Take-Offs**
- Crankshaft pulley,
- Twin Disc - HP 1200 Long Shaft Hydraulically actuated and self-adjusting wet clutch, with no hydraulic pump towers. Includes integral mechanical brake release with standard unit mounted charge / lub pump with integral sump. TDEC600 color display with J1939 can bus trunk.
- Lube oil is NOT included for the HPTO
- Oil Cooler – Fin/ Fan 208V oil cooler
- Rexnord Falk Wrapflex 80R R31 flexible output coupling

**Starting System**
- Electric starting motor - dual 24 Volt
- Batteries - Qty 4 x 8D part# 153-5720, 1500CCA, 210 amp hour
- Battery rack – Qty 2
- Battery cables – Qty 2 - 1880 mm (74 in) long

**Tooling** - 1 x Set per Section 11300 2.8.1
- 1 279-3473 Caterpillar Turning Tool
- 1 175-3700 DT Connector Service Kit, Wedge Removal Tool
- 1 509-6474 Deutsch Terminal Tool Set (7 Pieces)
- 1 7X-1710 Probe, Kit
- 1 175-7546 Oil Filter Cutter Gp
- 1 1U-5718 Vacuum Pump - Oil Sample
- 1 538-5051 Caterpillar ET - (Engine Technician) Service Tool
- 1 NEXG5007 Caterpillar ET Software 1-year subscription
- Computer not included

**General**
- Paint, Caterpillar Yellow
- Vibration damper
- Lifting eyes
- Automatic variable timing, electronic
- Literature

C. Quantity (3) Deran Model M36A Right Angle Gear
- Input Speed – 1800 rpm, Output Speed – 300 rpm
- 6:1 Ratio
- Vertical Solid Shaft
- Non-Reverse Type: Roller Sprag (>200% Maximum Reverse Torque)
- Fan Cooled
- 1.5 Service Factor
- Q-11 Gear Set
- VS94 Vibration Switch
- A25TABS Temperature Switch
- Norman Filter Assembly with Differential Pressure Gauge
- WIKA Pressure Gauge
- WEISS Temperature Gauge
D. Pump Testing and Inspections to Consist of the Following:
   - Hydrostatic Testing of pressurized components
   - Performance test of one pump with a shop motor, Un-Witnessed
   - CMTR’s for the major components
   - Bump Test Pedestal
   - Field Testing per Spec
   - Laser Alignment

E. Vibration Analysis performed by 3 separate firms
   - CAT
   - Xylem Vibration Analysis Expert
   - Mechanical Solutions Inc.

F. Field Service for Installation Assistance
   - 1 Trip, 2 Days per unit incuded in scope
   - Any additional field service required will be billed at the following rates
     - Pump Field Service Technician – $2000/Trip, $1500/Day
     - Engine Field Service Technician – $2375/Trip, $2375/Day
     - IEM Field Service Technician – $1,800/trip, $1800/Day

G. 1 set of special Tools
   - Includes Dismanteling beam assembly, signed and sealed by SC PE

H. Spare Parts Per Spec section 11101, 2.5

I. Warranty - 36 Month or 4,000 hrs, Starts within 18 months from shipment

J. Performance, Payment, and bid bond per specifications

K. Delivery of pumps, Engines, Right Angle Gears and accessories Incoterms 2020 FOB Jobsite
   - Includes G-force detection

Items A-K Net Sell Price: $ 4,794,600 US Dollars

Optional Adders

1. 5 Year Warranty – $239,200
   - 2 additional years added to the base 3 year warranty

2. 2 Year operational Spares – $165,900
   - Items listed below are suggested, spare parts scope can be modified/changed if items are deemed unnecessary. Please contact Xylem if you would like to revise the list.
     - Pump
       - N/A, Required spare parts per 11101, 2.5 are included in the base scope
     - Power Module
       - Qty (27) - 1R1808 Oil Filter
Flygt

a xylem brand

Qty (1) - RS0010 10 x Oil Sample Bottles
Qty (15) - 1R0755 Fuel Filter Secondary
Qty (15) - 326-1641 Fuel Filter Primary
Qty (3) - 1063973 Secondary Air Filter
Qty (3) - 1327168 Primary Air Filter
Qty (3) - RS9001 Coolant Sample Bottle
Qty (2) - RS8003 Fuel Sample - Storage
Qty (1) - 278-5428 Turbocharger GP(RH)
Qty (1) - 278-5427 Turbocharger GP(LH)
Qty (12) - 3740750 Injector
Qty (1) - 520200 Water Pump
Qty (1) - 5669549 Alternator Group
Qty (1) - 2071556 Starter
Qty (1) - 4H7869 Gasket
Qty (1) - 3E0075 Mag Switch Hydrostatic Testing of pressurized components

- IEM
  - One of each unique type of PLC controller modules, Allen Bradley / Rockwell, Compact Logix platform, consisting of:
    i. CPU
    ii. Digital input module, 16 point
    iii. Digital output module, 16 point
    iv. Analog input module, 8 point
    v. Analog output module, 2 point
    vi. Box of 10 of each unique type of control fuses.
    vii. One of each type of LED indicator lights
- Twin Disc, One unit for each of the following:
  o 1027916 Flexible Coupling ARCUSAFLEx
  o PX1040498 Color Display WITH J1939 CAN BUS TRUNK
  o K1037413 Seal & Gasket Kit
  o K1037416 Clutch & Brake Kit
  o Filter
  o TDEC 600
  o Complete HPTO 1200
- Right Angel Gear
  o N/A, does not require spare parts in a 2 year time frame
- Any additional items not listed above do not require spare parts in a 2 year time frame.

3. Power Module String Test - $267,100
- Utilizing the engine mounted control panel
- 2-hour function test - start / run / stop test
- 48-hour test heat run utilizing water dyno for unit #1.
- 6-hour each, test heat run for Unit #2 & 3
- Fuel and water for testing
- Labor and setup for testing
- VCI preservation at completion of testing
- Testing performed at Fabick Power Systems in Green Bay, WI
- IEM Field service (travel expenses included) - Factory testing in Green Bay, WI
- 21 IEM Field service days, technician, standard domestic rate, 3 trips total
- 5 Field service days, engineer/programmer, standard domestic rate, 1 trips total
4. Temporary Exhaust, Maxim - $94,200
   - 6.000 EA M-35-500 Clamp V-band manifold, 5", 304 SS Caterpillar
   - 3.000 EA M-15-14657-S WYE, 1-PLY, Cat C32, 6X6X12 WYE, 6X6X12 WYE connector for Caterpillar C32 with 5" 20D flared flanges, 5" SR 90D elbows, 6" expansion joints and floating 12" ANSI flange. 46.25" spread X 47" OAH. made of 304/321 stainless steel. drawing #14657.
   - 3.000 EA WYE Exhaust Blanket
   - 9.000 EA M-47-FF-1200-S NBG kit, ANSI, 12", fiber full face gasket 1800 DEG..304 SS hardware
   - 3.000 EA MSA22-12S1-14662 Silencer, MSA22, 12", spark arresting MSA22, 12" critical grade (25-32 dBA) spark arresting silencer with 12" ANSI flange inlet and outlet. type 1, end in/end out. for use in either horizontal or vertical orientation. made of 304 stainless steel. (Included in Engine Pricing)
   - 6.000 EA M-29-3000-S Mounting bracket, two piece, 30" single foot, 304 SS
   - 3.000 EA M-41-1275-S Flange, PLT, 12" pipe, 150#/12"THK, 304-3SS suits dual cert. 304/304L
   - 3.000 EA M-25-1275-1-20-D Outlet extension, 12" TB X FXD ANSI FLG 12" outlet extension with 12" ANSI flange O/E AND 12.75" OD O/E. 120" OAL. made of 304 stainless steel.
   - 3.000 EA M-22-1275-S Rain cap, standard, 12.75 ID", 304SS
   - 3.000 EA M-25-11-1275-34-S Outlet extension, FXD ANSI FLG E/E, 12" 12.75" outlet extension with 12" ANSI flanges E/E. made of 304 stainless steel. 34" OAL
   - 3.000 EA Temporary Exhaust Support
   - 3.000 EA 3 – 5 Year ESC Utilizing the engine mounted control panel

5. Adder for additional performance tests, per pump - $10,000

6. Deduct for reduced floor opening – ($60,900)
   - Based on a minimum floor opening of 102" x 98"

7. Adder for refreshing of packaging and protection system for an additional 6-month of storage per refresh (up to two) (Bid Form Item C) - $5,900 x2

**Item II: Proposal Comments and Clarifications**

1. Xylem’s scope of supply ends at the discharge flange of the pump and at the terminal boxes of the motor. No hardware is provided at or beyond these points, unless stated explicitly in Item 1. Installation, wiring, expansion joints, anchor bolts, miscellaneous piping not integral with the pumping equipment, external lubrication systems and instrumentation, loading and unloading and movement of equipment at site, removal of the existing equipment, assembly of equipment at site, field testing & commissioning, switch gear, and other miscellaneous items required for installation and proper operation of the proposed equipment which are not specifically noted above are not included with this proposal.

2. Additional comments and exceptions noted in Form 01300 – F1 – REV.03

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<td>Taxes (9.5%)</td>
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<td>Total</td>
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Xylem Water Solutions USA, Inc.
N27 W23263 Roundy Drive
Pewaukee WI, 53072
NOTE:
1. All dimensions are "Approximate" and are subject to change.
2. Floor opening is noted by dimensions M & G. Minimum floor opening is 102" x 98".
3. Baseplate overhang is noted by dimension H. Soleplate overhang is 11". Estimated Anchor bolt Qty = 20, 1.75" dia in 2" dia holes, CL of Anchor bolt holes to inside edge of soleplate is 8.75"

All dimensions are in " in ".

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<th>DEAL NO.</th>
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<tr>
<td>Client</td>
<td>City of Charleston</td>
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<tr>
<td>Project</td>
<td>Spring/Fishburne</td>
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<td>Pump Type</td>
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<tr>
<td>Rev.</td>
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Xylem Flygt AC
Flygt A-C Series
Large Vertical Column Pumps

THE MOST ENERGY-EFFICIENT PUMPS ON THE MARKET
Flygt A-C Series Large Vertical Column Pumps

Flygt (formerly Allis Chalmers Pump, Inc.) has over 130 years of design and manufacturing experience in pumps and pumping systems. Flygt innovation has kept pace with today’s demand for higher efficiency, greater reliability and state of the industry manufacturing standards. Numerous impeller designs are available in single and multiple stage configurations to cover a wide range of operating conditions to better meet your needs. Flygt designs offer industry leading efficiencies of up to 92%. The rugged heavy duty construction, cast bowl components and conservative mechanical design minimize vibration and provide for long term trouble free operation.

The experience, capability, on-time delivery, support during installation/maintenance and performance of equipment has earned Flygt the reputation as one of the most reliable pump manufacturers in the world.

Flygt A-C Series vertical column pumps are custom engineered for each individual project with the materials and features to meet the project requirements. Typical applications for vertical column pumps are in Power Generation, Water & Waste Water, General Industrial, Irrigation and Flood Control. Pump sizes ranging from 24 inches up to 144+ inches in diameter allow Flygt to tailor fit the pump to meet the specific requirements of your application.

1. DRIVER PEDESTAL
Heavy duty fabrication designed with openings to provide access to the pump coupling and stuffing box.

2. STUFFING BOX
Packed with graphite impregnated PTFE material, it reduces resistance and prolongs shaft sleeve life. An easily accessible split gland simplifies packing adjustment and replacement.

3. SHAFT TUBE
Protects the shaft from the pumped fluid and provides a passage for bearing lubrication. One end of the shaft tube is provided with an o-ring sliding fit to allow for thermal expansion and for ease of disassembly and reinstallation. Pumps can also be provided without shaft tubes (open line shafting) for self lubricated applications.

4. INTERMEDIATE COUPLING
(When required) Solid sleeve design provides a rigid transmission of power and torque through the shafts. The coupling is positively driven via coupling keys and transmits thrust loads via the split thrust ring design.
Customized Pumping Solutions

Flygt A-C Series pumps are available in above floor or below floor configurations; two floor installations, with thrust bearings in the pump or motor; and nearly unlimited material configurations. Flygt also offers the option for a true pull-out element configuration (as shown below) on our semi-enclosed impeller pumps. The pull-out design substantially reduces maintenance and downtime costs by allowing removal of the inner element without disturbing the suction bell, column pipes, discharge elbow and discharge piping. Column size for a given capacity is not affected by the “pull-out” design and there is no sacrifice in pumping performance. The sliding and conical fits assure proper alignment upon reassembly. The inner element is completely removable through the top of the pump thus eliminating the need to drain or enter the sump during maintenance. When the time comes to restore system efficiency, simply replace the wear components and your pump is ready for many more years of reliable performance.

5. BEARINGS
Upper and lower bearings are rigidly mounted from the top of the pump and diffuser. The impeller is overhung from the diffuser bearing offering increased efficiency and a reduced chance of clogging. Bearing spacing is conservatively designed using a lateral critical speed analysis. When required, intermediate bearings are installed and supported via the bearing spiders which are fitted to the column pipe. Bearings are typically either fluted rubber or elastomeric sleeve type bearings designed for water lubrication. Grease lubricated bearings are an option when desired.

6. SHAFT SLEEVES
Provided at all bearing locations and the stuffing box to prevent the shaft from wearing. The hardened alloy sleeves extend service life and are designed for easy replacement.

7. IMPELLER
Single suction, mixed flow, and rugged cast construction. Impellers are cast in a single piece. The vanes are formed by accurately set cores thus assuring even thickness and vane spacing. Impellers are balanced to an ISO/ANSI G2.5 quality level.

8. IMPELLER CONE
Separately cast component of same material as impeller for long wear life and reduced downtime. Design permits economical renewal of clearances.
The Flygt Advantage

**PERFORMANCE TESTING** - with testing capabilities up to 300,000 gpm (68,000 m³/hr) the performance of your pump can be accurately verified before it leaves the factory.

**CRITICAL SPEED ANALYSIS** - performed on every rotor to ensure that the first critical speed is well above the pump operating speeds.

**MECHANICAL DESIGN ANALYSIS** - performed on every pump to determine the proper shaft size, bearing spans, wall thickness, bolting sizes & quantities, and other critical design features.

**FEA & CFD ANALYSIS** - in-house Finite Element Analysis and Computerized Fluid Dynamics analysis are available to ensure that there are no system resonant frequency or hydraulic concerns.

**START-UP ANALYSIS** - determines the optimal starting sequence between the pump, motor and control valve, and confirms the ability of the drive to start the pump under any number of possible circumstances. Available upon request.

**EXPERIENCED CUSTOM DESIGNS** - every order is custom designed to match the specific pump configuration, mechanical design, hydraulic requirements and materials of construction dictated by the application and the contract documents.

**PUMP QUALITY** - all pump components and assemblies are inspected and documented in accordance with Flygt ISO 9000 certified quality program. Any special contract requirements are incorporated into the Inspection and Test Plan developed for each contract.

**MODEL TEST DATA** - the high efficiency hydraulics for each pump design have been extensively model tested over the full range of impeller diameters/tilts. Model testing in a closed loop system provides accurate measurement of all pump performance characteristics along with NPSHr values, hydraulic thrust values and the development of three quadrant curves (Karman-Knapp curves).

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*Flygt is a brand of Xylem, whose 12,000 employees are addressing the most complex issues in the global water market.*

**www.xyleminc.com**
EXHIBIT A—ASSIGNMENT OF PROCUREMENT CONTRACT, CONSENT TO ASSIGNMENT, AND ACCEPTANCE OF ASSIGNMENT

This assignment will be effective on the effective date of the construction contract between Buyer (as "Owner") and Contractor/Assignee (as "Contractor").

The Procurement Contract between City of Charleston ("Buyer") and _____________ ("Seller") for furnishing Goods and Special Services entitled Spring/Fishburne US 17 Drainage Project Pump Procurement (Procurement Contract) is hereby assigned, transferred, and set over to Contractor/Assignee, as assignee, by Buyer, as assignor. Upon assignment the Contractor/Assignee shall have the duties, rights, and obligations of Buyer under the terms of the Procurement Contract, and will be responsible to Owner under the construction contract for the performance of obligations by Seller, which will become a Subcontractor or Supplier to Contractor/Assignee. Buyer, Seller, and Contractor/Assignee hereby acknowledge and agree to be bound by the terms and conditions of assignment set forth in Article 5 of the Agreement Between Buyer and Seller for Procurement Contract.

Assignment Made by Buyer

(typed or printed name of organization)

By: ___________________________ Date: ______________ (date signed)

(individual's signature)

Name: ___________________________ Title: ___________________________

(typed or printed)

If Buyer is a corporation, attach evidence of authority to sign. If Buyer is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of Buyer-Seller Agreement.

Assignment Acknowledged and Accepted by Seller

(typed or printed name of organization)

By: ___________________________ Date: ______________ (date signed)

(individual's signature)

Name: ___________________________ Title: ___________________________

(typed or printed)

If Seller is a corporation, attach evidence of authority to sign.

Assignment Accepted by Contractor/Assignee

(typed or printed name of organization)

By: ___________________________ Date: ______________ (date signed)

(individual's signature)

Name: ___________________________ Title: ___________________________

(typed or printed)

If Contractor/Assignee is a corporation, attach evidence of authority to sign.
EXHIBIT B—SURETY’S CONSENT TO ASSIGNMENT

Surety hereby acknowledges, agrees, and consents that the Procurement Contract for furnishing Goods and Special Services entitled Spring/Fishburne by and between [Name of Buyer] ("Buyer") and [Name of Seller] ("Seller") may be assigned, transferred, and set over to [Name of Contractor/Agnipotee] ("Contractor/Agnipotee"), in accordance with Article 5 and Exhibit A of the Agreement between Buyer and Seller for Procurement Contract.

Surety further agrees that, upon assignment of the Procurement Contract, the Contractor/Agnipotee shall have all the rights of the Buyer under the Procurement Performance Bond and Procurement Payment Bond.

Agreement to Assignment Acknowledged and Accepted by Surety

______________________________________________
(typed or printed name of organization)

By: ___________________________ Date: ______________
(individual’s signature) (date signed)

Name: __________________________ Title: ______________
(typed or printed) (typed or printed)

Attach Power of Attorney.
## PERFORMANCE BOND FOR PROCUREMENT CONTRACT

<table>
<thead>
<tr>
<th>Seller</th>
<th>Surety</th>
</tr>
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<tbody>
<tr>
<td>Name:</td>
<td>Name:</td>
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<tr>
<td>Address (principal place of business):</td>
<td>Address (principal place of business):</td>
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<table>
<thead>
<tr>
<th>Buyer</th>
<th>Procurement Contract</th>
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<tbody>
<tr>
<td>Name:  The City of Charleston</td>
<td>Description (name and location):</td>
</tr>
<tr>
<td>Mailing address (principal place of business): 2 George St. Suite 2100, Charleston, SC 29401</td>
<td>Spring/Fishburne US 17 Drainage Project, 135 Lockwood Dr</td>
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<tr>
<th>Bond</th>
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<td>Bond Amount:</td>
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<tr>
<td>Date of Bond:</td>
<td></td>
</tr>
<tr>
<td>(Date of Bond cannot be earlier than Effective Date of Procurement Contract)</td>
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<tr>
<td>Modifications to this Bond form:</td>
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</tr>
<tr>
<td>□ None □ See Paragraph 15</td>
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Surety and Seller, intending to be legally bound hereby, subject to the terms set forth in this Performance Bond, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

<table>
<thead>
<tr>
<th>Seller as Principal</th>
<th>Surety</th>
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</thead>
<tbody>
<tr>
<td>(Full formal name of Seller)</td>
<td>(Full formal name of Surety) (corporate seal)</td>
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<tr>
<td>By:</td>
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<tr>
<td>(Signature)</td>
<td>(Signature) (Attach Power of Attorney)</td>
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Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Seller, Surety, Buyer, or other party is considered plural where applicable.
1. The Seller and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Buyer for the performance of the Procurement Contract, which is incorporated herein by reference.

2. If the Seller performs the Procurement Contract, the Surety and the Seller shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

3. If there is no Buyer Default under the Procurement Contract, the Surety’s obligation under this Bond will arise after:

   3.1. The Buyer first provides notice to the Seller and the Surety that the Buyer is considering declaring a Seller Default. Such notice may indicate whether the Buyer is requesting a conference among the Buyer, Seller, and Surety to discuss the Seller’s performance. If the Buyer does not request a conference, the Surety may, within five (5) business days after receipt of the Buyer’s notice, request such a conference. If the Surety timely requests a conference, the Buyer shall attend. Unless the Buyer agrees otherwise, any conference requested under this Paragraph 3.1 will be held within ten (10) business days of the Surety’s receipt of the Buyer’s notice. If the Buyer, the Seller, and the Surety agree, the Seller shall be allowed a reasonable time to perform the Procurement Contract, but such an agreement does not waive the Buyer’s right, if any, subsequently to declare a Seller Default;

   3.2. The Buyer declares a Seller Default, terminates the Procurement Contract, and notifies the Surety; and

   3.3. The Buyer has agreed to pay the Balance of the Procurement Contract Price in accordance with the terms of the Procurement Contract to the Surety or to a seller selected to perform the Procurement Contract.

4. Failure on the part of the Buyer to comply with the notice requirement in Paragraph 3.1 does not constitute a failure to comply with a condition precedent to the Surety’s obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

5. When the Buyer has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety’s expense take one of the following actions:

   5.1. Arrange for the Seller, with the consent of the Buyer, to perform and complete the Procurement Contract;

   5.2. Undertake to perform and complete the Procurement Contract itself, through its agents or independent contractors;

   5.3. Obtain bids or negotiated proposals from qualified sellers acceptable to the Buyer for a contract for performance and completion of the Procurement Contract, arrange for a contract to be prepared for execution by the Buyer and a seller selected with the Buyer’s concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Procurement Contract, and pay to the Buyer the amount of damages as described in Paragraph 7 in excess of the Balance of the Procurement Contract Price incurred by the Buyer as a result of the Seller Default; or

   5.4. Waive its right to perform and complete, arrange for completion, or obtain a new seller, and with reasonable promptness under the circumstances:

       5.4.1. After investigation, determine the amount for which Surety may be liable to the Buyer and, as soon as practicable after the amount is determined, make payment to the Buyer; or
5.4.2. Deny liability in whole or in part and notify the Buyer, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven (7) days after receipt of an additional written notice from the Buyer to the Surety demanding that the Surety perform its obligations under this Bond, and the Buyer shall be entitled to enforce any remedy available to the Buyer. If the Surety proceeds as provided in Paragraph 5.4, and the Buyer refuses the payment, or the Surety has denied liability, in whole or in part, without further notice, the Buyer shall be entitled to enforce any remedy available to the Buyer.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Buyer will not be greater than those of the Seller under the Procurement Contract, and the responsibilities of the Buyer to the Surety will not be greater than those of the Buyer under the Procurement Contract. Subject to the commitment by the Buyer to pay the Balance of the Procurement Contract Price, the Surety is obligated, without duplication for:

7.1. the responsibilities of the Seller for correction of defective or non-conforming Goods and Special Services, and completion of the Procurement Contract;

7.2. additional legal, design professional, and delay costs resulting from the Seller’s Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

7.3. liquidated damages, or if no liquidated damages are specified in the Procurement Contract, actual damages caused by delayed performance or non-performance of the Seller.

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety’s liability is limited to the amount of this Bond.

9. The Surety shall not be liable to the Buyer or others for obligations of the Seller that are unrelated to the Procurement Contract, and the Balance of the Procurement Contract Price will not be reduced or set off on account of any such unrelated obligations. No right of action will accrue on this Bond to any person or entity other than the Buyer or its heirs, executors, administrators, successors, and assigns.

10. The Surety hereby waives notice of any change, including changes of time, to the Procurement Contract or to related subcontracts, purchase orders, and other obligations.

11. Any proceeding, legal or equitable, under this Bond must be instituted in any court of competent jurisdiction where the Point of Destination is located and must be instituted within two years after a declaration of Seller Default, or within two years after the Seller ceased working, or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit will be applicable.

12. Notice to the Surety, the Buyer, or the Seller must be mailed or delivered to the address shown on the page on which their signature appears.

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

14. Definitions

14.1. Balance of the Procurement Contract Price—The total amount payable by the Buyer to the Seller under the Procurement Contract after all proper adjustments have been made including
allowance for the Seller for any amounts received or to be received by the Buyer in settlement of insurance or other claims for damages to which the Seller is entitled, reduced by all valid and proper payments made to or on behalf of the Seller under the Procurement Contract.

14.2. *Buyer Default*—Failure of the Buyer, which has not been remedied or waived, to pay the Seller as required under the Procurement Contract or to perform and complete or comply with the other material terms of the Procurement Contract.

14.3. *Goods and Special Services*—The full scope of materials, equipment, other items, and services to be furnished by Seller, as defined in the Procurement Contract.

14.4. *Point of Destination*—The location where delivery of the Goods shall be made, as stated in the Procurement Contract.

14.5. *Procurement Contract*—The contractual agreement between the Buyer and Seller identified on the cover page, including all Procurement Contract Documents and changes made to the Procurement Contract.

14.6. *Seller Default*—Failure of the Seller, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Procurement Contract.

14.7. *Procurement Contract Documents*—All the documents that comprise the contractual agreement between the Buyer and Seller.

15. Modifications to this Bond are as follows:
# PAYMENT BOND FOR PROCUREMENT CONTRACT

<table>
<thead>
<tr>
<th>Seller</th>
<th>Surety</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name:</td>
<td>Name:</td>
</tr>
<tr>
<td>Address (principal place of business):</td>
<td>Address (principal place of business):</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Buyer</th>
<th>Procurement Contract</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name: The City of Charleston</td>
<td>Description (name and location): Spring/Fishburne US 17 Drainage Project</td>
</tr>
<tr>
<td>Mailing address (principal place of business): 2 George St Suite 2100, Charleston, SC 29401</td>
<td>Procurement Contract Price:</td>
</tr>
<tr>
<td>Effective Date of Procurement Contract:</td>
<td></td>
</tr>
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<table>
<thead>
<tr>
<th>Bond</th>
</tr>
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<tr>
<td>Bond Amount:</td>
</tr>
<tr>
<td>Date of Bond:</td>
</tr>
<tr>
<td>(Date of Bond cannot be earlier than Effective Date of Procurement Contract)</td>
</tr>
<tr>
<td>Modifications to this Bond form:</td>
</tr>
<tr>
<td>☐ None ☐ See Paragraph 17</td>
</tr>
</tbody>
</table>

Surety and Seller, intending to be legally bound hereby, subject to the terms set forth in this Payment Bond, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

**Seller as Principal**

<table>
<thead>
<tr>
<th>(Full formal name of Seller)</th>
<th>(Full formal name of Surety) (corporate seal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>By: (Signature) Name: (Printed or typed) Title:</td>
<td>By: (Signature) (Attach Power of Attorney) Name: (Printed or typed) Title:</td>
</tr>
</tbody>
</table>

| Attest: (Signature) Name: (Printed or typed) Title: |
|---------|---------|

**Surety**

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Seller, Surety, Buyer, or other party is considered plural where applicable.
1. The Seller and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Buyer to pay for labor, materials, and equipment furnished for use in the performance of the Procurement Contract, which is incorporated herein by reference, subject to the following terms.

2. If the Seller promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Buyer from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Procurement Contract, then the Surety and the Seller shall have no obligation under this Bond.

3. If there is no Buyer Default under the Procurement Contract, the Surety’s obligation to the Buyer under this Bond will arise after the Buyer has promptly notified the Seller and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Buyer or the Buyer’s property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Procurement Contract, and tendered defense of such claims, demands, liens, or suits to the Seller and the Surety.

4. When the Buyer has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety’s expense defend, indemnify, and hold harmless the Buyer against a duly tendered claim, demand, lien, or suit.

5. The Surety’s obligations to a Claimant under this Bond will arise after the following:

   5.1. Claimants who do not have a direct contract with the Seller

      5.1.1. have furnished a written notice of non-payment to the Seller, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

      5.1.2. have sent a Claim to the Surety (at the address described in Paragraph 13).

   5.2. Claimants who are employed by or have a direct contract with the Seller have sent a Claim to the Surety (at the address described in Paragraph 13).

6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Buyer to the Seller, that is sufficient to satisfy a Claimant’s obligation to furnish a written notice of non-payment under Paragraph 5.1.1.

7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety’s expense take the following actions:

   7.1. Send an answer to the Claimant, with a copy to the Buyer, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

   7.2. Pay or arrange for payment of any undisputed amounts.

   7.3. The Surety’s failure to discharge its obligations under Paragraph 7.1 or 7.2 will not be deemed to constitute a waiver of defenses the Surety or Seller may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney’s fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.
8. The Surety's total obligation will not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond will be credited for any payments made in good faith by the Surety.

9. Amounts owed by the Buyer to the Seller under the Procurement Contract will be used for the performance of the Procurement Contract and to satisfy claims, if any, under any procurement performance bond. By the Seller furnishing and the Buyer accepting this Bond, they agree that all funds earned by the Seller in the performance of the Procurement Contract are dedicated to satisfying obligations of the Seller and Surety under this Bond, subject to the Buyer's priority to use the funds for the completion of the Goods and Special Services.

10. The Surety shall not be liable to the Buyer, Claimants, or others for obligations of the Seller that are unrelated to the Procurement Contract. The Buyer shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.

11. The Surety hereby waives notice of any change, including changes of time, to the Procurement Contract or to related subcontracts, purchase orders, and other obligations.

12. No suit or action will be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the Point of Destination is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Procurement Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit will be applicable.

13. Notice and Claims to the Surety, the Buyer, or the Seller must be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, will be sufficient compliance as of the date received.

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

15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Seller and Buyer shall promptly furnish a copy of this Bond or shall permit a copy to be made.

16. Definitions

16.1. Buyer Default—Failure of the Buyer, which has not been remedied or waived, to pay the Seller as required under the Procurement Contract or to perform and complete or comply with the other material terms of the Procurement Contract.

16.2. Claim—A written statement by the Claimant including at a minimum:

16.2.1. The name of the Claimant;

16.2.2. The name of the person for whom the labor was done, or materials or equipment furnished;

16.2.3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Procurement Contract;
16.2.4. A brief description of the labor, materials, or equipment furnished;

16.2.5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Procurement Contract;

16.2.6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;

16.2.7. The total amount of previous payments received by the Claimant; and

16.2.8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.

16.3. Claimant—An individual or entity having a direct contract with the Seller or with a subcontractor of the Seller to furnish labor, materials, or equipment for use in the performance of the Procurement Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Point of Destination is located or where the Goods and Special Services are to be installed or furnished. The intent of this Bond is to include without limitation in the terms of “labor, materials, or equipment” that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Procurement Contract, architectural and engineering services required for performance of the work of the Seller and the Seller’s subcontractors, and all other items for which a mechanic’s lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

16.4. Goods and Special Services—The full scope of materials, equipment, other items, and services to be furnished by Seller, as defined in the Procurement Contract.

16.5. Point of Destination—The location where delivery of the Goods shall be made, as stated in the Procurement Contract.

16.6. Procurement Contract—The contractual agreement between the Buyer and Seller identified on the cover page, including all Procurement Contract Documents and all changes made to the Procurement Contract.

16.7. Procurement Contract Documents—All the documents that comprise the contractual agreement between the Buyer and Seller.

17. Modifications to this Bond are as follows: None
BUYER’S ACKNOWLEDGMENT OF RECEIPT OF GOODS

Buyer: ____________________________________________________________
Buyer’s Project No.: ____________________________

Engineer: __________________________________________________________
Engineer’s Project No.: ____________________________

Seller: _____________________________________________________________
Seller’s Project No.: ____________________________

Project: ____________________________________________________________
Contract Name: _____________________________________________________

This Buyer’s Acknowledgment of Receipt of Goods (Acknowledgment) applies to:

☐ All Goods ☐ The following specified portions of the Goods:

Date of delivery of the Goods to the Point of Destination:

Date of Buyer’s visual inspection of the Goods:

Date of this Acknowledgment:

Buyer acknowledges:

1. The Goods to which this notice applies have been delivered to the Point of Destination.

2. Buyer has visually inspected such Goods pursuant to Paragraph 9.02.B.1 of the General Conditions of the Procurement Contract.

3. Based on the visual Inspection, such Goods appear to comply with the requirements of the Procurement Contract Documents as to quantities and condition, subject to any exceptions and limitations in this Acknowledgment.

4. Such Goods are deemed received for purposes of Paragraph 9.02.B.2 of the General Conditions of the Procurement Contract.

5. Seller may submit its Application for Payment for the delivered Goods, subject to the terms of the Procurement Agreement.

Exceptions (if any) to this Acknowledgment: ☐ None ☐ As follows:

The responsibilities between Buyer and Seller for securing and storing the Goods, maintaining the Goods during storage, and for furnishing the Special Services, shall be as provided in the Procurement Contract.

The following documents are attached to and made a part of this Acknowledgement:

This Acknowledgment does not constitute an acceptance of any Goods not in conformance with the Procurement Contract Documents, nor is it a release of Seller’s obligation to furnish all Goods and Special Services in accordance with the Procurement Contract.
By (signature): ____________________________
Name (Printed): ____________________________
Title: ____________________________
Date: ____________________________

Engineer, on behalf of Buyer
BUYER’S NOTICE REGARDING CONFORMITY 
OF GOODS AND SPECIAL SERVICES

Buyer: 
Buyer’s Project No.: 
Engineer: 
Engineer’s Project No.: 
Seller: 
Seller’s Project No.: 
Project: 
Contract Name: 
Notice Date: 
Effective Date of the Procurement Contract:

Buyer hereby gives notice to Seller that, to the best of Buyer’s knowledge, information, and belief, the Goods and Special Services:

☐ Are in conformance with the Procurement Contract Documents. Upon Seller’s submittal of its final Application for Payment in accordance with the Procurement Contract Documents, Seller will be eligible for final payment, except as expressly indicated in the Procurement Contract.

☐ Are nonconforming with the Procurement Contract Documents for the following reason(s):

1.

Seller’s Special Services were completed on:

Buyer has consulted with and received Engineer’s recommendation on conformity of the Goods and Special Services.

This Buyer’s Notice Regarding Conformity of Goods and Special Services (Notice) is made expressly subject to the following terms and conditions to which all who receive and rely on said Notice agree:

This Notice is expressly subject to the terms and conditions set forth in the Procurement Contract.

1. This Notice is not a guarantee or warranty of Seller’s performance under the Procurement Contract, an acceptance of Goods and Special Services that are not in accordance with the related Procurement Contract Documents, including but not limited to nonconforming Goods and Special Services discovered after final inspection, nor an assumption of responsibility for any failure of Seller to furnish the Goods and Special Services thereunder in accordance with the Procurement Contract, or to otherwise comply with the Procurement Contract Documents or the terms of any special guarantees specified therein.

2. This Notice does not relieve Seller of any surviving obligations under the Procurement Contract and is subject to Buyer’s reservations of rights with respect to completion and final payment.

Buyer

By (signature): ___________________________ Name (Printed): ___________________________

Date: ___________________________ Title: ___________________________

EJCDC® P-626, Buyer’s Notice Regarding Conformity of Goods and Special Services. 
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# STANDARD GENERAL CONDITIONS OF THE PROCUREMENT CONTRACT

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ARTICLE 1—DEFINITIONS AND TERMINOLOGY

1.01 Defined Terms

A. Whenever used in the Procurement Requirements or Procurement Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated, which are applicable to the singular or plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Procurement 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 Proposals which clarify, correct, or change the Requirements or the proposed Procurement Contract Documents.

2. Application for Payment—The document prepared by Seller, in a form acceptable to Buyer, to request progress or final payments, and which is to be accompanied by such supporting documentation as is required by the Procurement Contract Documents.

3. Proposal—An offer or proposal of a prospective Seller submitted on the prescribed form setting forth the prices for the Goods and Special Services to be provided.

4. Vendor—An individual or entity that, as a prospective Seller, submits a Proposal to Buyer.

5. Buyer—The individual or entity purchasing the Goods and Special Services.

6. Change Directive—A written directive from Buyer to Seller issued on or after the Effective Date of the Procurement Contract, ordering an addition, deletion, or revision in the Goods and Special Services.

7. Change Order—A document which is signed by Seller and Buyer and authorizes an addition, deletion, or revision to the Procurement Contract Documents or an adjustment in the Procurement Contract Price or the Procurement Contract Times, issued on or after the Effective Date of the Procurement Contract. Change Orders may be the result of mutual agreement by Buyer and Seller, or of resolution of a Claim.

8. Claim—A demand or assertion by Buyer or Seller seeking an adjustment of Procurement Contract Price or Procurement Contract Times, or both, or other relief with respect to the terms of the Procurement Contract. A demand for money or services by a third party is not a Claim.

9. Contractor/Assignee—A construction contractor with which Project Owner enters into a construction contract, and to which Project Owner, as initial Buyer, assigns this Procurement Contract.

10. Effective Date of the Procurement Contract—The date indicated in the Procurement Agreement on which the Procurement Contract becomes effective.

11. Electronic Document—Any Project-related correspondence, attachments to correspondence, data, documents, drawings, information, or graphics, including but not limited to Shop Drawings and other Submittals, that are in an electronic or digital format.
12. **Electronic Means**—Electronic mail (e-mail), upload/download from a secure Project website, or other communications methods that allow: the transmission or communication of Electronic Documents; the documentation of transmissions, including sending and receipt; printing of the transmitted Electronic Document by the recipient; the storage and archiving of the Electronic Document by sender and recipient; and the use by recipient of the Electronic Document for purposes permitted by this Procurement Contract. Electronic Means does not include the use of text messaging, or of Facebook, Twitter, Instagram, or similar social media services for transmission of Electronic Documents.

13. **Engineer**—The individual or entity designated as such in the Procurement Agreement.

14. **Field Order**—A written order issued by Engineer which requires minor changes in the Goods or Special Services, but which does not involve a change in the Procurement Contract Price or Procurement Contract Times.

15. **Goods**—The tangible and movable personal property that is described in the Procurement Contract Documents, regardless of whether the property is to be later attached to realty.

16. **Goods and Special Services**—The full scope of materials, equipment, other items, and services to be furnished by Seller, including Goods, as defined herein, and Special Services, if any, as defined herein. This term refers to both the Goods and the Special Services, or to either the Goods or the Special Services, and to any portion of the Goods or the Special Services, as the context requires.

17. **Laws and Regulations; Laws or Regulations**—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and binding decrees, resolutions, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

18. **Milestone**—A principal event specified in the Procurement Contract that Seller must attain by the date or within the number of days indicated, including but not limited to the delivery of the Goods and the furnishing of Special Services.

19. **Notice of Award**—The written notice, by Buyer to a Vendor, of Buyer’s acceptance of the Proposal.

20. **Point of Destination**—The specific address of the location where delivery of the Goods will be made, as stated in the Procurement Agreement.

21. **Procurement Agreement**—The written instrument, executed by Buyer and Seller, that sets forth the Procurement Contract Price and Procurement Contract Times, identifies the parties and the Engineer, and designates the specific items that are Procurement Contract Documents.

22. **Procurement Documents**—The Procurement Requirements and the proposed Procurement Contract Documents (including all Addenda).

23. **Procurement Requirements**—The advertisement or invitation to Proposal, Instructions to Proposers, Bid security of acceptable form, if any, and Proposal Form with any supplements.

24. **Procurement Contract**—The entire and integrated written agreement between Buyer and Seller concerning the Goods and Special Services.
25. *Procurement Contract Documents*—Those items so designated in the Procurement Agreement, and which together comprise the Procurement Contract. Shop Drawings and other Seller submittals are not Procurement Contract Documents, even if accepted, reviewed, or approved by Engineer or Buyer.

26. *Procurement Contract Price*—The money that Buyer has agreed to pay Seller for furnishing the Goods and Special Services in accordance with the Procurement Contract Documents.

27. *Procurement Contract Times*—The times stated in the Procurement Agreement by which the Goods must be delivered, Special Services must be furnished, and other Milestones must be attained.

28. *Procurement Drawings*—That part of the Procurement Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Goods and Special Services to be furnished by Seller. Shop Drawings and other Seller submittals are not Procurement Drawings as so defined.

29. *Procurement Specifications*—That part of the Procurement Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the furnishing of the Goods and Special Services, and certain administrative requirements and procedural matters applicable thereto.

30. *Project*—The total undertaking to be accomplished for Project Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Goods and Special Services are a part.

31. *Project Owner*—The entity that has retained (or will retain) engineers, contractors, and others for the planning, study, design, construction, testing, commissioning, and start-up of facilities and improvements. As of the Effective Date of the Procurement Contract, the Project Owner is the Buyer.

32. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Goods and Special Services and which establish the standards by which such portion of the Goods and Special Services will be judged.

33. *Schedule of Submittals*—A schedule, prepared and maintained by Seller, of required Submittals and the time requirements for Engineer’s review of the Submittals.

34. *Seller*—The individual or entity furnishing the Goods and Special Services.

35. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Seller and submitted by Seller to illustrate some portion of the Goods and Special Services. Shop Drawings, whether approved or not, are not Procurement Drawings and are not Procurement Contract Documents.

36. *Special Services*—Services to be performed by Seller (or its agents or subcontractors) in association with the Goods to be furnished by Seller, as required by the Procurement Contract Documents.

37. *Submittal*—A written or graphic document, prepared by or for Seller, which the Procurement Contract Documents require Seller to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals
may include Shop Drawings and Samples; schedules; product data; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or site quality-control testing and inspections; warranties and certifications; suppliers' instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; record documents; and other such documents required by the Procurement Contract Documents. Submittals, whether not or not approved or accepted by Engineer, are not Procurement Contract Documents. Change proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.

38. **Successful Vendor**—The Vendor whose Proposal the Buyer accepts, and to which Buyer makes an award of the Procurement Contract.

39. **Supplementary Conditions**—The part of the Procurement Contract that amends or supplements these General Conditions.

40. **Unit Price Goods and Special Services**—Goods and Special Services to be paid for on the basis of unit prices (if any).

1.02 **Terminology**

A. The words and terms discussed in Paragraphs 1.02.B and 1.02.C are not defined, but have the indicated meanings when used in the Requirements or Procurement Contract Documents.

B. **Intent of Certain Terms or Adjectives**

1. The Procurement 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 Goods and Special Services. It is intended that such exercise of professional judgment, action, or determination will be commercially reasonable and will be solely to evaluate, in general, the Goods and Special Services for compliance with the requirements of and information in the Procurement Contract Documents and conformance with the design concept of the completed Project as a functioning whole, as shown or indicated in the Procurement Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective will not be effective to assign to Engineer any duty or authority to supervise or direct the furnishing of Goods or Special Services or any duty or authority to undertake responsibility contrary to any other provision of the Procurement Contract Documents.

2. The word "non-conforming" when modifying the words "Goods and Special Services," "Goods," or "Special Services," refers to Goods and Special Services that are unsatisfactory, faulty, or deficient in that they:

   a. do not conform to or comply with the requirements of the Procurement Contract Documents;

   b. do not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Procurement Contract Documents; or
c. in the case of Special Services, have not been completed.

3. The word “receipt” when referring to the Goods, means the physical taking and possession by the Buyer under the conditions specified in Paragraph 9.02.B.2.

4. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.

5. The word “furnish,” when used in connection with the Goods and Special Services means to supply and deliver said Goods to the Point of Destination (or some other specified location) and to perform said Special Services fully, all in accordance with the Procurement Contract Documents.

C. Procurement Contract Price or Procurement Contract Times: References to a change in “Procurement Contract Price or Procurement Contract Times” or “Procurement Contract Times or Procurement Contract Price” or similar, indicate that such change applies to (1) Procurement Contract Price, (2) Procurement Contract Times, or (3) both Procurement Contract Price and Procurement Contract Times, as warranted, even if the term “or both” is not expressed.

D. Unless stated otherwise in the Procurement Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Procurement Contract Documents in accordance with such recognized meaning.

ARTICLE 2—PRELIMINARY MATTERS

2.01 Delivery of Bonds and Evidence of Insurance

A. When Seller delivers the executed counterparts of the Procurement Agreement to Buyer, the Seller also shall deliver to Buyer the performance bond and payment bond (if the Procurement Contract requires Seller to furnish such bonds).

B. Evidence of Seller’s Insurance: When Seller delivers the signed counterparts of the Procurement Agreement to Buyer, the Seller also shall deliver to Buyer, with copies to each additional insured (as identified in the Procurement Contract), the certificates, endorsements, and other evidence of insurance required to be provided by Seller in accordance with Article 5. Evidence of insurance to be obtained at a later date, such as insurance relating to transit or storage of the Goods, will be provided to Buyer at the time of such insurance is obtained.

C. Evidence of Buyer’s Insurance: After receipt of the signed counterparts of the Procurement Agreement and all required bonds and insurance documentation, Buyer shall promptly deliver to Seller, with copies to each additional insured (as identified in the Procurement Contract), certificates and other evidence of insurance (if any) required to be provided by Buyer.

2.02 Copies of Documents

A. Buyer shall furnish to Seller four printed copies of the Procurement Contract (including one fully executed counterpart of the Procurement Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.
2.03 **Electronic Transmittals**

A. Except as otherwise stated elsewhere in the Procurement Contract, the Buyer, Seller, and Engineer may send, and shall accept, Electronic Documents transmitted by Electronic Means.

B. If the Procurement Contract does not establish protocols for Electronic Means, then Buyer, Seller, and Engineer shall jointly develop such protocols.

C. Subject to any governing protocols for Electronic Means, when transmitting Electronic Documents by Electronic Means, the transmitting party makes no representations as to long-term compatibility, usability, or readability of the Electronic Documents resulting from the recipient’s use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the Electronic Documents.

2.04 **Preliminary Schedules**

A. Within 15 days after the Effective Date of the Procurement Contract, Seller shall submit to Buyer and Engineer for timely review:

1. a progress schedule of activities, consistent with the Procurement Contract Times, including at a minimum, Shop Drawing and Sample submittals, tests, and deliveries as required by the Procurement Contract Documents.
   a. The progress schedule will be acceptable to Buyer and Engineer if it provides an orderly progression of the Submittals, tests, and deliveries to completion within the specified Milestones of the Procurement Contract Times.
   b. Such acceptance will not impose on Buyer or Engineer responsibility for the progress schedule, for sequencing, scheduling, or progress of Seller’s performance of its obligations under the Procurement Contract, nor interfere with or relieve Seller from Seller’s full responsibility therefor.
   c. Such acceptance will not be deemed as an acknowledgment of the reasonableness and attainability of the schedule.

2. a preliminary schedule of Submittals.

B. No progress payment will be made to Seller until an acceptable progress schedule and acceptable schedule of Submittals are submitted to Buyer and Engineer (and other conditions applicable to progress payments are met).

2.05 **Preliminary Conference**

A. Within 20 days after the Procurement Contract Times start to run, a conference attended by Seller, Buyer, Engineer and others as appropriate will be held to establish a working understanding among the parties as to the Goods and Special Services and to discuss the schedules referred to in Paragraph 2.04.A, procedures for handling Shop Drawings and other Submittals, processing Applications for Payment, and maintaining required records.

2.06 **Safety**

A. Buyer and Seller shall comply with all applicable Laws and Regulations relating to the safety of persons or property, and to the protection of persons or property from damage, injury, or loss.
B. When Seller's personnel, or the personnel of any subcontractor to Seller, are present at the Point of Destination or any work area or site controlled by Buyer, the Seller shall be responsible for the compliance by such personnel with any applicable requirements of Buyer’s safety programs that are made known to Seller.

C. If Buyer or its representatives visit the Seller's manufacturing or storage facilities, for testing, inspection, or other purposes, Seller shall inform Buyer in advance of any safety preparations, standards, or programs with which Buyer and its representatives must comply.

ARTICLE 3—PROCUREMENT CONTRACT DOCUMENTS

3.01 Intent

A. The Procurement Contract Documents are complementary; what is called for by one is as binding as if called for by all.

B. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Procurement Contract Documents or from prevailing custom or trade usage as being required to produce or furnish the Indicated Goods and Special Services will be provided, whether or not specifically called for, at no additional cost to Buyer.

C. Unless otherwise stated in the Procurement Contract Documents, if there is a discrepancy between the electronic or digital versions of the Procurement Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version will govern.

D. The Procurement Contract supersedes prior negotiations, representations, and agreements, whether written or oral.

E. Engineer will issue clarifications and interpretations of the Procurement Contract Documents, as provided in Paragraph 3.04.

F. Any provision or part of the Procurement Contract Documents held to be void or unenforceable under any Law or Regulation will be deemed stricken, and all remaining provisions will continue to be valid and binding upon Buyer and Seller.

3.02 Reference Standards

A. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws and Regulations, whether such reference be specific or by implication, means the standard, specification, manual, code, or Laws and Regulations in effect at the time of opening of Proposals (or on the Effective Date of the Procurement Agreement if there were no Proposals), except as may be otherwise specifically stated in the Procurement Contract Documents.

B. No provision of any such standard specification, manual, reference standard, or code, and no instruction of a supplier, will be effective to change the duties or responsibilities of Buyer, Seller, or Engineer from those set forth in the part of the Procurement Contract Documents prepared by or for Engineer. No such provision or instruction will be effective to assign to Buyer or Engineer any duty or authority to supervise or direct the performance of Seller's obligations, or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Procurement Contract Documents prepared by or for Engineer.
3.03 Reporting and Resolving Discrepancies

A. Reporting Discrepancies

1. **Seller’s Review of Procurement Contract Documents:** If, before or during the performance of Seller’s obligations, Seller discovers any conflict, error, ambiguity, or discrepancy within the Procurement Contract Documents, or between the Procurement Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any supplier to Seller, then Seller shall promptly report it to Engineer (or if the Procurement Contract is assigned, then directly to Contractor/Assignee) in writing. Seller shall not proceed with the Goods and Special Services affected thereby until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer (or if the Procurement Contract is assigned, then by Contractor/Assignee) or by an amendment or supplement to the Procurement Contract Documents issued pursuant to Article 11.

2. Seller shall not be liable to Buyer or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Procurement Contract Documents unless Seller had actual knowledge thereof.

B. **Resolving Discrepancies:** Except as may be otherwise specifically stated in the Procurement Contract Documents, the provisions of the Procurement Contract Documents will take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Procurement Contract Documents and:

1. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Procurement Contract Documents); or

2. the provisions of any Laws or Regulations applicable to the furnishing of the Goods and Special Services (unless such an interpretation of the provisions of the Procurement Contract Documents would result in violation of such Law or Regulation).

3.04 Requirements of the Procurement Drawings and Procurement Specifications

A. During the performance of Seller’s obligations and until final payment, Seller and Buyer shall submit to the Engineer all matters in question concerning the requirements of the Procurement Drawings and Procurement Specifications (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Goods and Special Services, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Procurement Drawings and Procurement Specifications, and judge of the acceptability of the Goods and Special Services thereunder.

1. After assignment (if any) Seller shall submit such matters directly to Contractor/Assignee for response or administration, and the Procurement Contract provisions in Paragraphs 3.04.B and C will not apply.

B. Engineer will issue with reasonable promptness a written clarification, interpretation, or decision on the issue submitted, and if necessary, initiate an amendment or supplement to the Procurement Drawings or Procurement Specifications. Engineer’s written clarification, interpretation, or decision will be consistent with the overall intent of the Procurement Contract Documents, and will be final and binding on Seller and Buyer. If either Buyer or Seller believes that a written clarification or interpretation justifies an adjustment in the
Procurement Contract Price or Procurement Contract Times, either may make a Claim for such adjustment as provided in Article 12.

C. If a submitted matter in question concerns terms and conditions of the Procurement Contract Documents that do not involve (1) the performance or acceptability of the Goods and Services, (2) the design (as set forth in the Procurement Drawings, Procurement Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly give written notice to Buyer and Seller that Engineer is unable to provide a decision or interpretation.

3.05 Reuse of Documents

A. Seller and its subcontractors and suppliers shall not:

1. have or acquire any title to or ownership rights in any of the Procurement Drawings, Procurement Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions, or reuse any such Procurement Drawings, Procurement Specifications, other documents, or copies thereof, on extensions of the Project or any other project, without written consent of Buyer and Engineer and specific written verification or adaptation by Engineer; or

2. have or acquire any title or ownership rights in any other Procurement Contract Documents, reuse any such Procurement Contract Documents for any purpose without Buyer’s express written consent, or violate any copyrights pertaining to such Procurement Contract Documents.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Procurement Contract. Nothing herein precludes Seller from retaining copies of the Procurement Contract Documents for record purposes.

ARTICLE 4—COMMENCEMENT AND SCHEDULE

4.01 Commencement of Procurement Contract Times

A. The Procurement Contract Times will commence to run on the Effective Date of the Procurement Contract.

4.02 Continuing Performance

A. Seller shall adhere to the progress schedule established in accordance with Paragraph 2.04.A., as duly adjusted, and the Goods will be delivered and the Special Services furnished within the Procurement Contract Times.

B. Seller shall carry on furnishing of the Goods and Special Services and adhere to the progress schedule during all disputes or disagreements with Buyer. No furnishing of Goods and Special Services will be delayed or postponed pending resolution of any disputes or disagreements, except as expressly permitted herein, or as Buyer and Seller may otherwise agree in writing.

4.03 Adjustments to Progress Schedule

A. The progress schedule established in accordance with Paragraph 2.04 may be adjusted from time to time as provided below.
1. Seller shall submit to Buyer for acceptance (to the extent indicated in Paragraph 2.04) proposed adjustments in the progress schedule that will not result in changing the Procurement Contract Times. Such adjustments will comply with any applicable provisions of the Procurement Specifications.

2. Proposed adjustments in the progress schedule that will change the Procurement Contract Times must be submitted in accordance with the requirements of Article 11. Adjustments in Procurement Contract Times may only be made by a Change Order.

4.04 Delays

A. If Buyer, Engineer, or anyone for whom Buyer is responsible, delays, disrupts, or interferes with Seller’s performance or progress, then Seller shall be entitled to an equitable adjustment in Procurement Contract Price or Procurement Contract Times.

B. Seller shall not be entitled to an adjustment in Procurement Contract Price or Procurement Contract Times for delay, disruption, or interference caused by or within the control of Seller or anyone for whom Seller is responsible.

C. If Seller’s performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Buyer, Seller, and those for which they are responsible, then Seller shall be entitled to an equitable adjustment in Procurement Contract Times. Such an adjustment will be Seller’s sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Procurement Contract Times under this paragraph include but are not limited to the following:

1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
2. abnormal weather conditions;
3. inspection delays by governmental authorities, and custom delays;
4. international shipping delays;
5. acts or failures to act of third-party entities; and
6. acts of war or terrorism.

D. Adjustments of Procurement Contract Times or Procurement Contract Price—General Provisions: Seller’s entitlement to an adjustment of Procurement Contract Times or Procurement Contract Price is limited as follows:

1. Seller’s entitlement to an adjustment of the Procurement Contract Times is conditioned on the delay, disruption, or interference adversely affecting an activity on the critical path to completion of Seller’s obligations, as of the time of the delay, disruption, or interference.

2. Seller shall not be entitled to an adjustment in Procurement Contract Price for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Seller. Such a concurrent delay by Seller does not preclude an adjustment of Procurement Contract Times to which Seller is otherwise entitled.
3. Adjustments of Procurement Contract Times or Procurement Contract Price are subject to the provisions of Articles 11 and 12.

E. Each Seller request seeking a delay-related increase in Procurement Contract Times or Procurement Contract Price must be supplemented by supporting data that sets forth in detail the following: (1) the circumstances that form the basis for the requested adjustment; (2) the date upon which each cause of delay, disruption, or interference began to affect Seller’s progress; (3) the date upon which each cause of delay, disruption, or interference ceased to affect Seller’s progress; (4) the number of days’ increase in Procurement Contract Times claimed as a consequence of each such cause of delay, disruption, or interference; and (5) the impact on Procurement Contract Price. Seller shall also furnish such additional supporting documentation as Buyer or Engineer may require including, where appropriate, a revised progress schedule indicating all the activities affected by the delay, disruption, or interference, and an explanation of the effect of the delay, disruption, or interference on the critical path to completion.

ARTICLE 5—BONDS AND INSURANCE

5.01 Performance, Payment, and Other Bonds

A. Seller shall furnish a performance bond and a payment bond, each in an amount at least equal to the Procurement Contract Price, as security for the faithful performance and payment of Seller’s obligations under the Procurement Contract. These bonds must remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 9.04, whichever is later, except as provided otherwise by Laws or Regulations, the terms of a prescribed bond form, the Supplementary Conditions, or other provisions of the Procurement Contract.

B. Seller shall also furnish such other bonds (if any) as are required by the Supplementary Conditions or other provisions of the Procurement Contract.

C. All bonds must be in the form included in the Documents or otherwise specified by Buyer prior to execution of the Procurement Contract, except as provided otherwise by Laws or Regulations, and must be issued and signed by a surety named in “Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies” as published in Department Circular 570 (as amended and supplemented) by the Bureau of the Fiscal Service, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual’s authority to bind the surety. The evidence of authority must show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

D. Seller shall obtain the required bonds from surety companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue bonds in the required amounts.

E. If the surety on a bond furnished by Seller is declared bankrupt or becomes insolvent, or the surety ceases to meet the requirements above, then Seller shall promptly notify Buyer and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the bond and surety requirements of this Procurement Contract.
F. If Seller has failed to obtain a required bond, Buyer may exercise Buyer’s termination rights under Article 14.

G. Upon request to Buyer from any subcontractor, supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of Seller’s obligations, Buyer shall provide a copy of the payment bond to such person or entity.

H. Upon request to Seller from any subcontractor, supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of Seller’s obligations, Seller shall provide a copy of the payment bond to such person or entity.

5.02 Insurance

A. Seller shall provide insurance of the types and coverages and in the amounts stipulated in the Supplementary Conditions.

B. Failure of Buyer to demand certificates of insurance or other evidence of Seller’s full compliance with these insurance requirements or failure of Buyer to identify a deficiency in compliance from the evidence provided will not be construed as a waiver of Seller’s obligation to maintain such insurance.

C. Upon assignment of this Procurement Contract, Seller shall name the Contractor/Assignee as an additional insured and comply with the written request of Contractor/Assignee to provide evidence of insurance.

D. Buyer does not represent that insurance coverage and limits established in this Procurement Contract necessarily will be adequate to protect Seller.

E. The insurance and insurance limits required herein will not be deemed as a limitation on Seller’s liability under the indemnities and other rights granted to Buyer in the Procurement Contract.

5.03 Surety or Insurance Companies

A. All bonds and insurance required by the Procurement Contract Documents to be purchased and maintained by Buyer or Seller 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 must also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

ARTICLE 6—LICENSES AND FEES

6.01 Intellectual Property and License Fees

A. Except to the extent stated elsewhere in the Procurement Contract Documents, Seller is not transferring any patent rights, copyrights, or other intellectual property rights for the Goods delivered.

B. To the extent Seller is manufacturing to Buyer’s design, Buyer retains all patent rights, copyrights, and other intellectual property rights in such design.

C. If an invention, design, process, product, or device is specified in the Procurement Contract Documents for incorporation in the Goods or for the performance of Special Services, and if, to the actual knowledge of Buyer or Engineer, its use is subject to patent rights, copyrights,
or other intellectual property rights calling for the payment of a license fee or royalty to others, then the existence of such rights and payment obligations will be disclosed to Seller in the Procurement Contract Documents.

D. Seller shall pay all license fees and royalties and assume all costs incident to the use or the furnishing of the Goods, unless specified otherwise by the Procurement Contract Documents.

6.02 Seller’s Infringement

A. Subject to Paragraph 6.01, to the fullest extent permitted by Laws and Regulations, Seller shall indemnify and hold harmless Buyer, Engineer, and their officers, directors, members, partners, employees, agents, consultants, contractors, and subcontractors, from and against all claims, costs, losses, damages, and judgments (including but not limited to all reasonable 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 or alleged infringement of any patent, copyright, or other intellectual property right by any of the Goods as delivered or Special Services as performed.

B. Buyer will promptly notify Seller in writing of any claim, suit, or threat of suit by a third party for any infringement or alleged infringement of any patent, copyright, or other intellectual property right with respect to the Goods as delivered or Special Services as performed.

C. Seller shall promptly defend or settle the claim or suit. Seller shall have control over such claim or suit, bear all expenses, and satisfy any adverse judgment.

1. If Seller fails to defend such suit or claim after written notice by Buyer, Seller will be bound, in any subsequent suit or claim against Seller by Buyer, by any factual determination in the prior suit or claim.

2. If Buyer fails to provide Seller the opportunity to defend such suit or claim, Buyer shall be barred from any remedy against Seller for such suit or claim.

D. If a determination is made that Seller has infringed upon the intellectual property rights of another, Seller may, at Seller’s own expense, obtain the necessary licenses for Buyer’s benefit, or replace the Goods and provide related design and construction, consistent with the requirements of the Procurement Contract Documents, to avoid the infringement.

6.03 Buyer’s Infringement

A. Subject to Paragraph 6.01, and to the fullest extent permitted by Laws and Regulations, Buyer shall be responsible to Seller for any infringement or alleged infringement of any patent, copyright, or other intellectual property right caused by Seller’s compliance with the Procurement Drawings or Procurement Specifications, and will reimburse Seller for any license fee or royalties paid by Seller to others if such payment resulted from any invention, design, process, product, or device specified to be furnished or performed in the Procurement Drawings or Procurement Specifications, but not identified as being subject to payment of such license fee or royalty.

B. Seller will promptly notify Buyer in writing of any claim, suit, or threat of suit by a third party for intellectual property infringement arising from Seller’s compliance with the Procurement Drawings or Procurement Specifications.
C. Buyer shall defend or settle the claim or suit. Buyer shall have control over such claim or suit, bear all expenses, and satisfy any adverse judgment.

1. If Buyer fails to defend such suit or claim after written notice by Seller, Buyer will be bound, in any subsequent suit or claim against Buyer by Seller, by any factual determination in the prior suit or claim.

2. If Seller fails to provide Buyer the opportunity to defend such suit or claim, Seller shall be barred from any remedy against Buyer for such suit or claim.

ARTICLE 7—SELLER’S RESPONSIBILITIES

7.01 Performance of Obligations

A. Seller shall be solely responsible for the means, methods, techniques, sequences, and procedures necessary to perform its obligations in accordance with the Procurement Contract Documents.

B. Seller shall supervise, inspect, and direct the furnishing of the Goods and Special Services competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform its obligations in accordance with the Procurement Contract Documents.

C. Seller shall coordinate the provision of Special Services to avoid or limit interference or disruption of other activities at the location where the Special Services are to occur, including but not limited to ongoing facility operations and construction activities.

7.02 Labor, Materials and Equipment

A. Seller shall provide competent, qualified and trained personnel in all aspects of its performance of the Procurement Contract.

B. All Goods, and all equipment and material incorporated into the Goods, must be as specified, and unless specified otherwise in the Procurement Contract Documents, must be:

1. new, and of good quality;

2. protected, assembled, connected, cleaned, and conditioned in accordance with the original manufacturer’s instructions; and

3. shop-assembled to the greatest extent practicable.

7.03 Laws and Regulations

A. Seller shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of its obligations in accordance with the Procurement Contract Documents. Except where otherwise expressly required by such Laws and Regulations, neither Buyer nor Engineer shall be responsible for monitoring Seller’s compliance with any Laws or Regulations.

B. If Seller furnishes Goods and Special Services knowing or having reason to know that such furnishing is contrary to Laws or Regulations, Seller 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 performance. It will not be Seller’s responsibility to make certain
that the Procurement Specifications and Procurement Drawings are in accordance with Laws and Regulations, but this provision will not relieve Seller of Seller’s obligations under Paragraph 3.03.

C. Changes in Laws or Regulations not known at the time of opening of Proposals (or, on the Effective Date of the Procurement Contract if there were no Proposals) that have a direct effect on the cost or time of Seller’s performance will be the subject of an adjustment in Procurement Contract Price or Procurement Contract Times. If Buyer and Seller 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 Article 12.

7.04 “Or Equals”

A. Whenever an item of material or equipment to be incorporated into the Goods is specified or described in the Procurement Contract Documents by using the names of one or more proprietary items or specific suppliers or manufacturers, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or “or equal” item is permitted, other items of material or equipment or material or equipment of other suppliers or manufacturers may be submitted to Buyer for Engineer’s review.

1. If in Engineer’s sole discretion, such an item of material or equipment proposed by Seller 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.

2. For the purposes of this paragraph, a proposed item of material or equipment may be considered functionally equal to an item so named only if in the exercise of reasonable judgment, Engineer determines that: 1) it is at least equal in quality, durability, appearance, strength, and design characteristics; 2) it will reliably perform at least equally well the function imposed by the design concept of the completed Project as a functioning whole; 3) it has an acceptable record of performance and availability of responsive service; and (4) Seller certifies that if approved: a) there will be no increase in any cost, including capital, installation or operating costs, to Buyer; and b) the proposed item will conform substantially to the detailed requirements of the item named in the Procurement Contract Documents.

B. Engineer’s Evaluation: Engineer will be allowed a reasonable time within which to evaluate each proposal or Submittal made pursuant to Paragraph 7.04.A. Engineer will be the sole judge of whether to accept or reject such a proposal or Submittal. No “or equal” will be ordered, manufactured or utilized until Engineer’s review is complete, which will be evidenced by an approved Shop Drawing. Engineer will advise Buyer and Seller in writing of any negative determination. Notwithstanding Engineer’s approval of an “or-equal” item, Seller shall remain obligated to comply with the requirements of the Procurement Contract Documents.

C. Special Guarantee: Buyer may require Seller to furnish at Seller’s expense a special performance guarantee or other surety with respect to any such proposed “or-equal.”

D. Data: Seller shall provide all data in support of any such proposed “or equal” at Seller’s expense.
7.05 Taxes

A. Seller shall pay all taxes and duties arising out of the sale of the Goods and the performance of Special Services. All taxes and duties are included in the Procurement Contract Price, except as noted in the Supplementary Conditions.

7.06 Submittals

A. Shop Drawing and Sample Requirements

1. Before submitting a Shop Drawing or Sample, Seller shall:
   a. review and coordinate the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Procurement Contract Documents;
   b. determine and verify:
      1) all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect to the Submittal; and
      2) the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of Seller's obligations.
   c. confirm that the Submittal is complete with respect to all related data included in the Submittal.

2. Each Shop Drawing or Sample must bear a stamp or specific written certification that Seller has satisfied its obligations under the Procurement Contract Documents with respect to Seller's review of that Submittal, and that Seller approves the Submittal.

3. With each Shop Drawing or Sample, Seller shall give Engineer specific written notice of any variations that the Submittal may have from the requirements of the Procurement Contract Documents. This notice will be set forth in a written communication separate from the Submittal; and, in addition, in the case of a Shop Drawing by a specific notation made on the Shop Drawing itself.

B. Submittal Procedures for Shop Drawings and Samples: Seller shall label and submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals.

1. Shop Drawings
   a. Seller shall submit the number of copies required in the Procurement Specifications.
   b. Data shown on the Shop Drawings must be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Seller proposes to provide, and to enable Engineer to review the information for the limited purposes required by Paragraph 7.06.C.

2. Samples
   a. Seller shall submit the number of Samples required in the Procurement Specifications.
b. Seller shall clearly identify each Sample as to material, supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the Submittal for the limited purposes required by Paragraph 7.06.C.

3. Where a Shop Drawing or Sample is required by the Procurement Contract Documents or the Schedule of Submittals, any related work performed by Seller prior to Engineer’s review and approval of the pertinent Submittal will be at the sole expense and responsibility of Seller.

C. Engineer’s Review of Shop Drawings and Samples

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the accepted Schedule of Submittals. Engineer’s review and approval will be only to determine if the items covered by the Submittals will, after installation or incorporation in the Goods, comply with the requirements of the Procurement Contract Documents, and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Procurement Contract Documents.

2. Engineer’s review and approval will not extend to means, methods, techniques, sequences, or procedures of construction, manufacturing, fabrication, installation, or shipping, or to safety precautions or programs incident thereto.

3. Engineer’s review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

4. Engineer’s review and approval of a Shop Drawing or Sample will not relieve Seller from responsibility for any variation from the requirements of the Procurement Contract Documents unless Seller has complied with the requirements of Paragraph 7.06.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Procurement Contract Documents in a Field Order or other appropriate Procurement Contract modification.

5. Engineer’s review and approval of a Shop Drawing or Sample will not relieve Seller from responsibility for complying with the requirements of Paragraphs 7.06.A and B.

6. Engineer’s review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Procurement Contract Documents, will not, under any circumstances, change the Procurement Contract Times or Procurement Contract Price, unless such changes are included in a Change Order.

7. Neither Engineer’s receipt, review, acceptance or approval of a Shop Drawing or Sample will result in such item becoming a Procurement Contract Document.

8. Seller shall furnish Goods that comply with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.06.C.4.

D. Resubmittal Procedures for Shop Drawings and Samples

1. Seller 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. Seller shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous Submittals.

2. Seller shall furnish required Shop Drawing and Sample Submittals with sufficient information and accuracy to obtain required approval of an item with no more than two resubmittals. Engineer will record Engineer's time for reviewing a third or subsequent resubmittal of a Shop Drawing or Sample, and Seller shall be responsible for Engineer's charges to Buyer for such time. Buyer may impose a set-off against payments due Seller to secure reimbursement for such charges.

3. If Seller requests a change of a previously approved Shop Drawing or Sample, Seller shall be responsible for Engineer's charges to Buyer for its review time, and Buyer may impose a set-off against payments due Seller to secure reimbursement for such charges, unless the need for such change is beyond the control of Seller.

E. Submittals Other than Shop Drawings and Samples

1. The following provisions apply to all Submittals other than Shop Drawings and Samples:
   a. Seller shall submit all such Submittals to the Engineer in accordance with the schedule of Submittals and pursuant to the applicable terms of the Procurement Contract Documents.
   b. Engineer will provide timely review of all such Submittals in accordance with the schedule of Submittals and return such Submittals with a notation of either Accepted or Not Accepted. Any such Submittal that is not returned within the time established in the schedule of Submittals will be deemed accepted.
   c. Engineer's review will be only to determine if the Submittal is acceptable under the requirements of the Procurement Contract Documents as to general form and content of the Submittal.
   d. If any such Submittal is not accepted, Seller shall confer with Engineer regarding the reason for the non-acceptance, and resubmit an acceptable document.

2. Procedures for the submittal and acceptance of the Progress Schedule, the Schedule of Submittals, and the Schedule of Values are set forth in Paragraphs 2.04 and 2.05.

7.07 Indemnification

A. To the fullest extent permitted by Laws and Regulations, Seller shall indemnify and hold harmless Buyer, Engineer, Project Owner, and any assignee of Buyer, including Contractor/Assignee, and their officers, directors, members, partners, employees, agents, consultants, contractors, 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 the performance of Seller’s obligations under the Procurement Contract, 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 Goods themselves), including the loss of use resulting therefrom, but only to the extent caused by any negligent act or omission of Seller, or any individual or entity directly or indirectly employed by Seller or anyone for whose acts Seller may be liable.
B. In any and all claims against Buyer, Engineer, Project Owner, or any assignee of Buyer, including Contractor/Assignee, or their officers, directors, members, partners, employees, agents, consultants, contractors, or subcontractors, by any employee (or the survivor or personal representative of such employee) of Seller, any subcontractor, any supplier, or any individual or entity directly or indirectly employed by any of them to furnish any of the Goods and Special Services, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.07.A will not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Seller or any such subcontractor, supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

7.08 Concerning Subcontractors and Suppliers

A. Seller may retain subcontractors and suppliers for the performance of parts of the furnishing of the Goods and Special Services. The Seller's retention of a subcontractor or supplier will not relieve Seller's obligation to Buyer to perform and complete the furnishing the Goods and Special Services in accordance with the Procurement Contract Documents.

ARTICLE 8—SHIPPING AND DELIVERY

8.01 Shipping

A. Seller shall select the carrier and bear all costs of packaging, transportation, insurance, special handling, and all other costs associated with shipment and delivery.

8.02 Delivery

A. Seller shall deliver the Goods free on board (FOB) to the Point of Destination, freight prepaid, in accordance with the Procurement Contract Times set forth in the Procurement Agreement, or other date agreed to by Buyer and Seller.

B. At least 10 days before shipment, Seller shall provide written notice to Buyer of the manner of shipment and the anticipated delivery date. The notice must also include any instructions concerning special equipment or services required at the Point of Destination to unload and care for the Goods. Seller shall also require the carrier to give Buyer at least 24 hours' notice by telephone prior to the anticipated time of delivery.

C. Buyer will be responsible and bear all costs for unloading the Goods from carrier.

D. Buyer will assure that adequate facilities are available to receive delivery of the Goods at the time established for delivery, or on another date agreed to by Buyer and Seller.

E. No partial deliveries will be allowed, unless permitted or required by the Procurement Contract Documents or agreed to in writing by Buyer.

F. Provisions governing inspection on delivery are set forth in Paragraph 9.02.

8.03 Risk of Loss

A. Risk of loss and insurable interests transfer from Seller to Buyer upon Buyer's receipt of the Goods.

B. Notwithstanding the provisions of Paragraph 8.03.A, if Buyer rejects the Goods as non-conforming, the risk of loss on such Goods will remain with Seller until Seller corrects the non-conformity or Buyer accepts the Goods. If rejected Goods remain at the Point of
ARTICLE 9—BUYER’S RIGHTS

9.01 Seller’s Warranties and Guarantees

A. Seller warrants and guarantees to Buyer that the title to the Goods conveyed will be proper, its transfer rightful, and free from any security interest, lien, or other encumbrance. Seller shall defend, indemnify, and hold Buyer harmless against any liens, claims, or demands contesting or affecting title of the Goods conveyed.

B. Seller warrants and guarantees to Buyer that all Goods and Special Services will conform with the Procurement Contract Documents, and with the standards established by any Samples approved by Engineer. Engineer shall be entitled to rely on Seller’s warranty and guarantee. If the Procurement Contract Documents do not otherwise specify the characteristics or the quality of the Goods, the Goods must comply with the requirements of Paragraph 7.02.B.

C. Seller’s warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, improper modification, improper maintenance, or improper operation by persons other than Seller;

2. excessive corrosion or chemical attack, unless corrosive or chemically-damaging conditions were disclosed by Buyer in the Procurement Contract Documents and the Procurement Contract Documents required the Goods to withstand such conditions;

3. use in a manner contrary to Seller’s written instructions for installation, operation, and maintenance; or

4. normal wear and tear under normal usage.

D. Seller’s obligation to furnish the Goods and Special Services in accordance with the Procurement Contract Documents will be absolute. None of the following will constitute an acceptance of Goods and Special Services that are non-conforming, or a release of Seller’s obligation to furnish the Goods and Special Services in accordance with the Procurement Contract Documents:

1. observations by Buyer, Engineer, or Project Owner;

2. recommendation by Engineer or payment by Buyer of any progress or final payment;

3. use of the Goods by Buyer or Project Owner;

4. any acceptance by Buyer, Engineer, or Project Owner, or any failure to do so;

5. the end of the correction period established in Paragraph 9.04;

6. the issuance of a notice of acceptance;

7. any inspection, test or approval by others; or

8. any correction of non-conforming Goods and Special Services by Buyer or Project Owner.

E. Buyer shall promptly notify Seller of any breach of Seller’s warranties or guarantees.
9.02 Inspections and Testing

A. General Provisions

1. The Procurement Contract Documents specify required inspections and tests. Buyer shall have the right to perform, or cause to be performed, reasonable inspections and require reasonable tests of the Goods at Seller’s facility, and at the Point of Destination. Seller shall allow Buyer a reasonable time to perform such inspections or tests.

2. Seller shall reimburse Buyer for all expenses, except for travel, lodging, and subsistence expenses of Buyer’s and Engineer’s representatives, for inspections and tests specified in the Procurement Contract Documents. If as the result of any such specified testing the Goods are determined to be non-conforming, then Seller shall also bear the travel, lodging, and subsistence expenses of Buyer’s and Engineer’s representatives, and all expenses of re-inspection or retesting.

3. Buyer shall bear all expenses of inspections and tests that are not specified in the Procurement Contract Documents (other than any re-inspection or retesting resulting from a determination of non-conformity, as set forth in Paragraph 9.03); provided, however, that if as the result of any such non-specified inspections or testing the Goods are determined to be non-conforming, then Seller shall bear all expenses of such inspections and testing, and of any necessary re-inspection and retesting.

4. Seller shall provide Buyer timely written notice of the readiness of the Goods for all inspections, tests, or approvals which the Procurement Contract Documents specify are to be observed by Buyer prior to shipment.

5. Buyer will give Seller timely notice of all specified tests, inspections, and approvals of the Goods which are to be conducted at the Point of Destination, and a representative of Seller will attend such tests, inspections, and approvals.

6. If, on the basis of inspections or testing, the Goods appear to be conforming, Buyer will give Seller prompt notice thereof. If on the basis of inspections or testing, the Goods appear to be non-conforming, Buyer will give Seller prompt notice thereof and will advise Seller of the remedy Buyer elects under the provisions of Paragraph 9.03.

7. Neither payments made by Buyer to Seller prior to any tests or inspections, nor any tests or inspections, will constitute acceptance of non-conforming Goods, or prejudice Buyer’s rights under the Procurement Contract.

B. Visual Inspection on Delivery

1. Buyer will visually inspect the Goods upon delivery solely for purposes of identifying the Goods, general verification of quantities, and observation of apparent condition. Such visual inspection will not be construed as final or as receipt of any Goods and Special Services that, as a result of subsequent inspections and tests, are determined to be non-conforming.

2. If, on the basis of the visual inspection specified in Paragraph 9.02.B.1, the Goods appear to comply with the requirements of the Procurement Contract Documents as to quantities and condition, then within 10 days of delivery Buyer shall issue to Seller Buyer’s acknowledgment of the receipt of Goods.
C. **Final Inspection**

1. After all of the Goods have been incorporated into the Project, tested in accordance with such testing requirements as are specified, and are functioning as required, and Seller has performed and completed all Special Services, Buyer will make a final inspection.

2. If, on the basis of the final inspection, Buyer determines that the Goods and Special Services are conforming, Buyer’s notice thereof will constitute Buyer’s acceptance of the Goods and Special Services, subject to any limitations stated in the notice.

3. If, on the basis of the final inspection, the Goods and Special Services are non-conforming, Buyer will identify the non-conformity in writing.

9.03 **Non-Conforming Goods and Special Services**

A. If, on the basis of inspections and testing prior to delivery, the Goods and Special Services are found to be non-conforming, or if at any time after Buyer has acknowledged receipt of delivery and before the expiration of the correction period described in Paragraph 9.04, Buyer determines that the Goods and Special Services are non-conforming, then Seller shall promptly, without cost to Buyer and in response to written instructions from Buyer, either correct such non-conforming Goods and Special Services, or, if Goods are rejected by Buyer, remove and replace the non-conforming Goods with conforming Goods, including all work required for reinstallation.

B. **Buyer’s Rejection of Non-Conforming Goods**

1. If Buyer elects to reject the Goods in whole or in part, Buyer’s notice to Seller will describe in sufficient detail the non-conforming aspect of the Goods. If Goods have been delivered to Buyer, Seller shall promptly, and within the Procurement Contract Times, remove and replace the rejected Goods.

2. Seller shall bear all costs, losses and damages attributable to the removal, replacement, reinspeaction, and retesting of the non-conforming Goods.

3. Upon rejection of the Goods, Buyer retains a security interest in the Goods to the extent of any payments made and expenses incurred in their testing and inspection.

C. **Buyer’s Rejection of Non-Conforming Special Services**

1. If at any time Buyer elects to reject the Special Services in whole or in part, Buyer’s notice to Seller will describe in sufficient detail the non-conforming aspect of the Special Services.

2. Seller shall promptly provide conforming Special Services acceptable to Buyer.

3. If Seller fails to provide conforming Special Services, Buyer may remove the Special Services from the scope of the Procurement Contract, and equitably reduce the Procurement Contract Price.

D. **Remedyng Non-Conforming Goods:** If Buyer elects to permit the Seller to modify the Goods to correct the non-conformance, then Seller shall promptly provide a schedule for such modifications and shall make the Goods conforming within a reasonable time.

E. **Buyer’s Acceptance of Non-Conforming Goods:** Instead of requiring correction or removal and replacement of non-conforming Goods discovered either before or after final payment,
Buyer may accept the non-conforming Goods. Seller shall bear all reasonable costs, losses, and damages attributable to Buyer's evaluation of and determination to accept such non-conforming Goods.

F. **Seller Obligations:** Seller shall pay all claims, costs, losses, and damages, including but not limited to all fees and charges for re-inspection, retesting and for any engineers, architects, attorneys and other professionals, and all court or arbitration or other dispute resolution costs arising out of or relating to the non-conforming Goods and Special Services. Seller's obligations will include the costs of the correction or removal and replacement of the non-conforming Goods and the replacement of property of Buyer and others destroyed by the correction or removal and replacement of the non-conforming Goods, and obtaining conforming Special Services from others.

G. **Buyer's Rejection of Conforming Goods:** If Buyer asserts that Goods and Special Services are non-conforming and such Goods and Special Services are determined to be conforming, or if Buyer rejects as non-conforming Goods and Special Services that are later determined to be conforming, then Seller shall be entitled to reimbursement from Buyer of costs incurred by Seller in inspecting, testing, correcting, removing, or replacing the conforming Goods and Special Services, including but not limited to fees and charges of engineers, architects, attorneys and other professionals, and all court or arbitration or other dispute resolution costs associated with the incorrect assertion of non-conformance or rejection of conforming Goods and Special Services.

9.04 **Correction Period**

A. Seller's responsibility for correcting all non-conformities in the Goods and Special Services will extend for a period of one year after the acceptance of the Goods and Special Services in accordance with Paragraph 9.02.C.2.

B. Where non-conforming Goods and Services (and damage to other work resulting therefrom) have been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Goods and Services will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

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

**ARTICLE 10—ENGINEER'S STATUS**

10.01 **Engineer's Role Defined**

A. Engineer will be Buyer's representative until assignment (if any) of the Procurement Contract.

B. The duties and responsibilities and the limitations of authority of Engineer prior to assignment, if any, of the Procurement Contract, are set forth in the Procurement Contract Documents.

C. Engineer's responsibilities, if any, after an assignment (if any) of the Procurement Contract, are set forth in the Procurement Agreement.
10.02 **Duties and Responsibilities; Authority; Limitations**

A. As set forth in Article 3, Engineer will be the initial interpreter of the Procurement Contract Documents and judge of the acceptability of the Goods and Special Services, and will issue clarifications, interpretations, and decisions regarding such issues.

B. Acting on behalf of Buyer under the provisions of Article 9, Engineer has the authority to disapprove or reject Goods and Special Services that Engineer believes to be non-conforming. Engineer also has the authority to require special inspection or testing of the Goods or Special Services as provided in Paragraph 9.02, whether or not the Goods are fabricated or installed, or the Special Services are completed.

C. Engineer may authorize minor deviations or variations in the Procurement Contract Documents by: 1) written approval of specific variations set forth in Shop Drawings when Seller has duly noted such variations as required in Paragraph 7.06.A.3, or 2) a Field Order.

D. As set forth in Article 12, Engineer will review Claims, and render decisions on Claims.

E. In rendering any interpretations, clarifications, reviews, decisions, disapprovals, acceptances, rejections, authorizations, and judgments, Engineer will not show partiality to Buyer or Seller. Engineer will not be liable to Buyer, Seller, or others in connection with any interpretations, clarifications, reviews, decisions, disapprovals, acceptances, rejections, authorizations, or judgments conducted or rendered by Engineer in good faith.

F. Engineer will not supervise, direct, control, or have authority over or be responsible for the means, methods, techniques, sequences, or procedures used by Seller to perform its obligations under this Procurement Contract, or the safety precautions and programs incident thereto, or for any failure of Seller to comply with Laws and Regulations applicable to the performance of its obligations. Engineer will not be responsible for Seller’s failure to furnish the Goods and Special Services in accordance with the Procurement Contract Documents.

**ARTICLE 11—CHANGES**

11.01 **Amending and Supplementing the Procurement Contract**

A. The Procurement Contract may be amended or supplemented by a Change Order, a Change Directive, or a Field Order.

B. If an amendment or supplement to the Procurement Contract includes a change in the Procurement Contract Price or the Procurement Contract Times, such amendment or supplement must be set forth in a Change Order.

C. All changes to the Procurement Contract that involve (1) the conformance or acceptability of the Goods and Special Services, (2) the design (as set forth in the Procurement Drawings, Procurement Specifications, or otherwise), or (3) other engineering or technical matters, must be supported by Engineer’s recommendation. Buyer and Seller may amend other terms and conditions of the Procurement Contract without the recommendation of the Engineer.
11.02 Change Orders

A. Buyer and Seller shall execute appropriate Change Orders covering:

1. Changes in Procurement Contract Price or Procurement Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Goods and Special Services furnished in accordance with a Change Directive;

2. Changes in Procurement Contract Price resulting from a Buyer set-off, unless Seller has duly contested such set-off;

3. Changes in the Goods and Special Services which are: (a) ordered by Buyer pursuant to Paragraph 11.05, (b) required because of Buyer’s acceptance of non-conforming Goods and Services under Paragraph 9.03 or (c) agreed to by the parties, subject to the need for Engineer’s recommendation if the change in the Goods and Special Services involves the design (as set forth in the Procurement Drawings, Procurement Specifications, or otherwise) or other engineering or technical matters; and

4. Changes that embody the substance of any final and binding results under: Paragraph 11.03.B, resolving the impact of a Change Directive; Article 12, Claims; and similar provisions.

B. If Buyer or Seller refuses to execute a Change Order that is required to be executed under the terms of Paragraph 11.02.A, it will be deemed to be of full force and effect, as if fully executed.

11.03 Change Directives

A. A Change Directive will not change the Procurement Contract Price or the Procurement Contract Times but is evidence that the parties expect that the modification ordered or documented by a Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Change Directive’s effect, if any, on the Procurement Contract Price and Procurement Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Procurement Contract Documents governing adjustments, expressly including Paragraph 11.08 regarding change of Procurement Contract Price.

B. If Buyer has issued a Change Directive and Buyer or Seller believes that an adjustment in Procurement Contract Time or Procurement Contract Price is necessary, then such party shall submit a Claim seeking such an adjustment no later than 30 days after the completion of the Goods and Services set out in the Change Directive.

11.04 Field Orders

A. Engineer may authorize minor changes in the Goods and Services if the changes do not involve an adjustment in the Procurement Contract Price or the Procurement Contract Times and are compatible with the design concept as indicated by the Procurement Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Buyer and also on Seller, which shall perform the Goods and Special Services involved promptly.

B. If Seller believes that a Field Order justifies an adjustment in the Procurement Contract Price or Procurement Contract Times, then before proceeding with the Goods and Special Services at issue, Seller shall submit a Claim as provided herein.
11.05 Buyer-Authorized Changes in the Goods and Special Services

A. Without invalidating the Procurement Contract and without notice to any surety, Buyer may, at any time or from time to time, order additions, deletions, or revisions in the Goods and Special Services. Changes involving the design (as set forth in the Procurement Drawings, Procurement Specifications, or otherwise) or other engineering or technical matters will be supported by Engineer’s recommendation.

B. Such changes in the Goods and Special Services may be accomplished by a Change Order, if Buyer and Seller have agreed as to the effect, if any, of the changes on Procurement Contract Times or Procurement Contract Price; or by a Change Directive. Upon receipt of any such document, Seller shall promptly proceed with the Goods and Special Services involved; or, in the case of a deletion in the Goods and Special Services, promptly cease activities with respect to such deletion. Added or revised Goods and Special Services must be performed under the applicable conditions of the Procurement Contract Documents.

11.06 Buyer’s Contingency Allowance

A. The Buyer’s Contingency Allowance, if any such is set forth in the Procurement Agreement, is for the sole use of Buyer to cover unanticipated costs.

B. If Buyer exercises its unilateral right to use all or a portion of the Buyer’s Contingency Allowance, Buyer will issue a written directive that documents the costs to which the allowance is applied, Seller’s entitlement to compensation, and the consequent reduction in such allowance.

C. Prior to final payment, the Total Price, as set forth in the Procurement Agreement, will be duly adjusted to account for any unused portion of the Buyer’s Contingency Allowance.

D. The Procurement Agreement, Article 5, addresses the impact on Buyer’s Contingency Allowance of an assignment of the Procurement Contract.

11.07 Unauthorized Changes in the Goods and Special Services

A. Seller shall not be entitled to an increase in the Procurement Contract Price or an extension of the Procurement Contract Times with respect to any work performed that is not required by the Procurement Contract Documents, as amended, modified, or supplemented.

11.08 Change of Procurement Contract Price

A. The Procurement Contract Price may only be changed by a Change Order. Any Claim for an adjustment of Procurement Contract Price must comply with the provisions of Article 12.

B. An adjustment in the Procurement Contract Price will be determined as follows:

1. For changes in Unit Price Goods and Special Services, by application of the unit prices to the quantities of the items involved;

2. To the extent the cost of the change is not covered by unit prices, then by a mutually agreed lump sum; or

3. To the extent the cost of the change is not covered by unit prices and the parties do not reach mutual agreement to a lump sum, then on the basis of documented costs plus a Seller’s fee for overhead and profit of 15%.
11.09 Change of Procurement Contract Times

A. The Procurement Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Procurement Contract Times must comply with the provisions of Article 12.

11.10 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 Goods and Special Services or the provisions of the Procurement Contract (including, but not limited to, Procurement Contract Price or Procurement Contract Times), the giving of any such notice will be Seller’s responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

ARTICLE 12—CLAIMS, DISPUTES, AND DISPUTE RESOLUTION

12.01 Claims

A. The parties agree to endeavor to avoid or resolve Claims through direct, good faith discussions and negotiations whenever practicable. Such discussions and negotiations should at the outset address whether the parties mutually agree to suspend the Claims process, including the time periods established in this Paragraph 12.01; if so, a written record of such mutual agreement should be made and jointly executed.

B. Claimant shall deliver to Engineer and the other party to the Procurement Contract written notice of each Claim within 15 days after the occurrence of the event giving rise to the Claim.

C. Claimant shall deliver written supporting data to Engineer and the other party within 45 days after such occurrence unless Engineer allows an additional period of time.

D. Engineer will review each such Claim and render a decision in writing within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any.

E. If Engineer does not render a formal written decision on a Claim within the time stated in Paragraph 12.01.D., Engineer shall be deemed to have issued a decision denying the Claim in its entirety 31 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any.

F. The rendering of a decision by Engineer pursuant to this Paragraph 12.01 with respect to any such Claim, dispute, or other matter (except any which have been waived by the making or acceptance of final payment) will be a condition precedent to any exercise by Buyer or Seller of such rights or remedies as either may otherwise have under the Procurement Contract Documents or by Laws or Regulations in respect of any such Claim, dispute, or other matter. If the exercise of such rights or remedies will imminently be time-barred, a party may take actions necessary to preserve such rights and remedies notwithstanding the lack of the condition precedent referred to in this paragraph.

G. If a submitted matter in question concerns terms and conditions of the Procurement Contract Documents that do not involve (1) the performance or acceptability of Goods and Special Services under the Procurement Contract Documents, (2) the design (as set forth in the Procurement Drawings, Procurement Specifications, Addenda, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly give written notice to Buyer and Seller that Engineer is unable to provide a decision or interpretation. If Buyer and Seller
are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Paragraph 12.02.

H. Engineer’s written decision on such Claim or a decision denying the Claim in its entirety that is deemed to have been issued pursuant to Paragraph 12.01, will be final and binding upon Buyer and Seller 30 days after it is issued unless within 30 days of issuance Buyer or Seller appeals Engineer’s decision by initiating the mediation of such Claim in accordance with the dispute resolution procedures set forth in Paragraph 12.02.

I. If Article 12 has been amended to delete the mediation requirement, then Buyer or Seller may appeal Engineer’s decision within 30 days of issuance by following the alternative dispute resolution process set forth in Article 12, as amended; or if no such alternative dispute resolution process has been set forth, Buyer or Seller may appeal Engineer’s decision by 1) delivering to the other party within 30 days of the date of such decision a written notice of intent to submit the Claim to a court of competent jurisdiction, and 2) within 60 days after the date of such decision instituting a formal proceeding in a court of competent jurisdiction.

J. No Claim for an adjustment in Procurement Contract Price or Procurement Contract Times will be valid if not submitted in accordance with Article 12.

K. The effect on Claims of an assignment of the Procurement Contract by Buyer to a Contractor/Assignee is addressed in the Procurement Agreement, Article 5.

12.02 Dispute Resolution Method

A. Either Buyer or Seller may initiate the mediation of (1) any Claim decided in writing by Engineer under Paragraph 12.01 before such decision becomes final and binding, or (2) any other dispute between the parties, including but not limited to any dispute arising after final inspection of the Goods and Services. 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 Procurement Contract. The request for mediation must be submitted in writing to the American Arbitration Association and the other party to the Procurement Contract. Timely submission of the request will stay Engineer’s decision from becoming final and binding.

B. Mediation is a condition precedent to seeking final dispute resolution under Paragraph 12.01.C. Buyer and Seller shall participate in the mediation process in good faith. The process must be concluded within 60 days of filing of the request. The date of termination of the mediation will be determined by application of the mediation rules referenced above.

C. If the mediation process does not result in resolution of the dispute, then Engineer’s written Claim decision under Paragraph 12.01.D or a Claim denial pursuant to Paragraph 12.01.E becomes final and binding, or if applicable such other dispute is deemed resolved in favor of respondent, unless, within 30 days after termination of the mediation, Buyer or Seller:

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

2. agrees with the other party to submit the Claim or dispute to another final dispute resolution process, or

3. if no final dispute resolution process has been provided for in the Supplementary Conditions, delivers to the other party written notice of the intent to submit the Claim.
or dispute to a court of competent jurisdiction, and within 60 days of the termination of the mediation institutes such formal proceeding.

ARTICLE 13—PAYMENT

13.01 Applications for Progress Payments

A. Seller shall submit to Buyer for Engineer’s review Applications for Payment filled out and signed by Seller and accompanied by such supporting documentation as is required by the Procurement Contract Documents and also as Buyer or Engineer may reasonably require.

B. The timing and amounts of progress payments will be as stipulated in the Procurement Agreement.

C. Any Application for Payment that is based in whole or in part on the delivery of Goods must be accompanied by a bill of sale, invoice, or other documentation reasonably satisfactory to Buyer warranting that Buyer has rightfully received good title to the Goods from Seller and that, upon payment, the Goods will be free and clear of all liens. Such documentation will include releases and waivers from all parties with viable lien rights.

D. Buyer shall notify Seller promptly of any deficiency in the required documentation.

13.02 Review of Applications for Progress Payments

A. Review of Applications

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Buyer, or return the Application to Seller indicating in writing Engineer’s reasons for refusing to recommend payment.

2. Engineer’s recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Buyer, based on Engineer’s observations of Seller’s progress, 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 Goods and Special Services or other obligations of Seller have progressed to the point indicated;
   b. the quality of the Goods and Special Services or other obligations of Seller are generally in accordance with the Procurement Contract Documents; and
   c. the conditions precedent to Seller being entitled to such payment appear to have been fulfilled in so far as it is Engineer’s responsibility to observe the Seller’s progress.

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 Goods and Special Services or other obligations of Seller have been exhaustive, extended to every aspect of the Goods and Special Services or other obligations of Seller in progress, or involved detailed inspections of the Goods and Special Services or other
obligations of Seller beyond the responsibilities specifically assigned to Engineer in the Procurement Contract; or

b. there may not be other matters or issues between the parties that might entitle Seller to be paid additionally by Buyer, or entitle Buyer to withhold payment to Seller.

4. Neither Engineer’s review of Seller’s progress 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 Seller’s performance or furnishing of Goods and Special Services or other obligations of Seller; or

b. for the means, methods, techniques, sequences, or procedures of construction, manufacturing, fabrication, installation, or shipping, or the safety precautions and programs incident thereto; or

c. for Seller’s failure to comply with Laws and Regulations applicable to Seller’s performance under the Procurement Contract; or

d. to make any examination to ascertain how or for what purposes Seller has used the money paid for the Procurement Contract Price; or

e. to determine that title to any of the Goods or component parts have passed to Buyer 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 Buyer stated in Paragraph 13.02.A.2.

6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer’s opinion to protect Buyer from loss because:

a. the Goods and Services are non-conforming, requiring correction or replacement;

b. the Procurement Contract Price has been reduced by Change Orders;

c. Buyer has been required to correct non-conforming Goods and Special Services in accordance with Paragraph 9.03.C, or has accepted non-conforming Goods and Special Services pursuant to Paragraph 9.03.E; or

d. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Seller and therefore justify termination for cause under the Procurement Contract Documents.

13.03 Basis and Amount of Progress Payments

A. The basis and amounts of the progress payments will be as provided in the Procurement Agreement, subject to the provisions of this Article 13 regarding reductions in payment.

13.04 Suspension of or Reduction in Payment

A. Buyer may temporarily cease making progress payments, or reduce the amount of a progress payment, even though recommended for payment by Engineer, under the following circumstances:
1. Buyer has reasonable grounds to conclude that Seller will not furnish the Goods or the Special Services in accordance with the Procurement Contract Documents, and

2. Buyer has requested in writing assurances from Seller that the Goods and Special Services will be delivered or furnished in accordance with the Procurement Contract Documents, and Seller has failed to provide adequate assurances within ten days of Buyer’s written request.

3. In addition to any reductions in payment (set-offs) recommended by Engineer, Buyer is entitled to impose a set-off against payment based on any of the following:
   a. claims have been made against Buyer based on Seller’s conduct in the performance or furnishing of the Goods and Special Services, or has incurred costs, losses, or damages resulting from Seller’s conduct in the performance or furnishing of the Goods and Special Services, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;
   b. Seller has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Point of Destination or the worksite;
   c. Seller has failed to provide and maintain required bonds or insurance;
   d. Buyer has incurred extra charges or engineering costs related to Submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
   e. the Goods and Special Services are non-conforming, requiring correction or replacement;
   f. Buyer has been required to correct non-conforming Goods and Special Services, in accordance with Paragraph 9.03.C, or has accepted non-conforming Goods and Special Services pursuant to Paragraph 9.03.E;
   g. the Procurement Contract Price has been reduced by Change Orders;
   h. an event that would constitute a default by Seller and therefore justify a termination for cause has occurred;
   i. liquidated or other damages have accrued as a result of Seller’s failure to achieve Milestones, Substantial Completion, or final completion of the Goods and Special Services; or
   j. liens have been filed in connection with the Procurement Contract, except where Seller has delivered a specific bond satisfactory to Buyer to secure the satisfaction and discharge of such liens.

B. If Buyer refuses to make payment of the full amount recommended by Engineer, Buyer will provide Seller and Engineer immediate written notice stating the reason for such action and promptly pay Seller any amount remaining after deduction of the amount withheld. Buyer shall promptly pay Seller the amount withheld when Seller corrects the reason for such action to Buyer’s satisfaction.
13.05 Final Payment

A. After Seller has corrected all non-conformities to the reasonable satisfaction of Buyer and Engineer and furnished all Special Services, Seller may submit its final Application for Payment following the procedures for progress payments.

B. The final Application for Payment will be accompanied by all documentation called for in the Procurement Contract Documents (including but not limited to all final operations and maintenance manuals, and any special warranties), a list of all unsettled Claims, and the written consent of surety to the making of final payment.

C. If, on the basis of final inspection and the review of the final Application for Payment and accompanying documentation, Engineer is reasonably satisfied that Seller has furnished the Goods and Special Services in accordance with the Procurement Contract Documents, and that Seller has fulfilled all other obligations under the Procurement Contract Documents, then Engineer will, within 10 days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment subject to the provisions of Paragraph 13.02, and present the final Application for Payment to Buyer. Such recommendation will account for any set-offs against payment that are necessary in Engineer's opinion to protect Buyer from loss for the reasons stated in Paragraph 13.02.

D. If Engineer does not recommend final payment, Engineer will return the final Application for Payment to Seller, indicating the reasons for refusing to recommend final payment, in which case Seller shall make the necessary corrections and resubmit the final Application for Payment.

E. In support of its recommendation of final payment Engineer will also give written notice to Buyer and Seller that the Goods and Special Services are acceptable, subject to stated limitations in the notice and to the provisions of Paragraph 13.06.

F. If the final Application for Payment and accompanying documentation are appropriate as to form and substance, Buyer shall, within 30 days after receipt thereof, pay Seller the amount recommended by Engineer, less any sum Buyer is entitled to set off against Engineer's recommendation, pursuant to the provisions of Paragraph 13.04.

G. Buyer will not make final payment, or return or release included retainage (if any) at any time, unless Seller submits written consent of the surety to such payment, return, or release.

13.06 Waiver of Claims

A. By making final payment, Buyer waives its claim or right to liquidated damages or other damages for late completion by Seller, except as set forth in an outstanding Claim, appeal, set-off, or express reservation of rights by Buyer. Buyer reserves all other claims or rights after final payment.

B. The acceptance of final payment by Seller will constitute a waiver by Seller of all claims and rights against Buyer other than those pending matters that have been duly submitted or appealed under the provisions of Article 12.
ARTICLE 14—CANCELLATION, SUSPENSION, AND TERMINATION

14.01 Cancellation

A. Buyer has the right to cancel the Procurement Contract, without cause, at any
time prior to delivery of the Goods by written notice. Cancellation pursuant to the terms of this paragraph
will not constitute a breach of contract by Buyer. Upon cancellation:

1. Buyer shall pay Seller for the direct costs incurred in producing any Goods that Seller
has specially manufactured for the Project, plus a fair and reasonable amount for
overhead and profit.

2. For Goods that are not specially manufactured for the Project, Seller shall be entitled to
a restocking charge of 10 percent of the unpaid Procurement Contract Price of such
Goods.

14.02 Suspension of Performance by Buyer

A. Buyer has the right to suspend performance of the Procurement Contract for up to 90 days,
without cause, by written notice. Upon suspension under this paragraph, Seller shall be
entitled to an increase in the Procurement Contract Times and Procurement Contract Price
caused by the suspension, provided that performance would not have been suspended or
delayed for causes attributable to Seller.

14.03 Suspension of Performance by Seller

A. Seller may suspend the furnishing of the Goods and Special Services only under the following
circumstance:

1. Seller has reasonable grounds to conclude that Buyer will not perform its future
payment obligations under the Procurement Contract; and

2. Seller has requested in writing assurances from Buyer that future payments will be
made in accordance with the Procurement Contract, and Buyer has failed to provide
such assurances within ten days of Seller’s written request.

14.04 Breach and Termination

A. Buyer’s Breach

1. Seller shall have the right to terminate the Procurement Contract for cause by declaring
a breach if Buyer fails to comply with any material provision of the Procurement
Contract. Upon termination, Seller shall be entitled to all remedies provided by Laws
and Regulations.

2. If Seller believes Buyer is in breach of its obligations under the Procurement Contract,
Seller shall provide Buyer with reasonably prompt written notice setting forth in
sufficient detail the reasons for declaring that it believes a breach has occurred. Buyer
shall have 7 days from receipt of the written notice declaring the breach (or such longer
period of time as Seller may grant in writing) within which to cure or to proceed
diligently to cure such alleged breach.

B. Seller’s Breach

1. Buyer may terminate Seller’s right to perform the Procurement Contract for cause by
declaring a breach should Seller fail to comply with any material provision of the
Procurement Contract Documents. Upon termination, Buyer shall be entitled to all remedies provided by Laws and Regulations.

2. In the event Buyer believes Seller is in breach of its obligations under the Procurement Contract, Buyer shall provide Seller with reasonably prompt written notice setting forth in sufficient detail the reasons for declaring that it believes a breach has occurred. Seller shall have 7 days from receipt of the written notice declaring the breach (or such longer period of time as Buyer may grant in writing) within which to cure or to proceed diligently to cure such alleged breach.

3. If and to the extent that Seller has provided a performance bond under the provisions of Paragraph 5.01, the notice and cure procedures of that bond, if any, will supersede the notice and cure procedures of Paragraph 14.04.B.2.

ARTICLE 15—MISCELLANEOUS

15.01 Giving Notice

A. Whenever any provision of the Procurement Contract requires the giving of written notice to Buyer, Seller, or Engineer, it will be deemed to have been validly given if delivered:

1. in person, by a commercial courier service or otherwise, to the recipient’s place of business;
2. by registered or certified mail, postage prepaid, to the recipient’s place of business; or
3. by e-mail to the recipient, with the words “Formal Notice” or similar in the e-mail’s subject line.

15.02 Controlling Law

A. This Procurement Contract is to be governed by the law of the state in which the Goods are to be installed.

B. In the case of any conflict between the express terms of this Procurement Contract and the Uniform Commercial Code, as adopted in the state whose law governs, it is the intent of the parties that the express terms of this Procurement Contract will apply.

15.03 Computation of Time

A. When any period of time is referred to in the Procurement Contract by number of 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.

15.04 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 Procurement Contract, and the provisions of this paragraph will be as effective as if repeated specifically in the Procurement Contract in connection with each particular duty, obligation, right, and remedy to which they apply.
15.05 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Procurement Contract, as well as all continuing obligations indicated in the Procurement Contract, will survive final payment, completion, and acceptance of the Goods and Special Services or termination or completion of the Procurement Contract or of the services of Seller.

15.06 *Entire Agreement*

A. Buyer and Seller agree that this Procurement Contract is the complete and final agreement between them, and supersedes all prior negotiations, representations, or agreements, either written or oral. This Procurement Contract may not be altered, modified, or amended except in writing signed by an authorized representative of both parties.

15.07 *No Waiver*

A. A party's non-enforcement of any provision will not constitute a waiver of that provision, nor will it affect the enforceability of that provision or of the remainder of this Procurement Contract.

15.08 *Headings*

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

15.09 *Successors and Assigns*

A. Buyer and Seller 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 Procurement Contract.
SUPPLEMENTARY CONDITIONS OF THE PROCUREMENT CONTRACT
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SUPPLEMENTARY CONDITIONS OF THE PROCUREMENT CONTRACT

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

1.01 Not Used

ARTICLE 2—PRELIMINARY MATTERS

2.01 Not Used

ARTICLE 3—PROCUREMENT CONTRACT DOCUMENTS

3.01 Not Used

ARTICLE 4—COMMENCEMENT AND PROGRESS OF WORK

4.01 Not Used

ARTICLE 5—BONDS AND INSURANCE

5.01 Performance, Payment, and Other Bonds

SC-5.01 Add the following paragraphs immediately after Paragraph 5.01.A:

1. Required Performance Bond Form: The performance bond that Seller furnishes will be in the form of EJCDC® P-510, Performance Bond (2010 or 2019 edition).

2. Required Payment Bond Form: The payment bond that Contractor furnishes will be in the form of EJCDC® P-615, Payment Bond (2010 or 2019 edition).

5.02 Insurance

SC-5.02 Add the following new paragraphs immediately after Paragraph 5.02.E:

F. Seller shall purchase and maintain such liability and other insurance as is appropriate for the furnishing of Goods and Special Services and as will provide protection from claims set forth below which may arise out of or result from Seller’s furnishing of the Goods or Special Services and Seller’s other obligations under the Procurement Contract Documents, whether the furnishing of Goods and Special Services or other obligations are to be performed by Seller, any subcontractor or supplier, or by anyone directly or indirectly employed by any of them to furnish the Goods and Special Services, 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 Seller’s employees;

3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Seller’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 Seller, or (b) by any other person for any other reason;

5. claims for damages, other than to the Goods, 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.

G. The policies of insurance so required by this Paragraph 5.02 to be purchased and maintained must:

1. with respect to insurance required by Paragraphs SC-5.02.F.3 through SC-5.02.F.6 inclusive, include as additional insureds (subject to any customary exclusion in respect of professional liability) Buyer, Engineer, their consultants, all of whom must be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, and other consultants and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds must 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 below or required by Laws or Regulations, whichever is greater;

3. include completed operations insurance;

4. include contractual liability insurance covering Seller’s indemnity obligations under Paragraph 7.07;

5. contain a provision or endorsement that the coverage afforded will not be canceled, or renewal refused, until at least 20 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder will provide a copy of the notice to the other party, each other insured, and Engineer;

6. remain in effect at least until final payment and at all times thereafter when Seller may be correcting, removing, or replacing non-conforming Goods in accordance with Paragraph 9.03 and 9.04; and

7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment (and Seller shall furnish Buyer and each other additional insured identified in these Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Buyer and any such additional insured of continuation of such insurance at final payment and one year thereafter).

8. Contain a cross liability or severability of interest clause or endorsement. Insurance covering the specified additional insureds shall be primary insurance, and all other insurance carried by the additional insureds shall be excess insurance.

H. The limits of liability for the insurance required by Paragraph SC-5.02.F must 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 SC-5.02.F.1 and F.2:

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<th>Policy limits of not less than</th>
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<td>State</td>
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<td>Applicable Federal (e.g., Longshoreman’s)</td>
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<td>Foreign voluntary workers’ compensation (employer’s responsibility coverage), if applicable</td>
<td>Statutory</td>
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<tr>
<td>Jones Act (if applicable)</td>
<td></td>
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<tr>
<td>Bodily injury by accident—each accident</td>
<td>$ N/A</td>
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<tr>
<td>Bodily injury by disease—aggregate</td>
<td>$ N/A</td>
</tr>
<tr>
<td>Employer’s Liability</td>
<td></td>
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<tr>
<td>Each accident</td>
<td>$ 2,000,000</td>
</tr>
<tr>
<td>Each employee</td>
<td>$ 1,000,000</td>
</tr>
<tr>
<td>Policy limit</td>
<td>$ 3,000,000</td>
</tr>
<tr>
<td>Stop-gap Liability Coverage</td>
<td></td>
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<tr>
<td>For work performed in monopolistic states, stop-gap liability coverage must be endorsed to either the worker’s compensation or commercial general liability policy with a minimum limit of:</td>
<td>$N/A</td>
</tr>
</tbody>
</table>

2. Seller’s General Liability under Paragraphs SC-5.02.F.3 through F.6 which must include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody and control of Seller:

<table>
<thead>
<tr>
<th>Commercial General Liability</th>
<th>Policy limits of not less than</th>
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<tbody>
<tr>
<td>General Aggregate</td>
<td>$ 5,000,000</td>
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<tr>
<td>Products—Completed Operations Aggregate</td>
<td>$ 2,000,000</td>
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<td>Personal and Advertising Injury</td>
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<tr>
<td>Bodily Injury and Property Damage—Each Occurrence</td>
<td>$ 2,000,000</td>
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3. Automobile Liability under Paragraph SC-5.02.F.6:

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Bodily Injury</td>
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<tr>
<td>Each Person</td>
<td>$ 2,000,000</td>
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<tr>
<td>Each Accident</td>
<td>$ 5,000,000</td>
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<tr>
<td>Property Damage</td>
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<tr>
<td>Each Accident</td>
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<td>[or]</td>
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4. Professional Liability (if the Special Services include professional services):
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<tr>
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<th>Policy limits of not less than</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each Claim</td>
<td>$3,000,000</td>
</tr>
<tr>
<td>Annual Aggregate</td>
<td>$5,000,000</td>
</tr>
</tbody>
</table>

*This insurance shall be maintained throughout the duration of the project, if applicable, and for one year after final payment.

<table>
<thead>
<tr>
<th>Transportation Insurance</th>
<th>Policy limits of not less than</th>
</tr>
</thead>
<tbody>
<tr>
<td>This insurance shall be of the “all risks” type and shall protect Subcontractor and shall include the Indemnified Parties as insured from all insurable risks of physical loss or damage to Goods in transit until receipt at the Point of Destination.</td>
<td>One-hundred twenty (120%) percent of the commercial invoice value of the Goods shipped.</td>
</tr>
</tbody>
</table>

I. Seller shall deliver to Buyer, with copies to each additional insured identified in these Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Buyer or any other additional insured) which Seller is required to purchase and maintain.

ARTICLE 6—LICENSES AND FEES
Not Used

ARTICLE 7—SELLER’S RESPONSIBILITIES
Not Used

ARTICLE 8—SHIPPING AND DELIVERY
Not Used

ARTICLE 9—BUYER’S RIGHTS
Not Used

ARTICLE 10—ENGINEER’S STATUS
Not Used

ARTICLE 11—CHANGES
Not Used
ARTICLE 12—CLAIMS, DISPUTES, AND DISPUTE RESOLUTION

Not Used

ARTICLE 13—PAYMENT

Not Used

ARTICLE 14—CANCELLATION, SUSPENSION, AND TERMINATION

Not Used

ARTICLE 15—MISCELLANEOUS
### Data Sheet

<table>
<thead>
<tr>
<th>Paragraph</th>
<th>General Description</th>
<th>Data</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Address where shop drawings are to be sent</td>
<td>Engineer's address in the agreement</td>
<td>Consulting Engineer's address in the Supplementary Conditions</td>
</tr>
<tr>
<td></td>
<td>When &quot;Other&quot; is selected, indicate the alternative</td>
<td>x</td>
<td>Other</td>
</tr>
<tr>
<td>2.2</td>
<td>Review period in consecutive calendar days required</td>
<td>14 days</td>
<td>21 days</td>
</tr>
<tr>
<td></td>
<td>When &quot;Other&quot; is selected, indicate the alternative</td>
<td>28 days</td>
<td>30 unless otherwise identified on the plans or specifications.</td>
</tr>
<tr>
<td></td>
<td>x</td>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>2.3</td>
<td>Time required for resubmittal in calendar days.</td>
<td>x</td>
<td>60 days unless within 30 days</td>
</tr>
<tr>
<td></td>
<td>When &quot;Other&quot; is selected, indicate the alternative</td>
<td>30 days unless within 14 days</td>
<td>Other</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

### Part 1  GENERAL

1.1 TERMINOLOGY

1.1.1 When the phrase "as required" is stated in this section, it shall mean "as required in the attached Data Sheet".

### Part 2  SHOP DRAWINGS AND SAMPLES

2.1 GENERAL

2.1.1 Shop Drawings and other submittals a (submittals) covering all equipment and all fabricated components and building materials which will become a permanent part of the Work under this Contract shall be submitted to Engineer for review, as required.

2.1.2 Submittals shall verify compliance with the Contract Documents and shall include drawings and descriptive information in sufficient detail to show the kind, size, arrangement, and the operation of component materials and devices; the external connections, anchorages, and supports required; the performance characteristics; and dimensions needed for installation and correlation with other materials and equipment.

2.1.3 When an item consists of components from several sources, Contractor's initial submittal shall be complete including all components.

2.1.4 All submittals, regardless of origin, shall be stamped with the approval of Contractor and identified with the name and number of this Contract, Contractor's name, and references to applicable specification paragraphs and Contract Drawings. Each submittal shall indicate the intended use of the item in the Work. When catalog pages are submitted, applicable items shall be clearly identified, and inapplicable data
crossed out. The current revision, issue number, and date shall be indicated on all drawings and other descriptive data.

2.1.5 Contractor shall be solely responsible for the completeness of each submittal. Contractor's stamp of approval is a representation to Owner and Engineer that Contractor accepts sole responsibility for determining and verifying all quantities, dimensions, field construction criteria, materials, catalog numbers, and similar data, and that Contractor has reviewed and coordinated each submittal with the requirements of the Work and the Contract Documents.

2.1.6 All deviations from the Contract Documents shall be identified as deviations on each submittal and shall be tabulated in Contractor's letter of transmittal.

2.1.7 Such submittals shall, as pertinent to the deviation, indicate essential details of all changes proposed by Contractor (including modifications to other facilities that may be a result of the deviation) and all required piping and wiring diagrams.

2.1.8 One electronic copy, in PDF format, of each drawing and the necessary data shall be submitted to Engineer. Engineer will return one marked copy to Contractor. Facsimile (fax) copies will not be acceptable. Engineer will not accept submittals from anyone but Contractor. Submittals shall be numbered in the following manner: Five-digit specification section-three-digit sequential number two-digit revision number (Example: 01300-001-00). An initial submittal shall start with sequential number one (001) and revision number zero (00).

2.1.9 If the submitted information varies in any way from the written specifications, the Contractor shall prepare and submit completed formwork presented in Section 01300-Fi – Register of Exceptions, Notations, and Clarifications.

2.2 ENGINEER'S REVIEW OF SUBMITTALS

2.2.1 Engineer's review and acceptance of submittals will be only for the limited purpose of checking for general conformance to the Contract Documents, external connections, and dimensions that affect the layout; it does not indicate thorough review of all dimensions, quantities, and details of the material, equipment, device, or item covered. Engineer's review shall not relieve Contractor of sole responsibility for errors, omissions, or deviations in the drawings and data, nor of Contractor's sole responsibility for compliance with the Contract Documents.

2.2.2 Engineer's submittal review period shall be the consecutive number of calendar days as required and shall commence on the first calendar day following receipt of the submittal in Engineer's office. The time required to mail the submittal back to Contractor shall not be considered a part of the submittal review period.

2.2.3 When the drawings and data are returned marked "Rejected" or "Resubmittal Required", the corrections shall be made as noted thereon and as instructed by Engineer and five corrected copies (or one corrected reproducible copy) resubmitted. Facsimile (fax) copies will not be acceptable. When the drawings and data are returned marked "Reviewed with Comments", "Reviewed", or "Record Copy", no additional copies need be furnished unless specifically requested by Engineer.

2.3 RESUBMITTAL OF DRAWINGS AND DATA

2.3.1 Contractor shall accept full responsibility for the completeness of each resubmittal. Contractor shall verify that all corrected data and additional information previously requested by Engineer are provided on the resubmittal.

2.3.2 When corrected copies are resubmitted, Contractor shall direct specific attention to all revisions in writing and shall list separately any revisions made other than those called for by Engineer on previous submittals. Requirements specified for initial
submittals shall also apply to resubmittals. Resubmittals shall bear the next revision number of the previous submittal.

2.3.3 If more than one resubmittal is required because of failure of Contractor to provide all previously requested corrected data or additional information, Contractor shall reimburse Owner for the charges of Engineer for review of the additional resubmittals. This does not include initial submittal data such as shop tests and field tests that are submitted after initial submittal.

2.3.4 When resubmittals are needed, resubmittals shall be made within the number of days of the date on the letter returning the material to be modified or corrected as required, unless within the number days, as required, Contractor submits an acceptable request for an extension of time, listing the reasons why the resubmittal cannot be completed within the stipulated time.

2.3.5 The need for more than one resubmittal, or any other delay in obtaining Engineer's review of submittals, will not entitle Contractor to extension of the Contract Times unless otherwise allowed for in the General Conditions and Supplemental Conditions.

2.3.6 Engineer's resubmittal review period shall be the consecutive number of calendar days as required and shall commence on the first calendar day following receipt of the resubmittal in Engineer's office. The time required to mail the resubmittal back to Contractor shall not be considered a part of the resubmittal review period.

(End of Section 01300)
PART 1 GENERAL
1.1 SUMMARY
1.1.1 This document shall be used by the Contractor to identify Exceptions, Notations, and Clarifications to the written Specifications.

PART 2 PRODUCTS
2.1 NOT APPLICABLE.

PART 3 EXECUTION
3.1 INSTRUCTIONS
3.1.1 Should the Contractor’s offer vary in any way from the written Specifications such variances shall be identified and listed in Table 01300-F1 contained herein.
3.1.2 Should no Exceptions, Notations, or Clarifications be identified by the Contractor, it shall be assumed that the Contractor’s offering is completely compliant with the written Specifications.
3.1.3 This form shall be completed for each individual Specification section or industry standard. A single form prepared for all Specification sections or industry standards will not be accepted.
3.1.4 Table 01300-F1 has space available for fifteen (15) Items. Should the Contractor need to identify more than fifteen (15) items, additional pages shall be added to the table by duplication of the empty table and indication of the total number of pages, to include pages associated with §3.2.8, in the format ‘page X of Y’ in the upper right-hand corner of each subsequent sheet.

3.2 TABLE 01300-F1 DEFINITIONS
3.2.1 SPECIFICATION NUMBER – The Specification section to which an Exception, Notation, or Clarification is being made.
3.2.2 ITEM – Each individual Exception, Notation, or Clarification numbered sequentially.
3.2.2.1 Item numbers pertain to this table only and act as a quick reference to the row of interest during communications regarding the content of that row number.
3.2.3 PARAGRAPH NUMBER – The specific paragraph of the Specification to which the Exception, Notation, or Clarification applies.
3.2.4 COMMENT – Contractor’s explanation of the Exception, Notation, or Clarification.
3.2.5 CODE – The codes identified below shall be used to classify the type of each specific entry as an Exception, Notation, or Clarification.
3.2.5.1 EX – Full Exception
3.2.5.2 NOT – Notation(s) or Information only, no Exception
3.2.5.3 CL – Clarification, no full Exception, a classification of what is proposed to be supplied in the event that the specification paragraph indicates nonspecific intent.
3.2.6 ACCEPTED – Will indicate the position of the Owner with respect to each individual item.
3.2.6.1 The word ‘No’ entered indicates the proposed information is rejected without cause and the supplier must meet the requirements as indicated by the written Specification(s).

3.2.6.2 If discussion points are made and accepted regarding any rejection or undesirable action shown, then the information in the previously rejected row shall change to reflect any agreements other than the written comments. In this case the entire table and associated form shall be resubmitted.

3.2.6.3 Three initials shall indicate the row of information is accepted as it is written. The three initials will be of person of authority with jurisdiction shown below the table.

3.2.7 ACTIONS – Identifies specific actions to be completed and the organization responsible for completing them.
3.2.8 Certification of Acceptance and Incorporation

3.2.8.1 This Document, consisting of ___ pages, is entered into the Contract and made part of the purchase order to acquire the proposed equipment.

3.2.8.2 This certification is not valid unless signed by the Owner or Owner’s Representative and the Contractor or Contractor’s Representative having the authority to bind each party.

OWNER: City of Charleston

By: __________________________
Name: _______________________
Initials ______________________
Title: _________________________
Address: ______________________

CONTRACTOR: __________________________

By: __________________________
Name: _______________________
Title: _________________________
Address: ______________________

(End of Section 01300-F1)
PART 1 GENERAL

1.1 RELATED DOCUMENTS

1.1.1 GENERAL: Requirements of the General and Supplemental Conditions apply to all Work in this Section. Provide all labor, material, equipment, and services indicated on the Drawings or specified herein, necessary for and incidental to a complete job.

1.2 DESCRIPTION OF WORK

1.2.1 GENERAL: The coating work shall include all new construction, new equipment, piping, pipe supports, ductwork and accessories as shown on the Drawings, in Schedules, and as herein specified.

1.3 EXTERIOR COATINGS: Includes new surfaces not factory prefinished.

1.4 INTERIOR COATINGS: Includes new surfaces. Where a space or surface is indicated to be coated, include the coating of exposed piping, ductwork, and all other contiguous surfaces in the work unless indicated otherwise.

1.5 MECHANICAL AND ELECTRICAL COATINGS: Includes the coating of interior and exterior equipment, new piping, conduit, ductwork, supports, hangers, air grilles, registers, miscellaneous metalwork, and insulation coverings, except as specified otherwise herein.

1.6 WORK NOT INCLUDED

1.6.1 SHOP PRIMING: Unless otherwise specified, shop priming of ferrous metal items is included under the various sections for structural steel, miscellaneous metal items, hollow metal work and shop-fabricated or factory-built mechanical and electrical equipment or accessories.

1.6.2 PRE-FINISHED ITEMS: Unless otherwise indicated, do not include coating when factory-finishing is specified for such items as finished mechanical and electrical equipment including light fixtures, switchgear and distribution cabinets, doors, equipment, and plastic or epoxy coated electrical conduit.

1.6.3 CONCEALED SURFACES: Unless otherwise indicated, coating is not required on wall or ceiling surfaces in concealed areas and generally inaccessible areas such as foundation spaces, furred spaces, crawl spaces, utility tunnels, pipe spaces and duct shafts, as applicable to this project. Coating all piping, equipment, and other such items in these spaces as specified. Surfaces concealed and made inaccessible by panelboards, fixed ductwork, machinery, and equipment fixed in place are not included.

1.6.4 FINISHED METAL SURFACES: Do not coat aluminum, stainless steel, chromium plate, copper, bronze, and similar finished materials, except as otherwise specified, and except where surfaces have existing coatings.

1.6.5 OPERATING PARTS AND LABELS: Do not coating any moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sensing devices, or motor and fan shafts unless otherwise indicated. Do not coat over any code-required labels, such as Underwriters Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.

1.7 DEFINITION

1.7.1 GENERAL: "Coating" as used herein means all coating systems materials, and includes primers, sealers and fillers, coatings, enamels, emulsions, and other applied materials whether used as prime, intermediate or finish coats.
1.8 QUALITY ASSURANCE

1.8.1 Qualifications:

1.8.1.1 Applicators shall be trained in application of the products and demonstrate a minimum of five years successful experience in similar applications.

a) Maintain, throughout duration of application, a crew of Applicators who are fully trained, experienced and qualified to paint water storage tanks.

1.8.1.2 Single Source Responsibility:

a) Paint and solvents or reducers shall be of a single manufacturer.

b) Secondary materials, such as chalks, sealants, or fairing compounds, which are produced or are specifically recommended by coating system manufacturer, may be used with prior approval by the coating system manufacturer.

1.8.2 Inspection and Owners responsibility:

1.8.2.1 The Owner shall be responsible for contracting an independent, third-party NACE II or NACE III coating inspector. The contracted firm, and their inspectors, shall be experienced in inspecting high performance painting projects. Inspectors shall have previously performed the functions outlined in this specification and be proficient in the use of inspection equipment. Inspectors that are SSPC-QP 5 certified shall be considered acceptable. Inspectors without SSPC-QP 5 certification may be asked to provide necessary documentation of evidence demonstrating suitable qualifications including:

a) Experience using low voltage, wet sponge Holiday inspection as required by AWWA D102 (SP0188).

b) Experience using high voltage, spark Holiday inspection as required by AWWA D102 (SP0188).

1.8.3 OAP (fluorescing coating) inspection as outlined in SSPC-TU 11 and ASTM E2501. The coating inspector shall maintain a detailed daily report that outlines observations and/or measurements of surface preparation, ambient conditions, products, and batches used mixing techniques, application procedures, DFT, curing, final inspection, and other information requested at the pre-job conference.

a) The inspector shall have the authority to suspend coating work if the work being performed is not in accordance with this specification.

b) The inspector shall be responsible for checking interior and exterior coatings for film characteristics or defects that would adversely affect the performance of coating systems.

c) The inspector shall submit written reports describing inspections made and actions taken to correct nonconforming work.

1.8.4 Pre-Installation Meeting:

1.8.4.1 A meeting shall be held on-site before field application of coating systems begins.

1.8.4.2 Meeting shall be attended by Contractor, Owner’s representative (NACE inspector), Engineer, Coating Applicators, and Manufacturer’s NACE representative. If the meeting is canceled or cannot be completed due to any party’s failure to attend a second meeting shall be scheduled at that party’s expense.

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1.8.4.3 Topics to be discussed at meeting shall include:
   a) A review of Contract Documents and deviations or differences to be resolved.
   b) Environmental conditions, surface conditions, surface preparation, application and inspection procedures, and protection following application.
   c) Areas on-site to be available for storage.
   d) Other issues as deemed necessary. The Owner or Owners representative is to prepare and submit, to parties in attendance, a written report of the pre-installation meeting minutes. This report shall be submitted within 3 days following meeting.

1.8.5 QUALIFICATIONS OF PAINTERS: Use only qualified journeyman for the mixing and application of coating on exposed surfaces; in the acceptance or rejection of installed coating, no allowance will be made for lack of skill on the part of workers.

1.8.6 REFERENCED STANDARDS: Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these Specifications shall in no way invalidate the minimum requirements of the referenced standards. Comply with the provisions of the following codes and standards, except as otherwise shown or specified. Publications listed are part of this specification to extent referenced.

1.8.6.1 SSPC – The Society for Protective Coatings
   a) SSPC-SP1: Specification for Solvent Cleaning
   b) SSPC-SP2: Specification for Hand Tool Cleaning
   c) SSPC-SP3: Specification for Power Tool Cleaning
   d) SSPC-SP6: Specification for Commercial Blast Cleaning
   e) SSPC-SP7: Specification for Brush Blast Cleaning
   f) SSPC-SP10: Specification for Near White Blast Cleaning
   g) SSPC-SP11: Specification for Power Tool Cleaning to Bare Metal
   h) SSPC-SP16: Specification for Brush-off Blast Cleaning Non-Ferrous Metals
   i) SSPC-PA1: Shop, Field, and Maintenance Painting of Steel
   j) SSPC-PA2: Measurement of Dry Coating Thickness with Magnetic Gauges
   k) SSPC-Guide 12: Illumination of Industrial Painting Projects
   l) SSPC-TU11: Inspection of Fluorescent Coating Systems
   m) SSPC-QP 5: Certification for Coating and Lining Inspection Companies
   n) SSPC-VIS 2: Standard Method of Evaluating Degree of Rusting on Painted Steel Surfaces
1.8.6.2 NACE International
   a) SSPC SP 5/NACE No. 1: White Metal Blast Cleaning
   b) SSPC SP10/NACE No. 2: Near White Metal Blast Cleaning
   c) SSPC SP 6/NACE No. 3: Commercial Blast Cleaning
   d) NACE SP0188: Discontinuity Holiday Testing of Protective Coatings

1.8.6.3 ASTM International
   a) ASTM E-337: Test Method for Measuring Humidity with a Psychrometer
   b) ASTM D 4414: Standard Practice for Measurement of Wet Film Thickness by Notch Gages
   c) ASTM D 5162: Standard Practice for Discontinuity (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates
   d) ASTM D3359: Standard Test Method for Measuring Adhesion by Tape Test
   e) ASTM D4541: Test Method for Pull Off Strength of Coatings Using Portable Adhesion-Testers (Using the same Method as reported by Sherwin-Williams)
   g) ASTM D 4214, Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films, Method D
   h) ASTM D4417: Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel, Method C
   i) ASTM E2501 Light Source Products for Inspection of Fluorescent Coatings

1.8.6.4 AWWA – American Water Works Association
   a) ANSI/WWA D-102: Coating Steel Water Storage Tanks

1.8.6.5 NSF International
   a) ANSI / NSF 61: Drinking Water System Components – Health Effects

1.9 SUBMITTEDS

1.9.1 QUALIFICATION OF AIRLESS SPRAY APPLICATORS: Prior to any application of coating by airless spray, submit data for approval by the Engineer that indicates that the Contractor has successfully applied coating by airless spray or has a firm contractual agreement with a subcontractor having such required experience. The data includes the names and locations of not less than two sites where the Contractor or subcontractor referred to herein has applied coating by airless spray. Indicate the type and design of the equipment, including safety devices, and certify that the method of applying coating has been performed satisfactorily.

1.9.2 MATERIALS LIST; COATING PRODUCTS: Within 60 days after award of Contract, and before any coating materials are delivered to the job site, submit to the Engineer a complete list of all materials proposed to be furnished and installed under this portion of the Work.

1.9.3 MANUFACTURER’S DATA; COATING MATERIALS: Submit, for the Engineer’s review, the Manufacturer’s Current Spec Data Sheet for each generic type of material proposed. Such data includes product description, typical uses, service conditions,
surface preparation for new and previously coated surfaces, application, coverage, drying time, generic type, percent of solids by weight and volume, recommended wet and dry mil coverage, and reduction solvents required.

1.9.4 FIELD SAMPLE: On actual surfaces, duplicate coating finish of the approved sample. On at least 100 square feet of surface where directed, provide full-coat finish samples until required sheen, color and texture is obtained; simulate finished lighting conditions for review of in-place work.

1.9.5 COLOR CHART: Submit a color chart to Engineer for selection of colors.

1.10 PRODUCT HANDLING

1.10.1 DELIVERY: Deliver all materials to the job site in original, new, and unopened packages and containers bearing manufacturer's name and label, and the following information:

1.10.1.1 Name or title of material
1.10.1.2 Federal Specification number, if applicable
1.10.1.3 Manufacturer's stock number and date of manufacture
1.10.1.4 Manufacturer's name
1.10.1.5 Contents by volume, for major pigment and vehicle constituents
1.10.1.6 Thinning instructions
1.10.1.7 Application instructions
1.10.1.8 Color name and number

1.10.2 Deliver coating to the job ready-mixed, except for tinting of undercoats and possible thinning.

1.10.3 STORAGE:

1.10.3.1 Store only approved materials on the project. Store material and tools in a single room assigned for this use only. Keep storage place clean and neat and damage to it shall be corrected. Keep coating and other volatile material tightly covered at all times when not in actual use. Remove soiled and oily rags and waste from building every night and take every precaution to prevent spontaneous combustion. Storage area temperature shall be within manufacturer's minimum and maximum storage temperatures.

1.10.3.2 Do not use any plumbing fixture or pipe for mixing or for disposal of any refuse material.

1.11 JOB, WEATHER AND TEMPERATURE CONDITIONS

1.11.1 GENERAL:

1.11.1.1 Do not apply exterior coatings in snow, rain, fog, or mist; or when the relative humidity exceeds 85%; or to damp or wet surfaces; unless otherwise permitted by the coating manufacturer's printed instructions.

1.11.1.2 Apply interior coatings when the surfaces to be-coated are dry and temperatures are within the manufacturer's minimum and maximum.

1.11.1.3 Coating may be continued during inclement weather only if the areas and surfaces to be coated are enclosed and heated within the temperature limits specified by the manufacturer during application and drying periods.
1.11.1.4 All stated temperature ranges include ambient, material and surface temperatures. Temperature must be at least 5°C above the dew point and rising.

1.12 EXTRA STOCK

1.12.1 Upon completion of work, retain at least one unopened gallon of each type and color of product used on major areas and one unopened pint for minor area for touch up.

1.12.2 Containers shall be clearly labeled for identification.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 GENERAL: No claim as to unsuitability or unavailability of material specified or his inability to produce first class work with the specified materials will be entertained unless such claims are made in writing and submitted to the Engineer with substitute proposal 30 days prior to commencing work.

2.1.2 APPROVAL OF MATERIALS:

2.1.2.1 Do not apply any coating before required test reports, certificates, and requests for substitutions have been submitted and the respective material approved for use on this project.

2.1.2.2 Submit all requests for substitutions to the Engineer. Include specific identification of the proposed substitute; justification for the necessity of the substitution; certified test reports of the proposed substitute, including all tests required by the specification for the substituted material; and a tabulation of the specified material compared to the proposed substitute. The tabulation shall include all tests, composition of both pigment and vehicle, and quantitative and qualitative requirements for both the specified and the proposed material; clearly indicate any deviations from specified requirements.

2.1.3 COLORS AND FINISHES: The Owner has selected colors from the specified manufacturer's standard color charts. Surface treatment, and finishes, are indicated in the Schedules. Use representative colors when preparing samples for review. Final acceptance of colors will be from samples applied on the job.

2.1.4 COATING: Provide a coating which is well ground, will not cake or thicken in the container, is readily broken with a paddle to a smooth consistency, and has easy brushing properties.

2.1.5 LEAD CONTENT: Do not use coatings having a lead content of over 0.06 percent by weight of nonvolatile content and as regulated by Federal, State, and local laws.

2.1.6 COLOR PIGMENTS: Pure, non-fading, applicable types to suit the substrates and service indicated.

2.1.7 COATING THINNER: As recommended by coating manufacturer for the particular material thinned. Use only within recommended limits.

2.1.8 TINTING: As recommended by coating manufacturer for the material tinted. Use only within recommended limits.

2.1.9 QUALITY: Provide the best quality grade of the various types of coatings as regularly manufactured by acceptable coating materials manufacturers. Materials not displaying the manufacturer's identification as a standard, best-grade product will not be acceptable. Provide undercoat coating produced by the same manufacturer as the finish coats.
2.1.10 COATING COMPATIBILITY:

2.1.10.1 Provide finish coats which are compatible with prime coatings used. Upon request from other trades, furnish information on characteristics of finish materials proposed for use, to ensure that compatible prime coats are used. Provide barrier coats over incompatible primers or remove and reprime as required.

2.1.10.2 It is essential that the coatings applied in the shop and in the field be mutually compatible. Determine what shop coatings have been used and select approved field coatings compatible therewith.

2.1.11 MANUFACTURER: Insofar as practicable, provide materials which are the products of one manufacturer. To establish the quality of coating materials required, brand names and catalog numbers of Tnemec Company, Inc., of North Kansas City, Missouri or The Sherwin-Williams Company of Cleveland, Ohio are used.

2.2 GENERAL SCHEDULE OF COATING

2.2.1 STEEL STRUCTURAL, TANKS, PIPES AND EQUIPMENT

<table>
<thead>
<tr>
<th>Table A: Exterior/Interior Exposure (Non-immersion)</th>
</tr>
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<tbody>
<tr>
<td><strong>Manufacturer: Tnemec</strong></td>
</tr>
<tr>
<td><strong>Surface Preparation</strong></td>
</tr>
<tr>
<td><strong>Coating</strong></td>
</tr>
<tr>
<td>SSPC SP6 Commercial Blast Cleaning</td>
</tr>
<tr>
<td>Primer</td>
</tr>
<tr>
<td>2nd Coat</td>
</tr>
<tr>
<td>3rd Coat</td>
</tr>
<tr>
<td>Total Dry Film</td>
</tr>
</tbody>
</table>

| **Manufacturer: Carboline**                     |
| **Surface Preparation**                        |
| **Coating** | **Manufacturer Coating Series** | **Dry Film Mils** |
| SSPC SP6 Commercial Blast Cleaning             |
| Primer     | Carboline 859 Zinc Rich Epoxy     | 2.5 – 3.0          |
| 2nd Coat   | Carboguard 890 High Solids Epoxy  | 4.0 – 6.0          |
| 3rd Coat   | Carbothane 133HB Urethane         | 3.0 – 5.0          |
| Total Dry Film                                   | 9.5 – 16            |

| **Manufacturer: Sherwin Williams**              |
| **Surface Preparation**                        |
| **Coating** | **Manufacturer Coating Series** | **Dry Film Mils** |
| SSPC SP6 Commercial Blast Cleaning             |
| Primer     | Zinc Clad 4100                    | 3.0 – 5.0          |
| 2nd Coat   | Macrepoxy 546 FC Epoxy            | 5.0 – 10.0         |
| 3rd Coat   | Aerolon 7300 Polyurethane         | 2.0 – 4.0          |
| Total Dry Film                                   | 10 – 19             |
**Table B: Exterior/Interior Exposure (Non-immersion)**

*(Rotating and other Appurtenant Equipment)*

**Manufacturer: Thence**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer Coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primer</td>
<td>Manufacturer Standard Primer</td>
<td>1.5 - 2.0</td>
</tr>
<tr>
<td>SSPC SP6 Commercial Blast Cleaning or SSPC SP3 Power Tool Cleaning</td>
<td>2nd Coat</td>
<td>Series 135 Chembuid</td>
<td>3.0 - 4.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3rd Coat</td>
<td>Series 73 Color Endura Shield</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total Dry Film</td>
<td>8.5 - 11.0</td>
</tr>
</tbody>
</table>

**Manufacturer: Carboline**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer Coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primer</td>
<td>Manufacturer Standard Primer</td>
<td>1.5 - 2.0</td>
</tr>
<tr>
<td>SSPC SP6 Commercial Blast Cleaning or SSPC SP3 Power Tool Cleaning</td>
<td>2nd Coat</td>
<td>Carbofast 94 Surface Tolerant Epoxy</td>
<td>3.0 - 4.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3rd Coat</td>
<td>Carbothane 133HB Urethane</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total Dry Film</td>
<td>7.5 - 11.0</td>
</tr>
</tbody>
</table>

**Manufacturer: Sherwin Williams**

<table>
<thead>
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<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer Coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primer</td>
<td>Manufacturer Standard Primer</td>
<td>1.5 - 2.0</td>
</tr>
<tr>
<td>SSPC SP6 Commercial Blast Cleaning or SSPC SP3 Power Tool Cleaning</td>
<td>2nd Coat</td>
<td>Macropoxy 646 FC Epoxy</td>
<td>5.0 - 10.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3rd Coat</td>
<td>Acroil 7300 Polyurethane</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total Dry Film</td>
<td>8.5 - 16.0</td>
</tr>
</tbody>
</table>

**Table C: Interior Exposure (Non-immersion)**

**Manufacturer: Thence**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer Coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primer</td>
<td>Series 1 Omnithane</td>
<td>2.5 - 3.5</td>
</tr>
<tr>
<td>SSPC SP6 Commercial Blast Cleaning</td>
<td>2nd Coat</td>
<td>Series 2 0HS Color HI Build Epoxoline</td>
<td>4.0 - 5.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3rd Coat</td>
<td>Series 2 0HS Color HI Build Epoxoline</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total Dry Film</td>
<td>10.5 - 13.5</td>
</tr>
</tbody>
</table>

**Manufacturer: Carboline**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer Coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primer</td>
<td>Carbozinc 859 Zinc Rich Epoxy</td>
<td>2.5 - 5.0</td>
</tr>
<tr>
<td>SSPC SP6 Commercial Blast Cleaning</td>
<td>2nd Coat</td>
<td>Carboguard 890 High Solids Epoxy</td>
<td>4.0 - 5.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3rd Coat</td>
<td>Carboguard 890 High Solids Epoxy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total Dry Film</td>
<td>10.5 - 15.0</td>
</tr>
</tbody>
</table>

**Manufacturer: Sherwin Williams**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer Coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primer</td>
<td>Zinc Clad 4100</td>
<td>3.0 - 5.0</td>
</tr>
<tr>
<td>SSPC SP6 Commercial Blast Cleaning</td>
<td>2nd Coat</td>
<td>Macropoxy 646 FC Epoxy</td>
<td>5.0 - 10.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3rd Coat</td>
<td>Macropoxy 646 FC Epoxy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total Dry Film</td>
<td>13.0 - 25.0</td>
</tr>
</tbody>
</table>
### Table D: Interior Exposure (Non-immersion)

(Pre-engineered Metal Buildings, Equipment that only comes with a Manufacturer's standard coating)

<table>
<thead>
<tr>
<th>Manufacturer: Thermec</th>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer Coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSPC SP6 Commercial Blast Cleaning or SSPC-SP3 Power Tool Cleaning</td>
<td>Primer</td>
<td>Manufacturer’s Standard</td>
<td>1.0 – 2.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Series 135 Chembuild</td>
<td>3.0 – 4.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td>Series 20 HS Color Hi-Build Epoxoline</td>
<td>4.0 – 5.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Dry Film</td>
<td></td>
<td>8.0 – 11.0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Manufacturer: Carboline</th>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer Coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSPC SP6 Commercial Blast Cleaning or SSPC-SP3 Power Tool Cleaning</td>
<td>Primer</td>
<td>Manufacturer’s Standard</td>
<td>1.0 – 2.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Carbomastic 94 Surface Tolerant Epoxy</td>
<td>3.0 – 4.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td>Carboguard 890 High Solids Epoxy</td>
<td>4.0 – 5.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Dry Film</td>
<td></td>
<td>8.0 – 11.0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Manufacturer: Sherwin-Williams</th>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer Coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSPC SP6 Commercial Blast Cleaning or SSPC-SP3 Power Tool Cleaning</td>
<td>Primer</td>
<td>Manufacturer’s Standard</td>
<td>1.0 – 2.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Macropoxy 646 PC Epoxy</td>
<td>5.0 – 10.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td>Macropoxy 646 PC Epoxy</td>
<td>5.0 – 10.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Dry Film</td>
<td></td>
<td>11.0 – 22.0</td>
<td></td>
</tr>
</tbody>
</table>

### Table E: Potable Water

<table>
<thead>
<tr>
<th>Manufacturer: Thermec</th>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer Coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSPC SP 10 Near White Blast Cleaning</td>
<td>Primer</td>
<td>Series 1 Omnithane</td>
<td>2.5 – 3.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Series 20-1255 Pota Pox</td>
<td>4.0 – 5.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td>Series 20-1515 Pota-Pox Finish</td>
<td>4.0 – 5.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Dry Film</td>
<td></td>
<td>10.5 – 13.5</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Manufacturer: Carboline</th>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSPC SP 10 Near White Blast Cleaning</td>
<td>Primer</td>
<td>Carbozinc 621</td>
<td>2.0 – 3.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Carboguard 61 NSF Epoxy</td>
<td>4.0 – 6.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td>Carboguard 61 NSF Epoxy</td>
<td>4.0 – 6.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Dry Film</td>
<td></td>
<td>10.0 – 15.0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Manufacturer: Sherwin-Williams</th>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSPC SP 10 Near White Blast Cleaning</td>
<td>Primer</td>
<td>Corothane 1 Galva-Pac</td>
<td>2.0 – 3.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Macropoxy 646 PW Epoxy</td>
<td>3.0 – 6.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td>Macropoxy 646 PW Epoxy</td>
<td>3.0 – 6.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Dry Film</td>
<td></td>
<td>8.0 – 15.0</td>
<td></td>
</tr>
</tbody>
</table>
### Table F: Immersion – Non-Potable Water (Stormwater)

**Manufacturer: Tnemec**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSPC SP10 Near White Blast Cleaning</td>
<td>Primer</td>
<td>Series 1 Omnithane</td>
<td>2.5 – 3.5</td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Series 201 HS Hi-Build Epoxyline</td>
<td>4.0 – 5.0</td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td>Series 201 HS Color H.S. Epoxy</td>
<td>6.0 – 8.0</td>
</tr>
<tr>
<td></td>
<td><strong>Total Dry Film</strong></td>
<td></td>
<td><strong>12.5 – 16.5</strong></td>
</tr>
</tbody>
</table>

**Manufacturer: Carbozine**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSPC SP10 Near White Blast Cleaning</td>
<td>1st Coat</td>
<td>Carbozine 621</td>
<td>2.0 – 3.0</td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Carboguard 890 High Solids Epoxy</td>
<td>4.0 – 5.0</td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td>Carboguard 890 High Solids Epoxy</td>
<td>6.0 – 8.0</td>
</tr>
<tr>
<td></td>
<td><strong>Total Dry Film</strong></td>
<td></td>
<td><strong>12.0 – 16.0</strong></td>
</tr>
</tbody>
</table>

**Manufacturer: Sherwin Williams**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSPC SP10 Near White Blast Cleaning</td>
<td>1st Coat</td>
<td>Duraplate 235 MP Epoxy</td>
<td>4.0 – 8.0</td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Duraplate 235 MP Epoxy</td>
<td>4.0 – 8.0</td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td>Duraplate 235 MP Epoxy</td>
<td>4.0 – 8.0</td>
</tr>
<tr>
<td></td>
<td><strong>Total Dry Film</strong></td>
<td></td>
<td><strong>12.0 – 24.0</strong></td>
</tr>
</tbody>
</table>

### 2.2.2 Ductile Iron Pipe

#### Table G: Coating System

**Manufacturer: Tnemec**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAPF 500-03</td>
<td>1st Coat</td>
<td>Series 91-H2a Hydro-Zinc</td>
<td>2.5 – 3.5</td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Tnemec Series N140 Pata-Pox Plus</td>
<td>6.0 – 10.0</td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td>Tnemec Series 141 Epoxoline</td>
<td>10.0 – 12.0</td>
</tr>
<tr>
<td></td>
<td><strong>Total Dry Film</strong></td>
<td></td>
<td><strong>18.5 – 25.5</strong></td>
</tr>
<tr>
<td><strong>Interior</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1st Coat</td>
<td>Series N59</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Series 431 Perma-Shield</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total Dry Film</strong></td>
<td></td>
<td>50</td>
</tr>
</tbody>
</table>

**Manufacturer: Carbozine**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAPF 500-03</td>
<td>2nd Coat</td>
<td>Phenoline Tankshield</td>
<td>16-25</td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total Dry Film</strong></td>
<td></td>
<td>16-25</td>
</tr>
</tbody>
</table>

**Manufacturer: Sherwin Williams**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
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<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAPF 500-03</td>
<td>Primer</td>
<td>Duraplate UHS</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total Dry Film</strong></td>
<td></td>
<td>49</td>
</tr>
</tbody>
</table>
2.2.3 STAINLESS STEEL

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mil</th>
<th>Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSPC SP-16 Specification for Brush-off Blast Cleaning Non-Ferrous Metals</td>
<td>1st Coat</td>
<td>Series 20HS</td>
<td>4.0 - 6.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stripe Coat</td>
<td>Series 20HS</td>
<td>4.0 - 6.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Series 141 Epoxy</td>
<td>8.0 - 16.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Dry Film</td>
<td></td>
<td>16.0 - 28.0</td>
<td></td>
</tr>
</tbody>
</table>

Manufacturer: Carboline

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSPC SP-16 Specification for Brush-off Blast Cleaning Non-Ferrous Metals</td>
<td>Primer</td>
<td>Carboguard 635</td>
<td>4.0 - 6.0</td>
</tr>
<tr>
<td></td>
<td>Stripe Coat</td>
<td>Carboguard 635</td>
<td>4.0 - 6.0</td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Carboguard 635</td>
<td>4.0 - 6.0</td>
</tr>
<tr>
<td></td>
<td>Total Dry Film</td>
<td></td>
<td>8.0 - 12.0</td>
</tr>
</tbody>
</table>

Manufacturer: Sherwin Williams

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mil</th>
<th>Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSPC SP-16 Specification for Brush-off Blast Cleaning Non-Ferrous Metals</td>
<td>1st Coat</td>
<td>Duraplate 235 MP Epoxy</td>
<td>4.0 - 8.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stripe Coat</td>
<td>Duraplate 235 MP Epoxy</td>
<td>4.0 - 8.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Duraplate 235 MP Epoxy</td>
<td>4.0 - 8.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Dry Film</td>
<td></td>
<td>12.0 - 24.0</td>
<td></td>
</tr>
</tbody>
</table>

2.2.4 OVERHEAD METAL DECKING, JOIST

Table I: Interior Exposure (In a Dry Area)

Manufacturer: Thence

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mil</th>
<th>Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSPC-SP1: Specification for Solvent Cleaning</td>
<td>Primer</td>
<td>Series 115 Color Uni-Bond DF</td>
<td>2.5 - 3.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Series 115 Color Uni-Bond DF</td>
<td>2.5 - 3.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Dry Film</td>
<td></td>
<td>5.0 - 7.0</td>
<td></td>
</tr>
</tbody>
</table>

Manufacturer: Carboline

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mil</th>
<th>Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSPC-SP1: Specification for Solvent Cleaning</td>
<td>Primer</td>
<td>Carbocrylic 3359 DTM</td>
<td>2.5 - 3.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Carbocrylic 3359 DTM</td>
<td>2.5 - 3.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Dry Film</td>
<td></td>
<td>5.0 - 7.0</td>
<td></td>
</tr>
</tbody>
</table>

Manufacturer: Sherwin Williams

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mil</th>
<th>Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSPC-SP1: Specification for Solvent Cleaning</td>
<td>Primer</td>
<td>Pro Industrial Waterborne Acrylic Dryfall</td>
<td>1.5 - 2.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Pro Industrial Waterborne Acrylic Dryfall</td>
<td>1.5 - 2.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Dry Film</td>
<td></td>
<td>3.0 - 5.0</td>
<td></td>
</tr>
</tbody>
</table>
### Table J: Interior Exposure (In a Wet Area)

**Manufacturer: Thence**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SSPC-SP7: Specification for Brush Blast Cleaning</strong></td>
<td>Primer</td>
<td>Series 20HSi-Build Epoxoline</td>
<td>3.0 - 4.0</td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Series 20HS Hi-Build Epoxoline</td>
<td>3.0 - 4.0</td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td>Total Dry Film</td>
<td>6.0 - 8.0</td>
</tr>
</tbody>
</table>

**Manufacturer: Carboine**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SSPC-SP7: Specification for Brush Blast Cleaning</strong></td>
<td>Primer</td>
<td>Carboguard 890 High Solids Epoxy</td>
<td>3.0 - 4.0</td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Carboguard 890 High Solids Epoxy</td>
<td>3.0 - 4.0</td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td>Total Dry Film</td>
<td>6.0 - 8.0</td>
</tr>
</tbody>
</table>

**Manufacturer: Sherwin Williams**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SSPC-SP7: Specification for Brush Blast Cleaning</strong></td>
<td>Primer</td>
<td>Macropoxy 646 FC Epoxy</td>
<td>3.0 - 4.0</td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Macropoxy 646 FC Epoxy</td>
<td>3.0 - 4.0</td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td>Total Dry Film</td>
<td>6.0 - 8.0</td>
</tr>
</tbody>
</table>

### 2.2.5 MILL COATED STEEL PIPE

### Table K: Exterior/Interior Exposure (Non-immersion)

**Manufacturer: Thence**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SSPC-SF3: Specification for Power Tool Cleaning</strong></td>
<td>Primer</td>
<td>Series 20 HS 1211 Epoxoline Primer</td>
<td>3.0 - 4.0</td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Series 20 HS Color Hi-Build Epoxoline</td>
<td>4.0 - 5.0</td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td>(As Selected)</td>
<td>Total Dry Film</td>
</tr>
</tbody>
</table>

**Manufacturer: Carboine**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SSPC-SF3: Specification for Power Tool Cleaning</strong></td>
<td>Primer</td>
<td>Carboguard 890 High Solids Epoxy</td>
<td>3.0 - 4.0</td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Carboguard 890 High Solids Epoxy</td>
<td>4.0 - 5.0</td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td>Total Dry Film</td>
<td>7.0 - 9.0</td>
</tr>
</tbody>
</table>

**Manufacturer: Sherwin Williams**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SSPC-SF3: Specification for Power Tool Cleaning</strong></td>
<td>Primer</td>
<td>Macropoxy 646 FC Epoxy</td>
<td>4.0 - 6.0</td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Macropoxy 646 FC Epoxy</td>
<td>4.0 - 6.0</td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td>Total Dry Film</td>
<td>8.0 - 12.0</td>
</tr>
</tbody>
</table>
### Table L: Exterior/Interior Exposure (Non-immersion)

**Manufacturer: Thermec**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSSPC-SP16: Specification for Brush-off Blast Cleaning Non-Ferrous Metals or SSSPC-SP1 Solvent Cleaning</td>
<td>Primer</td>
<td>Series 201HS Color Hi-Build Epoxoline</td>
<td>4.0 – 5.0</td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Series 73 Color Endura-Shield</td>
<td>3.0 – 4.0</td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Dry Film</td>
<td></td>
<td>7.0 – 9.0</td>
</tr>
</tbody>
</table>

**Manufacturer: Carboline**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSSPC-SP16: Specification for Brush-off Blast Cleaning Non-Ferrous Metals or SSSPC-SP1 Solvent Cleaning</td>
<td>Primer</td>
<td>Carboguard 890 High Solids Epoxy</td>
<td>4.0 – 5.0</td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Carbothane 133HB Urethane</td>
<td>3.0 – 5.0</td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Dry Film</td>
<td></td>
<td>7.0 – 10.0</td>
</tr>
</tbody>
</table>

**Manufacturer: Sherwin Williams**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSSPC-SP16: Specification for Brush-off Blast Cleaning Non-Ferrous Metals or SSSPC-SP1 Solvent Cleaning</td>
<td>Primer</td>
<td>Macropoxy 646 FC Epoxy</td>
<td>5.0 – 10.0</td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Acrolon 7300 Polyurethane</td>
<td>2.0 – 4.0</td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Dry Film</td>
<td></td>
<td>7.0 – 14.0</td>
</tr>
</tbody>
</table>
Table M: Interior Exposure (Non-immersion)

**Manufacturer: Thencel**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSSPC-SP16: Specification for Brush-off Blast Cleaning Non-Ferrous Metals or SSPC SP1 Solvent Cleaning, Great Lakes Laboratories Clean 'n Etch shall be used on the galvanized surface prior to coating</td>
<td>Primer</td>
<td>Series 20HS Hi-Build Epoxyline</td>
<td>4.0 – 5.0</td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Dry Film</td>
<td></td>
<td></td>
<td>4.0 – 5.0</td>
</tr>
</tbody>
</table>

**Manufacturer: Carboline**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSSPC-SP16: Specification for Brush-off Blast Cleaning Non-Ferrous Metals or SSPC SP1 Solvent Cleaning, Great Lakes Laboratories Clean 'n Etch shall be used on the galvanized surface prior to coating</td>
<td>Primer</td>
<td>Carboguard 890 High Solids Epoxy</td>
<td>4.0 – 5.0</td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Dry Film</td>
<td></td>
<td></td>
<td>4.0 – 5.0</td>
</tr>
</tbody>
</table>

**Manufacturer: Sherwin Williams**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSSPC-SP16: Specification for Brush-off Blast Cleaning Non-Ferrous Metals or SSPC SP1 Solvent Cleaning, Great Lakes Laboratories Clean 'n Etch shall be used on the galvanized surface prior to coating</td>
<td>Primer</td>
<td>Macropoxy 646 FC Epoxy</td>
<td>5.0 – 10.0</td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Dry Film</td>
<td></td>
<td></td>
<td>5.0 – 10.0</td>
</tr>
</tbody>
</table>

2.2.7 CONCRETE, ROOF DECK

Table N: Interior Exposure (Non-Immersion)

**Manufacturer: Thencel**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface shall be clean and dry. Fill all bugholes and voids in the concrete with Thencel Series 218 MortarClad.</td>
<td>Primer</td>
<td>Series 20HS Color Hi-Build Epoxyline</td>
<td>180 Sq. Ft./Gal.</td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Series 20HS Color Hi-Build Epoxyline</td>
<td>180 Sq. Ft./Gal.</td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Dry Film</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Manufacturer: Carboline**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface shall be clean and dry. Fill all bugholes and voids in the concrete with Carboline 510 Epoxy Patching &amp; Surfacing Compound</td>
<td>Primer</td>
<td>Carboguard 890 High Solids Epoxy</td>
<td>5.0 – 8.0</td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Carboguard 890 High Solids Epoxy</td>
<td>5.0 – 8.0</td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Dry Film</td>
<td></td>
<td></td>
<td>10.0 – 16.0</td>
</tr>
</tbody>
</table>

**Manufacturer: Sherwin Williams**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface shall be clean and dry. Fill all bugholes and voids in the concrete with Duraplate 2390 Re-Surfacers</td>
<td>Primer</td>
<td>Macropoxy 646 FC Epoxy</td>
<td>5.0 – 10.0</td>
</tr>
<tr>
<td></td>
<td>2nd Coat</td>
<td>Macropoxy 646 FC Epoxy</td>
<td>5.0 – 10.0</td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Dry Film</td>
<td></td>
<td></td>
<td>10.0 – 20.0</td>
</tr>
</tbody>
</table>
### 2.2.8 CONCRETE FLOORS

**Table O: Epoxy High Build Floor Coating (Thin Film Epoxy)**

*Manufacturer: Tnemec*

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanically abrade per manufacturers recommendations</td>
<td>Primer</td>
<td>Series 201 Epoxoprime</td>
<td>190 Sq. Ft./Gal.</td>
</tr>
<tr>
<td>2nd Coat</td>
<td>Series 280 Tneme-glaze</td>
<td>200 Sq. Ft./Gal.</td>
<td></td>
</tr>
<tr>
<td>3rd Coat</td>
<td>Series 291 CRU</td>
<td>537 Sq. Ft./Gal.</td>
<td></td>
</tr>
<tr>
<td>Total Dry Film</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Manufacturer: Carbolite*

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanically abrade per manufacturers recommendations</td>
<td>Primer</td>
<td>Carboseal 720 Epoxy Primer</td>
<td>320 Sq Ft/Gal</td>
</tr>
<tr>
<td>2nd Coat</td>
<td>Carboseal 745 Epoxy</td>
<td>200 Sq Ft/Gal</td>
<td></td>
</tr>
<tr>
<td>3rd Coat</td>
<td>Carboseal 833 Urethane</td>
<td>350 Sq Ft/Gal</td>
<td></td>
</tr>
<tr>
<td>Total Dry Film</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Manufacturer: Sherwin Williams*

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanically abrade per manufacturers recommendations</td>
<td>Primer</td>
<td>GP 3579 Epoxy Primer</td>
<td>400 Sq Ft/Gal</td>
</tr>
<tr>
<td>2nd Coat</td>
<td>GP 3746 Epoxy</td>
<td>200 Sq Ft/Gal</td>
<td></td>
</tr>
<tr>
<td>3rd Coat</td>
<td>GP 4687 Urethane</td>
<td>300 Sq Ft/Gal</td>
<td></td>
</tr>
<tr>
<td>Total Dry Film</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 2.2.9 CONCRETE FILL SURFACE COATING IN SHAFT PUMP SUMP

**Table P: High Build Epoxy Concrete Surface Coating**

*Manufacturer: Tnemec*

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSPCSP13/NACE6, ICR1 CSP5</td>
<td>1st Coat</td>
<td>Series 218 Mortar-clad applied as a parging coat over the entire surface to fill all voids and holes and to provide a smooth and even finish</td>
<td>8 - 12</td>
</tr>
<tr>
<td>2nd Coat</td>
<td>Series 141</td>
<td>8 - 12</td>
<td></td>
</tr>
<tr>
<td>3rd Coat</td>
<td>Series 141</td>
<td>8 - 12</td>
<td></td>
</tr>
<tr>
<td>Total Dry Film</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Manufacturer: Carbolite*

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSPCSP13/NACE6, ICR1 CSP5</td>
<td>1st Coat</td>
<td>CarboGuard 510 SG Mortar coat over the entire surface to fill all voids and holes and to provide a smooth and even finish</td>
<td>25.0 - 35.0</td>
</tr>
<tr>
<td>2nd Coat</td>
<td>Plasite 45508</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd Coat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Dry Film</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Manufacturer: Sherwin Williams*

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSPCSP13/NACE6, ICR1 CSP5</td>
<td>1st Coat</td>
<td>Durplate 2300 applied as a parging coat over the entire surface to fill all voids and holes and to provide a smooth and even finish</td>
<td>15 - 125</td>
</tr>
<tr>
<td>2nd Coat</td>
<td>Durplate 5960 or Durplate 6100</td>
<td>15.0 - 125.0</td>
<td></td>
</tr>
<tr>
<td>3rd Coat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Dry Film</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

09900-15 of 22
### Table Q: Exterior Exposure

**Manufacturer: Teemec**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primer</td>
<td>Series 156 Enviro-Crete</td>
<td>60-80 Sq. Ft./Gal.</td>
</tr>
<tr>
<td>Surfaces shall be clean and dry.</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Coat</td>
<td>Series 156 Enviro-Crete</td>
<td>10.0 - 12.0</td>
</tr>
<tr>
<td></td>
<td>3&lt;sup&gt;rd&lt;/sup&gt; Coat</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Manufacturer: Carboline**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primer</td>
<td>Flexide Elastomeric</td>
<td>6.0 - 8.0</td>
</tr>
<tr>
<td>Surfaces shall be clean and dry.</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Coat</td>
<td>Flexide Elastomeric</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3&lt;sup&gt;rd&lt;/sup&gt; Coat</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Manufacturer: Sherwin Williams**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primer</td>
<td>Loxon XP</td>
<td>6.0 - 8.0</td>
</tr>
<tr>
<td>Surfaces shall be clean and dry.</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Coat</td>
<td>Loxon XP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3&lt;sup&gt;rd&lt;/sup&gt; Coat</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table R: Interior Exposure (Non-Immersion)

**Manufacturer: Teemec**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primer</td>
<td>Series 1254 Expoblock (Fill all voids)</td>
<td>60-80 Sq. Ft./Gal.</td>
</tr>
<tr>
<td>Surface shall be clean and dry</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Coat</td>
<td>Series 20 HS Color Hi-Build Epoxoline</td>
<td>175 Sq. Ft./Gal.</td>
</tr>
<tr>
<td></td>
<td>3&lt;sup&gt;rd&lt;/sup&gt; Coat</td>
<td>Series 20 HS Color Hi-Build Epoxoline</td>
<td>175 Sq. Ft./Gal.</td>
</tr>
</tbody>
</table>

**Manufacturer: Carboline**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primer</td>
<td>Sanitile 100 Block Filler</td>
<td>60-70 Sq Ft/Gal</td>
</tr>
<tr>
<td>Surface shall be clean and dry</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Coat</td>
<td>Carboguard 890 High Solids Epoxy</td>
<td>4.0 - 6.0</td>
</tr>
<tr>
<td></td>
<td>3&lt;sup&gt;rd&lt;/sup&gt; Coat</td>
<td>Carboguard 890 High Solids Epoxy</td>
<td></td>
</tr>
</tbody>
</table>

**Manufacturer: Sherwin Williams**

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primer</td>
<td>HD Blockfiller</td>
<td>60-70 Sq Ft/Gal</td>
</tr>
<tr>
<td>Surface shall be clean and dry</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; Coat</td>
<td>Macroxy 646 FC Epoxy</td>
<td>5.0 - 10.0</td>
</tr>
<tr>
<td></td>
<td>3&lt;sup&gt;rd&lt;/sup&gt; Coat</td>
<td>Macroxy 646 FC Epoxy</td>
<td></td>
</tr>
</tbody>
</table>

**Total Dry Film**

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2.2.11 WOOD

Table 5: Exterior/Interior Exposure

Manufacturer: Thence

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primer</td>
<td>Series 10-99W Primer</td>
<td>2.5 - 3.5</td>
</tr>
<tr>
<td>Surfaces shall be clean and dry.</td>
<td>2nd Coat</td>
<td>Series 1028 Enduratone</td>
<td>2.0 - 3.0</td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td>Series 1028 Enduratone</td>
<td>2.0 - 3.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total Dry Film</td>
<td>6.5 - 9.5</td>
</tr>
</tbody>
</table>

Manufacturer: Carboline

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primer</td>
<td>Santile 120 Primer</td>
<td>2.0 - 3.0</td>
</tr>
<tr>
<td>Surfaces shall be clean and dry.</td>
<td>2nd Coat</td>
<td>Carbocryl 3359</td>
<td>2.0 - 3.0</td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td>Carbocryl 3359</td>
<td>2.0 - 3.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total Dry Film</td>
<td>6.0 - 9.0</td>
</tr>
</tbody>
</table>

Manufacturer: Sherwin Williams

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primer</td>
<td>Wall &amp; Wood Primer</td>
<td>2.0 - 3.0</td>
</tr>
<tr>
<td>Surfaces shall be clean and dry.</td>
<td>2nd Coat</td>
<td>Pro-Industrial Acrylic</td>
<td>2.0 - 4.0</td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td>Pro-Industrial Acrylic</td>
<td>2.0 - 4.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total Dry Film</td>
<td>6.0 - 11.0</td>
</tr>
</tbody>
</table>

2.2.12 INSULATED PIPE

Table 7: Interior Exposure (For Coating the Insulation)

Manufacturer: Thence

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primer</td>
<td>Series 1026 Enduratone</td>
<td>265 Sq. Ft./Gal.</td>
</tr>
<tr>
<td>Surfaces shall be clean and dry.</td>
<td>2nd Coat</td>
<td>Series 1026 Enduratone</td>
<td>265 Sq. Ft./Gal.</td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total Dry Film</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: For semi-glass finish, use Series 29 Color Tufcryn S/G

Manufacturer: Carboline

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primer</td>
<td>Santile 120 Primer</td>
<td>2.0 - 3.0</td>
</tr>
<tr>
<td>Surfaces shall be clean and dry.</td>
<td>2nd Coat</td>
<td>Carbocryl 3359</td>
<td>2.0 - 3.0</td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td></td>
<td>2.0 - 3.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total Dry Film</td>
<td>4.0 - 6.0</td>
</tr>
</tbody>
</table>

NOTE: For semi-glass finish use Carbocryl 3359.

Manufacturer: Sherwin Williams

<table>
<thead>
<tr>
<th>Surface Preparation</th>
<th>Coating</th>
<th>Manufacturer coating Series</th>
<th>Dry Film Mils</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primer</td>
<td>Pro Industrial Acrylic</td>
<td>2.0 - 4.0</td>
</tr>
<tr>
<td>Surfaces shall be clean and dry.</td>
<td>2nd Coat</td>
<td>Pro Industrial Acrylic</td>
<td>2.0 - 4.0</td>
</tr>
<tr>
<td></td>
<td>3rd Coat</td>
<td></td>
<td>2.0 - 4.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total Dry Film</td>
<td>4.0 - 8.0</td>
</tr>
</tbody>
</table>

2.3 GENERAL COLOR SCHEDULE OF COATING

2.3.1 Structural Steel, Motors, Equipment.

2.3.1.1 Motors – All motors shall be coated the same color as the equipment they are attached to.

2.3.1.2 Equipment – In general the equipment shall be coated the same color as the piping associated with it. New equipment from construction projects will not be coated until the construction coating shows failure, and the warranty has expired.

2.3.1.3 Coordinate color of equipment with Owner.

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2.3.1.4 Piping shall be coated by pipe type in the colors in the colors identified in Table U.

<table>
<thead>
<tr>
<th>Pipe Type</th>
<th>Generic Color</th>
<th>Color Identification</th>
<th>Label Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combustible Liquids (Diesel Fuel, Gasoline, etc.)</td>
<td>Safety Brown</td>
<td>10080 Safety Brown</td>
<td>White</td>
</tr>
<tr>
<td>Water, Non-potable</td>
<td>Clay</td>
<td>4048 Mason Brick</td>
<td>White</td>
</tr>
<tr>
<td>Water, Finished or Potable</td>
<td>Water Safety Blue</td>
<td>4086 Safety Blue</td>
<td>White</td>
</tr>
<tr>
<td>Wastewater, Grit</td>
<td>Safety Green</td>
<td>4085 Safety Green</td>
<td>White</td>
</tr>
<tr>
<td>Wastewater, Sewer (Sanitary or Other)</td>
<td>Dark Grey</td>
<td>4017 Graphite</td>
<td>White</td>
</tr>
<tr>
<td>Other, Compressed Air</td>
<td>Dark Green</td>
<td>4071 Rain Forest</td>
<td>White</td>
</tr>
<tr>
<td>Other, Gas</td>
<td>Red</td>
<td>4040 Deck Red</td>
<td>White</td>
</tr>
<tr>
<td>Other Lines</td>
<td>Light Grey</td>
<td>4020 Zephyr</td>
<td>White</td>
</tr>
<tr>
<td>Hoists, Trolleys</td>
<td>Safety Yellow</td>
<td>4084 Safety Yellow</td>
<td>Black</td>
</tr>
<tr>
<td>Fire Protection</td>
<td>Safety Red</td>
<td>4081 Safety Red</td>
<td>White</td>
</tr>
</tbody>
</table>

2.3.2 Piping Labels

2.3.2.1 Piping labels sizes and letter heights shall be as tabulated in Table V.

<table>
<thead>
<tr>
<th>Outside Pipe Diameter (in)</th>
<th>Min. Length of Color Background (in)</th>
<th>Minimum Letter Height (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.75–1.25</td>
<td>8</td>
<td>0.5</td>
</tr>
<tr>
<td>1.5–2</td>
<td>8</td>
<td>0.75</td>
</tr>
<tr>
<td>2.5–6</td>
<td>12</td>
<td>1.25</td>
</tr>
<tr>
<td>8–10</td>
<td>24</td>
<td>2.5</td>
</tr>
<tr>
<td>&gt;10</td>
<td>32</td>
<td>3.5</td>
</tr>
</tbody>
</table>

2.3.2.2 Piping labels shall be placed and positioned on the pipes so they can be easily seen and read from the normal angle of approach.

2.3.2.3 Piping labels shall include arrows indicating the direction of flow in the pipe.

PART 3 EXECUTION

3.1 INSPECTION

3.1.1 GENERAL: Examine the areas and conditions under which coating work is to be applied and notify the Engineer in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.

3.1.2 ACCEPTANCE OF SURFACES: Starting of coating work will be construed as acceptance of the surfaces and conditions within any particular area. Do not coat over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to the formation of a durable coating film.

3.2 PREPARATION OF SURFACES

3.2.1 GENERAL: Perform preparation and cleaning procedures in strict accordance with the coating manufacturer's instructions and as herein specified, for each particular substrate condition.

3.2.2 PROTECTION OF AREAS AND SPACES: Remove, mask, or otherwise protect, prior to surface preparation and coating operations, such items as hardware, hardware accessories, machined surfaces, radiator covers, plates, lighting fixtures, and similar items in contact with coated surfaces. Remove, if necessary, for the complete coating of the items and adjacent surfaces. Following completion of coating, reinstall removed items utilizing workmen skilled in the trades involved for such removal and reinstalla-
3.2.3 CLEANING: Remove all dirt, rust, scale, splinters, loose particles, disintegrated coatings, grease, oil, and other deleterious substances from all surfaces which are to be coated or otherwise finished. Allow putty to set one week before coating. Allow caulking and glazing compounds to cure for times stated in manufacturers literature prior to being coated. Sandpaper entire surface of existing enamel and other glossy surfaces before application of any coatings. Inspect surfaces after preparation and receive approval before application of any coatings. On surfaces to be coated with water thinned coatings, spot prime with a brush all exposed nails and other ferrous metal with zinc chromate primer.

3.2.4 CONCRETE AND MASONRY: Remove dirt, fungus, grease, and oil prior to application of coatings. Wash new and previously uncoated surfaces with a solution composed of from 2 to 8 ounces of trisodium phosphate per gallon of hot water and then rinse thoroughly with fresh water. Remove efflorescence by scraping, wire brushing, and washing with a 5- to 10-percent by weight aqueous solution of hydrochloric (muriatic) acid and then wash thoroughly with fresh water, removing all traces of the acid. Give all new surfaces to be coated with other than cement-water coating a neutralizing treatment consisting of 2 pounds of zinc sulphate in one gallon of warm water. Apply the neutralizer liberally and allow to dry, then rinse the surfaces thoroughly with clean water and allow to dry for not less than 48 hours before coating is applied.

3.2.5 CONCRETE AND MASONRY TO RECEIVE TEXTURED COATING: The surface must be clean, dry, and free of oil, grease, form release agents, etc., prior to coating application. Remove old coating (loose or tight) and efflorescence. Clean caulked surfaces. Repair or fill all mortar joints and major defects following manufacturers' recommendations.

3.2.6 NEW UNPRIMED METAL SURFACES: Solvent clean zinc-coated surfaces with a biodegradable cleaner such as noted in the Surface Preparation section of this specification and wipe dry with clean, dry cloths. Treat aluminum surfaces to be coated with a 10 percent aqueous solution of chromic acid at a temperature of not less than 140 degrees F for 3 to 5 minutes and rinse thoroughly with clean warm water. Immediately after cleaning and treating, apply pretreatment wash primer, Mil. Spec. DOD-PIL328, to a dry film thickness of 0.2 to 0.5 mil on zinc-coated, aluminum, brass, copper, and ferrous surfaces. Apply primer as soon as practicable after pretreatment has dried.

3.2.7 GALVANIZED SURFACES: Remove dirt and grease with and wipe dry with clean cloths. Pretreat galvanized steel surfaces with proprietary acid-bound resinous or crystal-line zinc phosphate preparation, prior to coating, unless manufacturer of primer used directs otherwise.

3.3 MATERIALS PREPARATION

3.3.1 COLORS AND SCHEDULING: Secure approval of color samples before applying any coating or finish. Tint priming coats and undercoats to approximate shade of final coat. Furnish schedule showing when respective coats of coating for the various areas and surfaces are to be applied. Keep schedule current as job progress dictates. If Engineer so directs, do not apply succeeding coats until he has had opportunity to inspect completed coat.

3.3.2 LABOR, TOOLS AND MATERIAL: Employ only skilled mechanics. Application may be by brush, roller, or spray in accordance with manufacturer's published recommendations, except for specific cases specified otherwise. Keep equipment clean and in condition to provide quality job specified. Do not use same brush for application of coating on smooth surfaces which have been used to coating concrete. Mix, thin,
modify and apply materials only as specified by manufacturer's directions on container.

3.3.3 MIXING:

3.3.3.1 Mix and prepare coating materials in accordance with manufacturer's directions.

3.3.3.2 Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing and application of coating in a clean condition, free of foreign materials and residue.

3.3.3.3 Stir materials before application to produce a mixture of uniform density and stir as required during the application of the materials. Do not stir surface film into the material. Remove the film and if necessary, strain the material before using.

3.4 APPLICATION

3.4.1 GENERAL:

3.4.1.1 Before coating is started in any area, broom-clean the area and remove excessive dust from all areas to be coated. Broom cleaning, after coating operations begin in a given area will not be allowed; perform this cleaning with commercial vacuum cleaning equipment. Provide adequate illumination in all areas where coating operations are in progress.

3.4.1.2 Provide finished surfaces smooth, even, and free from runs, drops, defects, ridges, waves, laps, brush marks, and variations in colors. Avoid contamination of other surfaces and public and private property in the area; repair all damage thereto.

3.4.1.3 Apply coating in accordance with the manufacturer's directions. Use applicators and techniques best suited for the substrate and type of material being applied.

3.4.1.4 Apply additional coats when undercoats, stains, or other conditions show through the final coat of coating, until the coating film is of uniform finish, color, and appearance. Give special attention to ensure that all surfaces, including edges, corners, crevices, welds, and exposed fasteners, receive a dry film thickness equivalent to that of flat surfaces.

3.4.1.5 Coating surfaces behind movable equipment and furniture the same as similar exposed surfaces. Coating surfaces behind permanently fixed equipment or furniture with prime coat only before final installation of equipment.

3.4.1.6 Coating interior surfaces of ducts, where visible through registers or grilles, with a flat, non- specular black coating.

3.4.1.7 Coating the back sides of access panels and removable or hinged covers to match the exposed surfaces.

3.4.1.8 Finish exterior doors on tops, bottoms, and side edges the same as the exterior faces unless otherwise indicated.

3.4.1.9 Sand lightly between each succeeding enamel or varnish coat.

3.4.2 SCHEDULING COATING:

3.4.2.1 Apply the first-coat material to surfaces that have been cleaned, pretreated, or otherwise prepared for coating as soon as practicable after preparation and before subsequent surface deterioration.
3.4.2.2 Allow sufficient time between coats to permit thorough drying and provide each coat in proper condition to receive the next coat. Ensure that each coat covers the surface of the preceding coat or surface completely; there shall be an easily perceptible difference in shades of successive coats. Do not recoat until coating has dried to where it feels firm, does not deform, or feel sticky under moderate thumb pressure, and the application of another coat of coating does not cause lifting or loss of adhesion of the undercoat.

3.4.3 MINIMUM COATING THICKNESS:

3.4.3.1 Apply each material at not less than the manufacturer's recommended spreading rate, to establish a total dry film thickness as indicated or as recommended by coating manufacturer.

3.4.3.2 If coatings are thinned for spraying, the film thickness after application shall be the same as though the un-thinned coating were applied by brush. That is, the addition of a thinner shall not be used as a means of extending the coverage of the coating, but the area covered shall be no greater than the area which would have been covered with the same quantity of un-thinned coating.

3.4.4 STEELWORK AND IRONWORK:

3.4.4.1 Before being erected or set, coat those parts of ironwork and steelwork which are to be embedded in concrete or masonry with one field coat of the same type of coating as the shop coat. This provision does not apply to concrete reinforcement, steel conduits, and accessories.

3.4.4.2 Apply the touch-up coat to all steel and miscellaneous metals immediately upon arrival at the site.

3.4.5 MECHANICAL AND ELECTRICAL WORK:

3.4.5.1 Coating of mechanical and electrical work is limited to those items exposed in mechanical equipment rooms and in occupied spaces.

3.4.5.2 Mechanical items to be coated include, (but are not necessarily limited to) the following:
   a) Piping, pipe hangers, and supports
   b) Heat exchangers
   c) Tanks
   d) Ductwork
   e) Insulation
   f) Motor, mechanical equipment, and supports
   g) Accessory items

3.4.5.3 Electrical items to be coated include, (but are not necessarily limited to) the following:
   a) Conduit and fittings
   b) Switchgear

3.4.6 PIGMENTED (OPAQUE) FINISHES: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
3.4.7 TRANSPARENT (CLEAR) FINISHES:

3.4.7.1 Use multiple coats to produce glass-smooth surface film of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections.

3.4.7.2 Provide satin finish for final coats, unless otherwise indicated.

3.4.8 STIPPLE ENAMEL FINISH: Roll and redistribute coating to an even and fine texture. Leave no evidence of rolling such as laps, irregularity in texture, skid marks, or other surface imperfections.

3.4.9 FIELD ADJUSTMENT OF FINAL COAT: Provide minor tinting to adjust finish coat to either lighter or darker shade in field as directed.

3.4.10 PIPE IDENTIFICATION AND COLOR CODING:

3.4.10.1 In addition to any other specified coating for exposed interior piping, stencil a legend showing the name of the contents and an arrow showing the direction of flow on each pipe of the systems listed below in accordance with the color schedule at appropriate intervals, and, in general, at each valve and piece of equipment. The size and location of the legend shall be in general accordance with American Standard Association Scheme for the identification of Piping Systems (A131.1-1981).

3.4.10.2 Color code and identify the pipes in accordance with the schedule to be furnished by the Engineer.

3.5 CLEAN-UP AND PROTECTION

3.5.1 CLEAN-UP:

3.5.1.1 During the progress of the work, remove from the site all discarded coating materials, rubbish, cans, and rags at the end of each workday.

3.5.1.2 Upon completion of coating work, clean window glass and other coating-splattered surfaces. Remove splattered coating by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

3.5.2 PROTECTION:

3.5.2.1 Protect work of other trades, whether to be coated or not, against damage by coating and finishing work. Correct any damage by cleaning, repairing, or replacing, and recoating, as acceptable to the Engineer.

3.5.2.2 Provide "Wet Coating" signs as required to protect newly coated finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of coating operation.

3.5.2.3 At the completion of work of other trades, touch-up and restore all damaged or defaced coated surfaces.

(End of Section 09900)
PART 1 GENERAL

1.1 APPLICABLE REQUIREMENTS

1.1.1 This section applies to all sections of Division 11, EQUIPMENT, of this project except as specified otherwise in each individual section. Drawings and Specifications shall be considered as supplementary, one to the other, so that materials and labor indicated, called for, or implied by the one and not the other, shall be supplied and installed as though specifically called for by both.

1.1.2 This Section shall be considered supplemental to Division 1 Sections and applies to all sections of Division 11 such that requirements indicated in this Section shall be in addition to those indicated in Division 1. This Section shall not relieve or in any respect diminish any requirements of Division 1 Sections.

1.2 DESCRIPTION

1.2.1 The Work under Division 11 Sections of the Specifications consists of providing the various items of equipment required under this contract. Each item shall be furnished complete, installed, and operable as shown on the Drawings and in accordance with these Specifications and the manufacturer’s recommendations and instructions.

1.2.2 The omission of any reference to parts or work necessary or incidental to a complete installation shall not be construed as releasing the Contractor from furnishing such parts.

1.3 BASIS OF DESIGN AND SPECIFICATION CONFORMANCE

1.3.1 Where specific manufacturers are identified for a specified item in the Specifications or Drawings, the equipment of the named manufacturer or manufacturers has been used as the basis of design. Substitution of a piece of equipment of equal substance and function shall be allowed only when approved by the Owner.

1.3.2 Such substitutions shall be offered for approval or rejection by the Owner through the processes identified in Section 01300 Submittals, and 01300-F1 Register of Exceptions and Notations.

1.4 SUBMITTALS

1.4.1 Submit shop drawings, data sheets, and other required materials or data in accordance with Section 01300 SUBMITTALS.

1.4.2 All submittals from subcontractors, manufacturers and suppliers shall be sent directly to the Contractor for checking. The Contractor shall thoroughly check submittals and drawings for accuracy and conformance to the intent of the Contract Documents. Drawings found to be inaccurate or in error shall be returned by the Contractor for correction before submitting to the Engineer. All submittals shall be stamped and approved by the Contractor indicating that the Contractor has verified all dimensions, construction criteria, materials and the submittal fully conforms to the Contract Documents.

1.4.3 The Contractor shall submit all shop drawings in a timely manner, allowing for review time, revise and resubmit time and manufacturing time to meet the project schedule.

1.4.4 Partial submittals will not be acceptable and will be returned without review.

1.4.5 No materials or equipment shall be ordered, fabricated or shipped or any work performed until the Owner returns the submittal to the Contractor with approval stamp marked as “No Exceptions Taken” or Make Corrections Noted” and any registered

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Exceptions, Notations, and Clarifications identified in Section 01300-F1 approved and incorporated by the Owner.

1.4.6 The Contractor shall assume all the risk for all material and equipment which are fabricated or delivered prior to the approval of the submittals.

1.4.7 All submittals shall be bound, dated, properly labeled, organized, and indexed. Information on the label shall include specification section and paragraph reference, name or type of item submitted, manufacturers or suppliers name. The submittals shall also include, applicable federal, military, industry, and technical society publication references, and other information necessary to establish contract compliance of each item the Contractor proposes to furnish.

1.4.8 Any proposed exceptions to the Contract Documents shall be registered as required by Sections 01300 and 01300-F1. Submittals that do not reference any proposed exception to the Contract Documents shall be assumed to be in full compliance with the Contract Documents.

1.4.9 A copy of the specification section and all other applicable specification sections governing the specified equipment/work shall be included in the submittal. The specification section shall be complete with addendum updates included.

1.4.10 If the Contractor submits equipment that requires modifications to the equipment, piping, electrical conduit, and wires etc., the Contractor shall also submit details of the needed modifications required to accommodate the proposed equipment. If such equipment and modifications are accepted, the Contractor shall perform all work necessary to make the modifications at no additional cost to the owner.

1.4.11 Submit shop drawings and/or data sheets for approval on all items of equipment, materials, and accessories furnished under this Contract whether specifically listed or not. Submittals shall include but not limited to:

1.4.11.1 All information required in each individual specification section

1.4.11.2 Drawings

1.4.11.3 Complete product information, installation requirements, details, and instructions. The catalogs, diagrams, schematics, drawings, instructions, and manuals shall be marked by underlining and/or checking. Exteraneous data shall be removed. The information shall pertain only to the specific equipment item.

1.4.11.4 Test reports and certificates for equipment.

1.4.11.5 Signed and sealed piping stress and thermal analysis and pipe support and hanger design.

1.4.11.6 Materials and finish

1.4.12 Drawings shall include but not limited to:

1.4.12.1 Layout and installation drawings in plan, sectional views. The layout and installation drawings shall show equipment identifying and indicating proposed location and dimensions, layout and arrangement of accessories, control panels, piping, ductwork, plumbing, electrical conduits, and other items that must be shown to assure a coordinated installation. Drawings shall indicate adequate clearance for operation, maintenance, and replacement of operating equipment devices.

1.4.12.2 Piping drawings shall indicate pipes, fittings, spools, couplings, valves, connection to equipment, hangers, pipe supports, heating and ventilation
ducts, plumbing lines. The submittals for piping, appurtenances, supports and hangers shall comply with respective technical specifications.

1.4.12.3 Wiring diagrams. Wiring diagrams shall identify cable trays, circuit terminals, and indicate the internal wiring for each item of equipment and the interconnection between each item of equipment.

1.4.12.4 Lighting fixture layouts

1.4.12.5 Instrumentation Diagrams

1.4.12.6 Control Panels

1.4.12.7 Anchor bolt details, and other necessary installation details of equipment.

1.4.12.8 Performance curves for all process pumps shall be submitted with shop drawings. These curves shall show operating head, brake horsepower and efficiency plotted against capacity, and other data where required.

1.4.13 STANDARDS COMPLIANCE: When materials or equipment must conform to the standards of organizations such as the American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), National Electrical Manufacturers Association (NEMA), Underwriters Laboratories (UL), Hydraulic Institute (HI), or other industry standard, proof of such conformance shall be submitted to the Owner for approval. If an organization uses a label or listing to indicate compliance with a particular standard, the label or listing will be acceptable evidence, unless otherwise specified in the individual sections. In lieu of the label or listing, the Contractor shall submit a certificate from an independent testing organization, which is competent to perform acceptable tests and is approved by the Owner. The certificate shall state that the item has been tested in accordance with the specified organization's test methods and that the item conforms to the specified organization's standard. For materials and equipment whose compliance with organizational standards or specifications is not regulated by an organization using its own listing or label as proof of compliance, a certificate of compliance from the manufacturer shall be submitted for approval. The certificate shall identify the manufacturer, the product, and the referenced standard and shall state that the manufacturer certifies that the product conforms to all requirements of the project specification and of the referenced standards listed.

1.4.14 CERTIFIED TEST REPORTS: Before delivery of materials and equipment, certified copies of all test reports specified in the individual sections shall be submitted for approval.

1.4.15 CERTIFICATES OF CONFORMANCE OR COMPLIANCE: Submit certification from the manufacturer attesting that the materials and equipment to be furnished for this project comply, except for those identified, accepted, and incorporated as outlined in Section 01300 and 01300-F1, with the requirements of this specification and of the reference publications. Pre-printed certifications will not be acceptable; certifications shall be in the original. The certification shall not contain statements that could be interpreted to imply that the product does not meet all requirements specified, such as "as good as," "achieve the same end use and results as materials formulated in accordance with the referenced publications;" "equal or exceed the service and performance of the specified material." The certification shall simply state that the product conforms to the requirements specified.

1.5 OPERATION AND MAINTENANCE MANUAL

1.5.1 Manuals shall be specific for the project and not include information that is not applicable to the equipment provided.

1.5.2 As required in each individual section, furnish equipment operation and maintenance manuals. Furnish two (2) copies of the manual(s) bound in hardback binders or an 11010-3 of 11
approved equivalent. In addition, one (1) copy of the operation and maintenance manuals shall also be provided as electronic files on USB thumb drive or other acceptable electronic means. The format of the electronic files shall be compatible with latest version of Adobe Reader (pdf file) software. Electronic files shall be organized in such a manner to facilitate ease of use by the Owner or Owner’s personnel.

1.5.3 Furnish one complete manual prior to the time that equipment tests are performed and furnish the remaining manuals before the contract is completed. Inscribe the following identification on the cover: the words OPERATION AND MAINTENANCE MANUAL, the name and location of the equipment or the building, the name of the Contractor, and the contract number.

1.5.4 The manuals shall include the names, addresses, and telephone numbers of each subcontractor installing the equipment, and of the local representatives for the equipment. The manuals shall have a table of contents and be assembled to conform to the project specifications’ table of contents with the tab sheets placed before instructions covering the subject. The instructions shall be legible and easily read, with the large sheets of drawings folded in as required.

1.5.5 The manuals shall include:

1.5.5.1 Wiring and Control diagrams with data to explain detailed operation and control of each item of equipment.
1.5.5.2 A control sequence describing equipment start-up, operation and shut-down.
1.5.5.3 Description of the function of the item of equipment.
1.5.5.4 The procedure for starting.
1.5.5.5 The procedure for operating.
1.5.5.6 The procedure for shutdown.
1.5.5.7 Installation instructions.
1.5.5.8 Maintenance instructions and frequency.
1.5.5.9 Lubrication schedule including type, grade, temperature range, and frequency.
1.5.5.10 Safety precautions, diagrams, and illustrations.
1.5.5.11 Test procedures.
1.5.5.12 Performance data.
1.5.5.13 Parts list.

1.5.6 The parts lists for equipment shall indicate the sources of supply, recommended spare parts, and the service organization which is both qualified and reasonably convenient to the project site. Wherever possible, factory authorized service centers shall be listed. The manuals shall be complete in all respects for equipment, controls, accessories, and associated appurtenances provided.

1.5.7 The catalogs, diagrams, schematics, drawings, instructions, and manuals shall be marked by underlining and/or checking. Extraneous data shall be removed. The information shall pertain only to the specific equipment item.

1.6 INSTRUCTION TO OWNER’S PERSONNEL

1.6.1 When specified within individual sections, the Contractor shall furnish the services of competent instructors who will give full instruction to the designated plant personnel in the adjustment, operation, and maintenance, including pertinent safety requirements, of
the equipment or system specified. Each instructor shall be thoroughly familiar with all
parts of the installation and shall be trained in operating theory as well as practical
operation and maintenance work. Instruction shall be given during the first regular work
week after the equipment or system has been accepted and turned over to the Owner for
regular operation. The number of hours of instruction furnished shall be as specified in
each section. When more than 2 man-days of instruction are specified, approximately
half of the time shall be used for classroom instruction. All other time shall be used for
instruction with the equipment or system.

1.7 DELIVERY, STORAGE AND HANDLING

1.7.1 Delivery, storage and handling shall be in accordance with specifications and
manufacturer requirements.

1.8 JOB CONDITIONS

1.8.1 The Contract plans indicate the required size and general arrangement of all piping and
equipment. The final exact dimensions and configuration shall be determined by the
exact equipment furnished.

1.8.2 The Contractor, before roughing in any facilities or installation of any equipment, shall
consult all drawings - General, Mechanical, Electrical, etc., and shall inform himself of
materials, finishes, locations of ceilings, structural members, pipes, ducts, lighting
fixtures, conduits, etc., which may affect the installation.

1.8.3 Conflicts or discrepancies discovered before or after work has started shall be brought to
the attention of the Owner immediately, and the Engineer reserves the right to require
minor changes in the work of any Contractor to eliminate such conflicts.

1.9 FACTORY TESTING

1.9.1 Process equipment shall be subjected to factory testing in accordance with requirements
specified within the individual sections.

1.9.2 Factory test of all process pumping equipment shall be performed in accordance with
Hydraulic Institute (HI) standard testing requirements. All pumping equipment which
fails to meet HI standards shall be replaced with pumping equipment which meets the
specified requirements. Two (2) hard-copy and one electronic certified factory
performance test curves for each pump shall be furnished and approved before shipment
of the unit to the site. Test curves shall cover the full range of operation from shut off to
maximum capacity.

1.10 COATINGS

1.10.1 All equipment, motors, drive assemblies and basis shall be furnished in accordance with
Section 09900 - COATINGS and as specified herein.

1.11 GUARANTEE

1.11.1 All equipment shall be guaranteed as specified under the General and General
Supplemental Conditions and as specified in individual sections. Guarantee on all
equipment shall start after formal acceptance of equipment as defined by this section
and after successful completion of start-up procedures.

PART 2 PRODUCTS

2.1 ANCHOR BOLTS

2.1.1 The Contractor shall furnish all anchor bolts of ample size and strength required to
securely anchor each item of equipment. Anchor bolts shall have suitable washers and,
where so required, their nuts shall be hexagonal.

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2.1.2 All anchor bolts, nuts, washers, plates, and bolt sleeves shall be 316 Stainless Steel unless otherwise indicated or specified.

2.1.3 Chemical anchors shall be used for all structural anchors. Expansion bolts shall only be allowed where connection is not structural. Expansion bolts shall have malleable iron and lead composition elements of the required number of units and size.

2.1.4 Anchor bolts and expansion bolts shall be set accurately. If anchor bolts are set before the concrete has been placed, they shall be carefully held in suitable templates of approved design. Where indicated on the Drawings, specified, or required, anchor bolts shall be provided with square plates at least 4 inches by 4 inches by 3/8 inches or shall have square heads and washers and be set in the concrete forms with suitable pipe sleeves, or both. If anchor or expansion bolts are set after the concrete has been placed, all necessary drilling and grouting or caulking shall be done by the Contractor and care shall be taken not to damage the structure or finish by cracking, chipping, spalling, or otherwise during the drilling and caulking.

2.2 NAMEPLATES: With the exceptions mentioned below, each piece of equipment shall be provided with a substantial nameplate of non-corrodible metal, securely fastened in place, and clearly and permanently inscribed with the manufacturer's name, model or type designation, serial number, principal rated capacities, electrical or other power characteristics, and similar information as appropriate. The nameplate of the distributing agent/representative will not be acceptable.

2.3 EQUIPMENT DRIVE GUARDS: All equipment driven by open shafts, couplings, belts, chains, or gears shall be provided with approved all-metal guards enclosing the drive mechanism. Guards shall be constructed of galvanized sheet steel or galvanized 1-inch mesh screen (woven wire or expanded metal) set in a frame of galvanized steel members. Guards shall be secured in position by steel braces or straps which will permit easy removal for servicing the equipment. Guards shall conform to South Carolina Occupational Safety and Health Standards for General Industry.

2.4 LUBRICANTS: During testing and prior to acceptance, the Contractor shall furnish all lubricants necessary for the proper lubrication of all equipment furnished under this contract.

2.5 SPECIAL TOOLS

2.5.1 For each type of equipment furnished by him, the Contractor shall provide a complete set of all special tools (including special grease guns or other lubricating devices) which may be necessary for the adjustment, operation, maintenance, and disassembly of such equipment. Tools shall be high grade, smooth, forged, alloy, tool steel. Grease guns shall be lever type.

2.5.2 Special tools are considered to be those tools which, because of their limited use, are not normally available but which are necessary for the particular equipment.

2.6 MOTORS

2.6.1 Motors shall conform with applicable NEMA, IEEE and USASI Standards, and shall be as manufactured by Siemens, Toshiba, Baldor General Electric or approved equal. Motors using non-standard frames or otherwise of special characteristics will be permitted only with written approval of the Engineer.

2.6.2 Motor ratings shall be based on current NEMA design standards for continuous duty and/or multiple starts per hour on motors through 50 HP. On motors larger than 50 HP starting shall be based on NEMA MG1-20.43 number of starts. Horsepower, torque, and speed characteristics shall be suitable for the full normal range of operating conditions of the driven equipment without exceeding 95% of the nameplate full load amps (FLA) and temperature rise ratings regardless of size. Nameplate (FLA) shall be based on nameplate horsepower (HP) and shall not include the 15% service factor (SF). In addition, all motors 1 HP and larger shall have a 1.15 service factor. Wherever HP
ratings of motors proposed differ from those shown or specified, this fact shall be
prominently noted on the shop drawings submitted.

2.6.3 Process and major mechanical equipment drive motors shall be 3-phase, squirrel-cage
induction type NEMA Design B, 230/460 dual voltage in all sizes and types where this
rating is standard. Larger motors and special motors where dual voltage construction is
not available, shall be furnished in ratings consistent with the nominal system voltage.
Where process drives of fractional HP are required, standard frame 56 units shall be
supplied. Such drives requiring limited power input shall employ overload heaters
undersized accordingly.

2.6.4 General purpose single-phase motors, 1/2 HP and smaller, shall be 115-volt capacitor
start type designed for continuous duty. Light duty motors of the domestic appliance
variety will not be acceptable in this work. Bearings on frame 56 fractional HP motors
shall be of the anti-friction sleeve type.

2.6.5 The Contractor shall be responsible for delivery, handling and setting regardless of local
agreements as to actual work jurisdiction. Further, this responsibility shall include
checking of lubrication, drive alignment and condition, indication of proper rotation,
and any or all other matters relating to operational readiness. When all checks are
satisfactorily accomplished, the readiness of the unit for operation shall be indicated by a
conspicuous and legible tag installed by the responsible individual.

2.6.6 As part of the initial operational test, the Contractor shall arrange for checking and
recording of load current and verification of rating of overload heaters. No unattended
operation of the equipment shall be permitted until completion of this procedure.

2.6.7 Motor frames shall be totally enclosed fan-cooled unless otherwise specified within
individual sections.

2.6.8 All motors larger than NEMA 56 frame shall have anti-friction (ball or roller) bearings,
sized for average life of at least 100,000 hours under normal loading conditions (See
MG1-14.45). Bearing shall be AFBMA Standard sizes. Motors shall be equipped with
endshield-mounted ball bearings made to AFBMA Standards and be of ample capacity
for the motor rating. The bearing housing shall be large enough to hold sufficient
lubricant to minimize the need for frequent relubrication, but facilities shall be provided
for adding new grease and draining out old grease without major motor disassembly.
The bearing housing shall have long, tight, running fits or rotating seals to protect
against the entrance of foreign matter into the bearings, or leakage of grease out of the
bearing cavity. All motors 20 Hp or greater shall incorporate Inpro seals to protect the
bearings.

2.6.9 All motors installed in locations defined as Hazardous (Classes I, II and III, Divisions 1
and 2) by National Electric Code (NEC) and Publication NFPA 820 (Standard for Fire
Protection in Wastewater Treatment and Collection Facilities) shall be explosion proof as
defined by NEC and shall be designed and approved for the classified location in which
the motor is installed.

2.7 BALANCE AND VIBRATION: The vibration in any direction, as measured at the bearing
housings, with the motors running at normal voltage and frequency, the shaft axis in
normal position, and with one-half of a standard key in the keyway shall conform with the
limits listed in Table 1.

<table>
<thead>
<tr>
<th>FRAME DIAMETER SERIES</th>
<th>MAXIMUM PERMISSIBLE TOTAL AMPLITUDE PEAK-TO-PEAK (IN.)</th>
<th>SYNCHRONOUS SPEED (RPM)</th>
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<td>BELOW 1700</td>
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<td>3500 &amp; ABOVE</td>
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<table>
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<tr>
<th>Type</th>
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<tr>
<td>250, 280 &amp; 320</td>
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<td>0.0015</td>
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<tr>
<td>360, 400 &amp; 440</td>
<td>0.002</td>
<td>0.0015</td>
<td>0.001</td>
</tr>
</tbody>
</table>

2.7.1 If balancing weights are added to the rotor, they shall be permanently secured by welding, peening or other method approved by the Engineer.

2.8 MATERIALS

2.8.1 Stator frames and endshields shall be as follows: Drip proof and Standard Duty - TEFC: Stator frames and endshields, 254 and larger, shall be of rigid cast iron construction. For motors 215 frame and smaller, these parts may be cast aluminum or cast iron, whichever is manufacturer’s standard. Severe Duty - TEFC and Explosion-Proof: Frames and endshields shall be cast iron for all frame sizes.

2.8.2 Other external parts shall be as follows: Drip proof and Standard Duty - TEFC: Fan covers, and conduit boxes may be cast iron, aluminum or steel, depending on manufacturer’s standard. Severe Duty – TEFC and Explosion-Proof: Fan covers, and conduit boxes shall be cast iron.

2.9 CONDUIT BOXES: Conduit box mountings shall be arranged so conduit can be brought in from top, bottom or either side. Cast iron conduit boxes for all severe duty motors shall be tapped for threaded conduit connection. Conduit hole size shall conform to NEC Standards, depending on motor rating.

2.10 LIFTING PROVISIONS: All motors weighing more than 50 lbs. shall be drilled and tapped for lifting eyebolt or have integral lifting lugs of sufficient strength cast or attached to the motor frame.

2.11 MOTOR LEADS: Motor leads into conduit box shall have same insulation class as the winding and be equipped with a numbered pass or copper terminal staked or otherwise mechanically fastened to the lead sufficient to resist 15 lbs. pull. Leads shall be marked throughout the entire length to provide identification after terminals are taped or clipped.

2.12 VENTILATING FANS

2.12.1 Drip proof and totally enclosed fan cooled (TEFC): The fans forcing ventilating air through or over a motor may be steel, aluminum, or molded plastic, whichever is manufacturer’s standard.

2.12.2 Severe Duty – TEFC and Explosion-Proof: Ventilating fans shall be non-sparking, abrasion, and chemical resistant, cast brass or polypropylene.

2.13 SHAFT SEALS: All severe duty motors and TEFC motors, 254 frame and larger, shall have Inpro bearing protection seal on the drive end of the motor to prevent moisture or other foreign material from entering the bearing cavity.

2.14 NAMEPLATES: Aluminum nameplates may be used on dripproof and standard TEFC motors. Severe duty enclosed motors shall have nameplates of stainless steel. Nameplates shall be stamped to include the following information:

2.14.1 Horsepower (not including 15% SF)
2.14.2 Speed
2.14.3 Time Rating
2.14.4 Frequency
2.14.5 Phases
2.14.6 Model Number

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2.14.7 Rated Voltage
2.14.8 Service Factor (1.15 on all motors 1 HP and larger)
2.14.9 Full Load Amps (based on nameplate HP, not including 15% S.F.)
2.14.10 Insulation Class
2.14.11 NEMA Design
2.14.12 NEMA Code Letter
2.14.13 Maximum Ambient
2.14.14 Bearing Identification

2.15 CONNECTION DIAGRAMS: The motor connection diagram shall be permanently attached to the motor either inside the conduit box or on the motor frame in a readable location from the conduit box side.

2.16 LOCKED ROTOR CHARACTERISTICS: Motors with nameplate rating of 5 through 50 HP shall not exceed NEMA Code G locked rotor characteristics. Motors larger than 50 HP shall not exceed NEMA Code F locked rotor characteristics.

2.17 SEVERE DUTY: Motors designed for severe duty shall have the following characteristics in addition to those designated in the specification:

2.17.1 Sealed Windings as described in NEMA MG1-127, Part B.
2.17.2 Stainless Steel Nameplate.
2.17.3 Cast Iron Housing, Bearing Brackets, Fan Guard.
2.17.4 Cast Iron Conduit Box.
2.17.5 Cast Brass or Polypropylene Fan.
2.17.6 Inpro Bearing Protection Seal on shaft end.
2.17.7 Zinc Plated Hardware.
2.17.8 Minimum of 2 Extra Epoxy Varnish, or Equal, Dips and Bakes on Windings.

2.18 HEATER: Where required, motors shall contain internal heaters operating on 120 VAC to minimize condensation inside the motors.

2.19 EXTERNAL FINISH: All motors shall be prime painted with corrosion resisting metal primer, and finish painted in accordance with Division 9. All bolts, screws and other external hardware shall be treated by zinc with iridite or zinc chromate for resistance to corrosion.

2.20 PREPARATION FOR SHIPMENT: Before shipment, the shaft extension and any other bare exposed metal parts of each motor shall be coated with an easily removable rust preventative. All motors shall be securely fastened to a hardwood skid or pallet for fork truck handling and be covered for protection against dirt and moisture during transit and for short time outdoor storage.

2.21 OPERATING CHARACTERISTICS: Motors shall meet or exceed the starting locked rotor and maximum breakdown torques specified by NEMA for the NEMA design. The locked rotor starting currents shall not exceed NEMA maximum values for the specified NEMA design and rating. The current density and heating characteristics shall be such that the motors will not suffer damage if subjected to a maximum of two (20) seconds stall at six times full load current. The insulation system of the motor shall be described under NEMA 1-14.02. The motor manufacturer shall use IEEE Standards to establish the suitability of the insulation system to meet these requirements.
2.22 GEAR REDUCERS

2.22.1 Unless otherwise specified, all gear reducers shall be of the horizontal straight-line concentric type with heat treated alloy steel precision cut helical gearing. All gearing shall comply with the requirements of AGMA with a 1.5 service factor for continuous operation. AGMA rating plates shall be attached to the housing.

2.22.2 All shafts shall be of high carbon steel forgings turned and ground to size. Shafts shall be mounted on anti-friction bearings. All gearing shall be lubricated by revolving through lubricating oil reservoir. Ample volume shall be provided for the oil to act both as a lubricant and a coolant. Provide Inpro Bearing Protector oil seals at all shafts. housings shall be dust and moisture tight and shall have an easy means of filling, draining, and checking the oil level.

2.22.3 Drive motors shall be separate from the gear reducer. Output shaft of the motor shall be connected to the input of the gear reducer with a shear pin or torque overload type coupling to protect against overload.

2.23 BELT DRIVES: Belt drives shall have a minimum 1.5 service factor.

2.24 ENCLOSURES: All control devices or similar items appurtenant to the major equipment shall be furnished with dust and moisture-tight enclosures, unless otherwise specified, and all electrical conduit connections shall be of the threaded type.

2.25 SHEAR PINS: Shear pins or dowel pins shall be fabricated of 2017T4 aluminum, cold-head rod, conforming to the standards set forth in ASTM B316.

2.26 FLEXIBLE SHAFT COUPLINGS: Flexible shaft couplings for connection of motor and equipment drive shafts shall be of the nonmetallic flexible member type, except as otherwise specified or approved. Couplings shall accommodate angular misalignment up to 4 degrees, parallel misalignment up to 1/8-inch, and end float up to S/16-inch, either singly or in any combination. Coupling shall also act to cushion shock loads. Flexible element shall be of reinforced rubber tire type held in place by twin flanges. No lubrication shall be required. Coupling shall be of a design that eliminates metal to metal contact between the driver and driven shafts in the coupling. Design shall allow for replacement of flexible element without moving either driver or driven equipment.

PART 3 EXECUTION

3.1 ERECTION AND INSTALLATION SUPERVISION: The manufacturer or supplier of equipment included in each section shall inspect the completed installation, make all necessary adjustments, connections, or modifications prior to start-up. The manufacturer or supplier shall supervise start-up procedures after start-up is authorized by the Engineer. After start-up, the manufacturer shall make all final adjustments necessary for the intended use of the equipment and certify in writing that the equipment has been properly installed and adjusted and is operating satisfactorily. This report will include any special instructions for the operation and maintenance of the equipment.

3.2 FIELD TESTING: Field testing shall be performed as specified under the detailed specifications for the specific equipment item and in accordance with the requirements of Division 1 for overall testing and as follows. All motors will be field checked by the Engineer for compliance with current limitations described in this section.

3.3 INSTALLATION: Each item shall be furnished complete and installed as shown on the Drawings and in accordance with the manufacturer's recommendations, instructions, and directions. One (1) complete copy of these recommendations shall be furnished to the Engineer two (2) weeks prior to installation. Installation of the item will not be allowed to proceed until the recommendations are received.

3.4 RECORD DRAWINGS

3.4.1 During construction, the Contractor shall keep an accurate record of all deviations between work as shown on the Contract drawings and that which is actually installed.
3.4.1.1 Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.

3.4.1.2 Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

3.4.2 The Contractor shall maintain two complete sets of record drawings for the purpose of recording field changes. One set shall be used to record field changes in pencil and the second set shall be used by the Contractor to make a neat and accurate record in red ink of all changes and revisions to the original design.

3.4.3 Note construction change directive numbers, alternate numbers, change order numbers, and similar identification, where applicable.

3.4.4 Store record drawings in the field office apart from the Contract Documents used for construction. Do not use record drawings for construction purposes. Maintain record drawings in good order and in a clean, dry, legible condition, protected from deterioration and loss.

3.4.5 Such drawings shall be available to the Owner or Engineer at the job site at all times during construction.

3.5 PROGRAMMING SOFTWARE

3.5.1 Programming software shall be provided for any equipment which includes a programmable logic controller (PLC) or other digital controller that is user programmable. The software shall be suitable for loading and running on a laptop personal computer operating with a Windows-based operating system. A copy of the manufacturer’s original operating logic program shall be provided for use in maintaining and troubleshooting the equipment. Where multiple pieces of equipment, from the same or different vendors, use the same programming software, only one copy of the software need be provided.

(End of Section 11010)
### SITE DESIGN CONDITIONS

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<td>SITE CONDITIONS: Coastal Environment</td>
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### UTILITIES

#### STEAM

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#### AIR & NITROGEN

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### COOLING WATER

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PART 1 GENERAL

1.1 DESCRIPTION OF WORK

1.1.1 Definitions:

1.1.1.1 Contractor: Supplier or Vendor named on the purchase order with sole responsibility for all the machinery and shipped loose support components for the Storm Water Pumping Units named in this and associated specifications.

1.1.1.2 Power Module: Diesel Engine Driven Power Module. Complete Drive String from the radiator through terminal shaft coupling of the HPTO.

1.1.1.3 Pump: Axial flow propeller type vertical column pump or mixed flow vertical column pump, VS3 Type - Vertical Suspended Shaft, discharge below floor.

1.1.1.4 Clutch: Hydraulic Power Take Off (HPTO)

1.1.1.5 Cat: Caterpillar Inc.

1.1.1.6 Skid: Skid main base frame; holds all capital equipment in alignment on power module

1.1.1.7 Gear: Right angle gear or RAG driving the pump via the Power Module and support systems

1.1.1.8 Sprag clutch: Industry term; having become slang. A backstop device to prevent shaft rotation opposite of that intended or normal. However, a true "sprag" is not specified due to 'sprag' teeth failure rates. A cylindrical roller
back stop device is specified in this document under the slang term “sprag” or “sprag clutch”.

1.1.1.9 Owner: City of Charleston, Purchaser, issuer of Purchase Order (Contract for Purchase) or designated representatives specifically named in the Purchase Order with limitations clearly stated. Does not necessarily imply title transfer. Owner is a term only used in this document to identify the purchaser or an agent named in the PO.

1.1.1.10 There are three (3) machine trains; Each having a Power Module driving a right-angle gear driving a storm water pump. The Pump and Gear are specified in this section. The Power Module is specified in specification section 11300.

1.1.1.11 Stuffing Box: Packing box or otherwise where the pump shaft shall become sealed from the pumpage by inserting continuous packing or packing rings or any mechanical seal if indicated.

1.1.1.12 Pumpage: The liquid media being pumped such as storm water with all particulates, debris, and chemical constituents.

1.1.1.13 RAG: Right angle gear; gear

1.1.1.14 Freewheeling clutch: Freewheeling clutch, sprag clutch, back stop device to prevent rotation opposite that intended or normal.

1.1.2 Contractor shall furnish and shop test (as noted), field test (as noted), supervise the installation, adjust, and place in satisfactory operating condition three (3) variable speed axial or mixed flow vertical column pumps, gears, couplings, and seals for use with the power modules indicated in Specification number 11300 specified herein and as shown in the drawings. Each unit shall include the following main components: An impeller (propeller), bowl assembly, diffuser (if needed), column pipe, enclosed line shaft, line shaft support bushings (bearings), bearing lubrication (grease) system, discharge head with flange, stuffing box, adjustable spacer type pump coupling, sole plate, driver pedestal, pump mounting plate if so equipped, right angle gear transition piece if needed, solid shaft right-angle gear, and gear input shaft hub matching the power module torsional spacer input coupling, all sensors mounted that communicate to the control system panel accessories, and appurtenances as specified. Refer to drawings for dimensions and pump settings. The pump manufacturer shall assume full responsibility for the design, scope, supply and satisfactory operation of the entire pumping system drive train and support equipment provided, including but not limited to, pumps, right angle gears, engine driven skid mounted Power Modules as specified.

1.1.3 All critical and safety signage and / or decals shall be in English and Spanish (most prominent Spanish dialect for the Charleston Area). For hanging tags each sign shall be minimum 6 mil thick laminated with clear plastic, waterproof, oil, and grease proof, and double sided with a SS grommet of 3/8” diameter for hanging. If a major supplier does not have dual language decals, then Contractor shall design and supply dual language signage in such a way that it matches the specific intent of the single language decal and attachment position of the decal.

1.1.4 The pumping unit shall be specifically designed to pump un-treated screened stormwater and shall operate without clogging or fouling caused by the material in the pumped fluid at any operating condition within the range of service specified. The stormwater will be screened by mechanical bar screens; however, the pumped fluid is
expected to contain settleable solids consisting of organic and inorganic materials, grit, plastics, rags, petroleum products including grease. Dissolved substances will include hydrogen sulfide, minor mineral constituents, chlorinated compounds, and chlorides as sea water will seep into the storm water.

1.1.5 To assure single source responsibility of design and supply, the pumps, gears, drive couplings, clutches, diesel engines, radiators, skid base frames and all components specified herein and in section 11300 shall be furnished and coordinated by the pump manufacturer or bidder/contractor of record. The total working components of the vertical column pumps and right angle gears shall be suitable for the intended application and purpose, able to supply (with power from the Power Module) the required flow capacities successfully and acceptably after all parasitic losses for any point of the pump curve that is clearly marked with the range of operation without damage or reduced capacity given the ambient conditions named herein and at the installation site and shall be in every respect, complete and workable. To assure unity of responsibility, the pumps, controls, gears, drive shafts and diesel engines shall be furnished and coordinated by the pump manufacturer. Three pumping units are required under this Contract, which shall be driven by a diesel engine/right angle gear system. Refer to specifications Section 11300 for diesel engines. The pumping units shall be located and arranged as shown on the drawings.

1.1.6 The outside ambient design temperature range is 20°F to 105°F. There is no HVAC inside the building, hence, the building ambient inside may match the outside temperatures before machines start. The building 'inside design temperature' shall be 20°F up to 110°F before start and up to 118°F worse case after start. Note: Once running, the inside building temperature may rise 13°F above outside ambient.

1.1.6.1 Note that due to construction schedules the machinery may sit on the foundations with no roof protection for 12 months.

1.1.6.2 The engine radiator forced draft fan(s) outflow volume is augmented by large electric wall fans that start prior to engine cranking.

1.1.7 Each pumping unit will take suction from the suction bay with an arrangement and water level variation as shown on the Drawings. All points of the suction bay 'system' that cross the pump capacity curve shall be useable (pumpable) without harm to any component of the drive string, columns, structures, anchors or supporting equipment and foundations. Through analysis, if any points on the capacity curve indicate possible resonance, shaft instability or harm to the system by any means these points shall be clearly marked, submitted, and verified as received by Owner during the bid evaluation process or at any other time of the contract execution and verified as understood as operating points to avoid should there not be any practical solutions of mechanical or hydraulic design avoidance. A particular focus shall be made for avoidance of harmful vibrations or potential excitation of structures or other machinery components that may have a harmful response.

1.1.8 All capital equipment such as, but not limited to, the radiators, diesel engines, ship loose exhaust components, clutches (HPTOs), couplings, and the machinery specified in this section such as right angle gear boxes and pumps shall be newly ordered from the respective factories, have sequential serial numbers (by so stating on capital equipment component purchase orders to suppliers or sub-suppliers and communication to any internal engineering of Contractor engineered and produced products) and be 100% identical in every way including the pump sole plate, stuffing box housing / driver mount dimensions as they related to gear adaptor and gear mounting and skid base frames with particular focus and attention to extreme detail of shaft centerlines, pump centerline, gearbox end of shaft targets, sole plate
foundation anchor bolt targets and skid base frame anchor bolt targets and envelope sizes, grouting dimensions to be held and all dry weights. All replacement parts from like units shall be 100% interchangeable and have a single source of spare parts ordering from each dealer or factory of that component.

1.1.9 All working parts of the pumps, gears, and parts such as bearings, shaft, sleeves, etc., shall be standard dimensions, built to limit gauges or formed to templates, such that parts will be interchangeable between like units and such that the Owner may, at any time in the future, obtain replacement and repair parts for those furnished in the original machines. All parts shall be properly identified and location in the machines, as shown on the Assembly Drawings in the Instruction books furnished. This includes fabricated parts and housings. All submittals, drawings, certificates, contact documents, meeting minutes, exceptions, etc. utilized through this contract shall be including in the final submittal paper books and E-copy.

1.1.10 The Contractor is responsible for coordinating the timely successful work for engineering, manufacturing, delivery, installation supervision, cold and hot alignments of the complete pumping system equipment. The contractor shall strive to obtain any and all information regarding all supportive utilities by others required for the contractor furnished equipment to operate properly and offer guidance and notations should any support utilities not be appropriate for function and fit for purpose.

1.1.11 Great focus and attention to detail shall be incorporated into vibration mitigation of the installed vertical column pump and gear. Areas to be studied and mitigated are, but not limited to, vibration of acoustical, torsional, lateral, or linear origin and/or the responses. Self-induced impeller vane passing frequencies, pump column responses, all rotor modes, and gear tooth pass frequencies shall be well understood and studied. Excitation as well as high lateral and linear and torsional amplitudes from the Power Module shall be well understood as possible sources of vibration influence produced by the firing order phase angles of the engine at any obtainable speed and power capacity. A high degree of possible excitation separation margins is desired from machinery-to-machinery components and building structures. Note: The diesel engine is a high power density low mass torsionally active machine. This will be checked and discussed at length.

1.2 RELATED DOCUMENTS

1.2.1 Requirements of the General and Supplemental Conditions apply to all Work in this Section. Provide all labor, materials, equipment, and services indicated on the Drawings, or specified herein, or reasonably necessary for or incidental to a complete job.

1.2.2 Related sections include the following:

1.2.2.1 01300 – Submittals
1.2.2.2 01300-F1 – Register of Exceptions, Notations, and Clarifications
1.2.2.3 09900 – Coatings
1.2.2.4 11010 – Equipment General Provisions
1.2.2.5 11101-F1 – Pump Data Sheet
1.2.2.6 11300 – Diesel Engine Driven Power Modules

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1.2.2.7 15050 – Process Piping and Appurtenances
1.2.2.8 17040 – PLC System Specifications
1.2.2.9 17070 – Panels Consoles and Appurtenances
1.2.2.10 17150 – Instruments
1.2.2.11 17200 – Process Control Logic
1.2.2.12 Division 16 – Electrical

1.3 MANUFACTURERS AND SUPPLIERS

1.3.1 The installing contractor (to be determined) shall assume full responsibility for the satisfactory installation of each of the three pumping systems including pumps, gears, and engine driven power modules as specified. The Contractor defined in section 1.1.1.1 of this specification shall assume full responsibility for the satisfactory supervision of the installing contractor and final operation of the entire pumping system as specified herein.

1.3.2 The equipment covered by these Specifications shall be designed and manufactured by companies regularly engaged in packages of this type. The equipment is intended to be standard units of proven ability as manufactured by a competent organization having 20 years minimum experience in the design and production of such equipment. A single manufacturer shall furnish the three (3) pumps specified herein. A single manufacturer shall furnish the three (3) gears specified herein. The pumps and gears (with support appurtenances) furnished shall be designed, constructed, and installed in accordance with the best practice and methods, and shall operate satisfactorily when installed. Pumps shall be manufactured in accordance with the Hydraulic Institute Standards, except where otherwise specified herein. Gears shall be manufactured in accordance with the AGMA, except where otherwise specified herein.

1.3.3 All equipment furnished under this Specification shall be new and unused and shall be the standard product of manufacturers having a successful record of manufacturing and servicing the equipment and systems specified herein for a minimum of twenty (20) years.

1.3.4 The pump manufacturer shall be fully responsible for the design, arrangement, and operation of all connected rotating components of the assembled pumping unit to ensure that neither harmful nor damaging vibrations occur at any speed within the specified operating range. Design shall include all supporting sole plates, cast housings, fabricated steel housings or other base plates or structures for mounting the units.

1.3.5 Vibration levels shall not exceed current Hydraulic Institute standards for vertical column suspended line shaft (VS3) ‘propeller’ (impeller) pumps and AGMA for gears, as tested at the factory or installed at the pump station site.

1.3.6 The pumps shall be type VS3, vertically suspended shaft, vertical column, ‘discharge below floor’ axial or mixed flow manufactured by:

1.3.6.1 Fairbanks Nijhuis,
1.3.6.2 Patterson Pump Company,
1.3.6.3 Xylem,
1.3.6.4  RuhRPumpen,
1.3.6.5  Sulzer,
1.3.6.6  Flowservé, or
1.3.6.7  pre-approved equal.

1.4  SUBMITTALS

1.4.1  Submit the following in accordance with Section 01300.

1.4.2  Note: All dimensioned drawing submittals from sub-vendors or created by Contractor shall be in 2D .pdf format.

1.4.3  The contractor shall submit the following in accordance with Section 11010 Equipment General Provisions and this specification:

1.4.3.1  Certificate of unit responsibility attesting that the Contractor has accepted the assigned unit responsibility in accordance with the requirements of Section 1.3.1 as it relates to the overall pumping system as an engineered total package for installation by others under supervision of Contractor.

1.4.3.2  Register of Exceptions, Notations and Clarifications (Section 01300-F1) populated (for discussion and acceptance by Owner). Failing line-item acceptance so indicated and signed by Owner all specifications apply without dispute.

1.4.3.3  A copy of the contract document wiring diagrams and piping and instrumentation diagrams (P&IDs) and process flow diagrams (PFDs) relating to the submitted equipment with addendum updates that apply to the equipment in this Section shall be included with the submittal. These drawings/documents shall be marked to show specific changes necessary for the equipment proposed in the submittal. If no changes are required, the drawing(s) shall be marked “No Changes Required.”

1.4.3.4  Certified shop and erection drawings showing all-important details of construction, dimensions, and anchor bolt locations.

1.4.3.5  Descriptive literature, bulletins, and/or catalogs of the equipment.

1.4.3.6  Data on the characteristics and performance of each pump shall be provided. Data shall include guaranteed performance curves, based on model tests of the specified pump units, which show that they meet the specified requirements for head, capacity, efficiency, net positive suction head required (NPSHr) and horsepower. All curves shall display the specified operating conditions and the manufacturer’s limits for the allowable operating ranges and preferred operating ranges. Curves shall show pump efficiency. Curves shall be submitted electronically. Curves shall be plotted for any obtainable safe flow given the site conditions and limits of all the machinery train (Power Module, gear, pump) and the curve clearly marked to include from minimum continuous stable flow to largest pump flow capacity at all points shown on the Pump Data Sheet and drawings of the suction bay wet well water levels and associated calculated TDH. Catalog sheets showing a family of curves will not be acceptable. Curves shall be plotted for both minimum and maximum speed.

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1.4.3.7 The total weight of the equipment including the weight of each pump section and the single largest item.

1.4.3.8 Shaft deflection calculations to demonstrate compliance with requirements of these specifications.

1.4.3.9 Pump lateral critical speed analysis in accordance with Hydraulic Institute at new clearances and 2X clearances.

1.4.3.10 Torsional vibration analysis (TVA) for the entire drive train (Three (3) independent TVAs required, see 11300 for details)

1.4.3.11 Detailed drawings showing the installation and removal of the pump from the pump station with the 50-ton bridge crane. Drawings should show a step-by-step process and any required structural beams to support the pump on the foundation during installation/removal. Design of the support system should be signed and sealed by a Professional Engineer registered in the State of South Carolina.

1.4.3.12 Copies of all model test results.

1.4.3.13 A written certification from the Contractor and Pump Manufacturer (if different from Contractor) stating that the Power Module specified in section 11300 has been reviewed, the engine of that power module with all parasitic losses per the Caterpillar power and torque curves for the specific model as configured operating at site conditions meets all requirements of pump design operating conditions anywhere on the marked operating range for this project of the pump curve and at site actual pumping parameters and is fully compatible with the supplied pump, gearbox and will satisfactorily operate the pumps. This shall include confirmation that the Power Module has sufficient net break away torque at the pump input shaft hub (including any HPTO clutch plate modulation) and power at the programmed speed engagement RPM of the HPTO clutch (700 engine RPM or as recommended) through the job gearbox and input coupling with further sufficient torque and power to ramp the engine speed in recommended speed increasing steps and time frames to achieve full 1800 Engine RPM (and 1800 HPTO output tail shaft RPM) steady state pumping without steady state speed fluctuations in excess of +/- 2 Engine or HPTO output tail shaft RPM per 30 second intervals against a system curve representing the discharge water level at El. 7.5, suction water level at El. (-) 8.15 and to create sufficient flow to fully open the 66 inch diameter flap gate without loss of flow projected on the certified capacity curve of the pump (with 10% reserve power and torque above pump demand with all parasitic losses). Contractor confirms that the submitted Caterpillar power and torque curves and performance data sheets have no errors independently with Caterpillar Inc. factory model C32 Industrial Engine Application Engineering direct, not only through a Caterpillar dealer, and such confirmation is submitted on Caterpillar Inc. letterhead or approved equal (verifiable Caterpillar Inc. email with contact name, title, email address and direct phone number) with data sheet and/or curve control numbers indicated. The Contractor certification shall also contain language for the Power Module engine/gear/pump stopping sequence in particular to the HPTO logic for clutch plate modulation and brake application as well as confirming the de-clutch speed and the ability of the drive system to handle pump back wash flow reverse rotation pump torque and arrest that torque to 'pump shaft full stop' in ways that will not damage any component of the

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entire machinery train within 1.5 seconds of reverse rotation sensed by anti-
rotation 'ratchet' or freewheel sprag clutch type back stop in gearbox or
other means expecting as many as three (3) pump start rotations/stop
rotations per hour.

1.4.3.14 Pump transportation / trucking to site “shipping / handling G-force
detection” accelerometer: Make, model and data. Note: Any bent shafts shall
be replaced, not straightened, unless approved by Owner.

1.4.3.15 Contractor shall submit the internal written procedures and critical steps
involved with processing any order. Of note are interfaces with the various
departments of sales, engineering, contracts, QA/QC, Testing, and shipping
with timelines after receipt of PO with a focus on ‘order pages write up’
timing.

1.4.4 Test Reports

1.4.4.1 Description of pump factory test procedures and equipment. The test
procedures and equipment shall be approved prior to testing. No testing
shall be conducted without approval and shall be witnessed by the Owner or
Owner’s representative at the option of the Owner.

1.4.4.2 Description of field test procedures and equipment. The test procedures and
equipment shall be approved prior to testing. No testing shall be conducted
without approval and shall be witnessed by the Owner or Owner’s
representative at the option of the Owner.

1.4.4.3 Copies of all test results, as specified.

1.4.5 Operation and Maintenance Data

1.4.5.1 Complete operating and maintenance instructions shall be furnished for all
equipment included under these specifications. The maintenance
instructions shall include troubleshooting data, full preventative
maintenance schedules, and complete spare parts lists with ordering
information.

a) The submittal format shall be in the form of electronic files as well as 3 ring
binders in USA standard 8.5 x 11-inch paper size with all inclusions in the
binders having double sided hole reinforcement full length contact strips in
the left border before becoming hole punched with 3/8 inch (9.5 mm) holes.
No information shall be missing in left border due to hole punching. Format
shall be left page turn per USA standards including all international ‘right
turn’ submittal reformatted to left turn USA standards. Drawings shall be in
drawing pockets. The electronic file and paper copies shall be electronically
bookmarked, tabbed or otherwise divided, to cover all areas of each major
equipment item and their sub-components.

1.5 PRODUCT DELIVERY, HANDLING AND STORAGE

1.5.1 Submit a schedule of the details of product delivery.

1.5.2 Due to unforeseen challenges Contractor shall be aware that equipment may be
exposed to high humidity, salt air, rain, and high ambient temperatures once received
at the destination for many months. Contractor shall submit recommended outdoor
safe storage practices to maintain any warranties specified.
1.5.3 Delivery, handling, and storage of equipment shall be in accordance with the manufacturer's recommendations. Contractor shall coordinate equipment delivery with construction schedule to ensure timely progress of the work.

1.5.4 All shipped loose parts shall be properly packaged and protected so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the units and equipment are ready for operation.

1.5.5 All equipment and parts must be properly packaged and protected against any damage during a prolonged storage period at the site.

1.5.6 Factory assembled parts and components shall not be dismantled for shipment unless permission is received in writing from the Owner.

1.5.7 Finished surfaces of all exposed pump openings shall be protected by wooden blanks strongly built and securely bolted thereto.

1.5.8 Finished iron or steel surfaces not coated shall be properly protected to prevent rust and corrosion. After hydrostatic or other tests, all entrapped water shall be drained prior to shipment, and proper care shall be taken to protect parts from the entrance of water during shipment, storage, and handling. This should include vacuum evacuation and drying of wetted parts to pull moisture out of close clearances.

1.5.9 In order to protect the pumps against potential damage from sudden impact, recording accelerometers shall be attached to each pump during the entire shipping period. The accelerometer shall be of tri-axial type and shall measure the vibration in three axes X, Y and Z. Maximum acceleration in any direction shall not exceed 3.0g value. If the accelerometer records a value of 3.0g or higher at any time during transportation, the contractor shall provide the services of the pump manufacturer for a complete inspection of the pump immediately after delivery including but not limited to shafts and bearings. The Contractor shall correct any damage at no cost to the Owner as approved by the Engineer. The Engineer reserves the right to review and approve the correction measures as recommended by the pump manufacturer or to completely reject the delivered pump.

1.5.10 Each box or package shall be properly marked to show its contents.

1.5.11 The definition of "properly packaged and stored" shall mean minimum 12 month long term storage by usage of VPI (Vapor Phase Inhibitor) oils in lubricated machinery with atmospheric vents sealed to maintain the VPI volatility as recommended by each capital equipment manufacturer, Desiccants used shall only be by DessicantPower (dessicantpower.com) polymers and if approved by all manufacturers included in large metal cavities suspended by robust tie wires or other cavities subject to high moisture damage including fungal growth such as the gearcase, pump column sections, and other cavities that are easily opened for inspection and removal of desiccant bags. The equipment with internal desiccants shall be labelled in 3 independent places with 10" x 12" red tags withs words "Caution: Desiccant Inside. Do not rotate shafts by any means" in English and Spanish in 1" tall letters. A separate document cataloging all desiccant positions of machinery with strong warnings shall be issued for use by machinery representatives during installation supervision.

1.5.11.1 Contractor shall include refreshing the long-term storage for the entire shipment to site in 6-month intervals after the initial 12 months long term storage expires and make an option price for each additional 6 months long term storage procedure.
1.5.11.2 If Owner fails to purchase the additional long-term storage this in itself will not negate any warranty still in effect.

1.6 WARRANTY

1.6.1 The Contractor shall warranty the equipment against defects in material, and workmanship for a period of eighteen months after delivery or three years or 4,000 running hours after successful and accepted equipment start-up. If startup does not commence inside of eighteen months from shipment the three-year 4,000 running hours warranty automatically starts regardless of any future startup. The warranty period shall be in force and administered by the Contractor regardless of each individual component warranty terms.

1.6.1.1 If any single component is abused, mishandled, or operated out of range of the operation instructions or maintenance protocols this shall not void the remaining warranties for all other components not related to the abuse. Example: The wrong grease administered by owner in a Caterpillar fan hub bearing shall not void the turbocharger warranty or entire engine warranty.

1.6.2 If any part of the equipment should fail under the terms of warranty periods and terms of causation repairs shall be made in ways to return the machinery to acceptable full service at best speed at no expense to the Owner.

1.6.3 The Scope and Supply of this Contract shall be covered by a 15-year design guarantee. Burden of proof for any claim against a design issue, and costs of that proof, shall be borne by the Purchaser Owner. This guarantee is NOT the warranty of materials and workmanship indicated in 1.6.1 above.

1.7 CONDITIONS OF SERVICE

1.7.1 See the attached Pump Data Sheet.

PART 2 PRODUCTS

2.1 GENERAL

2.1.1 All parts shall be so designed and proportioned as to have liberal strength, stability, and stiffness and to be especially adapted for the service to be performed. Ample room for inspection, repairs and adjustment shall be provided.

2.1.2 Note: Any marking of stainless steel (SS) items during fabrication or storage, handling, quick ID reference shall be made only with markers or paint pens certified for use on SS as “Low Corrosion”

2.1.3 All necessary sole plate anchor bolt extensions (canister anchors with sub grade coupling embeds will be by others in-situ), nuts and washers shall be furnished and installed by the Installation Contractor, not by the machinery supplier Contractor.

2.1.3.1 All machinery external bolting are allowed to be 316 SS (grade 5 approximate equivalent yield) bolts/nuts, Yellow Chromate plated Grade 5 bolts/nuts or Grade 5 Xylan 1424 coated bolts/nuts. All flat washers shall be hardened SAE (not USS) double thick type matching the material and plating of the bolts and nuts.

2.1.4 Stainless steel nameplates giving the name of the manufacturer, the rated capacity, head, speed, and all other pertinent data shall be attached to each pump and gear box.
2.1.4.1 Each unit shall have data tag plates (two different plates per pump set; driver pedestal and gearbox) affixed to the pump driver pedestal frames and gearbox with robust SS drive screws in a readable position not blocked by equipment components. The plates shall not be less 0.030" thick SS engraved with 3/16" tall characters on a contrasting background.

2.1.4.2 The data plates and characters shall be indelible to fuel oils, lube oils, grease, transmission fluids and coolants.

2.1.4.3 The plates shall include the following information (submit data tag drawings for approval):

   a) All serial numbers sequentially matched on each plate, lowest with lowest of each component and so on.

   b) Equipment Module Tag: G-1, G-2, G-3 for Gearboxes and SP-1, SP-2, and SP-3 for the pumps.

   c) Make model and serial number with full load hp and RPM (gear to have nominal ratio indicated as well as precise speed of 1800 RPM input pinion and exact output bevel gear speed per tooth count.

2.1.5 Each pumping unit and all associated drive train equipment shall be designed and constructed to withstand the maximum back stop torque developed by the reverse flow rotation generated from any stop or failed forward drive (pump coupling breakage), routine or emergency, at any obtainable speed, with the maximum TDH specified at the pump discharge flange and the pump shaft instantly held in place with the gearbox back stop device. Gearbox back stop shall be designed for 200% maximum expected torque from worst case wet well water height TDH level back wash. The backstop shall engage in ways limiting G shock forces far below that which may damage equipment such as, but not limited to, back stop, rotors, propeller (impeller) mounting hardware, propeller blades, line shaft, gear teeth, couplings, clutches, or foundations.

2.2 PUMPS

2.2.1 GENERAL

2.2.1.1 The pumps shall be of the vertical suspended line shaft, VS3 type code, propeller (impeller), axial or mixed flow, vertical column, discharge below floor type.

2.2.1.2 The pumps shall be built to standard dimensions such that parts will be interchangeable between like units. The same manufacturer shall supply all three (3) pump completed assemblies.

2.2.1.3 Any pump section length shall not exceed 10 ft or as specified in following sections to facilitate removal of the pump. The pump manufacturer shall design and provide a beam assembly for pump removal. The beam assembly shall be designed with sufficient safety factor (1.5) and with capability of carrying the entire weight of the pump. The beam assembly shall be designed such that it shall attach to and carry any section of the pump column while resting on the operating floor beyond the pump floor opening. Beam assembly shall be long enough to span the distance between the pump bay walls and will not be permitted to bear on the operating floor outside of areas directly supported below by the pump bay walls. Pump sections shall be fitted with a pair of integral fabricated lifting eyes at the top flange of each
column, to facilitate hoisting to allow removal of each section with the beam assembly without disassembling the lower sections of the pump. Shear lugs shall be welded to the column, as necessary.

2.2.1.4 Any castings for the project over 75 lbs (weight before removing gates and risers or any cleaning) that require material testing via keel blocks shall have 3 keel blocks minimum near the riser(s). One keel block for testing, one spare, one additional spare if not consumed for original test for the Owner at owner's option, unmachined (raw casting saw cut from keel block manifold).

2.2.2 PERFORMANCE REQUIREMENTS

2.2.2.1 When operating at the maximum output speed of the driver, each pump shall have a characteristic performance curve, which meets all the conditions listed in the pump data sheets. The pumps, RAGs, and engines shall be capable of operating satisfactorily under the full range of conditions as defined in the pump data sheets.

2.2.2.2 The Power Module BHP capacity shall be back calculated for each item taking power from the Power Module as a loss or tolerance starting at the pump shaft by dividing the required horsepower by the reciprocal of the fractional losses or variations. Each loss shall be verified during detailed design. Example losses, variations, and margins: Pump power variation of +4% (per HI 14.6.3.4 Acceptance Grade 1B), RAG loss of 2%, coupling loss of 1%, HP10 clutch loss of 3%, engine power variation of ±3%, 15-hp cooling fan requirement, and a 10% horsepower margin. For a required pump shaft horsepower of 645.6-hp the losses (as shown above) shall be accounted for as shown in equation (1) below:

\[
\text{bhpg}_{\text{E}} = \left( \frac{\text{shp}_{\text{PUMP}}}{(1 - \text{lev})} \right) \left( 1 - \text{coupling} \right) \left( 1 - \text{hp}_{\text{PTO}} \right) \left( 1 - \text{eng} \right) + \text{hp}_{\text{fan}}
\]

\[
\text{hp}_{\text{MARGIN}} = \left( \frac{645.6}{(1 - 0.10)} \right) \left( 1 - 0.02 \right) \left( 1 - 0.01 \right) \left( 1 - 0.03 \right) + 15 \times (1 + 0.10) = 826.9\text{hp} \quad (1)
\]
\[ h_{\text{BHP,ENG}} = \text{Engine Brake Horsepower, Without Fan (WOF)} \]
\[ h_{\text{PR,ower}} = \text{Required Pump Shaft Horsepower} \]
\[ I_{\text{PUMP}} = \text{Pump Horsepower variation per HI 14.6.3.4 Acceptance Grade 1B} \]
\[ I_{\text{GAG}} = \text{Right angle Gear Loss} \]
\[ I_{\text{COUPLING}} = \text{Coupling Loss} \]
\[ I_{\text{HPTO}} = \text{HPTO Clutch Loss} \]
\[ I_{\text{ENG}} = \text{Engine horsepower variation per Caterpillar, or other manufacturer} \]
\[ h_{\text{PR,FAN}} = \text{Radiator Cooling Fan Horsepower Requirement} \]
\[ h_{\text{PR,ower Margin}} = \text{Design Horsepower Margin} \]

2.2.2.3 Pump speed shall not exceed that listed in the pump data sheets to satisfy the specified hydraulic duty requirements. The pump design speed shall be the maximum output speed of the engine and right-angle gear furnished, when operating at the pump's design capacity and head.

2.2.2.4 The primary operating point of any pump shall not be above the \( Q_{\text{MAX}} \) point without specific written authorization via the Exceptions register. For operation above \( Q_{\text{MAX}} \) the pump company chief engineer shall list the expected performance issues against running hours of continuous running at those points. Hour imitations shall be clearly indicted based on an uninterrupted run at those conditions of concern for an average storm water pumping window of two 24-hour days. The control system shall have the capacity to alarm the hours at those condition with an operator interface to change speed or un-clutch the pump to increase \( N_{\text{PSH}} \).

2.2.2.5 With the pumping units operating at full speed, the maximum horsepower required by the pumps shall not exceed the maximum brake horsepower of the Power Module engine listed in the pump data sheets. If the pumping units require more than the maximum horsepower listed in the pump data sheets at any full speed operation point between the secondary and tertiary discharge head, they will be rejected.

2.2.2.6 The complete pumping unit shall operate without harm or overload to any component at any point along the pump's submitted certified capacity curve with operating range for this project clearly indicated.

2.2.2.7 All components associated with the rotating elements in the drive train, including the RAG backstop device, equipment supports and supports for rotating elements, shall be selected, and designed to function without damage or disassembly during momentary flow reversal (arrested by the backstop) or a true flow reversal from a failed backstop or broken pump coupling with a TDH equal to the maximum TDH specified at the pump discharge flange and start/clutch engage/clutch dis-engage/stop indications of the wet well elevation view at any obtainable speed of the Power Module. Given a gear back stop failure or totally severed coupling rotating the drive train backwards through to the clutch tail shaft plate set not connected to engine (un-clutched with primary clutch plate rotor set of clutch at engine speed with engine running running) all the components must sustain a back spin noting the 1:6 backspin ratio (high pinion speed) including pump rotor, bushings, stuffing box, packing and gland, gear set, bearings, coupling (pump to gear and gear to clutch) centrifugal forces and clutch tail shaft internal centrifugal forces.

2.2.2.8 Control and automation protection shall be given against operation at zero discharge flange flow for more than the estimated lift time at worse case TDH to the discharge flange plus 5 seconds. This is not to be misunderstood
as 'zero flow' on the curve (which is essentially not achievable due to power demand), as flow will be progressing up the column pipe. Such protection shall not force an emergency stop but rather an immediate ramp down and clutch disengagement with a latched alarm for operator override to determine a cause. If zero flow out of the discharge flange continues without a clutch disengagement signal verification by HPTO tail shaft speed for any reason past 30 seconds from zero discharge flow origination point the Power Module shall receive an emergency soft stop sequence, and lockout awaiting corrective actions for causation.

2.2.3 PERFORMANCE TESTING

2.2.3.1 If the size of the pump makes actual ‘job pump’ factory testing impractical, model tests shall be conducted (if model testing is needed where no full flow job pump wet pit test is available) on a scaled-down model of the pump, per the current practices of the Hydraulic Institute standards, Section 14.6, Appendix K. The test setup at the test facility shall duplicate as closely as possible the inlet conditions shown in the drawings. Such a model test shall be conducted by the pump manufacturer. The pump factory test shall be done in a closed loop system with the pump mounted in the vertical position in a wet pit open to atmosphere with open discharge back to the wet pit from the pump discharge piping is ways to not promote vortex generation or cavitation from such discharge invalidating the test at near site conditions.

2.2.3.2 The results of the test shall demonstrate the head, flow, horsepower, efficiency, and NPSHr of the pumps. The pump manufacturer shall provide the buyer with certified curves, showing the results of the test. The tests shall also show the NPSHr of the subject pumps, operating at full speed, with minimum system head. All methods, instruments, procedures, and calculations employed in the model test shall comply with Hydraulic Institute standards with the following restrictions:

2.2.3.3 The model test speed shall be set so that the model TDH is the same as the pump TDH (equal head speeds).

2.2.3.4 Model test ratio shall not be less than 0.25:1.

2.2.3.5 Impellers for model shall not be less than 15 inches in diameter.

2.2.3.6 The efficiency step-up coefficient shall not be greater than x=0.10 per HI 14.6, K2.2.

2.2.3.7 If any model tested pump fails to meet any specification requirement, it will be modified until it meets all specification requirements. If any pump fails to meet the efficiency requirements at any of the listed flow or head conditions listed in the pump data sheets, and all reasonable attempts to correct the inefficiency are unsuccessful, the pump(s) shall be replaced with unit(s), which meet the specified requirements.

2.2.3.8 The NPSHr at 3% head (or performance) drop shall include the 3% back in as the actual NPSHr for the purpose of Owner wet pit level controls. This shall be noted in the test documents as ‘NPSHr per HI 3% head (or performance) capacity drop test fulfillment’ and ‘NPSHr Threshold Entry Point’ noted on the test form also with a foot note of explanation. Owner shall only use NPSHr Threshold Entry Point for suction bay wet pit level reduction plus Owner’s safety margin as
recommend by pump supplier based on noting Owner’s suction bay design at the suction bell area.

2.2.4 PUMP CONSTRUCTION

2.2.4.1 The connection of the RAG torque output to the pump will be made at the lower end of the solid shaft RAG terminal shaft hub. The head shaft of the pump shall extend up through the pump stuffing box inside of the driver pedestal with a hub or built on connection to an adjustable axial distance spacer coupling that shall be threaded to allow adjustment of the pump propeller / impeller clearances static and dynamic via the spacer coupling with a means to lock the coupling in place at the proper clearance. The spacer may/may not be required in the field but must be provided or a special length fabricated during installation should the need arise. Note: The coupling shall be sized and designed by the coupling manufacturer not ordered by the Contractor from catalog information to be certain the coupling supplier is aware of the start-stop torque duty cycles outlined herein as well as running loads and stopping 'back stop' instant peak reverse torque moments that are collected at, and arrested by, the coupling. It is understood the coupling may be manufactured by the Contractor (pump supplier) and in that situation a written internal document shall be submitted that the coupling division or coupling design team is aware of the duty points and start/stop shocks similar to written communication to an outside vendor for selection, design, and manufacture.

1. Note that a redundant reverse rotation indicator is specified herein, and this entails a shaft length available to mount two pulser clam shell magnetic target wraps around the shaft with a 1” minimum (26mm) magnetic field 'blur' separation gap. Both targets must be on the pump input shaft, not the coupling and not the gearbox shafting.

b) A spacer type coupling is required due to the fact the discharge wall flange and sole plate mounting concrete deck will be in place 1-2 years before the machinery arrives and field alignment adjustability is desirable to match the shaft centerlines to the Power Module at the same time as acceptable forces and moments are not exceeded to the discharge wall flange in case the pump driver pedestal tolerances are not allowing axial fit up.

c) The adjustment procedure for propeller clearances shall be submitted.

2.2.4.2 Whereas materials and techniques of construction are specified herein it is understood that different manufacturers may/may not agree with what is specified. The Contractor is ultimately responsible for proper design and engineering of the complete system. Use the exceptions, notations, and clarifications form table 1300-F1 that is part of Section 01300-F1 to offer challenges or better solutions than specified with an explanation in support for any communication shown on the form.

2.2.4.3 The pump shall be furnished with a suitable, integral fabricated ASTM A-36 steel-mounting ring of adequate design with a registered fit rabbet joint to match the pump stuffing box area ‘driver support pedestal’ mounting support ring, adaptor plate or housing to provide precise alignment. The registered fit tolerance shall take into consideration dissimilar thermal growth possibilities before thermal transfer equalization at the mounting transition interface to avoid casing distortion, alignment changes, rotor issues, bearing issues or packing box ‘seal’ issues.
a) The specifics of how each supplier mounts their standard design pump in regard to final hot alignment adjustability and stabilized lateral torque moments during start/stop/backstop may vary. Rabbet fits are suggested but not mandatory. Contractor shall communicate the sole plate, pump support plate, driver pedestal and right-angle gear stack up by using a written description in the offer, drawings and the forms provides for exceptions, notations and clarifications including alignment jacks if rabbet fits are not supplied.

b) Note: If clearance rabbet fits are not utilized the Contractor shall control the surface profile of all sliding machinery joints to provide sufficient coefficient of friction and use appropriate bolting for maximum joint stiffness to hold alignments. This shall be a design focus and shall be communicated.

c) The pump driver pedestal shall be designed and analyzed by FEA to have a 21% separation margin of natural frequency to any obtainable running speed and any known typical harmonics or the propeller and line shaft. The pedestal shall be bump tested after construction to tune the FEA and make adjustments to the finished pedestal if required. A second bump test shall be performed as installed in the field with all machinery mounted in place for any tuning before startup.

d) Of special note and focus: The driver pedestal construction and gear box bolting diameters, mating surface profiles (focus), coefficient of friction for vibratory lubricated surfaces, and quantity of bolting for the gearbox shall be studied carefully to properly arrest transverse loads during start/stop/emergency stop. This project contains an aggressive amount of pump start/stops possible per storm event (hence back stop sudden reverse torque). No bolts should be in shear as a clamping means to arrest transverse loads. This concept includes sole plate or pump plate mounting surface profile sliding joints to the pump driver pedestal also if any transition is not a rabbet fit. Bolt hole clearances must allow alignment in the field for any equipment stack that is not a rabbet fit. Note: Removable taper doweling is planned in the field after hot alignment targets are accepted.

2.2.4.4 The discharge head shall be segmented fabricated steel construction of ASTM A-36 steel, 1/2-inch minimum thickness and of the below floor type and shall be 66" inches nominal diameter and be of a five-meter type or a V section type straight weldment into the column side to reduce the dimension of the face of flange to center of shaft.

2.2.4.5 The discharge flange shall be a 66-inch 150 pound rated flat face design and shall include a 1-inch-thick spacer companion flange, with 4 shipped loose gaskets, that is not to be considered in the dimensional drawing of standard ‘face of flange to center of shaft’. The purpose of the spacer flange is for field installation tuning of any gap or angular issues with the ‘cast in place wall flange’ in the wet well wall in situ months before machinery arrives in the case field machining of the spacer assists in assuring forces and moments can be achieved on the column pipe discharge area. The submitted and as-built drawing shall indicate the true face of flange to center of shaft dimension as well as the face of spacer flange to center of shaft dimension, gasketed. The field installation may not require the spacer flange as the installation dimensional integrity may be adjusted by sole plate and pump mounting to the machinery foundation deck via canister anchors that will have 0.5 inch lateral play each.
2.2.4.6 The entire pump assembly including shaft, propeller, discharge head, column, bowl, and suction bell shall be supported from above by a sole plate and matching pump mounting plate with a driver pedestal to support the RAG. The length of single lift pump section, including any non-reducible section such as a welded pump mounting plate to the column, including the fabricated discharge shall not exceed 10 ft. (for bridge crane hook height single lift extraction purposes during repairs).

2.2.4.7 The sole plate shall be not less than 2.5 inch thick. The driver pedestal shall house the stuffing box and provide sufficient room for repacking the pump seal and mounting of two (2) hall effect rotation sensors specified herein, as well as housing the adjustable coupling with adequate room for tooling. The driver pedestal access openings that allow for all serviceable items and tooling shall be protected from operator contact by vibration resistant well supported square or rectangular metal screens constructed of heavy grade 316 stainless steel. The stuffing box and stuffing box bearing shall be grease lubed bronze complete with grease feed piping and grease relief fittings.

2.2.4.8 The pedestal flange bolting shall be 316 stainless steel in accordance with the requirements of ASTM F593 / F594. The contractor shall supply all bolting at 110% quantity.

2.2.4.9 The RAG pedestal will be fitted with an ASTM A-48 Class 30, stuffing box, which shall have a 0.5-inch FNPT tapped connection to facilitate lubrication of the packing box bearing.

2.2.4.10 RAG pedestal area shall include an automatic air release valve (ARV) through to vent any trapped air in the upper pump column above the discharge elbow. The ARV shall be sized and provided by the pump manufacturer. The RAG pedestal shall be supplied with a corresponding pump sole plate, for permanent installation in the concrete base structure.

2.2.4.11 The sole plate of the pump shall be clearance drilled to accept twenty-eight (28) 1-1/8-inch diameter anchor bolts as laid out and dimensioned in the drawings. Anchor bolts of a different number, diameter, or spacing/layout will not be accepted. The dimensional footprint limits of the sole plate shall not exceed that shown in the drawing due to possible interference with the Power Module foundation concrete pedestal in-situ that is likely poured, fixed dimensionally, and cured months before the pumps arrive.

2.2.4.12 The sole plate shall have chamfers on all edges and corners whatsoever as well as bolting and venting holes that will be finish painted with a minimal of ¼" radius on plate edges and 3/16" radius on holes to allow good adhesion of primer and topcoat paint.

2.2.4.13 The sole plate shall have an appropriate quantity of leveling jack bolt threaded holes minimum 1”-12 UNF thread each. 110% jack bolts shall be included loose marked “Sole plate jacking bolts plus spares”. The quality is per sole plate, not per contract as leveling and grouting will be performed back-to-back.

2.2.4.14 The sole plate shall have removable lifting eyes in 4 corners for crane lift and setting in place with eyes large enough clearance fit for minimum 1 inch diameter clevis shackle pin. The lifting eyes shall be installed for shipment if the soleplate is shipped loose. The lifting eyes shall be shipped loose, not installed, if sole plate is shipped fitted to the pump mounting plate.
2.2.4.15 The sole plate grout contact surface edges and holes shall be chamfered to a radius indicated by the grout supplier planned which is ITW Chockfast Red. The sole plate shall have sufficient grout vent holes. Contractor shall liaise with ITW and provide a sole plate drawing and Owner's foundation sole plate pocket drawing to ITW to receive recommendations of any grout pouring holes, vents, or threaded pressure type grout inlets in place of edge grout dam pouring if edge pouring is not recommended by ITW.

2.2.4.16 The sole plate grout contact surface shall have a rough fly crosscut surface profile that matches as a minimum any surface profile recommended by ITW for Chock Fast Red.

2.2.4.17 The primer of the grout side of the sole plate shall be as recommended by ITW for chemical bonding to Chockfast Red and provide protection for oxidation during transport and storage at site until installed.

2.2.4.18 The pump line shaft shall be of the enclosed design with greased line shaft span support bearings (guide bushings, bearings) and designed to provide sufficient stiffness to operate without distortion or damaging vibration throughout the range of service specified. The pump shaft shall be constructed of ASTM A-582 416 or 17-4 P.H. stainless steel alloy. Shaft diameter shall be determined by the pump manufacturer but shall not be less than 4.5-inches. The shaft deflection shall not exceed 0.005 inches at any operating condition within the zone described by the specified continuous duty operating conditions.

a) At the shaft connection point just above the stuffing box, the end of shaft runout in angular indication on the face shall be at or less than 0.0001" total indicator runout (TIR) per inch diameter measured at the farthest point from center in the axial face angular direction. The shaft radial runout at the same area of the throat of the stuffing box shall be at or less than 0.0015" TIR.

b) Line shaft design, materials and construction shall accommodate up to 72 multiple start-stops per any 24-hour consecutive duration in a two-day (48 consecutive hours) storm cycle that may occur twice a year. Contractor shall note how the Twin Disc hydraulic clutch engages and modulates and at what torque / speed curve dictated by the automation system. Contractor shall also note that the engines stay running during the storm event and only the hydraulic clutch engages and disengages to limit the harsh start-stop on the engine starters and FW ring gear/pinion interface of the engine. Contractor shall note the clutch engage and disengage is at 700 engine RPM and there is a degree of modulation by the Twin Disc clutch controller. Contractor shall verify the torque shock with Twin Disc engineering for engage / disengage cycles for stress risers and backstop issues and torque presented to the driver pedestal as an entire engineered system in real life storm operation by this description.

1. The line shaft materials and surface finish internal QA/QC specifications of the Contractor (pump supplier) shall include an intentional focus for this project on reducing notching effects of the shaft surface and heat treatment and machining processes to reduce stress risers at diameter changes based on the start/stop duty cycle outlined above.
2. The threaded section of the adjustable coupling shall be studied also for reduction techniques of stress risers in the thread roots or clamping process.

c) An automatic greaser shall be provided with a description of how grease should be administered by the automation system and how grease reliefs are designed, and excess grease is collected in ways that do not harm the environment or require excessive physical effort for removal of excess or spent grease above or in the stuffing box area by maintenance personnel.

2.2.4.19 An option shall be included for an open line shaft version of the pump with product lubricated bearings.

a) The material selections shall be based on the pumpage description for particulates and chemical constituents indicated on the pump data sheets.

b) An additional focus shall be placed on the shaft material itself to be corrosion resistant and of a minimum hardness of Rockwell 40 C.

c) The line shaft bearings shall be Thordon SXL.

d) An option for hard surfacing of Nickle-Chrome-Boron shall be included for the shaft surfaces matching each line shaft bearing with an overall linear area covering the entire bearing length plus a minimum 20% position length on the leading product entry side and 10% minimum on the downstream product exit side, or manufacturer's recommendation based on bearing erosion failure mechanism studies of similar velocities and expected angle of incidence for particle impingement common at the specified pumpage flows and line shaft RPM.

2.2.4.20 The pump column shall be constructed of ASTM A-36 steel, 66" inches in diameter and not less than 0.5 inches thick, flanged at each end. The column shall mate with the pump bowl assembly and the discharge head with gaskets to assure correct alignment. Column and shaft sections shall be a maximum of 10' long. The pump shall have protection from brackish water in the form of zinc anodes. The zinc anode shall be mounted on the bowl assembly. The zinc anode shall be 75-pound, Fairbanks Morse model HYD219A, ASTM B418, type 1 or MIL A18001-K or approved equal.

2.2.4.21 The column pipe shall have accelerometers or velocity transducers installed (suitable for low frequency CPM of pump speed and any harmonics) attached to the outside of the column pipe with welded and threaded blocks to match the mounting pattern of the accelerometers/transducers (installed with Loctite 243). The accelerometer locations shall be at X and Y in line with the center of the pump line shaft at each bearing stabilizer or support if equipped, at the impeller vane/blade pass area and the tail shaft bearing cross.

a) Accelerometers and wiring shall be 'caustic water, waterproof'

b) The wiring shall be inside 3/8" SS 0.065" tubing, not meant to be liquid tight, with smooth flared ends at column flanges transitions to not harm wiring insulation with vibration and terminated above the floor outside of the driver pedestal stand with a vibration isolated junction box and terminal strip with 20% spare terminals. For temporary connection to an FFT analyzer during testing and diagnosis or future control panel upgrading.
1. Tubing shall be supported every 10" with clamps to hold the tubing tight to the column pipe so as not to collect debris in the water flow.

2.2.4.22 The pump line shaft shall be constructed of ASTM A-582 416 Stainless Steel Alloy, or 17-4 PH and its diameter determined by the pump manufacturer. The enclosed line shaft bearings shall be sleeve type bearings designed for grease/oil lubrication. The bearing shall have a bronze lining (CA932) in contact with the shaft journal and shall be of the removal and renewal type. The bearing liner shall be arranged for maximum distribution of grease for lubrication of the journal surface.

a) Line shaft bearings shall be lubricated by grease. Adequate grease shall be provided to each individual bearing by a dedicated supply line. The volume of grease to each bearing shall be precisely metered according to the requirements of the pump manufacturer. The grease lines shall be supported and protected from water and mechanical damage during operation and shall penetrate through and terminate at the pump sole plate of the pump for connection of an external grease pump. Excess/waste grease generated as a part of normal pump lubrication shall be directed up the shaft enclosing tube and out through the top of the packing box for removal by the pump station operator.

1. All tubing utilized whatsoever shall be minimum 3/8" diameter 0.065" wall seamless 316 SS with Swagelok or equal 316 SS double ferrule fittings supported each 16" or less. Where thermal expansion may be an issue the tubing shall have an expansion loop that will not collect debris.

b) A shaft enclosing tube shall be provided to isolate the shaft and bearings from the pumped fluid. Shaft enclosing tube shall be manufactured of carbon steel pipe.

2.2.4.23 The line shaft couplings shall be of the keyed type constructed of ASTM A-582 416 Stainless Steel.

2.2.4.24 The pump propeller shall be of the open axial flow type or mixed flow as required constructed of ASTM A-743 CA6NM Stainless Steel. Propellers shall have 3-4 blades with a slight preference to 3 blades for rotor dynamic purposes (pump supplier to confirm quantity). The impellers shall be attached to the shaft by means of a key constructed of ASTM A-276 316 Stainless Steel. Propeller shall be balanced to ISO 1940, G2.5. All balancing shall be done in the pump manufacturer's own facility and balance reports shall be provided.

2.2.4.25 The impeller eye at minimum submergence level shall be indicated on the pump column drawing dimensioned from the bottom of the sole plate for use by Owner to check suction bay level set points and safety margins for maximum TDH level indication and 'low-low' suction bay level emergency stop.

2.2.4.26 The pump bowls shall be constructed of ASTM A395, Gr. 60-40-18 ductile iron having a minimum tensile strength of 40,000 psi. The pump bowls shall be of sufficient thickness to withstand the stress and strain experienced at full operating pressure and vane passing pulsations of the propeller at any obtainable speed. The bowls shall be subjected to a hydrostatic test 150 percent of that specified at the design conditions in Paragraph 1.7. The
2.2.4.27 Pump suppliers requiring bowl bearing protection shall submit the proposed system and benefits for bearing protection against the pumpage as defined in the pump data sheet.

2.2.4.28 The pump suction bell shall be provided to guide the flow into the impeller. The suction bell shall be 94 inches in diameter. No deviations from this dimension will be permitted.

2.2.4.29 The suction bowl assembly shall be fitted with a replaceable propeller housing located between the suction bell and discharge bowl. This propeller housing shall be constructed of ASTM A743-CF8M Cast Stainless Steel. A tail shaft bearing shall be provided.

2.2.4.30 Pump Coating: All portions of the column and pump discharge head not exposed to view, except for the interior of the bowls, shall have an interior and an exterior coating of high build modified epoxy compatible with the pump service. Surface preparation shall be in accordance with the coating manufacturer's recommendations. See specification section 09900 - Coatings, for requirements.

2.2.4.31 The shaft shall contain a hard stop collar just under the gear box for the purpose of a 'shaft rest' to not allow the impeller (propeller) to contact the bowl with the coupling removed. The collar will only block the shaft from dropping the propeller into contact with the bowl by use of a service tool fabricated for this purpose consisting of a clam shell bolted design with one diameter clearing the packing gland and the other diameter not clearing the stop collar but clearing the shaft by 1 mm diametral when fully closed. The rest surface shall be minimum 3/4" in any radial direction. The shaft support service tool (clam shell) shall have an axial dimension to allow a minimum amount of shaft movement downward after all shaft stretch relief above the collar to seat on the shaft stop clam shell faces and not allow impeller (propeller) contact. This is not meant to allow spinning of the pump shaft for any purpose.

2.2.4.32 A pump shaft rotation sensor shall be provided to detect pump shaft rotation, speed, and direction of rotation. The kit shall be by Electro-Sensor and consist of a hall effect sensor, clamp on clam shell pulser magnet strap attached to the pump shaft before the gearbox coupling, and an RPM read out device and direction of rotation receiver. The system shall self-diagnose a component failure. There shall be two (2) independent reverse rotation sensors for redundancy but only one RPM readout is required. The sensors shall be able to detect either CW or CCW rotation and shall have a redundant backup. The component list shall consist of One (1) Electro-Sensor TR400 Tachometer (24 VDC) panel face mounted in free standing control panel; Two (2) monitoring speed switches direction of shaft rotation device 906B-SS Bi-directional Hall Effect sensor mounted on a bracket with speed switch and relays inside threaded stainless-steel body, NEMA 4X, with 10 ft cable; Two (2) custom PVC Split collar pulsar wrap, 1.5" wide, approximately 6" inside diameter (match to final shaft size), 9" outside diameter, with 16 - 1/2" magnets. This system shall detect pump RPM at the pump shaft (not any gear shaft or engine shaft) and direction of rotation of the pumps shaft.
should there be a coupling total breach failure or gear box back stop freewheeling clutch failure.

a) The two pulser wraps shall be mounted to the same pump shaft adjacent to each other up stream (before) the pump-gear adjustable coupling with a minimum gap of 1 inch (26mm) between the wraps to limit magnetic field ‘blur’ signal contamination to the two (2) matching hall effect sensors mounted on brackets positioned for sensing the magnetic pulses. Hence, the pump shaft length must accommodate two pulsar wraps without jeopardizing the overall height of the driver pedestal/RAG input shaft relationship as a target to the Power Module output shaft within reasonable grout thickness (three (3)-inch maximum grout thickness unless approved by owner) and engine mounting feet shimming or RotaChock limits.

2.2.5 RIGHT ANGLE GEAR

2.2.5.1 General

a) The gear reducer shall be a right-angle type manufactured by De’Ran Gear Model M36A, or approved equivalent, with a vertical solid shaft. The gear drive shall be integrally fan cooled lube oil or an external fin-fan lube oil cooler to provide adequate cooling of the lubrication oil without the need for any freshwater cooling circuit. The integral heat exchanger ‘radiator’ (if supplied) and fan cooling system shall be mounted on the slow speed vertical shaft of the speed reducer. The thermal rating of the speed reducer shall at least be equal to the mechanical rating. The fan cooling (integral or shipped loose fin-fan) shall be based on 100% humidity and 118°F building ambient.

1. Any external fin-fan cooler shall be 208 VAC three phase fed by the RAG lube oil pump and include a 25-micron bypass filter, pressure gauge downstream of filter, pressure switches, pressure regulator floor mounted skidded type unitization with shipped loose PTFE hoses with crimp on JIC fittings and SS overbraid. Hoses to not be longer than 2 feet each out and in to gear or in/out of cooler with SS tubing runs as needed to transition to floor mounted cooler and gear box and floor clamps provided rather than longer hoses. Tubing shall be same diameter as hoses with 0.065” wall thickness and double ferrule compression fittings. The fin-fan type external cooler shall not be unit mounted to the RAG.

2. The gear shall be suitable for a ‘marine type seacoast’ installation, in doors but without HVAC to building. Note: Pump station building is approximately 4 miles inland from the Atlantic Ocean; 250 feet from saltwater river during high tide).

3. Contractor via gear supplier shall submit ‘coastal marine’ specialty construction details with a focus on heat exchanger radiator coating if recommend for marine coastal air environment. Any coatings to the air side of the heat exchanger (integral or shipped loose fin-fan) shall be Heresite or equal and shall include a certification that any thermal transfer losses are included in the heat exchanger sizing.

4. Selection calculations sheets shall be submitted with offer to include the AGMA 216.01 Surface Durability Formula showing as a minimum the Dynamic Factor, the Bending Strength Horsepower; actual precise gear
reduction based on tooth count with pinion speed of 1800 RPM, and actual service factor of the selected gear set.

b) The gear reducer shall have a ratio as required to produce the maximum pump operating speed at the rated speed of the Power Module coupling (1800 RPM) to the gear input shaft. The ratio shall be carefully coordinated to the pump capacity curve, with all direction of rotations verified, pump load torque multiplication via the ratio versus available Power Module torque capacity at any obtainable speed of the Power Module and pump within the pump capacity operating range.

c) No ratio shall be higher than 6:1 in a single stage. Two stage is allowed.

d) Speeds of all rotors in the entire drive train (Power Module radiator fan through to the pump impeller and last pump bearing) shall be capable of sustaining the speed at the engine overspeed trip set point less 1 RPM indefinitely while in normal pumping operation mode (clutch cycling and returning to the trip speed less 1 RPM based on suction bay water level).

e) The gear reducer shall be a single or double reduction spiral/bevel gear, right angle drive, with horizontal input shaft, and vertical downward output shaft design. The gear reducer output shaft shall be coupled to the vertical pump shafting and shall support the full dead weight of the vertical suspended shaft assembly as well as pumping dynamic down thrust at any obtainable intersection of the wet well system curve and pump capacity curve including water weight to the top of the column pipe. Gear reducer efficiency shall be not less than 97%. The gear reducer shall be designed and manufactured in accordance with AGMA Standards.

f) The casing shall be high tensile strength (minimum 30,000 psi) cast iron or fabricated steel of adequate strength and rigidity to withstand all loads imposed on it from operation of the equipment, to maintain all gears, bearings, and seals in precise alignment. Lifting lugs shall be provided on the housing suitably located to enable safe removal of the gear reducer. The housing shall be equipped with tapping for oil fill, drain, level indication, breather, etc. and inspection covers as required, which shall be arranged and located for easy observation and access. The bottom of gear case shall include a female register fit rabbet pilot to align with the pump stuffing box driver adapter housing rabbet fit with any thermal expansion tolerances considered so as to not produce any case deformation or shaft alignment issues.

g) Spiral bevel gears shall be precision cut from alloy steel. All gears shall be manufactured to AGMA Quality Class 11 or better as outlined in AGMA Standards. Gear teeth shall be carburized and hardened to a Rockwell C Hardness (HRC) of 58 to 60 and shall be hard cut after completion of heat treatment. No flame hardening or grinding of the gear teeth is permissible. Final surface finish of the gear teeth shall be 32 micro-inch or better. Calculations for strength and durability of gearing shall be based upon AGMA Standards. Ratings shall allow for a minimum of 200 percent momentary starting torque and shall have a minimum of 1.5-service factor above the nameplate horsepower. The actual service factor shall be communicated on the 'as-built' gear data sheets after heat treatment hardness is measured and shall not be less than 1.5. The pinion assembly shall be straddle mount with bearings supporting the pinion on both sides.
h) All bearings incorporated within the gear reducer shall be of the anti-friction type with an Anti-Friction Bearing Manufacturer's Association minimum rated life expectancy (B-10) of 50,000 hours when operating continuously at the full rated gear reducer input horsepower and torque with the supplied gear lube oil cooling system at building ambient conditions and self-generated dynamic heat loads combined. All bearings shall be of standard design, readily available. Bearings shall be oversized to assure the exact position of gears and shafts are maintained. The output shaft bearings shall be oversized steep angled tapered roller bearings, designed to support the weight, and all operating loads of the vertical shafting to be connected to the pump.

i) All shafts shall be of SAE 4130 steel, designed to AGMA limits for shaft stress and to minimize deflection, with close finished tolerances by grinding.

j) The gear reducer output shaft shall have a 'sprag' type cylindrical roller design one way freewheel non-reverse clutch back stop device capable of minimum 200% progressively or instantaneous applied torque rated for pump reverse rotation with a dead shaft (no longer powered in direction of pumping rotation) water column up to the discharge head upper most radius to stop the pump from reverse rotation with near instantaneous arresting cylindrical rollers. The back stop device shall be rated at full heat load at maximum power module input including self-generated heat in the gearbox rise above maximum building ambient of 118°F. The backstop freewheeling clutch shall incorporate a logarithmic spiraled engagement curve designed such that each load bearing reverse rotation shaft arresting component member is instantly sharing the angle of torque pickup for equal force sharing and full torque transfer.

k) Non-reverse torque shall be transferred directly to the gear case and pumps support in series to the foundation via the grouted sole plate. The backstop device shall not permit the pump shaft to rotate in the 'opposite of normal power' direction without damage during multiple reverse flow operations per hour through the pump up to 100% of the pump capacity as installed in-situ at site conditions with all mountings, housings, stuffing box / gearbox adaptors and plates, gearbox bolting (non-pinned) and anchored 'sole plate torque moment arresting components' mounting string to the pump house floor foundation.

l) Vibration and shock protective inertia snap switch, non-powered to actuate by inertia only (Murphy VS94 or approved equal) shall be provided for system shut down due to excessive vibration. To be mounted on Gearbox near input shaft and pump stuffing box housing near coupling hub area and wired to the control panel with remote reset capability. The VS94 shall be rigidly mounted without an inertia plate base (Set at 0.5 ips-pk shutdown setting). Options to be included: Remote reset, time delay on start, and 115 VAC space heater.

2.2.5.2 RAG Lubrication

a) Lubrication shall be by oil pressure lubrication of gears and bearings. Any gear mesh spray shall be a high, if not 100%, percentage to the out-mesh side and balance to the in-mesh (90/10 or 95/5 upon approval). The maximum design point lube oil temperature shall be 200°F based on AGMA 5 (ISO VG 220) lube oil.
b) The gear housing construction at the output shaft shall be dry well type with press fit shaft sleeve and captured O-Ring seal to prevent oil from pooling and leaking down the output shaft.

c) The gear input shaft shall have a double lip outboard oil seal with garter spring (spring towards internals) followed by an oil slinger and labyrinth seal.

d) A positive displacement oil pump shall be provided integral to the gear reducer housing to provide oil circulation and shall be driven from the gear reducer output shaft. The oil shall be circulated by the internal gear pump through a vertically mounted air/oil heat exchanger designed to dissipate heat from the reducer. The heat exchanger shall be designed to dissipate heat during full load pump operation in 118°F ambient temperature and 100% humidity with sea-coastal air. The heat exchanger shall be equipped with a fan that turns constantly with the vertical shaft. The fan shall be enclosed with a fan ‘finger guard’ to protect operators from hot surface contact and from moving parts and shall be in accordance with OSHA. The fan guard shall be removable with normal tools for cleaning away accumulated debris and insects.

e) The gear lube oil circuit shall include dual high oil temperature sensors to communicate values and trip points with the control panel, with trip set points of 190 °F high warning and 210°F high shutdown or as recommended. The lubrication system shall also include:

1. Lubrication oil filters, spin on, for water and particle removal. Lube Filters shall have pop up ‘high filter differential’ mechanical indictors to signal for element change.

2. Desiccant type breather for gear case.

3. Glycerin filled lubrication pressure differential gauge shall be included connected before and after lubrication filters.

4. Lubrication Thermometer installed in the pressure lubrication circuit just upstream of the heat exchanger and downstream of the heat exchanger in the lube sump.

2.2.6 POWER MODULE CONNECTION TO RAG INPUT SHAFT

2.2.6.1 The Power Module shall be connected to the RAG input shaft via a direct coupling, spacer type, torsionally soft pre-approved by Rexnord and specified by part number in the Power Module specification number 11300. The matching hub will be installed to the RAG. The use of U-Joint or CV joint drive shaft(s) are not allowed.

2.2.6.2 A coupling guard shall be provided. The coupling and shaft guard shall be carbon steel coated in accordance with specifications Section 09900. The shaft guard shall comply with applicable local and federal regulations for protection of all rotating components with the specified dimension access gaps not exceeded. Bolting of coupling hubs shall take into consideration desirable windage caused by the bolting for cooling and shall augment air flow meeting Rexnord’s maximum temperature guidelines for the polymer element ambient temp of 118°F plus the self-generated heat from misalignment and torsional damping. Robust screened air vents may be required in the guard’s shell. Care shall be taken that bolt windage does not
produce a vacuum to any oil seal areas. The shaft guard shall be provided with floor supports or a bolt on (with alignment pins to hold position) cantilever support to the Power Module skid base frame. The coupling guard shall not be fixed to the gear or HPTO. The guard design shall facilitate shaft alignment equipment mounting to hubs by being capable of total removal with normal hand tools.

2.3 STORMWATER PUMPS CONTROL LOGIC

2.3.1 Refer to Section 17200. Refer to specifications Section 17040 - PLC SYSTEM SPECIFICATIONS for PLC requirements.

2.4 ANCHOR BOLTS

2.4.1 Of Note: Canister anchors per drawing PS-P300 will be embedded in the foundation before machinery arrival and the pump sole plates. The anchors are one and one eighth (1 1/8") inch UNF grade B-7 stud bolts at foundation grade, (capped to prevent debris entry to cannister) with a captured coupling awaiting anchor extensions by an Installation Contractor to be determined later (not machinery Contractor) to drop through the sole plate to the coupling below the grout grade. Of Note: Grout is not allowed inside cannister anchors.

2.5 SPARE PARTS

2.5.1 One (1) set of all special tools (one set for all three pumps and gears) required for normal operation and maintenance shall be provided.

2.5.1.1 The pump manufacturer shall furnish a complete list of recommended spare parts necessary for the first five- (5) years of operation of the pumping system.

2.5.2 Spare Parts shall be properly packaged and labeled for easy identification without opening the packaging and suitably protected for long term storage.

2.5.2.1 The pump manufacturer shall furnish the following spare parts:

a) One (1) complete set of gaskets required for each pump provided.

b) Two (2) sets of line shaft bearings for each pump provided.

c) Two (2) sets of bowl bearings.

d) Two Sets (2) Packing.

e) Two (2) Packing Box Sleeve.

PART 3 EXECUTION

3.1 Equipment Installation

3.1.1 The equipment will be installed in accordance with the instructions of the Contractor by others. The pump sole plate will be leveled, aligned, grouted with approved non-shrink epoxy grout, and bolted in place by others per Contractor's instructions. Only supervision will be required by Contractor.

a) Note that the setting of the sole plate elevation is critical before pouring grout due to equipment stack from the sole plate upwards will fix the gear
input shaft target. That target is critical to match with the Power Module to provide the ability for direct coupling alignment shimming of the machinery on the Power Module skid. Contactor's field representative 'installation supervisor' shall hand measure and verify drawings of the registered fits and elevation stack of all components at the job site per tag numbers of the sole plate position machinery related to the gear input shaft target and confirm before the sole plate grout pouring. It is recommended to have the Power Module installed, levelled, and held firm by anchors pulling slightly against jack bolts but not grouted. The machinery mounted to the sole plate is "The Machine not to be Moved" for shaft alignment after grout has cured and all anchors pulled to full torque.

b) Contractor shall arrange and provide an alignment sub-contractor or alignment expert of the Contractor with modern laser alignment devices to be present and verify shafts targets before pouring any grout.

1. Contractor shall submit the make and model of the laser alignment system to be utilized for the entire project.

c) Contractor shall submit cold alignment procedures and thermal growth estimates shown separately. There will be no shaft dynamic position changes as all bearings regarding alignment are rolling element with zero lash hot. Contractor shall submit the final hot (warm) alignment procedure keeping in mind there may not be load available.

1. A warm alignment by operating the Power Module and Gearbox with pump shaft disabled from rotating shall be performed (after approval of the pump supplier and gear supplier). Thermal growth calculation formula shall be verified based on ambient surface temperature of machinery before starting and compared to shaft positions after final surface temperature of machinery running 20 minutes after all surface and coolant (lube oil in HPTO, Gear and Engine plus engine jacket coolant) temperatures stabilize, no load.

3.1.2 The contractor shall provide the services of a qualified manufacturer's representative who shall supervise the installation, adjustments and testing of the Machinery and shipped loose components supplied on the purchase order. The Contractor shall offer these services on a day rate basis inclusive of all expenses and travel costs, on site transportation, accommodations, and subsistence for the representative(s). An estimate of days required shall be submitted along with a timeline of each step of supervision suggestion.

3.1.3 The representative shall provide an optional day rate for of training for the operating personnel. Location of training (if different than pump station site) and venue costs by others.

3.1.4 The contractor shall provide the services of qualified instrumentation technicians to field calibrate each instrument supplied in accordance with manufacturer's specification and instruction for calibration. The Contractor shall provide written calibration sheet to the Engineer for each instrument certifying that it has been calibrated to its published specified accuracy.

3.1.5 All defects or defective equipment revealed by or noted during the tests shall be corrected or replaced promptly at the expense of the contractor. The tests shall be repeated, at the expense of the contractor, until satisfactory results are obtained.

3.2 Testing
3.2.1 Factory Test

3.2.1.1 Full flow as-built job pump tests are preferred at the factory or R&D center; however, the manufacturer may conduct model pump run tests before shipment of the pumps as specified in paragraph 2.2.3. Certified pump curves and test results shall be submitted and approved prior to shipment. The most recent Hydraulic Institute Standards shall be followed for tests.

3.2.1.2 Not less than 14 points shall be taken including not less than four within 8% of the primary operating point, not less than four within secondary operating point, not less than four at tertiary operating point and not less than two conditions within 4% of the pump's best efficiency point at the test speed.

3.2.1.3 The test curve(s) shall be certified and guaranteed. Testing shall be in accordance with ANSI/HI Table 14.6.3.4 'Pump test acceptance grades and corresponding tolerance band' Grade 1B.

3.2.2 Field Test

3.2.2.1 A field run test shall be conducted to demonstrate that the pumps operate without excessive vibration and within admissible range of coolant and oil temperatures at any obtainable operating point during the test and functionally operate satisfactorily. The field run test shall be witnessed by the Owner and Owner's representatives and the manufacturer's representative. Water supply for field testing the pumps shall be provided by the Owner by any safe means that may include opening the discharge flaps gates of two non-test non-running pumps and by filling the wet well during high tide conditions that will allow backflow.

3.2.2.2 When suction bay levels permit, a vibration test shall be conducted with a FFT vibration analyzer during field test for each pump. The analyzer shall be capable of measuring RMS values, peak to peak and 0-Peak displacement in mils and ips with an amplitude setting range of 1.5 ips and 5-10,000 Hz frequency range including, but not limited to, the operating frequency of the equipment at engine low idle 700 RPM and engine 1800 RPM up to the 8th harmonic frequency and the corresponding pump and gear RPM including the gear mesh frequencies up to the second harmonic and the pump vane pass frequency up to the forth harmonic (all minimums) or as recommended by each machine supplier OEM Rotor Dynamics Department. The vibration levels measured shall not exceed the most recent acceptable levels specified by the Hydraulic Institute. Certification shall be submitted to the engineer.

a) The vibration test shall be developed and submitted by a vibration contractor (or approved factory representative) for approval with a beginning dialogue of the following rules that are available for discussion and tuning based on the vibration contractor's experience with machine trains of this type.

1. Representatives of the Owner, pump, gear, and engine suppliers shall be present with the vibration test contractor or Pump OEM expert.

2. Vibration levels shall be checked in the horizontal and vertical planes passing through the shaft axis and at each reachable bearing or bearing support approximation if internal, and in the plane perpendicular to the
shaft axis on the body at both ends of the shafts, plus one axial direction. Note that the pump column will have installed vibration transducers terminated in a junction box located inside the driver pedestal for temporary reading by the FFT analyzer and technician. The engine shall be checked at front, middle and rear as there is no need to check every main bearing location, and the axial at flywheel housing. Each main machinery component shall be tested included Engine, Gear, Pump (above the floor) and engine Radiator at the fan bearing. Note that if any axial velocity or acceleration reading is higher than half of the radial reading this shall be a point of discussion (not necessarily rejection) no matter if that vibration amplitude is withing industry limits. Note that no proximity probes will be specified or should be installed so no ‘mils’ unit is required however the FFT analyzer shall be capable of reading mils for extreme troubleshooting capability if the need arises.

3. A No Load Run Up Waterfall and Run Down Waterfall Diagram shall be performed with the hydraulic clutch disengaged to show a no-load baseline of the Power Module and HPTO only. The speed ramp rate shall be 5 RPM /second up or down.

4. A Loaded Run Up Waterfall and Run Down Waterfall Diagram shall be performed with the hydraulic clutch engaged rotating the entire drive train pumping water. The waterfall diagrams shall be based on the exact operating start up procedure beginning at clutch engagement up to 1800 RPM engine speed and back down to clutch disengagement. Several TDH values shall be attempted given the available suction bay levels. The precise operating procedure will be developed during detailed engineering by Contractor. The intent of a waterfall diagram is to determine, as best possible given the water level complexities, if any harmonics produce harmful vibration levels or threshold of harmful levels. The TDH of the pump for any waterfall diagram shall be discussed and agreed upon in advance. The owner shall set the suction bay parameters the day of the test.

5. Additional to a waterfall diagram there shall be a routine vibration test at the operating speed of 1800 RPM with the 4 main specified pumping regimes attempted depending on load availability and make up suction bay water rates. If the suction bay limits the desired testing the pump supplier and owner shall agree to any amended plan before or during any test.

6. The vibration analyzer shall also be connected to the velocity transducers or accelerometers pre-installed to the pump column specified in the pump construction section.

7. At the discretion of the vibration test technician repeated tests or additional points of interest shall be performed in order to mimic, as best possible, a range of actual pumping conditions.

8. The testing costs shall be shown as an option including set up by one vibration expert on the lead day before any test followed by ‘all personnel’ loaded days of all experts present during the test as a lump sum per day including travel and accommodation costs all in regardless of quantity of experts provided per day. Additional testing set up and costs for solutions needed for additional testing where the original tests failed the guideline are for Contractor’s account.

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3.2.2.3 The speed of the pump shall be measured for each pump. The instrument shall be calibrated before the test and calibration certificates shall be presented to the inspector on the day of the test. The accuracy of the RPM monitoring instrument shall be within 1 RPM. The speed of the pump shall be within 1 rpm.

3.2.2.4 The pump power shall be tested by a torsion dynamometer, a strain gauge, or by use of highly calibrated electric motor demand as allowed by HI for each pump. A wireless strain gauge is preferred. Contractor shall submit how the actual power demand is collected during test. The instrument shall be calibrated before the test. The accuracy of the horsepower measurement instrumentation shall be within 1 HP. The power draw of the pump shall be within 1 HP.

3.2.2.5 The flow rate of each pump shall be determined from the rate of wet well level change. A separate wet well drawdown test shall be conducted for each pump. The drawdown test shall be repeated for a minimum of three times and the results shall be averaged. For the draw down test, during a high tide period, the wet well will be filled to elevation +2. The drawdown test shall be conducted between elevation +2 and -11.90 (13.90 ft total level change). The level change and time shall be as monitored by the Main Control System.

3.2.2.6 All field test results shall be certified and presented to the Owner or Owner's representative for review and approval.

(End of Section 11101)
CLIENT: City of Charleston, SC
PROJECT TITLE: Spring/Fishburne US17 Drainage Improvements
JOB NUMBER: 
EQUIPMENT NUMBER: 
EQUIPMENT SERVICE: 
SERIAL NUMBER: 
REQ / SPEC NUMBER:
PURCHASE ORDER NUMBER:

Cells coloured thus □ contain drop-down options
Text in BLACK color are by Purchaser
Text in BLUE color are by Supplier
Text in RED color are by Purchaser OR Supplier

COMMENTS: Pumps will be engine driven.

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<th>ITEM / TAG NUMBERS</th>
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<td>SP2</td>
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APPLICABLE OVERLAY STANDARDS
Hydraulic Institute (HI)

Rev | Date | Description | By | Checked | DATASHEET No.
--- |------|-------------|----|---------|-------------------

CENTrifugal PUMP DATA SHEET

Sheet | of
### CENTRIFUGAL PUMP Datasheet

#### General

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<thead>
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<tr>
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#### Liquid Characteristics

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**Design Notes:**
- Pumps will start against a closed flap-gate type check valve. See Drawings. See attached for pump region of accessibility. Pumps will ultimately be installed in a wet well. However, they may operate in an outdoor enclosure prior to the construction of the building that will house them.

#### Performance (7.1)

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### CENTRIFUGAL PUMP DATASHEET

#### CONSTRUCTION

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<td>SPECIAL FITTINGS FOR TRANSITIONING (6.4.3.3)</td>
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#### MATERIAL (6.12.1.1)

| ANNEX H CLASS |
| MINIMUM DESIGN METAL TEMPERATURE (6.12.1.1) | 116°F |
| MAXIMUM ALLOWABLE TEMPERATURE (3.1.19) | 500°F |
| REDUCED HARDNESS MATERIALS REQ'D (6.12.1.14) | NO |
| APPLICABLE HARDNESS STANDARD (6.12.1.14) | N/A |

#### BARELL

- BOWL
- DIFFUSERS
- IMPELLER
- IMPELLER WEAR RING
- CASE WEAR RING
- SHAFT
- BOWL (IF VS-TYPE)

#### BEARINGS AND BEARING HOUSINGS (6.18.1)

| Bearing (Type / Number): |
| REVIEW AND APPROVE THRUST SEATING SIZE (8.2.5.2.6) | YES |
| LUBRICATION (8.11.3) | GREASE |
| PRESSURE LUBE SYSTEM TO API-614, CHAPTER | N/A |
| API 614 Datasheets Attached (9.3.6.4) | N/A |
| PRESSURIZED LUBE OIL SYSTEM MOUNTED ON BASEPLATE | N/A |
| LOCATION OF PRESSURIZED LUBE OIL SYSTEM | |
| INTERCONNECTING PIPING PROVIDED BY | Supplier |
| OIL VISC. ISO GRADE | VG |
| VENT-TO-HOUSING CONSTANT LEVEL OILER (6.10.2.4) | NOT REQUIRED |
| OIL LIFT PROVISIONS (6.11.3) | N/A |
| GREASE LUBRICATION (6.11.4) | YES |

#### CASING MOUNTING (6.3.14, 9.3.6.3): |

| CASING TYPE: |
| CASING PRESSURE RATING: |
| DH3 BACK-PULLOUT LIFTING DEVICE REQUIRED (9.1.2.6) | NO |
| HYDROTEST (8.3.2.2): | N/A |
| HYDROTEST O/J PUMP ASSEMBLY (8.3.2.14): | YES |
| SUCTN PRESS REGIONS DESIGNED FOR MWP (6.3.8): | YES |

#### ROTOR

- SHAFT FLEXIBILITY INDEX (SFI) (8.1.1.3)
- FIRST CRITICAL SPEED (MULTISTAGE PUMPS ONLY)
- COMPONENT BALANCE TO ISO 1940-1, G1 (6.9.3.4)
- SHRINK-FIT LIMITED MOVEMENT IMPELLERS (9.2.2.3)
- ROTATION (VIEWED FROM COUPLING END)
- IMPELLERS INDIVIDUALLY SECURED (6.6.3) | YES |

#### COUPLING (7.2)

- MANUFACTURER: rewind Faulk
- MODEL: BMR R31
- RATING (HP / RPM)
- SPACER LENGTH (7.2.2.2) | 16.5 in |
- SERVICE FACTOR (7.2.3) |
- KOUL (TYPE) | NO |
- COUPLING WITH PROPRIETARY CLAMPING DEVICE (7.2.10) | NO |
- COUPLING IN COMPLIANCE WITH (7.2.4) (7.2.11) |

#### GUARDS (7.3)

- COUPLING AND SHAFT GUARD STANDARD (7.3)
- IGNITION HAZARD ASSESSMENT PER EN 13463-1 (7.3.2.7, 7.3.3.4)
- COUPLING GUARD MATERIAL (7.3.2.1, 7.3.3.3)
- SHAFT GUARD MATERIAL (7.3.2.1, 7.3.3.3)
- SPARK RESISTANT MATERIAL REQUIRED (7.3.2.1) | N/A |

#### BASEPLATE

| API BASEPLATE NUMBER (ANNEX D): |
| BASEPLATE CONSTRUCTION (7.4) |
| BASEPLATE DRAINS (7.4.1) |
| MOUNTING |
| NON-GROUT CONSTRUCTION (7.4.1.8): |
| SUPPLIED WITH: |
| • DRAIN CONNECTION |
| • GROUT AND VENT HOLES |
| • NOT REQUIRED |
| DEMONSTRATE BASEPLATE PAD FLATNESS (7.4.9) | YES |
| PROVIDE SPACER PLATE UNDER ALL EQUIPMENT FEET (7.4.19) | NO |
| BOLT CH 3/4" PUMP TO FOUNDATION |
| PROVIDE SOLEPLATE FOR CH 3/4" PUMPS (9.1.2): | N/A |

#### NOTES

- DATASHEET No.: 11101-F1 3 of 7
## Centrifugal Pump Datasheet

### Instrumentation

<table>
<thead>
<tr>
<th>Note</th>
<th>Instrumentation Per API 670 (7.5.2)</th>
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<tr>
<td>2</td>
<td>Accelerometers (7.5.2.1)</td>
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<td>Number of Accelerometers</td>
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<td>5</td>
<td>Mounting Location</td>
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<td>6</td>
<td>Provision for MTG only (6.10.2.13)</td>
<td>N/A</td>
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<td>7</td>
<td>Flat Surface Required (6.10.2.14)</td>
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<td>8</td>
<td>Vibration Probes (7.5.2.2)</td>
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<td>9</td>
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<td>10</td>
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<td>Number per Axial Bearing</td>
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<td>Threaded Provision for MTG only (6.10.2.13)</td>
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<td>Flat Surface Provision Only (6.10.2.14)</td>
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<td>Sensors and Cables Supplied by (7.5.2.4)</td>
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<td>16</td>
<td>Temperature Detectors (7.5.2.3)</td>
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<td>17</td>
<td>Temp. Probes Required (7.5.2.3)</td>
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<td>18</td>
<td>Provisions for Mounting Only (6.10.2.2)</td>
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<td>19</td>
<td>Radial Bearing Temp.</td>
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<td>Number per Radial Bearing</td>
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<td>Thrust Bearing Temp.</td>
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<td>23</td>
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<td>Temp. Gauges (with Thermowells) (9.1.3.5)</td>
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### Support System Mounting

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<td>Mounted on Pump Baseplate (7.6.1.4)</td>
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<td>Location on or off Baseplate (7.4.9)</td>
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<td>Interconnecting Piping by</td>
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### Mechanical Seal (6.8)

| API 682 Datasheet Attached | NO |
| Additional Central Flush Port (6.8.9) | NO |
| Heating Jacket Req'd (6.8.11) |    |

### Heating and Cooling (6.1.23-6.1.27)

| Heat Req'd | NO |
| Cooling Water Piping Plan (7.6.3.1) |    |
| Cooling Water Piping Fittings |    |
| Cooling Water Piping Materials |    |
| Cooling Water Requirements |    |
| Supply Pressure | psig |
| Bearing Housing | gpm |
| Heat Exchanger | gpm |
| Total Cooling Water | gpm |
| Heating Medium |    |
| Heating Piping |    |

### Piping & Appurtenances

| Tag All Orifices (7.6.2.4) | N/A |
| Socket Weld Union on 1st Seal Gland Nipple (7.6.2.8) | N/A |
| Manifold Aux Piping Systems at Skid Edge (7.6.1.8) | N/A |

### Pressure Vessel Design Code References

These References Shall Be Provided by the Manufacturer

| Casting Factors Used in Design (Per Table 4) |    |
| Source of Material Properties (6.3.5) |    |

### Welding and Repairs (6.12.3.1)

These References Shall Be Provided by the Purchaser, (default to Table 11 if no Purchaser Preference is Stated)

| Alternative Welding Codes and Standards |    |
| Welding Requirement (Applicable Code or Standard) |    |
| Alternative Welder/Operator Qualification Standard |    |
| Non-Pressure Retaining Structural Welding Standard (Baseplates or Supports) |    |
| Standard for Magnetic Particle or Liquid Penetrant Examination (Plate Edges) |    |
| Standard for Postweld Heat Treatment |    |
| Standard for Postweld Heat Treatment of Casing Fabrication Welds |    |

### Material Inspection

These References Shall Be Provided by the Purchaser

Default to Table 14

| Table 14 Inspection Class: |    |
| Alternative Material Inspections and Acceptance Criteria (See Table 15, 8.2.2.5) |    |

### Type of Inspection

<table>
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<tr>
<th>Type of Inspection</th>
<th>Method for Fabrications</th>
<th>Method for Castings</th>
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<tr>
<td>Radiography</td>
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<td>Magnetic Particle Inspection</td>
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<td>Liquid Penetrant Inspection</td>
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<td>Visual Inspection (all surfaces)</td>
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## CENTRIFUGAL PUMP DATASHEET

### SURFACE PREPARATION, PAINT & SPARES

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<td>START-UP</td>
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<td>DRIVER</td>
<td>GEAR</td>
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<td>CONNECTION DESIGN APPROVAL (9.2.1.4)</td>
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<td>BEARING LIFE CALCULATIONS REQUIRED (6.10.1.11)</td>
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### REV.

| DATA SHEET No. | SHEET OF | Rev. | |
|——— | ——— | ——— | ——— |
**VERTICAL PUMP SUPPLEMENTAL DATASHEET**

**VERTICAL PUMPS (CONT'D)**

<table>
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<th>PUMP THRUST:</th>
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<tbody>
<tr>
<td>(+) LIP</td>
<td>(+) DOWN</td>
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<tr>
<td>STATIC THRUST</td>
<td>lb</td>
</tr>
<tr>
<td>AT MIN FLOW</td>
<td>lb</td>
</tr>
<tr>
<td>AT RATED FLOW</td>
<td>lb</td>
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<td>lb</td>
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<td>MAX THRUST</td>
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</table>

**SUCTION CAN**

| COLUMN PIPE: |
| DISTANCE | FLANGED |
| DIAMETER | in |
| TOTAL COLUMN LENGTH | ft |
| NUMBER OF SECTIONS | |
| SPACING (LENGTH PER SECTION) | ft |

**GUIDE BUSHINGS:**

| NUMBER |
| LINE SHAFT BEARING SPACING | in |
| GUIDE BUSHING LUBE | |

**MATERIALS (additional)**

| SUCTION CAN / BARREL |
| DISCHARGE HEAD |
| BOWL SHAFT |
| LINESHAFT |
| LINESHAFT HARDFACING | Provide for prod. lube bearings opt. |

**PRESSURE RATING:**

| PRESSURE | MWP | psig | HYDRO | psig |
| SHAFT ENCLOSED TUBE | |
| DISCHARGE COLUMN | |

**SUMP DIMENSIONS:**

| GRADE ELEVATION | 1 ft |
| LOW LIQUID LEVEL | 2 ft |
| C.L. OF DISCHARGE | 3 ft |
| SUMP DEPTH | 4 ft |
| PUMP LENGTH | 5 ft |
| GRADE TO DISCH | 6 ft |
| GRADE TO LOW LIQUID LVL | 7 ft |
| GRADE TO 1ST STG IMPLR | 8 ft |
| SUBEMERGENCE RED | 9 ft |
| SUMP DIAMETER | 10 ft |

**SUMP ARRANGEMENT**

![Diagram of Sump Arrangement]

**DATASHEET No.**

Rev: SHEET OF
NOTES

1. Pump operating conditions generated from the basis of design pump. It is understood that every manufacturer will not be able to meet these exact duty operating points. In anticipation of this, we are providing an "acceptable pump performance region" (see graphic and tabulated points below). Should a manufacturer's offering fall within the identified region, the pump performance will be deemed acceptable.

<table>
<thead>
<tr>
<th>Point</th>
<th>Flow (GPM)</th>
<th>Head (ft)</th>
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<tbody>
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<td>8260</td>
<td>24</td>
</tr>
<tr>
<td>B</td>
<td>117320</td>
<td>24</td>
</tr>
<tr>
<td>C</td>
<td>134430</td>
<td>20</td>
</tr>
<tr>
<td>D</td>
<td>163760</td>
<td>7</td>
</tr>
<tr>
<td>E</td>
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<td>F</td>
<td>109990</td>
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See paragraph 2.2.4.21 of specification section 11101 - Axial Flow Stormwater Pumps.

3. See paragraph 3.2.1.3 of specification section 11101 - Axial Flow Stormwater Pumps for testing tolerance requirements.

4. The maximum total weight of the pump assembly (including the RAG, sole plate, pump column, and any appurtenant equipment) shall not exceed 120,000 lbs. Maximum weight of any one pump component to be lifted by the future bridge crane shall not exceed 100,000 lbs (50-Ton). The live load associated with the weight of water suspended above the propeller and any vertical downthrust shall not exceed 100,000 lbs.

5. The live load associated with the weight of water suspended above the propeller and any vertical downthrust shall not exceed 100,000 lbs.

6. Contractor to provide this as an option for open line shaft.

7. See drawings for proposed sump dimensions and pump operating levels.

DATASHEET No. ___________________________ Rev: _________ SHEET OF _________

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## SECTION 11300  DIESEL ENGINE DRIVEN POWER MODULES

### Acronyms and Abbreviations Utilized in This Document

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
<th>Unit</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Duty rating of Caterpillar Inc. meaning full rated load no more than 80% of the time</td>
<td>lbs.</td>
<td>Pounds (weight)</td>
</tr>
<tr>
<td>µm</td>
<td>Micrometer (0.001 mm or 0.0000039 inch)</td>
<td>LH</td>
<td>Left hand</td>
</tr>
<tr>
<td>2D</td>
<td>Two Dimensional</td>
<td>LL</td>
<td>Low Low (Shutoff state in controls)</td>
</tr>
<tr>
<td>8D</td>
<td>A battery group size by the BCI</td>
<td>mil</td>
<td>0.001 inch</td>
</tr>
<tr>
<td>A&amp;I</td>
<td>Application and Installation</td>
<td>mm</td>
<td>Millimeter</td>
</tr>
<tr>
<td>AC</td>
<td>Alternating Current or After (Cooler depending on context of use)</td>
<td>MNPT</td>
<td>Male National Pipe Thread (tapered)</td>
</tr>
<tr>
<td>ADEM4</td>
<td>Advanced Diesel Engine Management (computer) model 4 (Caterpillar brand)</td>
<td>NC</td>
<td>National Course threads</td>
</tr>
<tr>
<td>ATAAC</td>
<td>Air To Air After Cooled (Aftercooled)</td>
<td>NDE</td>
<td>Non-Drive End</td>
</tr>
<tr>
<td>BCI</td>
<td>Battery Council International</td>
<td>NDT</td>
<td>Nondestructive testing</td>
</tr>
<tr>
<td>BE</td>
<td>Between Shaft Ends</td>
<td>NEMA</td>
<td>National Electrical Manufacturers Association</td>
</tr>
<tr>
<td>BHP</td>
<td>Brake Horsepower</td>
<td>UNF</td>
<td>Unified National Fine threads</td>
</tr>
<tr>
<td>C</td>
<td>Celsius</td>
<td>NPT</td>
<td>National Pipe Thread (tapered)</td>
</tr>
<tr>
<td>C92</td>
<td>Cat 92-liter engine model number</td>
<td>OEM</td>
<td>Original Equipment Manufacturer</td>
</tr>
<tr>
<td>Cat</td>
<td>Caterpillar Inc. in this case Caterpillar Engine Division</td>
<td>OSHA</td>
<td>Occupational Safety and Health Administration</td>
</tr>
<tr>
<td>CCW</td>
<td>Counter or Anti Clockwise</td>
<td>P</td>
<td>Model designation of Twin Disc meaning power take off type shaft (side loaded; bigger tail shaft bearing)</td>
</tr>
<tr>
<td>CPM</td>
<td>Cubic Feet per Minute</td>
<td>P&amp;ID</td>
<td>Piping and Instrumentation Diagram</td>
</tr>
<tr>
<td>CW</td>
<td>Clockwise</td>
<td>PE</td>
<td>Professional Engineer</td>
</tr>
<tr>
<td>D&amp;F</td>
<td>Davis and Floyd (D&amp;F Engineering Incorporated)</td>
<td>PFD</td>
<td>Process Flow Diagram</td>
</tr>
<tr>
<td>D-1</td>
<td>Driver unit 1 (tag number), D-2, D-3 also. Diesel unit 1 (also)</td>
<td>PLC</td>
<td>Programmable Logic Controller</td>
</tr>
<tr>
<td>dBA</td>
<td>Decibels with an A weighted scale (sound pressure level)</td>
<td>PO</td>
<td>Purchase Order</td>
</tr>
<tr>
<td>DC</td>
<td>Direct Current</td>
<td>psi</td>
<td>Pounds per square inch (differential or absolute depending on context if no 'a' or 'd' is indicated in place of 'g' or often written by a layman as meaning psg.</td>
</tr>
<tr>
<td>DE</td>
<td>Drive End</td>
<td>psig</td>
<td>Pounds per square inch, gauge</td>
</tr>
<tr>
<td>DIT</td>
<td>Direct Injection Turbocharged</td>
<td>PTFE</td>
<td>Polytetrafluoroethylene</td>
</tr>
<tr>
<td>DITA</td>
<td>Direct Injection Turbocharged Aftercooled</td>
<td>PTO</td>
<td>Power Take Off</td>
</tr>
<tr>
<td>DM</td>
<td>Unknown prefix to Caterpillar Data Sheets. (There are EM sheets also at Cat so careful with EM and DM during correspondence)</td>
<td>RH</td>
<td>Right Hand</td>
</tr>
<tr>
<td>EDI</td>
<td>Engineering Dynamics Incorporated</td>
<td>RPM</td>
<td>Rounds Per Minute</td>
</tr>
<tr>
<td>EGSAA</td>
<td>Electrical Generating Systems Association</td>
<td>SAE</td>
<td>Society of Automotive Engineers</td>
</tr>
<tr>
<td>EPA</td>
<td>Environmental Protection Agency (US)</td>
<td>SC</td>
<td>South Carolina</td>
</tr>
<tr>
<td>Ex: or ex:</td>
<td>Example</td>
<td>SS</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td>For f</td>
<td>Fahrenheit</td>
<td>T</td>
<td>Something shaped like the letter T such as T-Bolt, T-section</td>
</tr>
<tr>
<td>FEA</td>
<td>Finite Element Analysis</td>
<td>TBD</td>
<td>To Be Determined</td>
</tr>
<tr>
<td>FFT</td>
<td>Fast Fourier Transform</td>
<td>TDH</td>
<td>Total Dynamic Head</td>
</tr>
<tr>
<td>FNPT</td>
<td>Female National Pipe Thread (tapered)</td>
<td>TNF</td>
<td>Torsional Natural Frequency</td>
</tr>
<tr>
<td>FOLD</td>
<td>Full Open Lock Open</td>
<td>TPI</td>
<td>Threads Per Inch</td>
</tr>
<tr>
<td>FW</td>
<td>Flywheel of engine</td>
<td>TVA</td>
<td>Torsional Vibration Analysis</td>
</tr>
<tr>
<td>FWHe</td>
<td>Flywheel Housing US</td>
<td>United States of America</td>
<td></td>
</tr>
<tr>
<td>G's</td>
<td>Force, Gravity</td>
<td>USA</td>
<td>United States of America</td>
</tr>
<tr>
<td>H</td>
<td>High (pre-alarm state in controls)</td>
<td>USS</td>
<td>United States Standard</td>
</tr>
</tbody>
</table>
Acronyms and Abbreviations Utilized in This Document

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>H2O</td>
<td>Fresh water or water, dihydrogen monoxide</td>
</tr>
<tr>
<td>HH</td>
<td>High High (Shutoff state in controls)</td>
</tr>
<tr>
<td>HP</td>
<td>Horsepower</td>
</tr>
<tr>
<td>HPTO</td>
<td>Hydraulic Power Take Off (Twin Disc clutch)</td>
</tr>
<tr>
<td>Hsg</td>
<td>Housing</td>
</tr>
<tr>
<td>i.e.</td>
<td>id est (Latin) 'That is' or 'specifically'</td>
</tr>
<tr>
<td>ID</td>
<td>Identification</td>
</tr>
<tr>
<td>IDC</td>
<td>A company name</td>
</tr>
<tr>
<td>Iso</td>
<td>Isometric drawing</td>
</tr>
<tr>
<td>ISO</td>
<td>International Organization for Standardization</td>
</tr>
<tr>
<td>JIC</td>
<td>Joint Industry Council (35° flare joint)</td>
</tr>
<tr>
<td>V</td>
<td>Shaped like the letter V, such as a V configuration engine, V clamp, V section, etc.</td>
</tr>
<tr>
<td>VAC</td>
<td>Volts Alternating Current</td>
</tr>
<tr>
<td>VDC</td>
<td>Volts Direct Current</td>
</tr>
<tr>
<td>VPI</td>
<td>Vapor Phase Inhibitor</td>
</tr>
<tr>
<td>WOF</td>
<td>With Out Fan (without a radiator fan load included at the FW of an engine)</td>
</tr>
<tr>
<td>WR°</td>
<td>Weight Ratio Squared</td>
</tr>
<tr>
<td>X</td>
<td>A variable input value or a quantity; also, a lateral direction</td>
</tr>
<tr>
<td>YZ</td>
<td>Lateral directions meaning left of axis X, right of axis Y and axial Z. Z can mean vertical also depending on context</td>
</tr>
</tbody>
</table>

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

1.1.1 Definitions:

1.1.1.1 Contractor: Supplier or Vendor named on the purchase order with sole responsibility for all the machinery and shipped loose support components for the Storm Water Pumping Units named in this and associated specifications.

1.1.1.2 Power Module: Diesel Engine Driven Power Module, Complete Drive String from the radiator through terminal shaft coupling of the HPTO

1.1.1.3 Pump: Axial flow propeller type vertical column pump or mixed flow vertical column pump

1.1.1.4 Clutch: Hydraulic Power Take Off (HPTO)

1.1.1.5 Cat: Caterpillar Inc.

1.1.1.6 Skid: Skid main baseframe; holds all capital equipment in alignment on power module

1.1.1.7 Owner: City of Charleston, SC issuer of Purchase Order (Contract for Purchase) or designated representatives specifically named in the Purchase Order with limitations clearly stated. Does not necessarily imply title transfer. Owner is a term only used in this document to ID purchaser or an agent named in the PO.

1.1.1.8 There are three (3) machine trains; Each having a Power Module driving a right-angle gear driving a storm water pump. The Pump and Gear are specified in other main sections.

1.1.2 Contractor shall furnish and shop test (as noted), field test (as noted), supervise the installation, adjust, and place in satisfactory operating condition three (3) variable speed diesel engine driven power modules as specified herein and as shown in the drawings.
1.1.3 Each unit shall include a robust ‘stiff design’ single piece skid base frame, radiator, diesel engine, hydraulic power take off (clutch), torsionally soft spacer coupling, batteries, battery racks, battery maintenance wall charger, engine and HPTO clutch control panel, accessories and appurtenances as specified. The diesel engine shall comply with US EPA Tier II (2) non-road engine emergency standby usage exhaust emission standards.

1.1.4 To assure single source responsibility of design and supply, the pumps, gears, drive couplings, clutches, diesel engines, radiators, skid base frames and all components specified herein shall be furnished and coordinated by the pump manufacturer or bidder/contractor of record. The total working components of the Diesel Engine Driven Power Module complete packages shall be suitable for the intended application and purpose, able to supply power and torque successfully and acceptably after all parasitic losses for any point of the pump curve that is clearly marked with the range of operation without damage or reduced capacity given the ambient conditions named herein and all specifications for this project and at the installation site and shall be in every respect, complete and workable.

1.1.5 All capital equipment such as, but not limited to, the radiators, diesel engines, ship loose exhaust components, clutches (HPTOs), couplings, right angle gear boxes and pumps shall be newly ordered from the respective factories, have sequential serial numbers (by so stating on capital equipment component purchase orders to suppliers or sub-suppliers) and be 100% identical in every way including the skid base frames with particular focus and attention to extreme detail of shaft centerlines, foundation anchor bolt targets and skid base frame envelope sizes and all dry weights. All replacement parts from like units shall be 100% interchangeable and have a single source of spare parts ordering from each dealer or factory of that component.

1.1.6 The contractor is responsible for coordinating the timely successful work for engineering, manufacturing, delivery, installation supervision, cold and hot alignments of the complete pumping system equipment. The contractor shall strive to obtain any and all information regarding all supportive utilities by others required for the contractor furnished equipment to operate properly and offer guidance and notations should any support utilities not be appropriate for function and fit for purpose. Of Note: After final hot alignment accepted by owner the right rear engine foot shall be doweled with a 5/8 inch removable tapered dowel and matching taper reamer for doweling.

1.1.7 Note: No Teflon or other type of pipe sealing tape is allowed on the entire machinery train or support equipment whatsoever anywhere.

1.1.8 The system processes shall be designed and submitted as P&IDs, PFDs and Isometric drawings.

1.1.9 Great focus and attention to detail shall be incorporated into vibration mitigation of the installed Diesel Engine Driven Power Modules. Areas to be studied and mitigated are, but not limited to, vibration of acoustical, torsional, lateral, or linear origin and/or the responses. Excitation from the afore mentioned sources and frequency, amplitude orders and harmonics produced by the firing order phase angles of the engine at any obtainable speed and power capacity. A high degree of possible excitation separation margins is desired from machinery to machinery components and building structures. Note: The diesel engine is a high power density low mass torsionally active machine. This will be checked and discussed at length.

1.1.10 A site visit to the Site is required for Contractor familiarization with the project.
1.1.11 Any castings for the project over 75 lbs (weight before removing gates and risers or any cleaning) that require material testing via keel blocks shall have 3 keel blocks minimum near the riser(s). One keel block for testing, one spare, one additional spare if not consumed for original test for the Owner at owner’s option, unmachined (raw casting saw cut from keel block manifold).

1.1.12 Speeds of all rotors in the entire drive train (Power Module radiator fan through to the pump impeller and last pump bearing) shall be capable of sustaining the speed at the engine overspeed trip set point less 1 RPM indefinitely while in normal pumping operation mode (clutch cycling and returning to the trip speed less 1 RPM based on suction bay water level).

1.1.13 All critical and safety signage and / or decals shall be in English and Spanish (most prominent Spanish dialect for the Charleston, SC Area). For hanging tags each sign shall be minimum 6 mil thick laminated with clear plastic, waterproof, oil and grease proof, and double sided with a SS grommet of 3/8” diameter for hanging. If a major supplier does not have dual language decals, then Contractor shall design and supply dual language signage in ways it matches the specific intent of the single language decal and attachment position of the decal.

1.2 RELATED DOCUMENTS

1.2.1 Requirements of the General and Supplemental Conditions apply to all Work in this Section. Provide all labor, materials, equipment, and services indicated on the Drawings, or specified herein, or reasonably necessary for or incidental to a complete job.

1.2.2 Related Sections include the following:

1.2.2.1 Section 01300 – Submittals
1.2.2.2 Section 01300-F1 – Register of Exceptions, Notations, and Clarifications
1.2.2.3 Section 03300 – Cast-In-Place Concrete
1.2.2.4 Section 09900 - Painting
1.2.2.5 Section 11010 - Equipment General Provisions
1.2.2.6 Section 11010-F1 – Project Design Data Sheet
1.2.2.7 Section 11101 – Axial Flow Storm Water Pumps
1.2.2.8 Section 11300-F1 – Engine Data Sheet
1.2.2.9 Section 15050-S – Process Piping and Appurtenances
1.2.2.10 Section 15300 – Fuel System
1.2.2.11 Section 17040 - PLC System Specifications, 17030 – Programmable Logic Controllers
1.2.2.12 Section 17150 - Instruments
1.2.2.13 Section 17200 – Process Control Logic
1.2.2.14 Division 16 - Electrical
1.3 MANUFACTURERS AND SUPPLIERS

1.3.1 The installing contractor (to be determined) shall assume full responsibility for the satisfactory installation of each of the three pumping systems including pumps, gears, and engine driven power modules as specified. The Contractor as defined in section 1.1.1.1 of this specification shall assume full responsibility for the satisfactory supervision of the installing contractor and final operation of the entire pumping system as specified herein.

1.3.2 The equipment covered by these Specifications shall be designed and manufactured by companies regularly engaged in packages of this type. The equipment is intended to be standard units of proven ability as manufactured by a competent organization having 20 years minimum experience in the design and production of such equipment.

1.3.3 All equipment furnished under this Specification shall be new and unused and shall be the standard product of manufacturers having a successful record of manufacturing and servicing the equipment and systems specified herein for a minimum of twenty (20) years.

1.3.4 The engine manufacturer shall have field service, shop service, parts, and maintenance facilities within 100-mile radius of the project site in the State of South Carolina.

1.3.5 The engines shall be Caterpillar model C32, ATAAC 'B' rating Tier II (2) 950 bhp at 1800 RPM or approved equal.

1.3.6 The Radiators shall be Young Touchtone vertical model number FR32 'fan on radiator frame' style or approved equal.

1.3.7 The HPTO Clutches shall be Twin Disc model HP1200-P without unit mounted reservoir or auxiliary pump tower or approved equal.

1.3.8 A single piece robust stiff skid base frame shall be designed and fabricated to hold all the capital equipment (Radiator, Engine, HPTO) and maintain precise alignment for full grouting for live and dead load direct energy path to grout and foundation.

1.3.9 The Caterpillar engine and skidded equipment of the Diesel Engine Driven Power Module shall be engineered, fabricated and packaged by a large Caterpillar Industrial Engine dealership with pump packaging fabrication experience and a dedicated engineering department designing pump packages for a minimum of 20 years such as Yancy Power Systems, Holt Power Systems, or approved equal.

1.4 SUBMITTALS

1.4.1 Note: All dimensioned drawing submittals from sub-vendors or created by Contractor shall be in 2D .pdf format.

1.4.2 The contractor shall submit the following in accordance with section 01300 – Submittals, 11010 – Equipment General Provisions and this specification:

1.4.2.1 Certificate of unit responsibility attesting that the Contractor has accepted the assigned unit responsibility in accordance with the requirements of Section 1.3 as it relates to the overall pumping system as an engineered total package for installation by others under supervision of Contractor.

1.4.3 A written certification of Design and Supply Coordination Guarantee from the Pump manufacturer stating that the Diesel Engine Power Modules will be designed, checked, configured, tested, and guaranteed to perform at site conditions mounted inside the
Pump station building to drive the supplied storm water Pump(s) at any point on the Pump curve included in the Contract with the allowed operation range clearly marked within the scope of all Application and Installation Guidelines of machinery sub-suppliers with all parasitic losses considered and studied including, but not limited to:

1.4.3.1 Radiator Cooling performance based on the outside ambient conditions specified, temperature rise inside the building presented to the leading edge of the forced draft radiator fan, internal static building pressure; external radiator discharge ducting and plenum pressure and heat dissipation capacity from heat loads and flow of all engine processes and parameters of those processes by the engine manufacturer with 50/50 antifreeze coolant and Here site core coating and 5 years fouling factor;

1.4.3.2 Fuel system as designed considering lift capacity of the engine 24 VDC priming fuel pump and gear driven primary fuel lift pump plus return line volumes and temperatures;

1.4.3.3 Fuel tank capacity in hours at 100% load (state the volume required only);

1.4.3.4 Engine rating per Caterpillar rating guide ‘B’ rated Tier II (2);

1.4.3.5 Building air flow considering engine combustion air volume at full load, radiator fan volume, fin/fan coolers for gearbox (if required) and HPTO oil cooling; building fan volumes;

1.4.3.6 Clutch HPTO power rating and cycle allowance with control module;

1.4.3.7 Torsional coupling between HPTO terminal shaft and right angle gearbox input shaft;

1.4.3.8 Forced flow jacket water heater;

1.4.3.9 Direct coupled alignment capability and ease of alignment knowing the gearbox is the 'Machine Not To Be Moved;'

1.4.3.10 Single piece skid base frame;

1.4.3.11 Foundation, anchors and grout design concept;

1.4.3.12 Crankcase fumes disposal concept;

1.4.3.13 Exhaust system components and installation concept within 50% of allowable exhaust flow back pressure;

1.4.3.14 Vibration mitigation concepts;

1.4.3.15 and that the total engine driven power module - Pump package is suitable for the intended application, and is in every respect, complete and workable.

1.4.4 Register of Exceptions, Information and Clarifications populated (for discussion and acceptance by Owner). Failing line-item acceptance so indicated and signed by Owner all specifications apply without dispute.

1.4.5 Confirmation of Designs: See Submittal Register for due dates listed by drawing numbers. Generally, the drawings for confirming will be copies of the contract document wiring diagrams, process flow diagrams, instrumentation and control
diagrams and others with latest revisions and any addendum updates all relating to the supplied equipment that apply to the total pumping system success and fitness for purpose. These drawings/documents shall be marked to show specific changes necessary for the equipment proposed in the submittal. If no changes are required, the drawing(s) shall be marked "No Changes Required." Any marks shall be identified by the person responsible for the marks with the company name and date of the marks followed by signature and printed or typed name of the responsible authority.

1.4.6 Certified general arrangement, shop, and erection drawings showing all-important details of construction, dimensions, owner (customer) connections and anchor bolt locations for the entire Engine Driven Power Module. Removal distances for all servicing items shall be indicated. A reference to the building datum lines shall be shown. Battery connection points (Note dual (2) x 24 VDC starters) and forced flow jacket water heater 480 VAC three phase connection point must be shown (if skid mounted, otherwise water connection must be shown marking cold in hot out on the heater and the engine block). If fin/fan HPTO oil cooler is skid mounted, then this 110 VAC single phase connection point must be shown. Equipment drain connections and drain liquid type shall be indicated (Engine Lube Oil, and any filter housing drains, HPTO oil drain (if reservoir is skid mounted), radiator antifreeze drain, ATAAC core condensation drains if so equipped.

1.4.7 Factory published specification performance sheets and curves indicating accessories, ratings, etc.

1.4.8 Manufacturer's catalog cut sheets of all main and auxiliary components such as engine cooling radiator, engine, HPTO clutch, couplings (2 included; HPTO input coupling and output couplings), wall mounted battery charger, forced flow engine block heater, HPTO fin-fan oil cooler, starting batteries, HPTO control module, engine computer module(s), silencer, exhaust flex connection, etc.

1.4.9 Dimensional elevation and layout drawing of the Diesel Engine Driven Power Module wet weight assembly labelled "Power Module Lift and Center of Gravity" showing the wet weight center of gravity of the entire skidded assembly mounted to the base frame with all accessories included on the machinery or baseframe that will be dead lifting in place on the foundation (dry weight) and present forces and moments in situ including wet weights (live and dead loads) in three (3) views.

1.4.10 "Component Dry Weights and Maintenance Lift Points": Drawing showing the dry weights of the individual capital equipment and the center of gravity in 3 views (Radiator, Engine, HPTO clutch) with those component lifting eyes indicated for the component only. Failing any supplied lifting eyes from the component suppliers a maintenance lift slinging scheme shall be shown with lifting sling rating called out.

1.4.11 Skid base frame detailed dimensioned design drawings without equipment shown as well as another layer or sheet showing equipment mounted.

1.4.12 Interconnect wiring diagram of complete engine system, including engine, HPTO clutch control module, remote pumps, fin/fan coolers, battery charger, remote alarm indication etc.

1.4.13 Engine mechanical data at varying loads up to full load, including heat rejection, exhaust gas flows, combustion air and ventilation air flows, noise data, fuel consumption, etc.

1.4.14 Jacket water heater connection diagram (forced flow type).

1.4.15 Control panel schematics.

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1.4.16 Oil sampling analysis, laboratory location, and information. Oil sample tap location on engine if equipped.

1.4.17 Emissions data

1.4.18 A schedule of delivery of the equipment to the job site.

1.4.19 Description of engine factory test procedures and equipment. The test procedures and equipment shall be approved prior to testing. No testing shall be conducted without approval.

1.4.19.1 Contractor shall option witnessed engine factory tests of 2.5-hour duration with load profile for the test and the Cat ADEM4 computer routine functions demonstrated, to be determined 4 weeks in advance. The functions test shall not exceed 30 minutes and the dyno load profiles shall not exceed 2 hours. Failing any load profile agreements or if the witness fails to participate the test shall be made at 25%, 50% in the first hour and 100% in the second hour of the 2-hour window and include 30 minutes of functions at the discretion of dyno operator and documented.

1.4.20 Description of field test procedures and equipment. The test procedures and equipment shall be approved prior to testing. No testing shall be conducted without approval.

1.4.21 Copies of all test results, as specified.

1.4.22 Location and capabilities of maintenance, parts, and service facilities for the Radiator, Engine, and HPTO.

1.4.23 Operation and Maintenance Manuals (Final Data Books)

1.4.23.1 Complete operating and maintenance instructions shall be furnished for all equipment included under these specifications. The maintenance instructions shall include troubleshooting data full preventative maintenance schedules, and complete spare parts lists with ordering information. The manuals shall be prepared specifically for this installation and shall include all required cuts, drawings, equipment lists, descriptions, etc. that are required to instruct operation and maintenance personnel unfamiliar with such equipment.

a) The parts lists will be tested after all machinery has been successfully started and any changes to components finalized in the field. Testing shall be by random selection of no more than 20 parts by the city operators whereby the Contractor shall find the replacement part number and ordering information within 20 minutes time for each part using only the submitted manuals. Parts selected for this test can be visually identified or verbally if internal such as “Turbocharger water cooled section return line tubing O-Ring” as an example of an unseen part. Failures will be corrected, and the root cause of failure determined for any major corrective formatting completeness.

1.4.23.2 The submittal format shall be in the form of electronic files as well as 3 ring binders with all inclusions in the binders having double sided reinforced full length contact strips in the left border before becoming hole punched. Format shall be left page turn per USA standards including all international ‘right turn’ submittal reformatted to left turn USA standards. Drawings shall be in drawing pockets. The electronic file and paper copies shall be tabbed 11300-8 of 30
or otherwise divided to cover all areas or each major equipment item and their sub-components.

1.4.23.3 The quantity of manuals and special requirements shall be as specified in Section 11010.

1.5 PRODUCT DELIVERY, HANDLING AND STORAGE

1.5.1 Due to unforeseen challenges Contractor shall be aware that equipment may be exposed to high humidity, salt air, rain, and high ambient temperatures once received at the destination for many months. Contractor shall submit recommended outdoor safe storage practices to maintain any warranties specified.

1.5.2 Delivery, handling, and storage of equipment shall be in accordance with the manufacturer's recommendations. Contractor shall coordinate equipment delivery with construction schedule to ensure timely progress of the work.

1.5.3 All shipped loose parts shall be properly packaged and protected so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the units and equipment are ready for operation.

1.5.4 All equipment and parts must be properly packaged and protected against any damage during a prolonged storage period at the site.

1.5.5 Factory assembled parts and components shall not be dismantled for shipment unless permission is received in writing from the Owner.

1.5.6 Finished iron or steel surfaces not painted shall be properly protected to prevent rust and corrosion.

1.5.7 Each box or package shall be properly marked to show its contents.

1.5.8 The definition of "properly packaged and protected" shall mean that the equipment has been prepared for a minimum of 12 months of long term storage by usage of VPI (Vapor Phase Inhibitor) oils in lubricated machinery with atmospheric vents sealed to maintain the VPI volatility as recommended by each capital equipment manufacturer. Desiccants used shall only be by DessicantPower (dessicantpower.com) polymers and if approved by all manufacturers included in large metal cavities suspended by robust tie wires or other cavities subject to high moisture damage including fugal growth such as the gearcase and other cavities that are easily opened for inspection and removal of desiccant bags. The equipment with internal desiccants shall be labelled in 3 independent places with 10" x 12" red tags with the words “Caution: Desiccant inside. Do not rotate shafts by any means” in English and Spanish in 1" tall letters. A separate document cataloging all desiccant positions of machinery with strong warnings shall be issued by machinery representatives during installation supervision.

1.5.8.1 Contractor shall include refreshing the packaging and protection system employed for long term storage for the entire shipment to site in 6-month intervals after the initial 12 months long term storage expires and make an option price for each additional 6 months long term storage procedure.

1.5.8.2 If Owner fails to purchase the additional long-term storage this in itself will not negate any warranty still in effect.

1.6 WARRANTY
1.6.1 The Contractor shall warranty the equipment against defects in material and workmanship for a period of eighteen months after delivery or three years or 4,000 hours after successful and accepted equipment start-up. If startup does not commence inside of eighteen months from shipment, the three-year, 4,000-hour warranty automatically starts regardless of any future startup. The warranty period shall be in force and administered by the Contractor regardless of each individual component warranty terms. The Contractor shall warranty the equipment against defects in material, and workmanship for a period of three years or 4,000 hours (each pump set has an individual running hour warranty milestone but the same calendar time period), whichever occurs first, after successful and accepted equipment start-up in situ at the pump station site with hand-over acknowledged by the Buyer (City of Charleston). If successful acknowledged hand-over does not commence inside of eighteen months from the time each completed unit is received free on truck at the job site the three-year, 4,000 running hours warranty automatically starts regardless of any future startup or hand-over.

The warranty period shall be in force and administered by the Contractor/Vendor regardless of each individual component standard warranty terms; no matter how large or small the component supplied by the Contractor under the Purchase Agreement.

1.6.1.1 If any single component is abused, mishandled, or operated out of range of the operation instructions or maintenance protocols this shall not void the remaining warranties for all other components not related to the abuse. Example: The wrong grease administered by owner in a Caterpillar fan hub bearing shall not void the turbocharger warranty or entire engine warranty.

1.6.2 If any part of the equipment should fail under the terms of warranty periods and terms of causation repairs shall be made in ways to return the machinery to acceptable full service at best speed at no expense to the Owner.

1.6.3 The Scope and Supply of this Contract shall be covered by a 15-year design guarantee. Burden of proof for any claim against a design issue, and costs of that proof, shall be borne by the Purchaser Owner. This guarantee is NOT the warranty of materials and workmanship indicated in 1.6.1 above.

1.7 DESIGN, OPERATING CONDITIONS and TAGGING

1.7.1 The Data Sheets, document 11300-F1 shall apply for the design and operating conditions to be met. The data sheets will include information indicated to be populated by Contractor Supplier and re-submitted as required by Section 01300.

1.7.2 There shall be a great design and construction focus on vibration mitigation. A full string Torsional Vibration Analysis (TVA) of every rotating mass shall be performed by 3 separate independent laboratories with names submitted for approval before the studies begin. Acceptable TVA providers are Caterpillar Inc. factory, IDC Engineering (Germantown Hills), Tech Transfer (Houston), Engineering Dynamics Inc [EDI] (San Antonio), or equal.

1.7.2.1 The input data required by each TVA supplier shall be solicited by that supplier, not offered as a standard assumed input 'package' from Contractor, to attempt to receive three (3) unique studies meeting the input components of each supplier's software. If Contractor gathers and submits one package of data for one TVA that same package of data shall NOT be copy pasted over and given to the next supplier prior to that supplier's request for data points.
a) Input data minimum suggestions for each rotating mass: Mass moment of inertia as WR^2; Torsional stiffness; all shaft diameters; wetted inertia of the propeller (impeller); torsional stiffness limits of vibratory components; coupling losses (Note: There are three (3) couplings in the entire string: Twin Disc elastomeric part of the HPTO hydraulically fitted to input shaft // coupling between gear and HPTO // Adjustable axial pump rotor clearance type coupling between gear to pump).

1.7.2.2 The output data of each study shall be compared to each other study and where more than 3% differential exists between critical points of severity such as, but not limited to, the first critical and second critical speed, all inputs shall be re-checked, the issues discussed with the Owner and a way forward decided.

1.7.2.3 One study shall be performed by Caterpillar after checking with Caterpillar to see if IDC will be performing Cat's TVA without any value add by Cat. i.e. Cat's TVA and IDC's TVA (if IDC is selected as an independent supplier) may be virtually identical hence of no value as two independent sources. The TVAs shall include the right-angle gearbox and storm water pumps along with the Power Module string with all couplings and hubs 'attached' and identified.

1.7.2.4 The station drawing shall be included to TVA suppliers showing all foundations and components such as bridge crane and sole plate with pump removal deck penetrations and how the machinery string fits in and fits together. All D&F drawings submitted that relate to the power module skid design and proposed mountings shall be submitted to the TVA suppliers whether they are required or not by that supplier.

1.7.2.5 There shall be a minimum 12% separation margin of any obtainable speed of any rotating mass compared to the TNF data for successful storm water pumping per the operating range shown on the pump curves and/or pump data sheets.

1.7.2.6 No torsional natural frequency resonance, or threshold of resonance, will be allowed up to the third (3rd) node, inclusive.

1.7.2.7 The C32 engines are known to be torsionally 'active' and are rated by others as the highest power density of any engine in the Cat engine product line. Contractor shall submit an independent form titled "Expected Engine Orders of Vibration" naming the expected orders (of moderate magnitudes to require to be known by technicians performing troubleshooting through the life of the machinery) generated by this engine model. Example: \( V_2, V_1, 2.0, 3.0, 4.0, 4.6, 6.0, 6.5 \) and so on until the amplitudes are insignificant.

1.7.2.8 The TVA report shall capture as a minimum:

a) TNFs and mode shapes
b) Interference diagram that shows the TNFs and excitation components as a function of shaft speeds of those components
c) Calculations of coupling torques to compare to limits of those couplings
d) Shaft stresses even if allowable margins are satisfied

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e) Calculation of transient torsional stresses and allowable number of clutch engagements per hours at 700 engine RPM at worst case torque of the pump (varies with pump TDH).

1.7.3 Three separate data tag plates shall be supplied affixed to the skid base frames with robust SS drive screws in a readable position not blocked by equipment components and not in foot traffic areas (not capable to be stepped upon and made non-readable from abrasions). The plates shall not be less 0.030" thick SS engraved with 3/16" tall characters on a contrasting background.

1.7.3.1 The data plates and characters shall be indelible to fuel oils, lube oils, grease, transmission fluids and coolants.

1.7.3.2 The plates shall include the following information (submit data tag drawings for all tags for approval):

1.7.3.3 All serial numbers sequentially matched on each plate, lowest with lowest of each component and so on.

1.7.3.4 Equipment Module Tag: D-1; D-2, D-3

1.7.3.5 Engine Make model and serial number with full load bhp and RPM

1.7.3.6 Radiator make, model, and serial number with air flow in CFM at X fan speed (matching 1800 RPM engine speed)

1.7.3.7 HPTO Make model and serial number with HP rating

1.7.3.8 Design ambient temperature (inside the building)

1.7.4 All Contractor and/or fabricator bolting (non-manufacture’s standard hardware) throughout, \( \frac{\sqrt{2}}{2} \)" or above, shall be Yellow Zinc Chromate plated grade 5 or better, 316 SS with an approximate yield equal to that of a grade 5, Xylan 1424 coated grade 5 or better or an approved plating, and affixed with Loctite 243. Exceptions must be noted for specialized hardware. No lock washers are allowed. All bolt heads and nut faces shall have a 'like plated' hardened flat washer double thick SAE (not USS) and torqued fully according to plating type with torque chart for use with the lubricity of Loctite 243.

PART 2 CAPITAL POWER MODULE COMPONENTS

2.1 DIESEL ENGINE

2.1.1 The Three (3) Diesel Engines shall be newly ordered with sequential serial numbers manufactured by Caterpillar Inc., model C-32 Industrial DITATAAC ‘B’ rating 950 bhp WOF at 1800 RPM US EPA Tier II (2) emissions non-road emergency standby or approved equal per the Engine Data Sheet document number AAA and this specification. The rating of 950 bhp is the flywheel brake horsepower without the losses of a radiator fan (WOF; without fan). The ‘B’ rating stipulates “For service where power and/or speed are cyclic (time at full load not to exceed 80%)" tallied per year). The engine rating and model may be challenged by Contractor if the selected storm water pump input power including all losses plus 110% of demand exceeds the ‘B’ rating WOF at FW of a Cat model C32.

2.1.2 The engine rating table and TMI Cat library performance sheets shall indicate a capability of up to 2100 RPM with the set point at testing or start up at site to be 1800
RPM at 950 bhp 'B' rated WOF. All data points utilized for any purpose during the Power Module design shall be at 1800 RPM and below. Example: DM 9030 Performance Data Sheet.

2.1.3 The estimated available combustion air inside machinery hall is 118°F temperature, 40 feet above mean sea level (AMSL) altitude and 100% humidity.

2.1.4 The BMEP at the published rated power at 1800 RPM at 80% duty factor (power for no more than 80% of the running hours) nor the demand power at any pumping point obtainable shall be no higher than 15 barg (217 psig)

2.1.5 The piston speed at 1800 RPM shall be no higher than 15m/s (49 feet per second)

2.1.6 All Application and Installation (A&I) materials available for the C32 in general and component A&I modules available shall be downloaded and studied and applied to all design criteria. The A&I guides, and modules criteria therein, shall be utilized to check and comment on all drawings submitted with this specification regarding the entire pump station site design compatibilities with utilities and components designed and supplied by others related to the successful operation of the Power Modules.

2.1.7 Contractor shall submit the Cat media numbers and face titles of all Cat A&I or modules guide materials in hand utilized as design guidelines. The A&I guides and modules utilized, shall be, but not limited to, C32 Electronics; C32 Mechanical Supplement; Exhaust Systems; Vibration; Mounting; Alignment; Diesel Fuel Systems; and Starting Systems. Where any conflict exists between the Cat media design parameters and this specification the Contractor shall utilize the Exceptions and Notations form to register such conflicts.

2.1.8 The engine shall have the top level standard industrial engine attachments such as, but not limited to:

2.1.8.1 Dual side mounted turbochargers, water cooled center section, rear facing exhaust marmon flange connections, ATAAC (Air to air aftercooling) scheme for compressor hot air connections to radiator dry cores.

2.1.8.2 ADEM4 control module for electronic speed control PTO speed control, various ratings, cold start, altitude compensation, fuel temperature compensation, high and low idle, diagnostics and protections for speed + temperatures + pressures, J1939 Broadcast (diagnostic, engine status and control)

2.1.8.3 Throttle position sensor

2.1.8.4 24 VDC system voltage

2.1.8.5 Internal jacket water cooling system with gear driven circulation jacket water pump (RH low) and full blocking thermostats and housing (LH high vertical discharge)

2.1.8.6 Exhaust manifolds, dry with heat shields on each corner

2.1.8.7 SAE standard rotation, CW viewed on NDE

2.1.8.8 MEUI fuel injection; electronically controlled mechanically produced (via cam follower) injection pressure

2.1.8.9 Primary 10-micron fuel filter and water separator
2.1.8.10  Secondary final 2-micron fuel filter

2.1.8.11  Low pressure fuel delivery system: 24 VDC electric fuel priming pump in parallel with gear driven main fuel lift pump

   a) Crankcase breather, rear mounted near FW housing That standard Cat breather pipe shall be turned upwards for a continuously rising path towards the wall of the radiator discharge plenum for wall penetration at a 1:50 slope upwards for terminating in the radiator up daft mounted to the wall of the plenum with an angle cut to develop a pressure drop vacuum from the air flow. All tubing and hose connections shall be provided for field installation by others. A drip leg shall be incorporated with a ball valve near the engine cylinder number 3-4 axial location for purpose of draining condensation from the fumes disposal tubing.

2.1.8.12  Gear driven lube oil pump and internal circulation galleys to rotating components, piston crown cooling jets and turbo charger center housings

2.1.8.13  Lube Oil cooler, RH integrated

2.1.8.14  Oil filler RH front gear case mounted

2.1.8.15  Oil level gauge ‘dip stick’ RH

2.1.8.16  Oil filter, RH

2.1.8.17  Rear sump standard volume oil pan

2.1.8.18  Torsional vibration damper, front mount

2.1.8.19  Two lifting eyes, engine only (not for power module lift)

2.1.8.20  Crankshaft pulley group for alternator (one groove 0.63” wide) and radiator fan drive (five groove 0.63” wide)

2.1.8.21  Flywheel housing SAE 0; with non-isolated mounting plate, and inclusion of, Murphy VS94 plane vibration shock snap switch in line with crankshaft centerline, near flywheel area.

2.1.8.22  A 120 VAC single immersion type lube oil heater with adjustable thermostat for 75°F to 125°F range (or wider) shall be installed in the engine lube oil pan and shall be sized for +20°F ambient to bring the lube oil temperature up to the recommended level by Caterpillar for engine cranking speed and starting with proper timely oil pickup by the engine lube oil pump after the engine starts.

2.1.8.23  An independent lube oil pre-lubrication unit 208 VAC three phase shall be installed for use with the control panel logic to pre-lubricate the engine. The same unit shall be capable of evacuation and refill of lube oil during an oil change. The pre-lubrication unit shall be remote mounted for vibration isolation (shipped loose) with interconnection large bore seamless SS tubing 0.065 wall thickness and PTFE hose jumpers 10 inch or less with SS overbraid and crimped JIC swivels and JIC fittings. Note: Any unavoidable NPT connections to the engine shall be made with sch 160 fittings.
a) Note the hoses necessary for the evacuation and refilling to and from 'off skid' disposal drums and clean oil refill may be of 100% length fifteen (15) feet long of SAE100R1-AT no skive type covering with JIC swivels on the customer side and any appropriate crimped connection required by the supplier on the unit side. The evacuation hose for Customer use to a waste oil drum shall be black color covering and tagged 'waste lube oil' and the refill hose for customer connection to new clean refill oil shall be green in color covering and tagged "Clean Refill Oil".

2.1.8.24 Cat yellow paint

2.1.8.25 US EPA Tier II certificate

2.1.8.26 Industrial stationary non-road emergency OEM pump use rating code

2.1.9 The engine shall have the following added non-standard optional attachments from Caterpillar:

2.1.9.1 Dual element air filters and mounting brackets

2.1.9.2 Front support 17" elevation to crank center, centered bridal plate bolted to block, 2 hole each foot, 2 feet

2.1.9.3 Rear pedestal type supports, 17" elevation to crank center fixed to FW housing, 4 holes each foot, 2 feet

2.1.9.4 24 VDC dual (2) starters, one on each bank

2.1.9.5 Belt driven charging alternator, 24 VDC, 95 amp

2.1.9.6 Circuit breaker 105 amp, mounted

2.1.9.7 RH mounted electronic instrument panel with ECM harness

2.1.9.8 Digital tachometer

2.1.9.9 Magnetic pickup (shipped loose for use by others, screws into FW housing 5/8 18 NF thread hole over FW ring gear teeth

2.1.9.10 74" in battery cables, 2 sets for 2 battery groups (left and right bank) with battery jumper for series connection of 2 x 8D 12 VDC batteries

2.1.9.11 2 sets (4 batteries) group 8D batteries 12 VDC (connected in series), lead acid, 290 +/- amp hour each battery; connected to yield a 24 VDC system voltage. Two (2) batteries and one rack make up one (1) set 24 VDC for left bank starter. Two (2) batteries and one rack make up one (1) set 24 VDC for the right bank starter.

2.1.9.12 English decals

2.1.10 Engine variable speed shall be from 700 to 1800 RPM controlled by an isochronous engine control module mounted on the engine.

2.1.11 Engine shall be built in an ISO 9001:2000 certified facility. Engine shall be a V-type, 12 Cylinder, four stroke diesel. Bore shall be 5.71 inches and stroke shall be 6.38 inches.
The direct injected engine shall have 32.1L displacement, with a compression ratio of 16.5:1.

2.1.12 Parts availability for engine shall be at fill rates of 99.7% within 24 hours or better.

2.1.13 The exhaust system shall be shipped loose, all grade 304 SS (not 304L) dimensioned, and test fitted from the turbocharger rear outlets through to the exterior radiator plenum wall terminating 6" outside the wall through the wall thimble (for follow on fabrication, pipe connection mounting, and silencer mount by others), consisting of the following components:

2.1.13.1 Silencer shall be critical grade EGSA Class 4 8" spark arresting type with the spark box on inlet side (for pipe drop run by installation contractor to operator level for yearly clean out), manufactured by GT Exhaust Systems or approved equal. The muffler shall be constructed of grade 304 stainless steel and be a ‘through’ inline design. Connection shall be 125-pound flat face flanges. The silencer shall have an attenuation of 25 to 33 dBA. An 8” size with 8” sch 5 pipe run shall be studied for back pressure and supplied if acceptable. Otherwise, a 10” size shall be utilized.

2.1.13.2 Flexible exhaust section 2 into 1 with SS V band clamps, matching turbo ‘hot wheel’ nozzle marmon flanges, 90° long radius elbows, collector to single 8” 125-pound flat face flange (or 10”). Provide three x ¼ inch FNPT fittings, plugged, for instrumentation.

2.1.13.3 Exhaust piping spools prefabricated and shipped loose in accordance with building drawing elevation manufactured from 304 SS sch 5 wall thickness. The final flange shall be shipped loose for field weld and termination spool sized to where final flange (under this scope) is approximately 6” outside the plenum wall (for tooling access while bolting) plus an additional 2” for field ‘cut to fit’. This shipped loose flange is additional to a spare flange named in the installation kit.

2.1.13.4 The entire exhaust system from turbo outlet through rain cap shall be designed by Contractor (gas throughput resistances perspective only, not supports, hangers, cladding by others) and meet Caterpillar guidelines for maximum back pressure allowance assuming the maximum allowed air filer restriction and shall be designed to half (50%) of the maximum allowed back pressure before engine performance is reduced.

2.1.13.5 The rain cap shall be shipped loose standard heavy duty (8” or 10”) as manufactured by DME Incorporated or approved equal. The rain cap shall be constructed of grade 304 stainless steel. The hinges shall be lubricated bronze. The rain cap shall be provided with counterweight.

2.1.13.6 Install kit, per engine: 115% bolt kits and 200% gaskets shall be included shipped loose. 1 extra V band per kit is to be included. One extra weld on flange shall be included. Note an installation contractor will mount the entire system and make up the spools from the wall flange to the terminal point with matching sch 5 SS pipe and utilize the shipped loose rain cap. Construction note: The spark arrester box collects small bits of red-hot carbon and must be emptied every year. The spark box works vertically however the cleanout must be brought down to operator level and plugged.

2.1.14 A skid or floor mounted forced flow circulation type jacket water pre-heater shall be provided. The heater wattage rating shall be sized by the Contractor to maintain jacket
water temperature (and any radiator bleed through leakage around engine thermostats) at 140 °F with a building low ambient of 20°F and shall be a 480 VAC, three phase, 60 hertz with thermostatic control.

2.1.14.1 Due to the propensity of hose breakage and work hardening the jacket water heater ‘piping’ shall be Teflon hose with SS overbraid (or approved work hardening proof equal material) crimped fittings with JIC 37° flare swivel connections for quick change. The supply and return lines connected to the engine block shall be made with schedule 160 threaded SS pipe nipples and immediately a FOLO ¼ turn SS threaded ball valve to isolate jacket water during a hose failure and JIC flares from the ball valve, hoses, and to the heater ending in JIC flares threaded into the tank and thermostat housing. Vibration of hoses shall be mitigated with low natural frequency robust supports and rubberized strap clam-clamps (not loop clamps).

2.1.15 A BCI Group 8D 12 VDC lead-acid storage battery set of the heavy-duty diesel starting type shall be provided. Two full sets are required for two starters with each starter on the opposing bank with each 12 VDC battery connect in series to the other for 24 VDC output. Battery system voltage shall be 24 VDC and be compatible with the starting system. The battery set shall be rated no less than 290-ampere hours (each 12 VDC battery). Necessary cables and clamps shall be provided. Cable terminations shall be captured with shrink tubing with sealing rosins to prevent corrosion attack at the insulation to crimp fitting points or by use of an all-in-one crimped fitting with corrosion sleeve molded on. Cable terminations shall be “crimp-on” only and shall be crimped on using the appropriate size dies and hydraulic crimping tool. Soldered terminations WILL NOT be acceptable.

2.1.16 A battery tray shall be provided for the batteries and shall conform to NEC 480-7(h). It shall be constructed of a durable material resistant to deterioration by battery electrolyte. Further, construction shall be such that any spillage or boil-over battery electrolyte shall be contained within the tray to prevent a direct path to ground. Note there are two complete battery sets of group 8D each battery in series, 4 batteries per engine.

2.1.17 Two (2) current limiting wall mounted battery float charger shall be furnished per Power Module (one for each battery set) to automatically recharge batteries, shipped loose. Charger shall float at 2.17 volts per cell and equalize at 2.33 volts per cell. It shall include overload protection, silicon diode full wave rectifiers, voltage surge suppressor, DC ammeter, DC voltmeter, and fused AC input. AC input voltage shall be 120 volts, single phase. Charger shall have LED annunciation for low DC volts, rectifier failure, loss of AC power, high DC volts. Amperage output shall be no less than ten (10) amperes. Charger shall be wall-mounting type in NEMA 4X SS enclosure.

2.2 HPTO - HYDRAULIC POWER TAKE OFF - CLUTCH

2.2.1 A Twin Disc (brand) or approved equal Model HP1200P HPTO shall be fitted to the flywheel housing of the engine for use with connecting and disconnecting the power module to the right-angle gearbox, hence, in turn the storm water pump. Note: The P model is desired for tail shaft extension reasons although it is a side load style. The (i) inline model is acceptable if tail shaft axial space is not required. The following attachments, usage guides or configurations shall be included or understood:

2.2.2 The HPTO shall be nominally rated 1200 hp however de-rated for use up to 10 engagements / disengagements per hour with the specified Cat engine and storm water pump breakaway inertia and torque along with any gear power losses and torque multiplication (less torque on gear input).
2.2.2.1 A Twin Disc or approved equal model TDEC-600 control module for the HPTO shall be provided and installed in a free-standing vibration isolated control panel near the clutch with pre-wired Twin Disc harness umbilical cable. If skid mounted the support for the enclosure shall be intentionally high moment of inertia 1" plate steel for weight holding the enclosure and elastomeric isolated to the support frame. If vibration sensitive the module shall be freestanding floor mounted. Module communication is via SAE J1939 connections. Tie in points and ‘pin outs’ shall be per Twin Disc drawing PX1040894 that communicate with the free-standing control panel logic and annunciation to the remote annunciation panel (remote annunciator by others).

2.2.2.2 The cyclic duty ‘high level philosophy’ shall be for an already running engine at 1100-1800 no load to drop to 700 engine RPM (must be above 450 RPM), engage clutch with a pre-programmed modulated clutch plate engagement while tail shaft output speed is monitored versus engine flywheel input speed so as not to stall the engine; once input/output speed match then ramp slowly to rated engine speed and pump TDH available dictates the flow rate where the wet pit system curve and pump capacity curve intersect. Disengage in reverse sequence at 1000 RPM, ramp no-load to 1200-1800 RPM for minimum 5-minute clutch plate and oil cooldown (high oil flow) awaiting next engagement cycle down to 700 RPM and repeat.

2.2.3 The HPTO configuration shall be without pump tower and without unit mounted reservoir (cover plate utilized) for dry sump remote reservoir operation. Note: The dry sump remote reservoir is not mandatory however the unit mounted reservoir is expected to have an interference fit with a mandatory cross member of the Power Module skid baseframe.

2.2.3.1 For any remote mount reservoir concept Twin Disc drawings 1029777A and 1027950U latest revision shall be strictly followed with exception that 600 psig PTFE SS overbraid hoses with crimped JIC swivels and JIC fittings may be substituted for SAE J517 100R if the quality and integrity exceed the Twin Disc specifications.

2.2.3.2 Note the cooler shown in the Twin Disc drawing 1027950U will be of air to oil fin-fan type with an electrical 208 VAC 3 phase input and an electric oil heater for minimum +20°F ambient possibilities. The core of the fin-fan cooler shall be coated with Heresite corrosion resistant coating with no loss of thermal conductivity.

2.2.4 Hydraulically actuated and self-adjusting

2.2.5 No pilot bearing required

2.2.6 Torsional input coupling SAE 460 style elastomeric 18" with drive plate pattern for SAE 0 flywheel registered fit and bolting. Flywheel bolt holes and friction face for coupling and coupling face shall be cleaned with alcohol down to bright metal and dried. The coupling bolts shall be fixed with Loctite 243 primerless thread locker and sequentially torqued. Torque shall consider lubricative effect of Loctite (increases). Torque values sheet and torque pattern mimic drawing shall be submitted and signed by installer. For this coupling to flywheel, only grade 8 yellow zinc chromate fasters shall be utilized without lock washers and double thick grade 8 yellow zinc chromate plated SAE (not USS) flat washers.
2.2.6.1 Flywheel housing ventilation or HPTO housing ventilation shall prevent the ambient plus heat from the crankshaft cheek and cylinder block to flywheel in addition to self-generated heat of the input coupling from exceeding the design temperature limit of the coupling mounting plate and drive components and elastomer (80°C / 176 °F).

2.2.7 Unit mounted charge pump for hydraulics, gear driven at engine speed regardless of clutch pack engagement or dis-engagement.

2.2.8 Remote mounted reservoir with foot valve, ‘running level’ sight level indicator (guarded), filler cap taking note of back wash oil level after shutdown. Skid mounted (with isolators) or floor mounted. No hydraulic hoses longer than 12” with SS pipe spanning distances, supported, braced with clam shell type rubberized clamps and PTFE with SS overbraid JIC 37° fittings, JIC crimped hose end swivels.

2.2.9 Fin/ Fan 208 VAC three phase oil cooler with oil flow by the clutch unit mounted charge pump with spin on oil filter, forced draft fan with fan guard and shroud and front rock / fin guard. This cooler module may be incorporated to reservoir at Contractor option. Fan flow to be directed in concept with engine radiator fan flow to prevent stalling. 10% fouling factor for core sizing shall be included.

2.2.10 HPTO support plate fabricated from minimum 3/4” steel plate per HPTO Owner's Manual document number 1030419 page 26 figure 7. The mounting ring section shall be machined for a registered fit to the HPTO mounting surface datum line 2 of the Twin Disc general arrangement drawing. Note project drawing PS-P301 for concept of construction. Take note there is a 4.4 mm dimensional interference shown on the Twin Disc drawing where datum 2 will cause a flush mounted support plate to contact the unit mounted reservoir castings near the gasketed split line. (Verified by Twin Disc as a manufacturing oversight; not a drawing error). Support Plate to clutch bolting shall not be put in 'shear' with spacers behind the plate. A full contact 6 mm minimum thickness machined spacer plate may be considered if Contractor desires to keep unit mounted reservoir on the HPTO housing. Note skid base may need a relief for the unit mounted reservoir option (possible crossmember interference). Three (3) RotaChocks, or approved equal, for 5/8” bolts shall be utilized for precise alignment of the support plate to yield near zero stress on the engine flywheel housing by 'loose bolt gap' method. This will be checked during cold alignment in the field and after final hot alignment targets are verified followed by another run to check FW housing stress (via the support plate). 2.2.11 The clutch assembly shall include a brake mechanism capable of locking the rotation of the clutch. The brake retention capability shall be not less than 5,000 foot-pounds of torque.

2.3 ENGINE RADIATOR

2.3.1 The engine radiator shall be skid base frame mounted and aligned to engine front pulley fan driver manufactured by Young Touchtone or approved equal with the following components or design features:

2.3.2 Remote mount, vertical core, horizontal forced draft (blower) air flow, frame mounted fan, fan hub and pulley and sliding idler hub belt tightening pulley. The frame shall be 'individual piece' hot dip galvanized before assembly with galvanized hardware. Following assembly, the galvanized steel frame shall be coated in accordance with paragraph 2.2.6 of specification section 09900. The core shall be dip coated with Heresite coastal air corrosion resistant coating (does not change thermal transfer properties).
2.3.3 Coolant level Low and Low Low float switches shall be included on sliding adjustable brackets robustly attached for low vibration and mounted at suggested levels with visual level indication incorporated. Visual indication may be a dry needle float indication not necessarily a wet sight glass. Hoses for the level indicators shall be PTFE SS overbraid with crimped JIC swivels and JIC fitting connections to the expansion tank.

2.3.4 The radiator shall be designed to the parameters set forth in the overall project pump station specification and data sheet 11021-F1 and this specification for the building indoor conditions before and during engine operation. Ethylene Glycol or similar coolant shall be utilized at 50%/50% mixture for heat transfer calculations.

2.3.5 Radiator shall include bolted steel frame suitable for 147 mph wind load, plenum chamber, 3/4" maximum radial tip clearance fan ring, lifting holes, core guard, OSHA fan and fan drive guards, forced draft.

2.3.6 Radiator core shall be constructed of thick heavy copper plate fins to resist damage and clogging while providing maximum thermal efficiency and core strength.

2.3.7 No solder shall be used to bond or seal the tube to header joints to eliminate solder bloom corrosion, solder cracking, or fatigue failures.

2.3.8 Tube to header joints shall have heavy wall flat brass tubes, rounded at the ends, and mechanically bonded to steel header plates.

2.3.9 Design shall allow for thermal expansion and contraction differential between the radiator core and steel frame.

2.3.10 Radiator tanks are to be removable, without disassembly of the radiator side frames, to allow for core inspection, cleaning, and repair.

2.3.11 Precision-tooled header plates shall be utilized which include an “ORing” seal to affix expansion tanks to core headers. O-ring compression between tank and header mating surfaces will be used to provide a superior seal. No gaskets shall be utilized.

2.3.12 Tanks to have suitable fittings for venting and draining.

2.3.13 Radiator shall be tested at 35 psig with a maximum operating pressure 15 psig.

2.3.14 Fan shall be forced draft, fixed center, with airfoil type adjustable pitch blades. Fans shall be constructed of fiberglass reinforced nylon blades or cast aluminum blades with cast aluminum hubs.

2.3.14.1 The fan hub bearing frame shall have a Murphy model VS94 vibration snap switch installed with remote reset.

2.3.15 Pressurized filler cap shall be accessible to the far-right side of top tank (‘right’ is viewed on fan pulley) for easy access by personnel standing on a ladder or platform (by others).

2.3.16 The radiator shall include a diesel fuel return line cooler per Caterpillar heat rejection data. The cooler shall be plumbed to the engine and fuel return lateral with minimum ½ inch seamless SS tubing 0.065” wall thickness with double ferrule JIC compression fittings properly fitted and clamped per the vibration mitigation guideline of the tubing and fitting supplier. A non-return valve is required upstream of the building fuel return lateral piping entry point. If short (less than 10 inch allowed) hoses are required, the hoses shall be PTFE with SS overbraid and crimped JIC swivels.
2.3.17 Fabricator shall install a FOLO ¼ turn SS ball valve in wet bottom tank drain plug and if required in dry tanks for condensation draining per supplier guidelines. Any ball valve shall be fitted to any tank bottom threaded connection with a sch. 160 close nipple and JIC 37° flare termination downstream of the ball, capped. A matching 12 foot long one inch WOG rated 300 psig hose with JIC swivel fittings for draining purposes shall be shipped loose. Ball valves shall be reasonably accessible to attach drain hose which may require thought on radiator support frame cross member placements.

2.3.18 Belts and belt guard shall be installed. Power band belts are acceptable provided that strict instructions for any special tools and clear tensioning procedures are shown in the Owner’s Manual for prevention of over / under tensioning. Failing the tensioning instruction and tooling for power band belts, individual belts shall be included that can be checked for proper tension with an off-the-shelf tension checking tool.

2.3.19 Radiator shall be capable of rejecting all heat from the engine at rated load as required per Caterpillar Performance data and jacket water pump flow curves with all external flow resistance of connection piping and through the wet core and back to the engine jacket water pump.

2.3.20 Note there is a wet circuit core for the engine jacket water heat removal and two dry circuit cores for the engine ATAAC circuits. All interconnection tubing and flexible short jumper hose connections shall be provided with a focus on robust clamping with SS T-Bolt type clamps and tooling access points for clamp removal in situ with normal extensions for standard tools.

2.3.20.1 The turbocharger compressor air inlet air aftercooler connections leading to the engine intake manifold supply and return from radiator require extra care to be made of heat resistant special silicone supplied by Caterpillar Inc. with Caterpillar part numbers with midspan support hoops of heavy gauge SS to prevent hose connection pressure bulging while allowing thermal expansion of connections. Caterpillar part number spring loaded T-Bolt clamping is required. These clamps have an intentional special torque.

2.3.21 A 5-year fouling factor shall be incorporated.

2.3.22 The expected ambient rise inside the pump station building machinery hall is estimated to be 18°F above a 105°F outside ambient for an estimated total air temperature at leading edges of fan blades to be 118°F. Contractor shall check this rise against all supplied machinery thermal radiated loads and building proposed air mover fan curves, the radiator fan flow exiting the machinery hall plus engine combustion air consumption. Note an existing prime power generator set is located in the building with a heat signature and fan flow.

2.3.23 The suggested radiator model is based on an estimated (neg) -0.5 inch H₂O static ‘inside machinery hall’ pressure and a radiator discharge duct, wall louver and vertical rise outside plenum resistance of 12 inch H₂O at full engine speed.

2.3.24 The Contractor shall verify all sizing design parameters and submit all design data prior to ordering the radiators.

2.4 SKID BASE FRAME

2.4.1 A robust stiff single piece skid base frame shall be fabricated per concept drawing PS-P301 and general arrangement Power Module concept drawing PS-P102.
2.4.2 All blind threaded bolt holes shall have a small diameter ‘trapped grease/liquid’ relief hole drilled perpendicular or axially at dead bottom no less than 1/8” to prevent hydrolock of bolts and false torques.

2.4.3 Main conceptual importance of design:

2.4.3.1 The building foundations will be completed many months prior to delivery of the machine trains. Anchor bolt locations will be fixed and embedded, distances to walls, foundations, roofs designs fixed (but not in place) and as such, great care must be taken to maintain certain building datum line dimensions for the skidded power modules. i.e., The pump plan view X-Y shaft target and thick soleplate will limit the power module inertia block housekeeping curb size and envelope location, hence, anchor bolt placements. The gearbox end-of-shaft X, Y, and Z location will limit the allowable alignment and grout adjustments in X Y and Z planes of the power module.

2.4.3.2 The additional main design concept is ‘vibration mitigation’ and this cannot be stressed enough. i.e., Lateral, linear and torsional vibration and associated excitation harmonics checked and corrected via analysis and skid construction techniques to form a direct path of energy to the foundation inertia via Chockfast Red epoxy grout, or approved equal, that will be specified for the installation contractor, and very robust deep anchor bolting.

2.4.3.3 Anchors, by others, will be 1 1/8”-12 UNF Grade B-7 studs deep set full stretch cannister type and have 1/2 inch X-Y radial play off dead center in any direction; 1” lock to lock.

2.4.3.4 The installation at site and grouting will be by others, however the skid overall design envelope compared to the foundation drawing envelope shall have 2” absolute minimum with 3” minimum preferred grout dam extension on all sides. Grout is also allowed to the edge of the concrete pedestal with edge preparation and forms per ITW ChockFast Red installation guideline.

2.4.4 The skid shall be fabricated from 10-inch wide-flange 54-pound beam. See concept drawing number PS-P301. All crossmembers shall be coped and full depth made from 10-inch wide-flange 54-pound beam with the bottom grout surface flush with main runners and cross members.

2.4.5 The design shall be such that during an FEA analysis if a theoretical load equal to 125% of the dead and live loads were applied to the planimetric X-Y plane of the skid with one corner ‘pinned’, any part of the skid in any point of the X-Y plane shall not produce any deflection greater than less than 0.014 inch.

2.4.6 Four point threaded lifting eye mounting plates for use with removeable lifting eyes shall be fabricated from 4140 steel, surfaced for high friction coefficient on the bolting side and welded to the side of the skid with very robust bolsters opposing the lift stress direction in compression and tension after calculating the placements against the power module dry weight center of gravity for a dead lift with the supplied spreader bar and slings. The welds shall receive 100% NDT.

2.4.6.1 The 4 individual threaded lifting eyes areas shall have a minimum of 6 bolting places all 3/4”-16 UNF bolts. To these plates 4 loose attachable matching lifting eye lug ‘ears’, match machined to the welded block surface, with outward angles shall be attached for lifting and utilized on each power
module and removed after the last lift for storage at site. The design shall be of a captured hard stop blocked or pinned lift in such ways that the lifting eye lug mounting bolts are not put in shear stress and only utilized for frictional holding of the lifting eye lug 'ears' to the threaded weldments and preventing the captured hard blocking from loss of engagement during lift (the lifted load helps lock in the eyes to the hard stop block for additional strength and reducing any separation events). This design shall be made on a separate drawing and receive a SC PE stamp and meet all US industry guidelines for safety and service factors for dead lift of dry weight mounted machinery. All modules receive the threaded weldments. Only on set of four lifting lug 'ears' are needed for the three modules, shipped loose.

2.4.6.2 A matching spreader bar shall be offered as an option with all slings and shackles/clevises to be utilized with the four removable lifting ears at each crane lift point of the transport journeys and setting in place at site. The welded plates shall not interfere with personnel walking around the skid (not protrude past beam flanges. The drawing shall be submitted and include a SC PE stamp, 100% NDT welds. No slings shall come in contact with any mounted machinery component considering normal crane swing sway of up to 10° zero to peak either side of center dead stable lift (20° inclusive angle peak to peak sway).

2.4.7 Foundation anchor bolt locations shall have two web bolsters (stiffeners) on either side of anchor holes on the compression side of web, and one bolster on the tension side of web aligned to the anchor stud location (notching of bolster allowed to span gussets if needed with full wrap weld of notch). Anchor holes shall be 1 1/8-inch diameter and dimensions shall be held against drawing PS-P301. Anchor bolts shall be tightened from on top of the skid upper flange (2 holes. One through bottom and again through top flange in alignment). Note: Anchors in-situ (by others) will be camiseter type 1-1/8"-12 UNF diameter grade B7 stud and will have a 1-1/8"-12 UNF threaded coupling tightened to blind dead end and held against rotation by a roll pin just under the surface of the foundation. The anchor extension bolts to pass through the skid to line up with and thread into the anchor below grade couplings are by others (Installation contractor TBD). The pass-through top flange anchor bolt hole to bottom flange anchor bolt hole alignment is critical.

2.4.8 Threaded spool (not nuts) vertical jacking bolt positions shall be welded to skid bottom flange within 8 inches of anchor bolt holes as shown on skid drawing with square head hardened all thread special jack bolts (slight taper ends) and thin jam nuts provided, shipped loose with 110% quantity. Of note: Jack bolts will be removed and disposed of after final curing of grout. Jack bolt length shall provide 3.5 inches of skid lift.

2.4.9 Machine mounting areas shall have two bolsters under each engine mount area and HPTO support plate RotaChock area (four) on the compression side of the web to not allow deformation of the flanges by live and dead loads and provide a positive energy communication to the grout.

2.4.10 All holes larger than ½ inch shall be broached, not drilled. All holes ½ inch and smaller shall be counter sunk to remove sharp edges. All sharp edges whatsoever shall have a slight radius to allow paint adhesion.

2.4.11 Skid design shall follow countermeasures for torque moment illustrated on drawing PS-P301. One extra non load bearing cross member is positioned with one anchor bolt on left side of module skid, according to drawing PS-P301.
2.4.12 Engine mounts shall be positioned at cross member for live load to foundation via grout. Radiator mount shall be attached and part of the main skid base generally in accordance to drawing FS-P301 with methods foreseen to lift the radiator, engine with HPTO fully supported on the same skid with 4-point lifting eyes. Radiator frame must be capable of jacking vertically and shimming to perform belt alignment.

2.4.12.1 Engine mounts shall have X, Y, and Z jacking positions for alignment with all thread square head jack bolts, taper blunt point and jam nuts.

2.4.13 The elevation center line and drive train center line of all mounted equipment must be held to that shown on the general arrangement drawing.

2.4.14 All skid flanges that come in contact with grout shall have several broached holes of ¾ inch diameter spaced each 10-12 inches to allow grout to rise through and ‘brad’ the beam when the grout hardens. The bradding holes shall be inside behind the webs out of view to not be confused with anchor bolt holes.

2.4.15 A 3/16” thick 3-way sloping drip pan shall be sealed welded and stitched in between cross member with a dead bottom threadolet 1-inch FNPT drain near front corner right side of engine for piping to a sloop drain. Grout pouring holes shall be included and minimum 5-inch diameter with a ‘pouring vertical head’ large diameter matching tubing or schedule 5 pipe seal welded to drip pan (to promote head pressure of grout pour) with bottom of ‘head pouring pipe’ flush to bottom of skid in place strategically where normal funnels or fabricated special funnels can access the grout pouring hole without disturbing mounted machinery. Grout vents of ¾ inch FNPT threadolets shall be welded in place over trapped grout beam placements and plugged hand tight plus 1/2 turn so as not to dislodge during shipment (no thread sealant required).

2.4.16 Engine mounting blocks shall be made from hardened 4140 material, threaded ¾”-16 UNF fine thread (not UNC) and welded to the skid for final horizontal milling. All Caterpillar mounting holes shall be utilized. All equipment mounting feet including the HPTO support plate shall have ¾ inch diametral clearance for the purpose of X-Y adjustment for precision alignment to the gearbox input shaft in the field. Any blind threaded bolt hole shall be cross drilled with a 1/8-inch hydrostatic lock relief port.

2.4.17 Four identically thick (0.001 +/- each to another) 0.400-inch nominal thickness 4140 double sided shim blocks (loose) with a machined surface roughness of 2.5 μm Ra on both sides shall be utilized under each engine foot in direct contact with machined welded threaded mounting block. Only two shims are allowed on top of the shim block. Two shim blocks with 4 bolt pattern holes for engine rear mounts and two with two bolt pattern holes for the front engine mounting feet (large contact format).

2.4.18 No more than 3 shims are allowed including the 0.400-inch nominal shim block. Shims shall be prefabricated grade 2B SS with slight radius corners. Alternatively, a scheme using RotaChocks under special robust fabricated and bolstered engine mounts may be presented for approval. Step shimming is not allowed for the entire project.

2.4.18.1 RotaChocks mounts for the engine in place of threaded blocks and shims shall be 5/8-inch mounting bolt size, two per each rear foot with clearance for pin spanner and one per each front foot. Minimum and maximum chock heights shall be carefully considered. No shims will be allowed with any adjustable chocks.
2.4.18.2 Fabricated engine mounts, if other than Cat factory engine mounts, must be submitted for approval and show how they will interface with RotaChocks and hold centerline targets with alignment adjustments still available.

2.4.19 Leveling registers of minimum 1 ½ inch thickness (1,500 inch) mild steel shall be welded to outside edges of the skid for the purpose of leveling before pouring grout using a transit and rod from two vantage points where at least one register previously recorded can been seen as a reference from the other vantage point. The registers shall be machined (after welding in place) as described in the machining section below.

2.4.20 After all welding and drillings are finished the entire skid shall be stress relieved / normalized in an oven. No further welding whatsoever is allowed after stress relief.

2.4.21 Four threaded earth grounding 5/8¨-11 UNC threaded 3/4 inch deep service post points at four corners (vertically placed) shall be provided and threaded with a stub bolt prior to painting to protect threads from paint. Service posts by others.

2.4.22 After complete fabrication, the skid shall be sandblasted to near white metal and primed with a zinc rich primer. The bottom runners that will come in contact with the grout shall be blasted to the recommended surface profile per the grout supplier's recommendation and primed with a light coat of inorganic zinc primer but not finish coated. All other surfaces shall then be finished coated to contract color BEFORE machining. If no skid color or paint scheme is called out in paint section a high build epoxy black paint shall be utilized for the skid.

2.4.23 After final finish painting the equipment mounts and leveling registers shall all be machined on a horizontal bed milling machine without removing the skid from the bed, in one process. The leveling registers shall all be at the same elevation regardless of location. The skid shall be attached to the bed without stress prior to machining. The engine mounting feet shall be at surface profile 2.5 µm Ra. The leveling registers may be at any consistent ‘smooth’ fine surface finish for use with a surveyor’s rod.

2.5 TORSIONAL COUPLING; Gear to HPTO

2.5.1 Of Note: The power module shall be direct coupled to the right-angle gearbox input shaft at site.

2.5.2 Of Note: The alignment criteria shall be the limits of the gearbox, Twin Disc HPTO clutch or coupling, whichever is stricter (normally the gearbox or any rolling element bearing shaft). The liberal alignment limits of any coupling shall never be utilized as a machinery alignment across this project limit unless the coupling limit is stricter (almost never the case).

2.5.3 The possibility exists for a spacer type torsional coupling to be required, hence, depending on finished machinery train axial spacing adhering to the skid footprint limits and centerlines that must be met within the axial limitations of the foundation inertia block and grout dam area and anchor bolts.

2.5.4 The coupling shall be a torsionally soft misalignment spacer coupling such as a Rexnord Falk Wrapflex 80R R31, or approved equal, spacer coupling with a tentative distance between shaft ends (BE) of 16.50".

2.5.4.1 Of Note: This coupling has been pre-approved by Rexnord application engineering for use as the second coupling in series downstream of the Twin Disc HPTO (with integral SAE 450 torsionally soft direct FW mount input coupling) driving a spiral bevel right angel gear 6:1 ratio (high speed pinon at 1800 RPM at nominal 950 hp input).
2.5.4.2 Compound root radius on inner corners of flex element as a stress relief shall be incorporated in design.

2.5.4.3 Polyurethane element, wear, and chemical resistant, with operating temperature range covering -10°F to 200°F including any self-generated heat rise above 118°F ambient (Note: 118 °F machinery hall temp estimate with all machines running at 105°F outside ambient and 13°F building rise).

2.5.4.4 Nickel plated shaft and hub integral to coupling to provide longer polymer life given the possibility of minor torque reversals to coupling throughput.

2.5.4.5 Nylon cover

2.5.5 The hub blanks shall be Rexnord 1130T or approved equal. Coupling and hubs should NOT be purchased before TVA results are tabulated.

2.5.5.1 Contractor shall ship one hub to be machined and installed by power module fabricator and the other hub shipped to gearbox supplier for machining and installation with target 'pull up' dimensions indicated if other than flush with end of shaft for axial distancing in the field. Otherwise, both finished hubs may need axial adjustment in the field. In that case field service supervision shall bring hub pulling equipment to site for cold alignment prior to pouring grout.

2.5.6 Safety Note: Spacer may be removed for safety any time service is required to engine gear or pump to prevent any engine starter accidental 'bump' and partial rotation in tandem with electrical lock-out-tag-out procedures for engine controls. This also allows engine running without fear of accidental clutch engagement.

2.6 POWER MODULE CONTROL

2.6.1 For each power module, provide a free-standing floor mounted control panel per section 17070 Panels Controls and Appurtenances. The free-standing panel shall be manufactured by IEM (Jacksonville FL plant) company or approved equal.

2.6.2 All 'on Power Module' wiring shall be brought to vibration isolated NEMA 4X SS Junction box(s) with 1” thick inertia plate rubber isolated at edge of skid.

2.6.3 'On module' wiring installed by the fabricator to be in liquid tight conduit supported each 16” with rubberized loom clamps; no 'spiral wrap allowed'. OEM machinery wiring shall be left in the OEM state.

2.6.4 Contractor shall carefully coordinate and supply each 'end device' mounted to each machine such as the entire Power Module, Gearbox and Pump as well as tie ins to the small skid mounted fin-fan coolers and other small, skidded items required to be controlled or required as input sensor signals or feedback information by/to the free-standing panel with individual NEMA 4X SS junction boxes.

2.6.5 Provide for the engine/machine train instrumentation, indication, and control points as identified in section 17200.

2.6.6 Refer to specifications Section 17040 - PLC SYSTEM SPECIFICATIONS for PLC requirements.

2.7 ANCHOR BOLTS
2.7.1 Of Note: Canister anchors per drawing PS-P301 will be embedded in the foundation before machinery arrival by others. The anchors are 1-1/8” UNF grade B-7 stud bolts at foundation grade, (capped to prevent debris entry to cannister) with a captured coupling awaiting anchor extensions by the Installation Contractor (TBD) to drop through top flange and bottom flange of Power Module Skid. The anchor extensions shall be provided by others.

2.8 SPARE PARTS and TOOLS

2.8.1 One (1) set of all special tools (one set for all three modules) required for normal operation and maintenance shall be provided.

2.8.1.1 One Caterpillar starter pad mounted turning tool shall be provided shipped loose for slow roll of engine by ‘hand’. Of Note: Takes the place of any starter temporarily with hex head spring loaded pinion engagement for use with ratchet and socket or geared slow power turning device (such as a handheld electric geared pipe threader with an engineered OEM adapter to a socket); not for use with air or electric impact tools.

2.8.2 Contractor shall list and option spare parts as follows:

2.8.2.1 Two years operational and protective stock of spare parts including consumables and long lead time protective stock (except liquids). This optional list shall be combined with the gearbox and pump lists for one main list for this entire purchase order contract with 60-day validity. Exploded view parts diagrams identifying each part and of what machine shall accompany the list with a table cross referencing the parts viewing locations of support documents (catalog, page number, etc.)

2.8.2.2 Commissioning spares list and option to purchase with 60-day validity including first change of lube oils or filters if required directly after commissioning run time. Protective stock of commonly failed parts during commissioning especially related to long lead time parts that can become useful if not used during commissioning in next five years of operation. Exploded view parts diagrams identifying each part and of what machine shall accompany the list with a table cross referencing the parts viewing locations of support documents (catalog, page number, etc.)

2.8.3 All Spare Parts shall be properly packaged and labeled for easy identification without opening the packaging and suitably protected for long term storage.

PART 3 EXECUTION

3.1 Equipment Installation

3.1.1 The equipment will be installed in accordance with the instructions of the Contractor by others. The Power Module will be leveled, aligned, grouted with approved non-shrink epoxy grout, and bolted in place, by others per Contractor’s instructions. Only supervision will be required by Contractor.

3.1.2 The Contractor shall provide the services of a qualified manufacturer’s representative who shall supervise the installation, adjustments and testing of the Machinery and shipped loose components supplied on the purchase order. The Contractor shall offer these services on a day rate basis inclusive of all expenses and travel costs, on site transportation, accommodations, and subsistence for the representative(s). An
estimate of days required shall be submitted along with a timeline of each step of supervision suggestion.

3.1.3 The manufacturer's representative shall provide an optional day rate for of training for the operating personnel. Location of training (if different than pump station site) and venue coats by others.

3.1.4 The Contractor shall provide the services of qualified instrumentation technicians to field calibrate each instrument supplied in accordance with manufacturer's specification and instruction for calibration. The Contractor shall provide written calibration sheet to the Engineer for each instrument certifying that it has been calibrated to its published specified accuracy.

3.1.5 All defects or defective equipment revealed by or noted during the tests shall be corrected or replaced promptly at the expense of the contractor. The tests shall be repeated, at the expense of the contractor, until satisfactory results are obtained.

3.2 Testing of Capital Machinery

3.2.1 Factory standard tested will be acceptable however any 'water' coolant wetted components shall be tested with antifreeze to prevent pockets of fresh water trapped during draining from freezing during transport and storage.

3.2.2 Optional Engine Factory Witnessed Test per Cat factory standards

3.2.2.1 Contractor shall option a three-hour witnessed factory test with all suggested and obtainable parameters available at the engine factory for approval. Contractor shall comment if the following parameters are available.

3.2.2.2 Fuel consumption at 1/4, 1/2, 3/4, and full load

3.2.2.3 Exhaust emissions

3.2.2.4 Mechanical and exhaust noise

3.2.2.5 Governor speed regulation at 1/4, 1/2, 3/4, and full load; and during transients

3.2.2.6 Cooling system performance (on bare engine only such as pump circulation and thermostat opening, oil cooler working, no leaks, turbo center section temp OK, etc.)

3.2.3 Power Module String Test

3.2.3.1 Contractor shall optional a full 48-hour un-interrupted witnessed Type Test heat run string test of the first Power Module at the fabricators facility with the followed suggest scenarios for load.

   a) Two bearing generator coupling off skid to the power module with the contract spacer coupling with a wireless strain gauge on the generator shaft downstream of the coupling to calibrate the load applied. A resistance (only) pure watts-based load bank shall be utilized for load with load bank step switches recorded to provide full load or near full load per the strain gauge readings.
b) Portable water brake dynamometer or existing dynamometer cell large enough to accommodate the entire power module including radiator fan flow and combustion air.

3.2.3.2 Power Module shall be 100% complete finish painted with job exhaust system up to a horizontal short run and job silencer mounted on a temporary frame horizontally with short rain cut discharge pipe. Do not consider building the entire job site exhaust as it would be in its final form. Power Module shall be Radiator through final coupling with coolant and oils that would be recommended at site in the final form. It would be understood that such a test be outdoors subject to environmental conditions on the day of testing. Any items or controls not suitable for outdoor inclement weather shall be protected from damage by rain / snow wind covers or any other necessary means.

3.2.3.3 Any Power Module lagging to test area supports during a test shall be explained and approved prior to test, understanding that there will be vibration sample probing so 'near site' conditions are desirable.

3.2.3.4 If any faults occur during the 48-hour Type Test heat run, the faults shall be corrected, and the test started again from time zero.

3.2.3.5 The first 2 hours of any test shall be functional demonstrations of start/run/stop and any faults that can be mimicked to prove all panel functions and sensors on the machine are functioning properly and wired correctly. Each assigned free standing job panel shall be utilized per module. After function test the heat runs shall begin.

3.2.3.6 The two follow-on modules shall be tested as the first module with the exception that the heat run shall be 6 hours, not 48.

3.2.3.7 During any heat run the witness may ask operators to probe certain places for non-recorded vibration with hand FFT analyzer.

3.2.3.8 Only the instrument panel readings shall be used for acceptance with exception of any special diagnostic of other readings taken by power module supplier to verify their designs for their use.

3.2.3.9 Absolutely no touch up painting is allowed after any accepted tests whatsoever.

3.2.3.10 Long term storage shall be provided after all test and draining of fluids, as necessary. No tests shall be performed without full 50/50 antifreeze to prevent pockets of fresh water that cannot be drained fully to prevent freezing during storage and transport.

3.2.4 Field Test

3.2.4.1 A field run test shall be developed by committee and priced as an option after equipment selections are made and fixed at that time to determine a test procedure largely based on what can be tested safely with a dry pit and what can be tested during a storm event and for how long at different flow rates. Ex: Pump coupling removed and Radiator through gear terminal shaft no-load spin test, etc.
3.2.4.2 The test procedure will be conducted to demonstrate that the engines operate without vibration or overheating and operate satisfactorily. The field run test shall be witnessed by the engineer and the manufacturer's representative.

3.2.4.3 After installation is complete, the manufacturer's local dealer shall perform the following:
   a) Verify that the equipment is installed properly.
   b) Check all auxiliary devices for proper operation, including battery charger, jacket water heater(s), remote annunciator, etc.
   c) Test all alarms and safety shutdown devices for proper operation and annunciation.
   d) Check all fluid levels.
   e) Start engine and check for exhaust, oil, fuel leaks, vibrations, etc.
   f) Verify that the engine will start and run all designated pump operating conditions per procedure no load and later with storm load.
   g) Jacket water temperature
   h) Oil Pressure
   i) Fuel pressure
   j) Ambient temperature

3.2.4.4 All field test results shall be certified and presented to the Engineer for review and approval.

(End of Section 11300)
**ENGINE DRIVER**

**GENERAL PURPOSE**

**DATA SHEET**

**Contract**

**Item No.**

**Rev.**

**Engine Type**

**RFQ No.**

**PO No.**

**Sheet**

**Or 3**

**DATE:**

**CONTRACT NO.:**

**PO NO.:**

**By:**

**REV.:**

**REVIEWED:**

---

**Applicable To:**

- Proposal [x]
- Purchase [ ]
- As-Built [ ]

**For:** Diesel Engines

**Driven Equipment:** V83 axial flow propeller pump

**Manufacturer:** To be Determined

**Service:** Stormwater Pumping

**Note:** Indicates information to be completed.

- [ ] By Buyer
- [ ] By Manufacturer

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**Site Data**

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**Equipment:**

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- [ ] Under Roof
- [ ] Outdoors
- [ ] Heated
- [ ] Unheated

**Fuel:**

- No. 2 Diesel

**Cooling System by:**

- [ ] Buyer
- [x] Seller

**Mounting:**

- [ ] Soleplate
- [ ] Baseplate
- [ ] Enclosed
- [x] Common
- [ ] Separate

**Tests:**

- [x] Run
- [x] Loaded

**API Reports:**

- [ ] Engine
- [ ] Radiator

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**Engine Data**

(With All Accessory Loads Except Fan Water Pump)

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</tr>
<tr>
<td>Cylinders:</td>
<td>Unlined [x] Lined</td>
</tr>
<tr>
<td>Turbocharged:</td>
<td>[x] No</td>
</tr>
<tr>
<td>Aftercooled:</td>
<td>[x] Yes</td>
</tr>
<tr>
<td>[ ] No</td>
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<tr>
<td>Governed Speed</td>
<td>rpm</td>
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<tr>
<td>(x) Variable</td>
<td>[ ] Constant</td>
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<tr>
<td>Hydraulic [ ] Mech</td>
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<td>Governor Manufacturer:</td>
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<tr>
<td>Model:</td>
<td>NEMA Class</td>
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<tr>
<td>Hp Capability at Gov Speed, Site Elev and Max Temp:</td>
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</tr>
<tr>
<td>Maximum</td>
<td></td>
</tr>
<tr>
<td>Allowable Intermittent Horsepower</td>
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<td>Allowable Continuous Horsepower</td>
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<td>Maximum General Demand Horsepower</td>
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<tr>
<td>Piston Speed at Governed Speed</td>
<td>f/min</td>
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<td>BMEP at Governed Speed and Demand</td>
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**Engine Auxiliary Systems**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
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<tbody>
<tr>
<td>Heat Rejection:</td>
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<tr>
<td>Jacket Water</td>
<td>Btu/hhr</td>
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<tr>
<td>Oil</td>
<td>Btu/hhr</td>
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<td>Jacket Coolant:</td>
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<tr>
<td>Water [ ] Ethylene Glycol % In * F Out * F</td>
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<td>Lube Oil Coolant:</td>
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<tr>
<td>Water [ ] Ethylene Glycol % In * F Out * F</td>
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<tr>
<td>Engine manufacturer shall supply power cylinder CW piping from single inlet flange to single discharge flange.</td>
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<tr>
<td>Manufacturer [ ] Buyer to Supply CW Pump and Surge Tank</td>
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<td>Temperature Controls:</td>
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</tr>
<tr>
<td>JW Circuit</td>
<td>Radiator</td>
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<td>Fin-Fan</td>
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<tr>
<td>CW Pump Separately Mounted</td>
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<tr>
<td>Shaft Driven</td>
<td>bhp</td>
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<tr>
<td>Mfr [ ] Buyer to Supply Start / Stop Controls</td>
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<tr>
<td>Starting Air:</td>
<td>psig</td>
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<tr>
<td>STD Cu Ft / Start</td>
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<tr>
<td>Starting Electric</td>
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</tr>
<tr>
<td>Generator [ ] Battery</td>
<td>amp/hr</td>
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<tr>
<td>Engine Manufacturer to Supply Torsional Analysis</td>
<td></td>
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<tr>
<td>All Lube Oil Piping by Manufacturer</td>
<td></td>
</tr>
</tbody>
</table>
## Engine Data (Continued)

### Engine Data (With All Accessory Loads Except Fan Water Pump)

- **Ignition:**
  - { } LTM
  - { } HTM
  - { } Impulse Gen
  - { } Distr
  - { } Low Fire Hazard

- **Duty:**
  - { } Continuous
  - { } Intermittent
  - { } Standby

- **Start:**
  - { } Manual
  - { } Automatic

- **Engine Accessories (W/Engine, Unless Noted):**
  - { } Air Inlet Filter:
    - **Manufacturer:**

  - { } Exhaust Silencer:
    - **Manufacturer:**

  - { } Backfire Relief:
    - { } Remote Mounting
    - { } Self-Cleaning

### Miscellaneous

- **Coupling Mfr:** Rexnord Fault

- **Model with Engine:**
  - Type: { } Gear

  - { } Nonsparking Guard

- **Clutch Mfr:**
  - Model: 
  - Rating: 
  - hp

- **Manual**
  - { } Remote
  - { } Operated

### Dimensions and Weights

- **Overall Length:** in. Engine only
- **Overall Width:** in.
- **Overall Height:** in.
- **Net Weight Engine:** lb
- **Maintenance:** lb, cly., Head

### Air Filter

- { } Oil Filter:
  - { } Full-Flow
  - { } Bypass

- **Micron:** Mfr

- **Flywheel Guard**

- **Low Pressure Fuel Regulator**

- **Lube Oil Cooler, Shell and Tube:** Mfr

- **Complete Fuel System**

- **Day Tank**

- **Thermostatic Valves for Controlling Water and Oil Temperature**

- **Governor Control Motor for Remote Speed Adjustment:**

- **Alarms:**
  - { } Hi Jake
  - { } Low Oil Press.
  - { } Over Speed

- **Radiator with:**
  - { } Pull Fan and Vertical Discharge; Fan

- **Instrument Panel:**
  - { } Machine
  - { } Floor

- **Mounted with:**
  - { } Tachometer:
    - { } Mechanical

  - { } Electrical

  - { } with Clutch

  - { } Pyrometer with Thermocouples

  - { } Gages:
    - { } Oil Press.

  - { } Starting Air

  - { } Manifold

  - { } Fuel

  - { } Ignition Switch

  - { } Starting

  - { } Switch

  - { } Air Valve

  - { } Ammeter, Battery, Battery Rack
Other Requirements:
Engine, skid, clutch, radiator, and all appurtenant equipment shall weigh no more than 20,000 lbs.
PART 1 GENERAL

1.1 SUMMARY

1.1.1 These specifications describe requirements for a diesel Main Fuel Tank and diesel Day Tank consisting of two tanks, an electronic control module, fuel polishing systems, fuel supply and return pumps, single and double contained fuel piping, and remote fill station sized to support the operation of the engines to be installed.

1.1.2 The Contractor shall supply and furnish all materials and equipment to be fully compatible with the electrical, environmental, and space conditions on the site. All equipment necessary to safely support the full fuel demands of the project engines shall be included and this system shall be designed for un-attended operation and shall be fully automatic to the extent practicable.

1.1.3 This system shall also provide provision for the remote monitoring of fuel tank levels and system status by the pump station Main System Controller (MCS).

1.2 RELEVANT STANDARDS

1.2.1 Steel Above Ground Tanks for Flammable and Combustible Liquids – UL 142

1.2.2 Standard for Protected Aboveground Tanks for Flammable and Combustible Liquids – UL 2085

1.2.3 Standard for Industrial Control Equipment – UL 508

1.2.4 American Welding Society Structural Welding Code – AWS D1.1 / D1.1 M

1.2.5 IBC Seismic Certification / Design in Accordance with ASCE 7-05 Chapter 13

1.2.6 Standard for the General and Dimensional Specifications for 37-degree (JIC) Flared Tube Fittings – SAE J514

1.3 DESCRIPTION OF WORK

1.3.1 Fuel System Description:

1.3.1.1 The subject fuel system will supply three (3) 950-hp Caterpillar C32 Tier II diesel engines and a 300 kW Caterpillar C9 generator set with integral 690-gallon fuel tank base type day tank built into the base frame (generator and generator integral fuel tank base type day tank will be in-place at the time of system installation and will have supply and return pumps integral to the day tank and will only require a double contained supply and return to the Main Fuel Tank).

1.3.1.2 The general arrangement will supply each engine by one-inch piping fed from a common two-inch supply manifold drawing from the Day Tank. The existing generator day tank will only require a double contained one-inch supply and one-inch return, to and from the Main Fuel Tank situated outside.

1.3.1.3 Return fuel from each engine will be routed by one-inch piping to a common two-inch return manifold returning fuel to a separate Day Tank included for
Supply in this specification section assigned only to the three (3) pump engines.

1.3.1.4 Supply and return fuel to each engine will be provided by the engine-mounted 24-volt fuel priming pump before cranking of the engine and an engine-mounted gear driven fuel pump once the engine has started. These pumps will “lift” fuel from the day tank to prime and supply each engine during operation.

1.3.1.5 The Day Tank will not be required to directly pump fuel to each engine but will be required to match engine demand to replenish the Day Tank fuel level from the Main Fuel Tank.

1.3.1.6 The day tank shall be equipped with alternating main duplexed fuel supply pumps that will lift fuel from the Main Fuel Tank and replenish the fuel level in the Day Tank.

1.3.1.7 The Day Tank shall also be equipped with a single fuel return pump that will have the ability to pump fuel from the Day Tank back to the Main Fuel Tank. The return pump shall have capacity in excess of the supply pump(s).

1.3.1.8 Fuel supply and return between the Day Tank and the Main Fuel Tank shall be accommodated by two-inch supply and return piping double contained where so indicated on the drawings.

1.3.1.9 The Main Tank shall be refueled through a three-inch double contained fuel fill line originating from a remote fuel fill station located in the utility wing of the pump station. See drawing PS-P304.

1.3.1.10 Fuel supply and return between the Main Fuel Tank and Main Fuel Tank Polishing system shall be accommodated by one-inch supply and return piping double contained where so indicated on the drawings.

1.3.1.11 This contract includes the fuel system components but does not include other components. Fuel system piping to be installed by the mechanical installation contractor.

1.3.2 Fuel Flow Rates (For Caterpillar C32)

1.3.2.1 Maximum Fuel Flow Rates (From Caterpillar DM9030 Systems Data Sheet for a Tier II Caterpillar C32 rated at 950-bhp WOF at 1,800 rpm ‘B’ rating) – Values WILL vary from those presented if a different engine is selected.

a) The maximum fuel flow rate to each engine from the Day Tank (to include fuel consumed and fuel returned) is 221.9 gal/hour per engine. This will result in a total maximum flow rate of 665.7 gal/hour total from the Day Tank to the engines.

b) The maximum fuel flow rate from each engine’s fuel return line back to the Day Tank is 180.7 gal/hour. This will result in a maximum flow rate of 542.1 gal/hour total from the engines to the Day Tank.

1.3.2.2 Maximum fuel consumption (From Caterpillar DM9030 Performance Data Sheet for a Tier II Caterpillar C32 rated at 950-bhp) – Values WILL vary from those presented if a different engine is selected.
a) At full load, each engine will consume 45.1 gal/hour of diesel fuel. With all three engines operating at full load, maximum consumption will be 135.3 gal/hour.

1.3.3 The fuel system shall consist of, at a minimum:

1.3.3.1 A remote fill station with spill container, adapter, and check valve

1.3.3.2 Dual contained fuel supply and return lines (as shown on the drawings)

1.3.3.3 Single contained fuel supply and return lines (as shown on the drawings)

a) The engine lateral returns lines shall each have a low-pressure full flow piston check valve, zero leak, 0.5 psig cracking pressure of commercial duty stainless steel body and hydrocarbon rated wetted components, suitable for diesel fuel, to prevent back flow from any source when an engine is not running. The minimum pressure rating of the check valve body and ‘withstand’ of the components shall be 150 psig.

1.3.3.4 One 4,000-gallon protected, double containment above ground Main Fuel Tank designed for use with diesel fuel as shown on the drawings and as specified herein.

1.3.3.5 Main Fuel Tank polishing system with enclosure.

1.3.3.6 One 600-gallon Day Tank designed for use with diesel fuel as shown on the drawings and specified herein.

1.3.3.7 All other appurtenances needed to complete a functioning system

1.3.4 The contractor shall be responsible for field verifying dimensions as required for proper installation of the specified components.

1.3.5 The contractor is responsible for coordinating the work for installation of storage tanks, the instruments and controls, electrical work, and other related work.

1.3.6 The Main Fuel Tank shall be designed and installed in accordance with applicable sections of NFPA 30 (Flammable and Combustible Liquids Code), NFPA 31 (Standard for the Installation of Oil-Burning Equipment), NFPA 37 (Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines), UL 2085 (Standard for Protected Aboveground Tanks for Flammable and Combustible Liquids).

1.3.7 The design and sizing of the fuel system shall be confirmed by the Contractor. The supplied flow rates (or those of a substitute engine) shall be used to verify the sizes of piping between the Day Tank and the engines, and the Main Fuel Tank and the Day Tank.

1.4 RELATED WORK

1.4.1 Equipment General Provisions – Section 11010

1.4.2 Instruments – Section 17150

1.4.3 Electrical – Division 16

1.5 SUBMITTALS
1.5.1 The contractor shall submit the following in accordance with Section 11010 – EQUIPMENT GENERAL PROVISIONS:

1.5.1.1 Shop Drawings showing:

a) Dimensions of tanks, fittings, valves, attachments, and associated appurtenances.

b) One-line diagrams and wiring diagrams for system and associated components.

c) P&IDs, PFDs, and Isometrics

d) Locations of fittings, valves, and attachments, tank layout plan showing the piping connections to the tank. The size of fittings shall be verified for proper fit of supplied instruments and proposed fill, supply, and return piping identified on the plans.

e) Weight of tanks, empty and full.

1.5.1.2 Product Data

a) Construction material specifications

b) Statement that fabrication is in accordance with Specifications.

c) Factory certifications and test results.

d) Instructions for handling, storage and installation of tanks and associated equipment.

e) Instructions for equipment handling and startup.

f) Owner's manuals, to include any associated troubleshooting guides.

g) Local product representative(s) and contact(s) for service and support.

h) Printed warranty(s).

1.5.1.3 Detailed list of any exceptions taken to these specifications. Include reference to specification section and proposed alternative with reason stated for exception.

1.6 QUALIFICATIONS

1.6.1 The manufacturer(s) of the products identified herein shall have produced equipment similar for a minimum or ten-years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided in order to demonstrate compliance with this requirement.

1.6.2 The Day Tank and Main Fuel Tank manufacturer(s) shall be certified to ISO 9001 International Quality Standard and shall have third party certification verifying quality assurance in design/development, production, installation, and service, in accordance with ISO 9001.

1.6.3 The installing contractor shall have a minimum of five-years experience in the installation and testing of fuel systems. When requested by the Engineer, and
acceptable list of installations with similar equipment shall be provided in order to
demonstrate compliance with this requirement.

1.7 PRODUCT DELIVERY, HANDLING AND STORAGE

1.7.1 Delivery, handling, and storage of equipment shall be in accordance with the
manufacturer's recommendations. Contractor shall coordinate equipment delivery
with construction schedule to ensure timely progress of the work.

1.8 WARRANTY

1.8.1 The Tank Manufacturer shall guarantee the storage tanks against defects in design,
material, and workmanship for a period of twenty (10) years after the date of tank
installation and commissioning.

PART 2 PRODUCTS

2.1 FUEL TANKS

2.1.1 MAIN FUEL TANK:

2.1.1.1 The Main Fuel Tank shall be an Aboveground Tank System approved for
listing under UL Standard 2085, Aboveground Tanks, Protected Type,
Secondary Containment with Vehicle Impact and Projectile Resistance. Unit
must comply with all provisions of U.F.C. 79-7, Appendix A-II-F.
Dimensions shall be as shown on the drawings.

2.1.1.2 The Main Fuel Tank shall have a capacity of 4,000 gallons.

2.1.1.3 Weight:

a) The Main Fuel Tank shall weigh no more than 46,000 lbs when 100% full of
fuel.

2.1.1.4 The Main Fuel Tank shall be of cylindrical design with support feet
perpendicular to the long axis of the tank and shall be of the exterior
dimensions shown on the plans.

2.1.1.5 Manufacturer will have a minimum of five-years experience in producing
specified tank for commercial use and document at least 10 installations in
satisfactory operation.

2.1.1.6 Fire Resistance: The tank system shall be designed and tested to provide
two-hour fire protection for the primary tank as per UL 2085 two-hour
furnace fire test and two-hour simulated pool fire test.

2.1.1.7 Secondary Containment with Leak Monitoring: A monitoring tube shall be
located between the inner tank and secondary barrier.

2.1.1.8 Spill/Overfill Containment: The tank system shall include a U.L. listed 7-
gallon spill/overfill container manufactured as an integral part of the
primary tank, surrounding the fill pipe, and protected by two-hour fire
rating of the enclosure. The spill/overfill container shall include a stick port
and normally closed valve to release spilled product into the main tank.
Exterior steel shall be antioxidiant powder coated to inhibit rust.

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2.1.1.9 Overfill Protection: Overfill protection shall be provided by the following methods:

a) Direct reading level gauge visible from fill pipe access;

b) Overfill Protection Valve (OPV) rated for pressurized delivery located within fill pipe to close automatically at 95% full level;

c) High level alarm.

2.1.1.10 Fuel Quantity Indication: Fuel quantity indication shall be provided by the following methods:

a) The Main Fuel Tank shall be provided with a sight gauge (mechanical gauge visible to an operator standing on the same level as the tank is mounted.

b) The Main Fuel Tank shall be provided with a fuel level indicator transmitter for communication of Day Tank fuel level to the pump station MCS.

c) The Main Fuel Tank shall be provided with a float switch whose actuation can be adjusted from 95% to 100% full. This float switch shall be utilized as an interrupt to shut down the operation of the return fuel pumps on both the Day Tank and the existing Generator Day Tank to prevent overfilling of the Main Fuel Tank by either of the return fuel pumps.

2.1.1.11 The Main Fuel Tank shall include, at a minimum, the following fittings, and openings:

a) Fuel fill port with overfill prevention valve (OPV) and drop tube of sufficient size to accept the fuel fill piping shown on the drawings.

   i. The OPV shall be a 3” OPW 61fSTOP-3050 or approved equal.

   ii. The OPV shall prevent overfilling of storage tank by providing positive shut-off during a pressurized fill when the tank level rises to pre-determined level or tank capacity.

   iii. Any excess product between the valve and fuel delivery coupler shall be drained into the tank through internal drain vents and shall also isolate a siphon due to a broken or leaking fill pipe.

   iv. Valve body, adaptor, collar, poppet shall be cast aluminum. The cam shall be stainless steel. The shaft shall be CRS zinc plated. Float shall be closed cell Buna-N. The valve shall be UL listed.

b) Stick port (spare) opening (4” NPT)

c) 2” Tank fill opening cap.

d) Fitting of appropriate size for a mechanical sight gauge.

e) Fitting of appropriate size for level indicator transmitter.

f) Fitting of appropriate size for an adjustable float switch.

g) Fuel vents (normal and emergency).
i. 3" Atmospheric (normal) vent with cap/breather of the rebuildable desiccant filled type, having a replaceable pleated filter element (4-micron minimum), outside sight glass indicator, integrated standpipe, foam pre-filter pad, replaceable desiccant bag, and 316 stainless-steel housing. All seals shall be suitable for use with diesel fuel. Vent cap/breather shall be the DC RS-15 as manufactured by DESCASE or approved equal.

ii. Emergency pressure relief vent sized per the requirements of NFPA 30 and UL 142. Emergency vent cap shall be of the spring-pressure operated type. Opening pressure shall be 0.5 psig; full open pressure 2.5 psig. Flow rate shall be marked on top of vent.

h) Appropriately sized ports to accept fuel level indicators, level indicator transmitter, leak switches, and alarms.

i) Fuel distribution and return ports to accept the sizes and quantity of supply and return piping shown on the drawings. Fuel supply dip tubes shall provide foot valves where so indicated on the drawings.

j) Access Ladder and catwalk with appropriate handrails.

k) Manway.

2.1.1.12 Seismic restraints shall be provided for seismic zone D.

2.1.1.13 Signage: Tanks shall be marked on all sides as per state and local codes.

2.1.1.14 The Main Fuel Tank shall be manufactured by Tramont, Highland Tank, or approved equal.

2.1.2 DAY TANK

2.1.2.1 The Day Tank shall be a rectangular, 600-gallon diesel fuel tank approved for listing under UL Standard 142 Steel Above Ground Tank for Flammable and Combustible Liquids. The Day Tank shall be rectangular in shape and shall be made with heavy gauge steel construction.

2.1.2.2 The Day Tank shall be supplied with an closed-top 150% rupture basin constructed of heavy gauge welded steel. The rupture basin shall contain a leak detection device that shall be wired to the ECM to shut down the fuel supply pump(s), as well as a dead bottom drain with a ball valve and blind flange.

2.1.2.3 The Day tank shall be coated with rust inhibitor within the inner tank and shall be primed and finish painted on the external tank and rupture basin.

2.1.2.4 All connections to the Day Tank shall be made with 150 lb. welded raised face flanges.

2.1.2.5 The Day Tank shall include, at a minimum, the following fittings, and openings:

a) 2" engine supply (with foot valve).

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b) 2" engine return.

c) 2" supply from Main Fuel Tank.

d) 2" return to Main Fuel Tank (with foot valve)

e) 1" supply to Day Tank fuel polishing system. (with foot valve)

f) 1" return from Day Tank fuel polishing system.

g) 4½“ square inspection port below electrical controls.

h) 2" Manual fill port with cap.

i) Fuel vents (normal and emergency)

   i. 2" Atmospheric (normal) vent with cap/breather of the
       rebuildable desiccant filled type, having a replaceable pleated
       filter element (4-micron minimum), outside sight glass
       indicator, integrated standpipe, foam pre-filter pad,
       replaceable desiccant bag, and 316 stainless-steel housing. All
       seals shall be suitable for use with diesel fuel. Vent
       cap/breather shall be the DC RS-3 as manufactured by DES-
       CASE or approved equal. Normal atmospheric vent shall be
       routed via piping to the exterior of the building with the
       cap/breather placed in such a way as to facilitate ease of
       servicing by maintenance personnel.

   ii. Emergency pressure relief vent sized per the requirements of
       NFPA 30 and UL 142. Emergency vent cap shall be of the
       spring-pressure operated type. Opening pressure shall be 0.5
       psig; full open pressure 2.5 psig. Flow rate shall be marked on
       top of vent.

j) Fitting of appropriate size for a mechanical sight gauge.

k) Fitting of appropriate size for level indicator transmitter.

l) Overfill gravity spill port and piping, atmospheric, for use to a containment
   tank with 100% gravity run of a size 150% above maximum transfer pump
   flow volume with overflow pipe no more than half full and sufficient vent or
   vacuum breaker for low or no evacuation restriction. Route overflow pipe to
   fuel trench in building.

m) Earth ground post for main tank and rupture basin tank direct welded to
   both tanks not located on any support feet.

n) Dead bottom water and sediment drain.

2.1.2.6 Electronic Control Module (ECM)

a) The PLC/Microprocessor based ECM shall control redundant fuel supply
   and single fuel return gear pumps for fuel transfer.

b) A separate ground lug shall be provided to the mounting pan for all the
   electronics.
c) The ECM shall have an HMI to display various tank parameters, modes, functions, and alarms and allow for operator interaction and operation with the Day Tank.

d) The ECM shall be powered by 120V AC power and shall be connected to the emergency generator.

e) The ECM shall be provided with the following local indications:

i. Fuel level

ii. Alarms

1. High fuel (100% to 105% of capacity)
2. Low fuel (7% to 62% capacity)
3. Critical low fuel (6% of capacity)
4. Fuel in containment
5. ECM functional, tank fault

f) Function

g) The ECM shall also be provided with the following dry contacts operable in both a normally closed, and normally open condition:

i. Tank fault

ii. Critical high fuel (106% or greater of capacity)

iii. Supply pump in operation

iv. Return pump in operation

v. High fuel (100% to 105% of capacity)

vi. Low fuel (7% to 62% capacity)

vii. Critical low fuel (6% of capacity)

2.1.2.7 Fuel Quantity Indication System

a) The Day Tank shall be provided with a sight gauge (mechanical gauge) in addition to the gauge provided on the electronic control module (ECM).

b) The Day Tank shall also be provided with a fuel level indicator transmitter for communication of Day Tank fuel level to the pump station MCS.

2.1.2.8 Fuel Transfer Pumps

a) The Day Tank shall be equipped with redundant fuel supply pumps operating in an alternating lead-lag configuration for refueling the Day Tank. The lead pump shall activate when the fuel level in the Day Tank decreases to 87% of tank capacity. The lag pump shall activate and operate in parallel with the lead pump if the fuel level further decreases to 75% of
tank capacity. Fuel supply pumps shall be sized by the manufacturer to accommodate the demand of the three engines to be fueled.

b) The Day Tank shall also be equipped with a single fuel return pump. The return fuel pump shall activate when the Day Tank level exceeds 110% of its normal capacity. The return pump shall be activated by a separate, critical high-level switch. The capacity of the return pump shall be at minimum 125% of the fuel supply pumps operating in parallel. The return pump shall also include contacts for automatic remote shut down of the return pump as indicated by a float switch located in the Main Fuel Tank.

2.1.2.9 Miscellaneous
a) Solenoid valve(s), strainers, check valves, ball valves as indicated or required by code
b) All other appurtenances needed to complete a functioning system.

2.1.2.10 Day Tank Fuel Polishing System
a) See §2.1.3 for fuel polishing system requirements.

2.1.2.11 Signage:

a) Tanks shall be marked on all sides as per state and local codes.

2.1.2.12 The Day Tank shall be as manufactured by Tramont or approved equal.

2.1.3 FUEL POLISHING SYSTEM(S)

2.1.3.1 Automatic fuel maintenance and conditioning system(s) shall pump, filter the fuel, remove water and particulates, condition the fuel, and return fuel to the appropriate storage tank to ensure fresh fuel supply. The fuel filtration system shall be designed to maintain stored fuel to meet or exceed ASTM (D)975 using the following four-stage filtration and conditioning system:

a) Primary Filtration
i. Primary filtration two-pass filter:

1. The first pass primary filtration element shall be a five-stage hydrodynamic separator that will remove free water and particulate matter from the fuel. The hydrodynamic separator shall contain water sensors for detection and annunciation of the presence of water within the hydrodynamic separator bowl by the fuel polishing system controller.

2. The second pass primary filtration element shall be a 30-micron filter element contained within the hydrodynamic separator. Filter element shall be of the cartridge type and shall be integral to the hydrodynamic separator and shall be serviceable for removal and replacement of the element as required.
3. The primary filter shall also be equipped with a vacuum gauge for visual indication of fuel filter condition.

b) Secondary Filtration:
   i. Secondary filtration shall be for the removal of emulsified water and particulate matter down to 10-microns. Filter element shall be the spin-on canister type and shall be easily serviceable.

c) Tertiary Filtration:
   i. Tertiary filtration shall be for particulate matter down to 2-microns. Filter element shall be the spin-on canister type and shall be easily serviceable.

d) Quaternary Conditioning
   i. Quaternary conditioning shall be accomplished by a magnetic fuel conditioner to de-cluster and disperse fuel for proper combustion.

2.1.3.2 Electronic Control Module

a) The PLC/Microprocessor based ECM shall control filtering operations and shall be capable of automatic or manual control.

b) The ECM shall have an HMI to display various polishing system parameters, modes, functions, and alarms, and shall allow for operator interaction of the fuel polishing system. The HMI and associated control panel shall provide the following:
   i. Power on/off button
   ii. Programmable digital timer for setting the fuel polishing schedule with:
       1. Left key/button
       2. Right key/button
       3. Up key/button
       4. Down key/button
       5. OK key/button
       6. Escape key/button
   iii. Manual timer mode button
   iv. Circuit breaker
   v. Start button
   vi. Alarm reset
vii. Power indication light
viii. Service system indication light
ix. Pump active indication light
x. Manual timer active indication light

2.1.3.3 Fuel System Connections

a) Fuel system connections to the fuel polishing unit(s) shall be made by flexible braided 316 stainless steel hose with inner PTFE lining and shall be attached to the fuel system piping and inlet and outlet ports of the fuel polishing system by way of flared JIC fittings suitable for use with diesel fuel.

b) Full open lock open (FOLO) quarter turn ball valves shall be installed on both the supply and return fuel lines between the fuel polishing unit and the fuel system piping to allow for isolation of the fuel polishing unit for service or replacement as required.

2.1.3.4 Enclosure Requirements:

a) The fuel polishing system shall be enclosed within tank or wall mountable enclosure rated to NEMA 4X.

b) The E-stop for the fuel polishing unit shall be mounted on the exterior of the enclosure and shall be operable without opening the enclosure.

c) The fuel polishing system shall be mounted within the enclosure and shall include an integral drip pan with spill sensor.

d) The pump, filters(s), conditioners, and associated electronics shall be mounted in the enclosure and all filters shall be located over the integral drip pan.

2.1.3.5 Mechanical Features:

a) Main Fuel Tank Fuel Polishing System

i. Pump: 3.5 gpm pump with brass gears, stainless steel shaft, and double lip seals rated for continuous duty. Maximum static lift of 15-feet.

ii. Motor: 0.5 hp 120V AC 60 Hz rated for continuous duty and the service environment.

b) Day Tank Fuel Polishing System

i. Pump: 2.5 gpm pump with brass gears, stainless steel shaft, and double lip seals rated for continuous duty. Maximum static lift of 5-feet.

ii. Motor: 120V AC 60 Hz rated for continuous duty and the service environment.

2.1.3.6 Basis of Design Equipment:
a) Main Fuel Tank Fuel Polishing System
   i. The Main Fuel Tank Fuel Polishing System shall be the AFP-210 as manufactured by Reverso Pumps or approved equal.

b) Day Tank Fuel Polishing System
   i. The Day Tank Fuel Polishing system shall be the AFP-150 as manufactured by Reverso Pumps or approved equal.

2.1.4 Fuel Storage Tank Schedule

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Tanks</td>
<td>1</td>
</tr>
<tr>
<td>Length</td>
<td>11'-6&quot;</td>
</tr>
<tr>
<td>Width</td>
<td>8'-6&quot;</td>
</tr>
<tr>
<td>Diameter</td>
<td>8'-6&quot;</td>
</tr>
<tr>
<td>Height</td>
<td>8'-9&quot; (Excluding top mounted appurtenances)</td>
</tr>
<tr>
<td>Weight:</td>
<td>46,000 lbs (Weight of Fuel + Tank Maximum)</td>
</tr>
<tr>
<td>Design Volume</td>
<td>4,000 gallons</td>
</tr>
<tr>
<td>Type</td>
<td>Aboveground, Double Containment</td>
</tr>
<tr>
<td>Color</td>
<td>White – Confirm with Owner before order</td>
</tr>
</tbody>
</table>

Table 2: Day Tank Characteristics (Rectangular)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Tanks</td>
<td>1</td>
</tr>
<tr>
<td>Length (Tank)</td>
<td>6'-9&quot;</td>
</tr>
<tr>
<td>Width (Tank)</td>
<td>3'-6&quot;</td>
</tr>
<tr>
<td>Height (Tank)</td>
<td>4'-2&quot; (Excluding top mounted appurtenances)</td>
</tr>
<tr>
<td>Length (Containment Tank)</td>
<td>7'-2&quot;</td>
</tr>
<tr>
<td>Width (Containment Tank)</td>
<td>4'-6&quot;</td>
</tr>
<tr>
<td>Height (Containment Tank)</td>
<td>3'-11&quot;</td>
</tr>
<tr>
<td>Weight (Tank + Containment + Appurtenances):</td>
<td>6,500 lbs (Weight of Fuel + Tank Maximum)</td>
</tr>
<tr>
<td>Design Volume</td>
<td>600 gallons</td>
</tr>
<tr>
<td>Type</td>
<td>Aboveground, 150% Rupture Basin</td>
</tr>
<tr>
<td>Color</td>
<td>White – Confirm with Owner before order</td>
</tr>
</tbody>
</table>

2.2 REMOTE FILL STATION

2.2.1 A remote fill station shall be provided and installed in the utility wing of the pump station. The fill station cabinet shall provide at minimum ten gallons of spill containment capacity.

2.2.2 The remote fill station shall be connected to the Main Fuel Tank via three-inch double contained piping, and the connection between the fill station and double contained piping shall be accomplished by raised face flange.

2.2.3 The containment piping shall be sealed to the carrier just beyond the connection point to the cabinet and drained back to the spill containment cabinet.

2.2.4 The connection to the double contained piping shall be made from the top of the cabinet.
2.2.5 Cabinet construction shall be of 316 stainless steel.

2.2.6 Cabinet shall be equipped with the following:
   2.2.6.1 Stainless steel hand pump assembly
   2.2.6.2 3” stainless steel ball valve
   2.2.6.3 3” quick disconnect check valve coupler and dust cap
   2.2.6.4 Sloped bottom for drain to hand pump and cabinet drain

2.2.7 Remote fill station shall Model 715S-TT5-3MSS-0 as manufactured by Morris Bros. Co. or approved equal.

2.3 MISCELLANEOUS

2.3.1 Dielectric couplings and/or flanged kits shall be provided at all copper to steel connections and as required to isolate the piping from the tank.

2.4 DUAL CONTAINED PIPE

2.4.1 Dual Contained Pipe system shall be manufactured by Tricon Piping Systems or approved equal.

2.4.2 Carrier Pipe shall be 316L stainless steel.
   2.4.2.1 All joints 2 ½” and larger shall be butt welded. Sizes 2” and smaller shall be socket welded.
   2.4.2.2 Straight lengths of piping shall be supplied with 6” of piping exposed at each end for field joint fabrication. Pipe length to be supplied in 21-42 ft. lengths.

2.4.3 Containment pipe shall be 316L stainless steel.

2.4.4 Service Pipe supports
   2.4.4.1 The carrier pipe within the containment pipe shall be supported at not more than 10 feet intervals.
   2.4.4.2 The supports shall be designed to allow for continuous airflow and draining of the containment system.
   2.4.4.3 Supports shall be made of the same material as the carrier pipe.

2.4.5 Sub-Assemblies
   2.4.5.1 Fittings: All carrier pipe fittings to be factory fabricated and class 3,000 per ASME B16.11. and to be factory fabricated and contained.
   2.4.5.2 Primary and secondary fittings to be 100% air-tested at the factory. Primary pipe to be welded to ANSI B31.3.
   2.4.5.3 All fittings 2-1/2” and larger to be butt weld long radius conforming to ASME B16.9. Fittings 2” and smaller to be socket weld conforming to ASME B16.11.
2.4.5.4 Containment systems made near the installation site or by the installer or other organization not regularly engaged in manufacturing containment systems, will not be allowed.

2.5 SINGLE CONTAINMENT FUEL PIPING

2.5.1 Pipe shall be schedule 40 316L stainless steel.

2.5.1.1 All joints 2 ½” and larger shall be butt welded. Sizes 2” and smaller shall be socket welded.

2.5.1.2 Straight lengths of piping shall be supplied with 6” of piping exposed at each end for field joint fabrication. Pipe length to be supplied in 21-42 ft. lengths.

2.5.2 Sub-Assemblies

2.5.2.1 Fittings: All carrier pipe fittings to be factory fabricated and class 3,000 per ASME B16.11. and to be factory fabricated and contained.

2.5.2.2 Primary and secondary fittings to be 100% air-tested at the factory. Primary pipe to be welded to ANSI B31.3.

2.5.2.3 All fittings 2-1/2' and larger to be butt weld long radius conforming to ASME B16.9. Fittings 2” and smaller to be socket weld conforming to ASME B 16.11.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 The tank system including accessories shall be installed in strict accordance with the manufacturer’s recommendations and applicable fire and environmental codes. All state and local permits shall be obtained by contractor prior to installation. Should any defects become evident during inspection, testing, or within the guarantee period, the contractor shall repair or replace the defective tank or fitting promptly as approved by the Engineer. The tests shall be repeated, at the expense of the contractor, until satisfactory results are obtained.

3.1.2 Tanks shall be marked on all sides with warning signs: “FLAMMABLE” or “COMBUSTIBLE”, “NO SMOKING”, product identification and other signs as required by applicable codes.

3.1.3 Electrical work shall be in accordance with applicable codes and shall be rated for hazardous area as required. Electric feed for dispensing pumps shall include an emergency shutoff switch located per code requirements. Tanks shall be electrically grounded in accordance with NFPA 78.

3.1.4 The installing contractor shall handle the piping system in accordance with the directions furnished by the manufacturer. No fuel system piping shall be installed in standing water. Where applicable, fuel trenches shall be maintained dry until the carrier and containment piping has been fully welded and ready for service.

3.1.5 The system installation shall be inspected and approved by the system supplier or its certified contractor. The system supplier shall submit a comprehensive checklist of quality and safety items critical to the system and verify that the installation has been in accordance with these standards and applicable fire and environmental codes.
3.2 ANCHOR BOLTS

3.2.1 The Contractor shall furnish all anchor bolts of ample size and strength required to securely anchor each item of equipment. Anchor bolts shall have suitable washers and, where so required, their nuts shall be hexagonal.

3.2.2 Bolts, anchor bolts, threaded rod, nuts, and washers shall be type 316 stainless steel.

3.2.3 Expansion type anchor bolts WILL NOT be permitted. All anchors shall be of the drill and epoxy type and installed per the anchor manufacturer's requirements.

3.2.4 All anchors shall be appropriately sized to handle the reactions generated by the associated equipment.

3.3 SHOP TESTING

3.3.1 The tank manufacturer shall have quality control procedures adequate to ensure that all fabrications comply with these Specifications. Quality control shall include in process inspections as well as a final inspection by the manufacturer and written record of these inspections.

3.3.2 Inspection records shall be made for each tank. Inspection records shall be available to the Engineer.

3.3.2.1 Each tank shall be pressure tested. The tank shall be filled with water under a pressure of 5 psig for a period of 30-minutes and checked for leaks.

3.3.2.2 The tank manufacturer shall certify that the inner and outer walls are leak free prior to shipment.

3.4 FIELD TESTING

3.4.1 Final acceptance by the Engineer is contingent upon satisfactory inspection upon arrival at the job site. The Engineer shall inspect each tank for defects, damage, and conformance with the Specifications.

3.4.2 Following installation of the fuel system piping the following testing shall be completed on both the carrier piping and the containment piping.

3.4.2.1 The carrier piping shall be hydrostatically tested to 1-1/2 times the operating pressure of the system and shall maintain this pressure for a minimum time of one-hour.

3.4.2.2 The containment piping shall be hydrostatically tested to 15 psig and shall maintain this pressure for a minimum time of one-hour.

3.4.3 After installation, each tank, connecting pipes, and valving shall be field tested by filling with water. The tank and fittings shall hold water without loss, evidence of weeping or capillary action for a period of 24 hours prior to acceptance.

3.4.4 After testing, the tanks shall be thoroughly cleaned and dried.

3.4.5 The installing contractor shall test the system during startup to ensure that the return pump system will move fuel overflow back to the Main Tank from the Day Tank.

(End of Section 15300)

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PART 1 - GENERAL

1.1. RELATED DOCUMENTS

1.1.1. Drawings and general provisions of Contract, including General and Supplemental Conditions and Division 1 of the specifications, apply to work of this section.

1.2. DESCRIPTION OF WORK

1.2.1. The work covered by the division of the specification includes the furnishing of all labor, materials, tools, temporary power, transportation, permits, certificates, temporary protection and storage required to complete the electrical installation.

1.2.2. All work included in this division of the work and its sections is complimentary to all the requirements and conditions set forth in other Divisions and Sections of the specifications, and associated drawings wherever applicable to the Electrical Work.

1.3. DEFINITIONS

1.3.1. The word "Provide" as used herein and also on the plans shall mean to furnish and install as part of the Electrical Contract.

1.3.2. "The Contractor" refers to the Electrical Contractor and any subcontractors to the Electrical Contractor.

1.3.3. "The Contract" refers to the Electrical Contract and any subcontracts to the Electrical Contract.

1.3.4. "The Engineer" refers to Davis & Floyd Engineers and Architects.

1.3.5. "The Architect" refers to Davis and Floyd Engineers and Architects.

1.4. LICENSES, PERMITS, FEES AND TAXES

1.4.1. The Contractor shall:

1.4.1.a. Secure and pay for all licenses and permits necessary to perform work under this division.

1.4.1.b. Pay all Federal, State, and Local taxes that may be required.

1.4.1.c. Provide the Engineer with a written certificate that all parts of the electrical system have been tested, inspected, and final approval has been obtained from the appropriate code enforcement agencies.

1.4.2. CODES AND REGULATIONS

1.4.2.a. The latest adopted edition of the codes and regulations of the following govern this section and shall be considered minimum requirements:

(1) National Electrical Code (NEC)
(2) State and/or Local Electrical Codes
(3) National Electrical Safety Code (NESC)
(4) Underwriters Laboratories, Inc. (UL)
(5) Occupational Safety and Health Administration (OSHA)
(6) National Fire Protection Association (NFPA)
1.4.2.b. This specification does not relieve the Contractor in any way of the responsibility for compliance with the appropriate and/or adopted editions of the applicable codes or other public regulations, including those that apply at the point of final installation.

1.4.2.c. The Contractor shall not assume that any drawing or specification forming a part of the contract documents authorizes the violation of any code, regulation or standard. Where conflicts arise, it shall be deemed that the Contractor has estimated the cost of all work to be completed in accord with the prevailing code.

1.5. UTILITIES

1.5.1. Contact the local power utility company and the local telephone utility where applicable, and explain in detail all aspects of the work. Coordinate the work with their requirements Contractor shall pay all utility connection charges.

1.6. TEMPORARY POWER AND LIGHT

1.6.1. Provide temporary power and light as specified and in accordance with NEC Article 590.

1.7. SKILLED TRADESMEN AND STANDARD OF WORK

1.7.1. The work under this contract shall be performed by tradesmen skilled in each particular trade and shall be accomplished so as to be safe, neat and functional upon completion.

1.8. CONTRACTOR RESPONSIBILITIES - WORKMANSHIP

1.8.1. Careful attention shall be paid to workmanship. Any work which, in the opinion of the Engineer, is badly arranged or poorly executed shall be replaced in a proper and neat manner by the Contractor at no expense to the Owner, and shall not delay the project schedule.

1.8.2. All Contractor’s work in progress or completed, as well as buildings, machinery, and equipment that may be damaged through the execution of this work, shall be protected by the Contractor. Such protection shall remain and be maintained until its removal is approved by the Owner.

1.8.3. CLEANUP AND HOUSEKEEPING

1.8.3.a. The Contractor shall at all times keep the premises free from the accumulations of waste materials or rubbish caused by his employees or by the work. Waste materials shall be removed and work area broom-cleaned at least weekly.

1.8.3.b. The work area shall be kept in an orderly fashion such that no safety hazards are created or movement of other equipment is impaired.

1.8.3.c. At the completion of the work, the Contractor shall remove from the site all of the construction materials belonging to him.

1.8.3.d. If the Contractor fails to perform the cleaning work specified above or in case of dispute among the several Contractors employed by the Owner, then the Owner reserves the right to remove the rubbish and waste materials and charge the cost to the Contractor to the extent incurred by the Owner.

1.9. CONFLICTS BETWEEN PLANS, DIMENSIONS AND SPECIFICATIONS
1.9.1. Bring any conflict between these specifications, design drawings, referenced national standards and codes immediately to the Engineer's attention, and obtain clarification before proceeding.

1.9.2. The Contractor shall be responsible for all dimensions required for laying out and installing his work. The Contractor shall take measurements in the field as required to verify or supplement dimensions shown, and assume responsibility for a complete and satisfactory installation in accordance with the best modern practice and methods.

1.9.2.a. Do not obtain dimensions by scaling the drawings. Any information involving accurate measurements of the building shall be taken from the architectural, structural, or civil drawings, or on the building site.

1.9.3. The contract drawings are diagrammatic and are not intended to show the work in every respect and do not show all structural and installation details. They are given for general information purposes and to assist the Contractor in determining actual conditions and locations.

1.9.3.a. The Engineer reserves the right to make reasonable changes in the location of outlets, apparatus, or equipment up to the time of roughing-in. Such changes as directed shall be made by the Contractor without additional compensation.

1.9.3.b. The drawings do not attempt to show every detail which may be required to ensure proper arrangement. Provide all such items which are necessary for a complete, safe, and first-class installation.

PART 2 - PRODUCTS

2.1. MATERIAL STANDARDS

2.1.1. All electrical materials and materials and equipment installed on this project shall be new and manufactured within one year of bid date.

2.1.2. All electrical materials and equipment shall be UL listed. Exception: Engineer provides written authorization for use of materials and equipment listed by an alternate testing laboratory or certifying agency such as ETL or CSA.

2.1.3. The intent of these specifications is to establish the quality and style of products to be furnished. Products are specified in these specifications or on the drawings by reference to manufacturer, vendor, trade name, product line and/or catalog number.

2.1.4. The design is based on the use of the specified product. Should the Contractor choose to substitute an "equal" or "approved equal" product, then the Contractor shall ensure that the product so substituted is compatible in all electrical, mechanical, structural and environmental aspects and that dimensionally it will fit within the space allowed. The Contractor shall make all necessary adjustments to ensure a complete, functional and neat installation in keeping with the intent of these specifications.

2.2. MATERIAL SUBSTITUTIONS

2.2.1. Where the term "..... or equal" is used, then the Contractor may substitute products considered to be "trade equal" to those specified.

2.2.2. Where the term "..... or equal by manufacturer(s)" is used, then the Contractor may substitute products considered to be "trade equal" to those specified, as manufactured by any of the named manufacturers.

2.2.3. Where the term "..... or prior approved equal" is used then the Contractor may substitute approved products considered by the engineer to be "trade equal" to those specified, as manufactured by those manufacturers listed in the specifications as "prior approved equals" for those manufacturers having applied for and received prior approval in accordance with Article 2.2.4.
2.2.4. The Contractor, materials and equipment manufacturers, suppliers or distributors may request approval for the use of substitutions for products specified, provided:

2.2.4.a. Such request is delivered to the Engineer in writing a minimum of ten (10) days prior to bid due date.

2.2.4.b. The request includes sufficient detail, in the opinion of the Engineer, to indicate that quality and style are equal to the specified item.

2.2.4.c. A written approval from the Engineer must be issued before the proposed substitution can be considered for possible use under the contract. This approval will be issued in an Addendum to all Bidders of Record.

2.2.4.d. For items which require shop drawings or product data submittals, final approval or rejection will be indicated via the Engineer’s review of these submittals.

2.2.4.e. Verbal approvals are unacceptable. The burden shall be on the Contractor to have the written approvals before proceeding.

2.2.4.f. No substitutions of specified material will be permitted after award of the contract.

2.3. SHOP DRAWINGS

2.3.1. Submit to the Engineer one (1) digital copy in PDF format of all layout, detail and shop drawings called for by the contract documents.

2.3.2. Submit shop drawings within 30 days after the Notice to Proceed, or sooner if required by the project schedule, or General Conditions.

2.3.3. Submit the Division 16 electrical submittal as a complete package in PDF format. Submittal shall include thumbnails appropriately labeled per each division 16 specification section.

2.3.4. Shop Drawings submittals shall include but not be limited to the following items:

2.3.4.a. Manufacturer’s product specifications and installation instructions

2.3.4.b. Catalog cuts for the specific product submittal

2.3.4.c. Rough-in diagrams and templates

2.3.4.d. Wiring diagrams

2.3.4.e. Printed performance curves.

2.3.5. Refer to each section of these specifications for specific requirements applicable to that section.

2.3.6. Engineer’s approval of drawings shall not relieve the Contractor from responsibility for deviations from the contract documents, unless he has, in writing, called attention to such deviations at the time of submitting, nor shall it relieve him from the responsibility of error of any sort.

2.3.7. Review of manufacturer’s drawings constitutes acceptance of general design only and will not release the Contractor from fulfilling the terms and intent of the drawings and specifications.

2.3.8. The omission from shop drawings of any material shown on the drawings and/or specified shall not relieve the Contractor from furnishing same.

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2.3.9. Refer to the GENERAL CONDITIONS for additional requirements.

2.4. OWNER SUPPLIED MATERIALS AND EQUIPMENT

2.4.1. The Contractor shall receive, store and install all Owner supplied materials and equipment. Materials and equipment shall be stored in a place and manner approved by the Engineer. The Contractor shall be responsible for all damage to Owner supplied materials or equipment except for damage specifically noted in writing on the bill of lading at the time of receipt.

PART 3 - EXECUTION

3.1. WORK INCLUDED

3.1.1. All work subject to the following:

- Instruction to Bidders
- General and Supplemental Conditions
- All drawings
- Specifications and Supplemental Documents
- Contract Agreement

3.1.2. All materials and equipment to be furnished and installed as described in all sections and as shown on the contract drawings.

3.1.3. The Contractor shall provide all labor, materials, and equipment indicated or reasonably implied to carry out the intent of the work complete.

3.1.4. Unless specific contract responsibility is assigned elsewhere in the contract documents, the Contractor shall be responsible for the mounting of and the final electrical connections to all electrical equipment and devices as indicated by the contract documents, whether furnished by the Contractor or furnished by others.

3.1.5. Final termination of all power feeders and branch circuits to all motors and other power consuming equipment as shown on the contract drawings whether furnished by the Contractor or by others.

3.1.6. Unless specific contract responsibility is assigned elsewhere in the contract documents, the Contractor shall provide all control wiring and components required for HVAC control, automatic door controls, and other controls indicated by the contract documents.

3.2. SUPERVISION AND SCHEDULING

3.2.1. Work shall be properly supervised at all times by a field supervisor or competent foreman employed by and representing the Contractor.

3.2.2. The Contractor shall acquaint himself with the plans for structural, mechanical, and all other trades as necessary to properly install outlets, fixtures, equipment, conduits, etc., at proper stage of construction and shall work in advance of the others as required to eliminate all cutting and patching possible.

3.2.3. It shall be the Contractor’s responsibility to inform other contractors of necessary clearances and access openings for all electrical equipment.

3.2.4. Material orders must be placed in sufficient time to be installed at the proper stage of construction. Failure to do this will not be considered justification for substitution of materials at a later date when need becomes urgent and specified materials are not readily obtainable.
3.2.5. In the event the project requirements necessitate disconnecting or temporary shutting down of any existing electrical services or systems, it shall be the Contractor's responsibility to coordinate such down time(s) with the Owner.

3.3. ADDITIONS, RENOVATIONS AND DEMOLITIONS

3.3.1. For projects involving addition to, or renovation or demolition of existing facilities, the Contractor shall visit the site and thoroughly familiarize himself with all existing conditions. No requests for additional compensation will be considered for work which a thorough examination of existing conditions would have shown was reasonably required in order to properly complete the work.

3.3.2. Disconnect, relocate and reconnect any existing electrical equipment shown or required to be removed or relocated. Contractor shall safeguard all existing equipment from damage during construction.

3.3.3. Disconnect, disassemble and remove all existing electrical materials and equipment shown for demolition or removal or required to be removed to complete the work. Deliver and turn over to the Owner all materials specified as remaining the property of the Owner. Remove from the site and dispose of all other materials.

3.3.4. All work in existing areas shall be done in such a manner as to minimize any disturbance to existing operations. Any power outages shall be as short as possible and shall be coordinated with the Owner. Schedule power outages for weekends or nights if required by the Owner. Inform the Owner and local fire department and/or security alarm provider of any alterations or shut downs which will disrupt any of the life safety systems.

3.4. RECORD DRAWINGS

3.4.1. During construction, the Contractor shall keep an accurate record of all deviations between work as shown on the contract drawings and that which is actually installed.

3.4.2. The Contractor shall maintain two complete sets of record drawings of the contract drawings for the purpose of recording field changes. One set shall be used to record field changes in pencil; the second set shall be used by the Contractor to make a neat and accurate record in red ink of all changes and revisions to the original design which exist in the completed work. Such drawings shall be available to the Owner or Engineer at the job site at all times and submitted to the Owner or Engineer upon substantial completion of the project.

3.5. CUTTING, DRILLING AND PATCHING

3.5.1. To avoid unnecessary cutting of the building structure, all inserts and conduit or cable sleeves required in the general construction for completion of the work, specified herein, shall be furnished and installed by the Contractor in time to avoid delay in the general construction.

3.5.1.a. Should any cutting of the building structure be required to provide sleeves, and other openings, the Contractor shall perform all the necessary cutting and patching. Do not cut, drill or core any structural members except with approval of the Engineer.

3.5.1.b. Seal with suitable materials all openings in masonry or concrete, roofs, sidewalls, etc. All openings in floors under consoles, switchgear, etc., open to atmosphere are to include as a firestop a closed-cell structure foaming agent that meets or exceeds Factory Mutual Class I Specification for Combustion. The agent used shall be listed to maintain the fire/smoke rating of the structure penetrated.

3.6. TOUCH-UP PAINTING

3.6.1. The Contractor shall be responsible for restoring all electrical equipment to its original condition, which includes touch-up painting as required.
3.7. CLEAN-UP

3.7.1. Clean interior of all panel cabinets, pull boxes and other equipment enclosures.

3.7.2. Wash and wipe clean all lighting fixtures, lamps and other electrical equipment which may have become soiled during the installation.

3.8. TRENCHING AND BACKFILLING

3.8.1. The Contractor shall be responsible for all trenching, backfilling and restoring to original condition all surfaces disturbed by the Contractor.

3.8.2. All trenching and backfilling shall be in accordance with Section 02200, EARTHWORKS of the specifications and Article 300.5 of the NEC.

3.9. CONCRETE WORK

3.9.1. The Contractor shall be responsible for all concrete work required for electrical equipment including but not limited to, concrete light pole bases, concrete pads for utility-provided transformers, concrete bases for metering supports, concrete duct banks and concrete equipment pads for specified electrical equipment.

3.9.2. All concrete work shall be in accordance with Section 03300, CAST-IN-PLACE CONCRETE, of the specifications and as detailed on the drawings.

3.9.3. The Contractor shall provide concrete pads for electrical equipment as indicated on the drawings. Pads shall not be poured until seismic calculations are approved.

3.10. DEMONSTRATION OF COMPLETED ELECTRICAL SYSTEMS

3.10.1. The Contractor shall, upon request, demonstrate proper operation of all electrical systems and equipment in the presence of the Engineer and/or other designated persons.

3.10.2. Make such changes as directed to make installation comply with the plans and specifications.

3.10.3. Repair or replace all faulty work and/or equipment.

3.10.4. The Contractor shall furnish to the Engineer for transmittal to the Owner one (1) hard copy and one (1) electronic copy in PDF format of instruction books and manufacturer's installation/operation/maintenance data, for all electrical equipment purchased by the Contractor. Instruction books and other data shall include a list of spare parts for this equipment.

3.11. WARRANTY

3.11.1. The Contractor shall warrant the completed electrical system to be free from mechanical and electrical defects for a period of one (1) year from the date of the Owner's acceptance of the building, unless the manufacturer's product warranty exceeds this period, in which case the Contractor will include in his bid the cost to make his warranty of labor (and material incidental to replacement of the product) coincide with the product warranty.

3.12. ATTACHMENTS

None

END OF SECTION 16010

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SECTION 16055  MOTORS

PART 1 -  GENERAL

1.1. RELATED DOCUMENTS

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

1.2. SUMMARY

1.2.1. This Section includes basic requirements for factory-installed and field-installed motors. These specifications are intended to augment and support section where motor requirements are not detailed or precisely defined. Where conflicts may arise in the interpretation of certain equipment specifications such as Section 11010, this section shall remain silent.

1.2.2. Related Sections include the following:

1.2.2.a. Division 11 Sections.

1.2.2.b. Division 15 Sections.

1.2.2.c. Section 16056, “NEMA Premium™ Efficiency Electric Motors:

1.3. DEFINITIONS

1.3.1. Factory-Installed Motor: A motor installed by motorized-equipment manufacturer as a component of equipment.

1.3.2. Field-Installed Motor: A motor installed at Project site and not factory installed as an integral component of motorized equipment.

1.4. SUBMITTALS

1.4.1. Product Data for Field-Installed Motors: For each type and size of motor, provide nameplate data and ratings; shipping, installed, and operating weights; mounting arrangements; size, type, and location of winding terminations; conduit entry and ground lug locations; and information on coatings or finishes.

1.4.2. Shop Drawings for Field-Installed Motors: Dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Include the following:

1.4.2.a. Each installed unit’s type and details.

1.4.2.b. Nameplate legends.

1.4.2.c. Diagrams of power and control wiring. Provide schematic wiring diagram for each type of motor and for each control scheme.

1.4.3. Coordination Drawings: Floor plans showing dimensioned layout, required working clearances, and required area above and around field-installed motors. Show motor layout, mechanical power transfer link, driven load, and relationship between electrical components and adjacent structural and mechanical elements. Show support locations, type of support, and weight on each support. Indicate field measurements.

1.4.4. Manufacturer Seismic Qualification Certification: Submit certification that motors, accessories, and components will withstand seismic forces defined in Division 15 Section "Mechanical Vibration and Seismic Controls." Include the following:

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1.4.4.a. Basis of Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

(1) The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

1.4.4.b. Dimensioned Outline Drawings of Motorized Equipment: Identify center of gravity and locate and describe mounting and anchorage provisions.

1.4.4.c. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

1.4.5. Test Reports: Written reports specified in Parts 2 and 3.

1.4.6. Operation and Maintenance Data: For field-installed motors to include in emergency, operation, and maintenance manuals.

1.5. QUALITY ASSURANCE

1.5.1. Source Limitations: Obtain field-installed motors of a single type through one source from a single manufacturer.

1.5.2. Product Options for Field-Installed Motors: Drawings indicate size, profiles, and dimensional requirements of motors and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."

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

1.5.4. Comply with NFPA 70.

1.6. PROJECT CONDITIONS

1.6.1. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1.6.1.a. Notify Architect at least seven days in advance of proposed utility interruptions. Identify extent and duration of utility interruptions.

1.6.1.b. Indicate method of providing temporary utilities.

1.6.1.c. Do not proceed with utility interruptions without Architect's written permission.

1.7. COORDINATION

1.7.1. Coordinate features of motors, installed units, and accessory devices. Provide motors that are:

1.7.1.a. Compatible with the following:

(1) Magnetic controllers.

(2) Multispeed controllers.

(3) Reduced-voltage controllers.

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(4) Solid State Controllers.

(5) Variable Frequency Drives

(6) Variable Speed Drives

1.7.1.b. Designed and labeled for use with variable frequency controllers, and suitable for use throughout speed range without overheating.

1.7.1.c. Matched to torque and horsepower requirements of the load.

1.7.1.d. Matched to ratings and characteristics of supply circuit and required control sequence.

1.7.1.e. Matched motor feeder impedance for drives.

1.7.2. Coordinate motor support with requirements for driven load; access for maintenance and motor replacement; installation of accessories, belts, belt guards; and adjustment of sliding rails for belt tensioning.

1.7.3. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 3 Section.

PART 2 - PRODUCTS

2.1. MOTOR REQUIREMENTS

2.1.1. Motor requirements apply to factory-installed and field-installed motors except as follows:

2.1.1.a. Different ratings, performance, or characteristics for a motor are specified in another Section.

2.1.1.b. Manufacturer for a factory-installed motor requires ratings, performance, or characteristics, other than those specified in this Section, to meet performance specified.

2.2. MOTOR CHARACTERISTICS

2.2.1. Motors 3/4 HP and Larger: Three phase.

2.2.2. Motors Smaller Than 1/2 HP: Single phase.

2.2.3. Frequency Rating: 60 Hz.

2.2.4. Voltage Rating: NEMA standard voltage selected to operate on nominal circuit voltage to which motor is connected.

2.2.5. Service Factor: 1.15 for open dripproof motors; 1.15 for totally enclosed motors.

2.2.6. Duty: Continuous duty at ambient temperature of 105 deg F (40 deg C).

2.2.7. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

2.2.8. Enclosure: Totally enclosed fan cooled (TEFC).

2.3. POLYPHASE MOTORS

2.3.1. Description: NEMA MG 1, Design B, medium induction motor.
2.3.2. Motors connected to ASD/VFD Drives: NEMA MG 1, Class 32 (1600 Volts peak).

2.3.3. Efficiency: Standard efficiency according to NEMA MG 1, Para. 12.59 and Table 12-12, Section 16056, Premium efficiency.

2.3.4. Stator: Copper windings, unless otherwise indicated.

2.3.5. Rotor: Squirrel cage, unless otherwise indicated.

2.3.6. Bearings: Double-shielded, prelubricated ball bearings suitable for radial and thrust loading.

2.3.7. Temperature Rise: Match insulation rating, unless otherwise indicated.

2.3.8. Insulation: Class F, unless otherwise indicated.

2.3.9. Code Letter Designation:

2.3.10. Enclosure: Cast iron for motors 7.5 hp and larger; rolled steel for motors smaller than 7.5 hp.

2.3.10.a. Finish: Gray enamel.

2.4. POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS

2.4.1. Motors Used with Reduced-Inrush Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.

2.4.2. Motors Used with Variable Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.

2.4.2.a. Designed with critical vibration frequencies outside operating range of controller output.

2.4.2.b. Temperature Rise: Matched to rating for Class B insulation.

2.4.2.c. Insulation: Class H.

2.4.2.d. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.

2.4.3. Rugged-Duty Motors: Totally enclosed, with 1.25 minimum service factor, greased bearings, integral condensate drains, and capped relief vents. Windings insulated with nonhygroscopic material.

2.4.3.a. Finish: Chemical-resistant paint over corrosion-resistant primer.

2.4.4. Source Quality Control: Perform the following tests on each motor according to NEMA MG 1:

2.4.4.a. Measure winding resistance.

2.4.4.b. Read no-load current and speed at rated voltage and frequency.

2.4.4.c. Measure locked rotor current at rated frequency.

2.4.4.d. Perform high-potential test.

2.5. SINGLE-PHASE MOTORS

2.5.1. Type: One of the following, to suit starting torque and requirements of specific motor application:

2.5.1.a. Permanent-split capacitor.

2.5.1.b. Split-phase start, capacitor run.

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2.5.1.c. Capacitor start, capacitor run.

2.5.2. Shaded-Pole Motors: For motors 1/20 hp and smaller only.

2.5.3. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

2.5.4. Bearings: Ball type for belt-connected motors and other motors with high radial forces on motor shaft; sealed, prelubricated-sleeve type for other single-phase motors.

2.5.5. Source Quality Control: Perform the following tests on each motor according to NEMA MG 1:

2.5.5.a. Measure winding resistance.

2.5.5.b. Read no-load current and speed at rated voltage and frequency.

2.5.5.c. Measure locked rotor current at rated frequency.

2.5.5.d. Perform high-potential test.

PART 3 - EXECUTION

3.1. EXAMINATION

3.1.1. Examine areas to receive field-installed motors for compliance with requirements, installation tolerances, and other conditions affecting performance.

3.1.2. Examine roughing-in of conduit systems to verify actual locations of conduit connections before motor installation.

3.1.3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2. MOTOR INSTALLATION

3.2.1. Anchor each motor assembly to base, adjustable rails, or other support, arranged and sized according to manufacturer’s written instructions. Attach by bolting. Level and align with load transfer link.

3.2.2. Install motors on concrete bases complying with Division 3.

3.2.3. Comply with mounting and anchoring requirements specified in Division 15 Section "Mechanical Vibration and Seismic Controls."

3.3. FIELD QUALITY CONTROL

3.3.1. Prepare for acceptance tests as follows:

3.3.1.a. Run each motor with its controller. Demonstrate correct rotation, alignment, and speed at motor design load.

3.3.1.b. Test interlocks and control features for proper operation.

3.3.1.c. Verify that current in each phase is within nameplate rating.

3.3.2. Testing: Perform the following field quality-control testing:
3.3.2.a. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.15.1.

3.3.2.b. Certify compliance with test parameters.

3.3.2.c. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

3.3.3. Manufacturer’s Field Service: Engage a factory-authorized service representative to perform the following:

3.3.3.a. Inspect field-assembled components, equipment installation, and piping and electrical connections for compliance with requirements.

3.3.3.b. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.3.3.c. Verify bearing lubrication.

3.3.3.d. Verify proper motor rotation.

3.3.3.e. Test Reports: Prepare a written report to record the following:

(1) Test procedures used.

(2) Test results that comply with requirements.

(3) Test results that do not comply with requirements and corrective action taken to achieve compliance.

3.4. ADJUSTING

3.4.1. Align motors, bases, shafts, pulleys and belts. Tension belts according to manufacturer’s written instructions.

3.5. CLEANING

3.5.1. After completing equipment installation, inspect unit components. Remove paint splatters and other spots, dirt, and debris. Repair damaged finish to match original finish.

3.5.2. Clean motors, on completion of installation, according to manufacturer’s written instructions.

END OF SECTION 16055
SECTION 16056  NEMA PREMIUM™ EFFICIENCY ELECTRIC MOTORS

PART 1 - GENERAL

1.1. The intent of this specification is to outline the minimum requirements for three-phase AC induction motors applied to municipal and industrial application for operation on voltages 600 volts or less, rated 500 HP or less, operating more than 2000 hours per year at >75% of full-load.

PART 2 - DESIGN STANDARDS

2.1. In addition to this specification, equipment shall comply with the current applicable standards promulgated by the following organizations:

- AFBMA: Anti-Friction Bearing Manufacturers Association
- ANSI: American National Standards Institute
- ASTM: American Society of Testing Materials
- AWWA: American Water Works Association
- IEEE: Institute of Electrical and Electronics Engineers (Testing)
- HI: Hydraulic Institute
- NEMA: National Electrical Manufacturers Association (NEMA Standards Publication MG 1)

PART 3 - SERVICE CONDITIONS

3.1. USUAL SERVICE CONDITIONS

3.1.1. Ambient temperature not greater than 40º C and not less than -15º C

3.1.2. Voltage variation within +/-10%

3.1.3. Frequency variation within +/-5%

3.1.4. Combination of 2 and 3 above, not to exceed 10%.

3.1.5. Exposure to an altitude that does not exceed 3300 feet (1000 meters).

3.1.6. Installation on a rigid mounting surface.

3.1.7. Installation in areas or supplementary enclosures, which do not seriously interfere with the ventilation of the motor.

PART 4 - ENCLOSURES

4.1. General purpose horizontal motors for indoor operation in a clean environment can be ODP (Open Dripproof).

4.2. General purpose horizontal motors for outdoor operation or located in hostile non-hazardous environments shall be “Enclosed” or “Weather Protected.”
4.3. All motors in hazardous locations shall be approved for the application and meet the Class and Group as required by the area classification.

PART 5 - ELECTRICAL DESIGN

5.1. Motors shall be rated continuous duty.

5.2. Insulation system shall be rated minimum Class B (130° C).

5.3. Maximum temperature rise by resistance at rated HP shall not exceed Class B limits (80° C).

5.4. For motors rated at 1.15 Service Factor, the maximum temperature rise by resistance shall not exceed Class F limits (115° C).

5.5. The speed/torque and speed/current characteristics shall comply with NEMA Design A or B, as specified on the request for quote.

5.6. Motors shall be suitable for full voltage starting, unless otherwise specified.

5.7. Motors shall meet the requirements of “NEMA PREMIUM™” in accordance with NEMA MG 1 – 2016.

5.8. Motors applied to variable frequency drives shall adhere to NEMA Standards Publication MG 1, Part 30, Application Considerations for Constant Speed Motors Used on a Sinusoidal Bus with Harmonic Content and General Purpose Motors Used with Adjustable-Voltage or Adjustable-Frequency Controls or Both, or Part 30, Definite-Purpose Inverter-Fed Polyphase Motors.

PART 6 - MECHANICAL DESIGN

6.1. BEARINGS

6.1.1. Bearings shall be rated for a minimum of 26,280 hours L-10 life at full-load direct-coupled, except vertical high thrust motors.

6.1.2. Vertical motors shall be capable of withstanding a momentary up-thrust of at least 30% of normal down-thrust.

6.2. LUBRICATION

6.2.1. Grease lubricated bearings shall be designed for electric motor use. Grease shall be capable of higher temperatures associated with electric motors and shall be compatible with Polyurea-based greases.

6.2.2. Grease fittings, if provided, shall be Alemite™ type (or equivalent).

6.2.3. Oil lubricated bearings, when specified, shall have an externally visible sight glass to view oil level.

6.2.4. Shielded bearings with regreaseable provisions are permissible.

6.3. OTHER

6.3.1. Vibration shall not exceed 0.15 inch per second, unfiltered peak.

6.3.2. Noise level shall meet the requirements of the application.

6.3.3. Motors (180 frame and larger) shall have provisions for lifting eyes or lugs capable of a safety factor of 5.

6.3.4. All external fasteners shall be corrosion-resistant.
6.4. ACCESSORIES (WHEN SPECIFIED)

6.4.1. Anti-condensation heaters keep motor windings at least 5° C above the ambient temperature.

6.4.2. Winding thermostats shall be normally closed, connected in series.

6.4.3. Grounding provisions shall be in the main terminal box.

PART 7 - SUBMITTAL DATA REQUIRED

7.1. Description of product.


7.3. Motor performance data (curves or listed data of torque and current as a function of speed; current, efficiency, power factor, and speed as a function of load).

7.4. Motor dimension prints, including coupling of hollow shaft.

7.5. Motor parameters required for the determination of the Reed Critical Frequency of vertical hollow shaft motors.

PART 8 - TESTS (IN ADDITION TO MANUFACTURERS’ STANDARD TESTS)

8.1. When specified, provide report of routine tests per NEMA MG 1.

8.2. When specified, conduct efficiency test and speed torque test with report. (IEEE 112, Method B)

8.3. When specified, conduct noise test with report. (Per NEMA MG 1 Part 9)

END OF SECTION 16056
PART 1 - GENERAL

1.1. RELATED DOCUMENTS

1.1.1. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1, and Section 16010, apply to this Section.

1.2. DESCRIPTION OF WORK

1.2.1. Furnish and install seismic restraints and other earthquake-damage-reduction measures for electrical components in accordance with current code requirements. Comply with specific seismic construction requirements, shown on the Drawings or specified in other sections.

1.3. DEFINITIONS

1.3.1. IBC: International Building Code.

1.3.2. Seismic Restraint: A fixed device (a seismic brace, an anchor bolt or stud, or a fastening assembly) used to prevent vertical or horizontal movement, or both vertical and horizontal movement, of an electrical system component during an earthquake.

1.3.3. Mobile Structural Element: A part of the building structure such as a slab, floor structure, roof structure, or wall that may move independent of other mobile structural elements during an earthquake.

1.4. SUBMITTALS

1.4.1. Refer to Section 16010 for general submittal requirements.

1.4.1.a. Product Data: Illustrate and indicate types, styles, materials, strength, fastening provisions, and finish for each type and size of seismic restraint component used.

1.4.1.b. Anchor Bolts and Studs: Tabulate types and sizes, complete with report numbers and rated strength in tension and shear as evaluated by an agency approved by authorities having jurisdiction.

1.4.2. Shop Drawings: For anchorage and bracing not defined by details and charts on Drawings. Indicate materials, and show designs and calculations signed and sealed by a professional engineer.

1.4.2.a. Design Analysis: To support selection and arrangement of seismic restraints. Include calculations of combined tensile and shear loads.

1.4.2.b. Details: Detail fabrication and arrangement. Detail attachment of restraints to both structural and restrained items. Show attachment locations, methods, and spacings, identifying components and listing their strengths. Indicate direction and value of forces transmitted to the structure during seismic events.

1.4.2.c. Preapproval and Evaluation Documentation: By an agency approved by authorities having jurisdiction, showing maximum ratings of restraints and the basis for approval (tests or calculations).

1.4.3. Coordination Drawings: Plans and sections drawn to scale and coordinating seismic bracing for electrical components with other systems and equipment, including other seismic restraints, in the vicinity.

1.4.4. Product Certificates: Signed by manufacturers of seismic restraints certifying that products furnished comply with requirements.
1.4.5. Qualification Data: For firms and persons specified in "Quality Assurance" Article.

1.4.6. Material Test Reports: From a qualified testing agency indicating and interpreting test results of seismic control devices for compliance with requirements indicated.

1.5. QUALITY ASSURANCE

1.5.1. Comply with seismic restraint requirements in IBC, unless requirements in this Section are more stringent.

1.5.2. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing seismic engineering services, including the design of seismic restraints, that are similar to those indicated for this Project.

1.5.3. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, with the experience and capability to conduct the testing indicated.

1.6. PROJECT CONDITIONS

1.6.1. Refer to structural drawings for seismic use group and conditions specific to this project.

1.7. COORDINATION

1.7.1. Coordinate layout and installation of seismic bracing with building structural system and architectural features, and with mechanical, fire-protection, electrical, and other building features in the vicinity.

1.7.2. Coordinate concrete bases with building structural system.

PART 2 - PRODUCTS

2.1. MANUFACTURERS

2.1.1. Where products are specified by naming one manufacturer or vendor, supply the product so named. Refer to Section 16010 for material substitutions.

2.1.2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

2.1.2.a. Amber/Booth Company, Inc.
2.1.2.b. Loos & Company, Inc.
2.1.2.c. Mason Industries, Inc.

2.2. MATERIALS

2.2.1. Use the following materials for restraints:

2.2.1.a. Indoor Dry Locations: Steel, zinc plated.
2.2.1.b. Outdoors and Damp Locations: Stainless steel.
2.2.1.c. Corrosive Locations: Stainless steel.

2.3. ANCHORAGE AND STRUCTURAL ATTACHMENT COMPONENTS
2.3.1. Strength: Defined in reports by ICBO Evaluation Service or another agency acceptable to authorities having jurisdiction.

2.3.1.a. Structural Safety Factor: Strength in tension and shear of components used shall be at least two times the maximum seismic forces to which they will be subjected.

2.3.2. Concrete and Masonry Anchor Bolts and Studs: Steel-expansion wedge type.

2.3.3. Concrete Inserts: Steel-channel type.

2.3.4. Through Bolts: Structural type, hex head, high strength. Comply with ASTM A 325.

2.3.5. Welding Lugs: Comply with MSS SP-69, Type 57.

2.3.6. Beam Clamps for Steel Beams and Joists: Double sided. Single-sided type is not acceptable.

2.3.7. Bushings for Floor-Mounted Equipment Anchors: Neoprene units designed for seismically rated rigid equipment mountings, and matched to the type and size of anchor bolts and studs used.

2.3.8. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for seismically rated rigid equipment mountings, and matched to the type and size of attachment devices used.

2.4. SEISMIC BRACING COMPONENTS

2.4.1. Slotted Steel Channel: 1-5/8-by-1-5/8-inch (41-by-41-mm) cross section, formed from 0.1046-inch- (2.7-mm-) thick steel, with 9/16-by-7/8-inch (14-by-22-mm) slots at a maximum of 2 inches (50 mm) o.c. in webs, and flange edges turned toward web.

2.4.1.a. Materials for Channel: ASTM A 570, GR 33.


2.4.1.c. Fittings and Accessories: Products of the same manufacturer as channels and designed for use with that product.

2.4.1.d. Finish: Stainless Steel.

2.4.2. Channel-Type Bracing Assemblies: Slotted steel channel, with adjustable hinged steel brackets and bolts.

2.4.3. Cable-Type Bracing Assemblies: Zinc-coated, high-strength steel wire rope cable attached to steel thimbles, brackets, and bolts designed for cable service.

2.4.3.a. Arrange units for attachment to the braced component at one end and to the structure at the other end.

2.4.3.b. Wire Rope Cable: Comply with ASTM 603. Use 49- or 133-strand cable with a minimum strength of 2 times the calculated maximum seismic force to be resisted.

2.4.4. Hanger Rod Stiffeners: Slotted steel channels with internally bolted connections to hanger rod.

PART 3 - EXECUTION

3.1. INSTALLATION

3.1.1. Install seismic restraints according to applicable codes and regulations and as approved by authorities having jurisdiction, unless more stringent requirements are indicated.
3.2.  STRUCTURAL ATTACHMENTS

3.2.1. Use bolted connections with steel brackets, slotted channel, and slotted-channel fittings to spread structural loads and reduce stresses.

3.2.2. Attachments to New Concrete: Bolt to channel-type concrete inserts or use expansion anchors.

3.2.3. Attachments to Existing Concrete: Use expansion anchors.

3.2.4. Holes for Expansion Anchors in Concrete: Drill at locations and to depths that avoid reinforcing bars.

3.2.5. Attachments to Solid Concrete Masonry Unit Walls: Use expansion anchors.

3.2.6. Attachments to Hollow Walls: Bolt to slotted steel channels fastened to wall with expansion anchors.

3.2.7. Attachments to Wood Structural Members: Install bolts through members.

3.2.8. Attachments to Steel: Bolt to clamps on flanges of beams or on upper truss chords of bar joists.

3.3.  ELECTRICAL EQUIPMENT ANCHORAGE

3.3.1. Anchor rigidly to a single mobile structural element or to a concrete base that is structurally tied to a single mobile structural element.

3.3.2. Anchor panelboards, motor-control centers, motor controls, switchboards, transformers, fused power-circuit devices, transfer switches, communication system components, and electronic signal processing, control, and distribution units as follows:

3.3.2.a. Size concrete bases so expansion anchors will be a minimum of 10 bolt diameters from the edge of the concrete base.

3.3.2.b. Concrete Bases for Floor-Mounted Equipment: Use female expansion anchors and install studs and nuts after equipment is positioned.

3.3.2.c. Bushings for Floor-Mounted Equipment Anchors: Install to allow for resilient media between anchor bolt or stud and mounting hole in concrete.

3.3.2.d. Anchor Bolt Bushing Assemblies for Wall-Mounted Equipment: Install to allow for resilient media where equipment or equipment-mounting channels are attached to wall.

3.3.2.e. Torque bolts and nuts on studs to values recommended by equipment manufacturer.

3.4.  SEISMIC BRACING INSTALLATION

3.4.1. Install bracing according to spacings and strengths indicated by approved analysis.

3.4.2. Expansion and Contraction: Install to allow for thermal movement of braced components.

3.4.3. Cable Braces: Install with maximum cable slack recommended by manufacturer.

3.4.4. Attachment to Structure: If specific attachment is not indicated, anchor bracing to the structure at flanges of beams, upper truss chords of bar joists, or at concrete members.

3.5.  ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

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3.5.1. Make flexible connections in raceways, cables, and wireways where they cross expansion and seismic control joints, where adjacent sections or branches are supported by different structural elements, and where they terminate at electrical equipment anchored to a different mobile structural element from the one supporting them.

3.6. FIELD QUALITY CONTROL

3.6.1. Testing Agency: Engage a qualified testing agency to perform the following field quality-control testing:

3.6.1.1 Testing: Test pull-out resistance of seismic anchorage devices.

3.6.1.1.a Provide necessary test equipment required for reliable testing.

3.6.1.1.b Provide evidence of recent calibration of test equipment.

3.6.1.1.c Schedule test with Engineer, before connecting anchorage device to restrained component (unless post-connection testing has been approved), and with at least seven days' advance notice.

3.6.1.1.d Obtain Engineer's approval before transmitting test loads to the structure. Provide temporary load-spreading members.

3.6.1.1.e Test at least four of each type and size of installed anchors and fasteners selected by Engineer.

3.6.1.1.f Test to 90 percent of rated proof load of device.

3.6.1.1.g If a device fails the test, modify all installations of same type and retest until satisfactory results are achieved.

3.6.1.1.h Record test results and submit to Engineer.

END OF SECTION 16071
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SECTION 16080  ELECTRICAL TESTING

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

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

1.2. SUMMARY

1.2.1. This Section includes general requirements for electrical field testing and inspecting. Detailed requirements are specified in each Section containing components that require testing. General requirements include the following:

1.2.1.a. Qualifications of testing agencies and their personnel.
1.2.1.b. Suitability of test equipment.
1.2.1.c. Calibration of test instruments.
1.2.1.d. Coordination requirements for testing and inspecting.
1.2.1.e. Reporting requirements for testing and inspecting.

1.2.2. Allowances: Electrical tests and inspections specified in various Division 13 and 16 Sections are covered by a testing and inspecting allowance specified in Division 1 Section “Allowances.” See Division 1 Section “Allowances” for what is included in allowance amount, the amount of the allowance, payment procedures for allowance, changes to allowance amounts and disposition of unused portions of allowance.

1.3. QUALITY ASSURANCE

1.3.1. Testing Agency Qualifications: As specified in each Section containing electrical testing requirements and in subparagraph and associated subparagraph below.

1.3.1.a. Independent Testing Agencies: Independent of manufacturers, suppliers, and installers of components to be tested or inspected.

(1) Testing Agency’s Field Supervisor for Power Component Testing: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Division 16 power component Sections.

1.3.2. Test Equipment Suitability: Comply with NETA ATS, Section 5.2.

1.3.3. Test Equipment Calibration: Comply with NETA ATS, Section 5.3.

PART 2 - PRODUCTS – Not Applicable

PART 3 - EXECUTION

3.1. GENERAL TESTS AND INSPECTIONS

3.1.1. If a group of tests are specified to be performed by an independent testing agency, prepare systems, equipment, and components for tests and inspections, and perform preliminary tests to ensure that systems, equipment, and components are ready for independent agency testing. Include the following minimum preparations as appropriate:

Davis & Floyd, Inc.  16080 - 1  Black & Veatch, Corp.
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3.1.1.a. Perform insulation-resistance tests.

3.1.1.b. Perform continuity tests.

3.1.1.c. Perform rotation test (for motors to be tested).

3.1.1.d. Provide a stable source of single-phase, 208/120-V electrical power for test instrumentation at each test location.

3.1.2. Test and Inspection Reports: In addition to requirements specified elsewhere, report the following:

3.1.2.a. Manufacturer's written testing and inspecting instructions.

3.1.2.b. Calibration and adjustment settings of adjustable and interchangeable devices involved in tests.

3.1.2.c. Tabulation of expected measurement results made before measurements.

3.1.2.d. Tabulation of “as-found” and “as-left” measurement and observation results.

END OF SECTION 16080
## Conduit Specifications Sheet

<table>
<thead>
<tr>
<th>INSTALLATION SITUATION</th>
<th>CIRCUIT TYPE</th>
<th>APPROVED CONDUIT TYPES</th>
<th>INSTALLATION NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNDERGROUND DUCT BANKS</td>
<td>ALL</td>
<td>PVC, SCHEDULE 40</td>
<td>ENCASE IN CONCRETE, PROVIDE MARKER TAPE 1'-0&quot; ABOVE CONC. USE COAT RGS ELBOWS COAT RGS ELBOWS WITH BITUMASTIC PAINT BEFORE ENCASING IN CONCRETE.</td>
</tr>
<tr>
<td>UNDERGROUND CONDUITS</td>
<td>SECONDARY VOLTAGE</td>
<td>PVC, SCHEDULE 40</td>
<td>PROVIDE MARKER TAPE 1'-0&quot; ABOVE CONDUIT. USE COAT RGS ELBOWS WITH BITUMASTIC PAINT AND LET DRY BEFORE COVERING.</td>
</tr>
<tr>
<td>CONDUITS BELOW SLABS ON GRADE</td>
<td>ALL</td>
<td>PVC, SCHEDULE 40</td>
<td>USE LONG SWEEP ELBOWS FOR STUB-UPS EXCEPT WHEN ENTERING BOTTOM OF FLOOR MOUNTED MCC'S. WHERE RADIUS IS LIMITED, DRAWINGS SHOW PULLBOX FOR TRANSITION.</td>
</tr>
<tr>
<td>CONDUITS IN ELEVATED SLABS OR Poured CONCRETE WALLS</td>
<td>ALL</td>
<td>RSS</td>
<td>RSS</td>
</tr>
<tr>
<td>CONDUITS IN MASONRY WALLS</td>
<td>FEEDER CIRCUITS,</td>
<td>RSS</td>
<td>RSS</td>
</tr>
<tr>
<td>CONDUITS EXPOSED OUTDOORS OR IN WET LOCATIONS</td>
<td>ALL</td>
<td>RSS</td>
<td>RSS</td>
</tr>
<tr>
<td>CONDUITS EXPOSED IN PROCESS AREAS</td>
<td>ALL</td>
<td>RSS WITH SEAL OFF</td>
<td>EXPOSED CONDUITS ARE CONSIDERED IN A CLASS I, DIVISION 2 HAZARDOUS LOCATON.</td>
</tr>
<tr>
<td>CONDUITS IN HAZARDOUS LOCATIONS</td>
<td>ALL</td>
<td>RSS WITH SEAL OFF</td>
<td>EXPOSED CONDUITS ARE CONSIDERED IN A CLASS I, DIVISION 2 HAZARDOUS LOCATON.</td>
</tr>
<tr>
<td>CONDUITS EXPOSED IN DRY LOCATIONS</td>
<td>ALL</td>
<td>RSS</td>
<td>RSS</td>
</tr>
<tr>
<td>SEAL OFF COMPOUND</td>
<td>ALL</td>
<td>ALL</td>
<td>DO NOT APPLY WITHOUT ENGINEER'S FINAL WRITTEN PERMISSION OBTAINED BY CONTRACTOR UPON SATISFACTORY COMPLETION OF INSTALLATION AND CHECKOUT OF ALL CIRCUIT WIRING.</td>
</tr>
</tbody>
</table>

RSS - STAINLESS STEEL RIGID METAL CONDUIT
SECTION 16120  LOW VOLTAGE WIRES AND CABLES -0-600 VOLTS

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

1.1.1. Drawings and general provisions of Contract, including General and Supplementary Conditions, Division 1 and Section 16010, apply to this section.

1.2. DESCRIPTION OF WORK

1.2.1. Furnish and install all wires and cables for all electrical systems as shown on the drawings and herein specified.

1.2.2. RELATED WORK SPECIFIED ELSEWHERE:

   Section 16195  Electrical Identification

1.3. QUALITY ASSURANCE

1.3.1. STANDARDS:

   1.3.1.a. Where products are specified by naming one manufacturer supply the products so named. Refer to Section 16010, paragraph 2.2 for material substitutions.

   1.3.1.b. Wire and cable shall be of the letter type required by Table 310.104(A) of the NEC for each use and as indicated in Attachment "A".

   1.3.1.c. All wiring shall be in accordance with the sizes specified. If the contract documents indicate sizes larger than code requirements, the contract documents shall take precedence.

1.4. SUBMITTALS

1.4.1. SHOP DRAWINGS

   1.4.1.a. Refer to SECTION 16010 for General Requirements.

   1.4.1.b. For each type of wire and cable provide NEC type, manufacturer, catalog or type number, and catalog cut for each item. For cable assemblies provide manufacturer's technical data.

1.5. PRODUCT DELIVERY, STORAGE AND HANDLING

1.5.1. All wire and cable shall be new (manufactured within one year of bid date) and delivered to the site in original cartons of complete coils or reels.

1.5.2. All wire and cable shall be suitably protected against weather, moisture, or physical damage during storage and handling and shall be in good condition when installed.

PART 2 - PRODUCTS

2.1. WIRE AND CABLES

2.1.1. All conductors shall be copper, 98 percent minimum conductivity at 20°C, unless noted otherwise. Insulation levels shall be 90°C.
2.1.2. SPECIAL WIRE (POWER CABLELING) FOR DRIVES: Provide VFD rated cabling from the VFD output to the motor. See specification section 16120, Attachment "A" for more information. Provide manufacturer recommended termination kits.

2.2. COLOR CODING

2.2.1. Color coding shall be consistent throughout.

2.2.2. All power distribution conductors shall be color coded as follows:

<table>
<thead>
<tr>
<th>208Y/120 Volt 3Ø 4W*</th>
<th>480Y/277 Volt 3Ø 4W*</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Phase = black</td>
<td>A Phase = brown</td>
</tr>
<tr>
<td>B Phase = red</td>
<td>B Phase = orange</td>
</tr>
<tr>
<td>C Phase = blue</td>
<td>C Phase = yellow</td>
</tr>
<tr>
<td>Neutral = white</td>
<td>Neutral = gray</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>480 Volt Delta 3Ø 3W</th>
<th>240/120 Volt 1Ø 3W*</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Phase = brown</td>
<td>Ungrounded wire = black</td>
</tr>
<tr>
<td>B Phase = orange</td>
<td>Other ungrounded wire = red</td>
</tr>
<tr>
<td>C Phase = yellow</td>
<td>Neutral = white</td>
</tr>
</tbody>
</table>

* The neutrals of different systems must be distinguished from each other by using gray or a color line (other than green) along the white insulation.

All grounding conductors shall be green.

2.2.3. Grounding conductors are included in the cable wiring specified in 2.1.3.

2.2.4. Where alternate power sources are used (ex. standby generators) use a color stripe on all conductors to distinguish these from normal power.

2.2.5. CONTROL WIRE:

<table>
<thead>
<tr>
<th>120 VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>120V power - red</td>
</tr>
<tr>
<td>Common - white</td>
</tr>
<tr>
<td>Inputs - yellow</td>
</tr>
<tr>
<td>Outputs - black</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>24 VAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>24V Power - red/black</td>
</tr>
<tr>
<td>Common - white/black</td>
</tr>
<tr>
<td>Inputs - yellow/black</td>
</tr>
<tr>
<td>Outputs - black/yellow</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>24 VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 VDC [+/-] - blue</td>
</tr>
<tr>
<td>24 VDC [-] - white/blue</td>
</tr>
</tbody>
</table>

2.2.6. For wire sizes #8 AWG and smaller use color coded conductors. For wire sizes #6 AWG and larger phasing tape may be used. Mark conductors at all termination, junction and pull points.

2.3. WIRE CONNECTIONS AND TERMINATIONS

2.3.1 All wire, cable, terminations and associated hardware to be supplied and installed by this Contractor unless otherwise noted. Special connectors are required and specified for special load-side VFD cabling.
2.3.1.a. Contractor shall provide any special connectors, splice and termination kits, tapes and any other terminating accessories that may be required by the scope of this project.

2.3.2. Connections and Taps

2.3.2.a. 14 AWG thru 8 AWG, lighting and building power wiring:

(1) Electrical spring connectors shall be plated for corrosion protection. Uses pre-insulated connectors for each combination of wires, as recommended by manufacturer.

2.3.2.b. Control connections shall be made with nylon self-insulated compression-type locking fork tongue lugs.

2.3.2.c. Power connections, #6 AWG and larger, shall be made with tin plated copper compression connectors.

2.3.2.d. Where interlocked armored cable passes through top or bottom of motor terminal boxes or elsewhere, the armor must be terminated with an approved connector.

(1) Terminators shall be installed complete with insulated throat grounding type bushings.

2.3.2.e. Where multi-conductor non-armored cable passes through top or bottom of motor terminal boxes, or at other terminations, Crouse-Hinds Type CGFP or equal shall be provided.

PART 3 - EXECUTION

3.1. CABLE AND WIRE PULLING

3.1.1. Where mechanical assistance is used for pulling conductors, wire pulling compounds having inert qualities that do not harm the wire insulation or covering shall be applied to the conductors as they are pulled into raceways.

3.1.1.a. Interior of all raceways shall be free from grease, filings or foreign matter before conductors are pulled in.

3.1.1.b. Wires are to be pulled from reels. Provide a reel rack for holding reels.

3.1.2. Cable pulling forces shall not exceed the cable manufacturer's recommended maximum values. The cable manufacturer's recommended pulling and laying methods shall be followed.

3.1.3. As a minimum requirement, all wiring shall be installed in accordance with the latest edition of the National Electric Code.

3.1.4. Minimum bending radii for cables shall be in accordance with NEC requirements.

3.1.5. Motor and control wiring shall be continuous. On other circuits, conductors shall be continuous from outlet to outlet and no splices shall be made except in outlet or junction boxes. No splices shall be made in conduits.

3.1.6. Conduit and wire may not be shown on drawings, but circuit numbers have been shown on the drawings or on motor/equipment schedules or panel schedules. Provide wiring as required to provide a complete operation system with circuit numbers as indicated. Common neutrals shall not be used.

3.2. SPECIAL SYSTEM

3.2.1. INTRINSIC SAFE CIRCUITS (control and indication):

3.2.1.a. Intrinsic safe wires must be run in conduits which contain only these wires.
3.2.1.b. Routing of wires in panels must be a minimum of 2 inches from non-intrinsic wires or a physical barrier of grounded or non-conductive material must be installed between the two wiring systems.

3.3. TERMINATIONS

3.3.1. GENERAL:

3.3.1.a. All wires or cables that are shown on the Drawings for panels, field devices, motors, controllers, etc. shall be terminated by This Contractor unless specifically noted "Terminations to be done by Others".

3.3.1.b. All crimp-on and compression connections must be made with tools recommended by connector manufacturer.

3.3.1.c. Tighten electrical connectors and terminals, including screws and bolts, in accordance with manufacturer’s published torque tightening values. Where manufacturer’s torqueing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Std 486A.

3.3.2. TERMINATIONS:

3.3.2.a. Conductors shall be terminated with all strands intact.

3.3.2.b. When terminated at a pressure pad terminal, all strands (but not the insulation of a conductor) shall be within the pressure pad.

3.3.2.c. Terminations having lugs shall be used to connect motor leads to circuit wires, one (1) lug on motor lead and one (1) lug on circuit wires. Bolt the lugs together to complete the circuit. Insulate with vinyl plastic electrical tape.

(1) Factory assembled kits may also be used for motor terminations.

3.3.2.d. All spare wires shall be terminated at terminal strips provided by This Contractor if equipment terminal strips have no spare terminals unless otherwise indicated.

3.4. SPLICES AND TAPS:

3.4.1. Splice and tap connections for #6 AWG and larger shall be made with copper alloy split bolt or similar connectors manufactured for this purpose, with appropriate insulated cover.

3.4.2. Insulate wire and cable splices by taping with vinyl plastic electrical tape. Apply tape to the wire splices with the same tension that it has when it comes from the roll. The tape shall provide a uniform covering of at least four (4) layers, half-lapped in two (2) directions.

3.4.3. When requested, several splices shall be opened for the Engineer’s inspection.

3.5. INDUCTIVE HEATING

3.5.1. CONDUCTORS GROUPED TOGETHER:

3.5.1.a. Where conductors carrying alternating current are installed in metal enclosures or metal raceways, they shall be so arranged as to avoid heating the surrounding metal by induction. To accomplish this, all phase conductors and, where used, the neutral and all equipment grounding conductors shall be grouped together.

3.6. PHASING AND IDENTIFICATION OF CONDUCTORS

3.6.1. GENERAL:
3.6.1.a. Phases shall be established at all transformers, switchboard, motor control centers, feeders, switches and panelboards and marked in an approved manner, namely A, B, C as follows.

3.6.1.b. Front to back, or top to bottom, or left to right when facing the front of the equipment.

3.6.1.c. Refer to PART 2 - PRODUCTS, Section 2, - COLOR CODING, for feeder conductor phase identification.

3.6.1.d. Mark junction and pull boxes with source equipment designation and circuit number. Use a permanent engraved plastic label for boxes in exposed locations and a permanent ink marker for boxes which are concealed.

3.6.2. BRANCH CIRCUITS: Identify all branch circuits as to panel designation and circuit number. Refer to SECTION 16471 - PANELBOARDS for specific requirements at the panel.

3.6.3. CONTROL WIRING: Control conductor identification shall agree with the identification system shown on Drawings and wiring diagrams.

3.6.4. For wire, cable and conduit identification refer to SECTION 16195 - ELECTRICAL IDENTIFICATION.

3.7. CABLE VOLTAGE LEVEL SEPARATION

3.7.1. Power wiring shall be run in separate ducts or conduit from the signal wiring and where not specifically detailed on drawings, the minimum spacing between power and signal ducts or conduit shall be as follows:

3.7.1.a. Ferrous conduit:

<table>
<thead>
<tr>
<th>Power Feeders</th>
<th>480/240/120-Volt Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>2'-0&quot; minimum</td>
<td>6&quot; inches minimum</td>
</tr>
</tbody>
</table>

3.7.1.b. Plastic conduit:

<table>
<thead>
<tr>
<th>Power Feeders</th>
<th>480/240/120-Volt Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>4'-0&quot; minimum</td>
<td>2'-0&quot; minimum</td>
</tr>
</tbody>
</table>

3.7.1.c. Exceptions must be approved by the Engineer prior to installation.

3.8. ATTACHMENTS

Attachment A - Building and/or Process Wire

END OF SECTION 16120
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SECTION 16120
LOW VOLTAGE WIRE AND CABLES - 0 TO 600 VOLT CLASS
ATTACHMENT A - BUILDING AND/OR PROCESS WIRE

1. Minimum wire size shall be 12 AWG, except that 14 AWG may be used for control and signal circuits, unless indicated otherwise.

2. Control wiring shall be 600 VAC, 19 strand, soft drawn copper with flame retardant, heat-resistant thermoplastic insulation and an overall nylon jacket, or equivalent. Moisture resistant as required. Type THHN/THWN-2 or MTW where additional flexibility is required.

3. Power wiring #8 AWG and smaller shall be 600 VAC, 7 strand soft drawn copper, with flame retardant, heat-resistant thermoplastic insulation and overall nylon jacket, or equivalent, moisture resistant, type THWN-2. Cross-linked polymer insulation, type XHHW-2 may also be used.

4. Power wiring larger than #8 AWG shall be 600 VAC, seven (7) strand thru #2 AWG, 19 strand #1 AWG thru #4/0 AWG, 37 strand #250 kcmil thru #500 kcmil and 61 strand #600 kcmil and larger soft drawn copper with flame retardant, heat-resistant thermoplastic insulation and overall nylon jacket, type THWN-2. Cross-linked synthetic polymer insulation, type XHHW-2 may also be used.

5. Power wiring on the load side of variable frequency drives shall be type VFD Cable, XLPE, 2kV, shielded, copper cable as manufactured by Belden, Southwire, ServiceWire or approved equal. Cable and shield shall be terminated in accordance with manufacturer's instructions and applicable cable shield termination kits.

6. All wiring in high ambient temperature areas (boiler rooms, drying rooms, paper machine rooms, kitchens, etc.) shall have insulation rated for 90°C service.

7. Wiring in lighting fixture and in each final conduit run (flexible, EMT, or heavy wall) to lighting fixtures shall have insulation rated for 90°C service.

8. Flexible cord wiring for chain-suspended fixtures or pendant drop cords shall be thermostet insulated, with an oil-resistant outer covering, rated as Junior Hard Service. Type SJO.
   a. Where portable cord is required, it shall be Type SJO where the voltage between any two conductors does not exceed 300 volts.
   b. Where the voltage between conductors exceeds 300, but does not exceed 600 volts (and for all voltages of any portable cords in hazardous areas) the flexible cord shall be thermostet insulated, with an oil-resistant outer covering, rated as Hard Service. Type SO.

9. Refer to the drawings and/or conduit and cable schedules for sizes and number of conductors.
SECTION 16135  OUTLET, JUNCTION AND PULL BOXES

PART 1 -  GENERAL

1.1. RELATED DOCUMENTS

1.1.1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 and SECTION 16010, apply to work of this section.

1.2. DESCRIPTION OF WORK

1.2.1. Furnish and install outlet, junction and pull boxes as shown on the Drawings and herein specified.

1.3. QUALITY ASSURANCE

1.3.1. STANDARDS: Where products are specified by naming one manufacturer or vendor, supply the product so named or refer to SECTION 16010 paragraph 2.2 for Material Substitutions.

1.4. SUBMITTALS

1.4.1. SHOP DRAWINGS: Refer to SECTION 16010 paragraph 2.3 for General Requirements.

1.4.2. PRODUCT DATA: Submit list of products to be provided, including manufacturer and catalog number, along with manufacturer's catalog cuts for each product.

PART 2 -  PRODUCTS

2.1. GENERAL

2.1.1. Provide all outlet, junction and pull boxes as shown on drawings or as may be required for a complete electrical installation.

2.1.2. All conduit runs shall terminate in a cabinet, box or enclosure.

2.1.3. The size of all the box types shall be adequate for the number and size of conductors and provide accessibility for the removal of conductors when necessary.

2.1.4. All boxes shall be of the proper sizes and design for use as required per NEC 370.

2.1.5. All boxes shall be vapor-proof, weather-proof, or explosion-proof where required by applicable Codes or as shown on the drawings.

2.1.6. Where required, cover gaskets shall be of neoprene material.

2.1.7. Where boxes with concentric knockouts are used, provide grounding bushing and bonding jumpers per NEC 250.92(B) (2) through (B) (4).

2.2. OUTLET BOXES

2.2.1. In general, outlet boxes shall be:

2.2.1.a. Manufactured by Steel City, Raco, Appleton, Bowers or approved equal.

2.2.1.b. Constructed of 316 stainless steel.

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2.2.1.c. Sized as required by code and as specified herein.

2.2.1.d. Multi-gang boxes shall be provided for all devices adjacent to each other. Ganged sectional switch boxes are not acceptable.

2.2.2. Surface mounted device boxes in dry locations shall be the following pressed steel type:

2.2.2.a. Two-gang and single-gang: 4 inch square box with required raised cover. An outlet box may be a single gang “utility” type box at locations where not more than one (3/4”) conduit enters box.

2.2.2.b. Multi-gang: Solid gang switch boxes with covers similar to Steel City G Series, or equal.

2.2.2.c. In exterior, wet, process areas, mechanical rooms and areas subject to damage, outlet boxes shall be of stainless or aluminum construction with threaded hubs.

2.2.3. Flush mounted device boxes in masonry or concrete shall be the following types:

2.2.3.a. Single-gang, two-gang or multi-gang: 2-1/2 inch deep masonry boxes, Steel City type GW or equal.

2.2.4. Flush ceiling boxes in concrete shall be 4 inch octagon, 4 inch deep minimum size concrete boxes.

2.2.5. Provide fixture studs, mounting straps, hangers, etc., as required for proper installation.

2.2.6. Through-the-wall boxes are not permitted.

2.3. TERMINAL, JUNCTION AND PULL BOXES

2.3.1. Junction and pull boxes shall be of a size that provides ample pulling and splicing space and, when required, insulated cross-brackets to support feeder cables and circuit connectors.

2.3.2. Terminal boxes shall be sized as shown on the drawings or if not, sized of sufficient size to allow mounting of required terminal blocks ±50% spare. Along with conduit on top and bottom, along each side and vertically between terminal blocks.

2.3.3. The locations of terminal, pull and junction boxes, shown on the drawings, are approximate, confirm final location of each box with Owner/Engineer.

2.3.4. Generally, standard manufactured boxes shall be used.

2.3.5. Provide boxes of the NEMA type indicated or if not indicated, of a type suitable for the intended use and environment.

2.3.6. Junction boxes and pull boxes shall have screw on covers unless noted otherwise. Cover screws shall be brass or cadmium plated steel.

2.3.7. Terminal boxes shall have hinged latched covers unless noted otherwise.

2.3.8. Fabricated boxes shall be either stainless steel or aluminum as specified on the drawings, or as environmental conditions may dictate.

2.3.9. Stainless steel boxes shall be factory fabricated from 316 stainless sheet steel. Joints shall be Tungsten Inert Gas (TIG) welded. Welded joints shall then be brushed with a stainless steel brush.

2.3.10. Thickness of sheet metals shall be minimum of:
2.3.10.a. Boxes with maximum dimension of less than 18 inches - 14 gauge.

2.3.10.b. Boxes with maximum dimension of 18 to 30 inches - 12 gauge.

2.3.10.c. Boxes with maximum dimension over 30 inches - 10 gauge.

2.3.11. Boxes that are adjacent to panels and switch shall be painted to match.

2.3.12. In terminal, junction and pull boxes where power and shielded cables enter provide suitable barriers.

PART 3 - EXECUTION

3.1. GENERAL

3.1.1. Outlet boxes shall be installed as indicated on the drawings and rigidly mounted, plumb and level.

3.1.2. Boxes shall be carefully aligned so that the cover plates are on a line parallel to the finished ceiling, bottom chord or wall surfaces. For wall outlets, the edges of cover plates shall be true vertically and horizontally.

3.1.3. Outlets shall be cleared of all trash, dirt, and plaster before the installation of wires, wiring devices or cover plates. Plug open knockouts with suitable blanking devices. All outlets shall have covers installed prior to final inspection.

3.1.4. Install boxes and fasten them to the building structure independently of the conduits and wire which enter them. Provide bolts, rod hangers, brackets, or other methods that provide fixed, non-vibrating support.

3.1.5. Edges of flush boxes shall be flush with finished wall surfaces.

3.1.6. Supports shall be constructed of stainless steel hardware.

3.2. OUTLET BOXES

3.2.1. No back to back or through wall outlet boxes. Outlet boxes on opposite sides of wall shall be offset minimum 12 inches to prevent transfer of sound and maintain fire ratings. Boxes shall be offset to opposite sides of studs in partition walls.

3.2.2. Provide outlet box divider barriers between 480/277 volt and 208/120 volt devices.

3.2.3. Conduit terminations in boxes in dry areas shall be through punched or drilled holes with double locknut securing conduits.

3.2.4. Small junction boxes shall have factory stamped knockouts. Large boxes shall have holes cut with suitable knockout punch. The burning out of holes with gas torch is not to be permitted.

3.2.5. Conduit attachments to sheet steel boxes in exterior or other wet or process areas, shall be with threaded hubs similar to Appleton uniseal hubs Type HUB or Myers scru-tite hub.

3.2.6. Boxes in wet, dusty, or exterior areas shall be equipped with gasketed covers.

3.2.7. Fixture studs shall be provided in outlet boxes wherever necessary and shall be securely fastened to the boxes in an approved manner.
3.2.8. Device outlet boxes on steel columns shall be mounted in web of column using drilled holes and self-tapping screws.

3.3. TERMINAL, JUNCTION AND PULL BOXES

3.3.1. Boxes, panels and enclosures for electrical wire, cable and equipment shall be surface or flush mounted as indicated on the drawings, shall be set true and plumb, and shall be secured rigidly to building or supporting steel or masonry walls with approved attachment fittings.

3.3.2. Junction or pull boxes shall be installed at least 18 inches above floor surface, unless indicated otherwise on the drawings.

3.3.3. Terminal boxes less than 24” high shall be mounted 60” AFF to top of box and terminal boxes greater than 24” high shall be mounted 72” AFF to top of box, unless indicated otherwise.

3.3.4. Junction or pull boxes attached to vertical or horizontal surfaces in damp, exterior or process areas shall be offset from the surface from 1/2 to 1-5/8 inches.

3.3.5. Junction and pull boxes shall be installed with covers oriented to provide ready access to wiring and to minimize leakage of foreign materials past covers. All covers shall be in place and properly secured.

3.3.6. Covers of flush junction boxes shall be painted with wall and ceilings. If covers are not in place when contract painting is done, Contractor shall pay any additional costs incurred to have the painting contractor match the paint.

3.3.7. Junction and pull boxes of the surface-mounted type shall be so placed or equipped to prevent moisture or water from entering and accumulating within the enclosure.

3.3.8. Enclosures outdoors and other wet or process locations shall have threaded hubs similar to Appleton uniseal hubs type HUB or Myers scru-tite hub for all conduit entries and shall be waterproof. Conduits should enter enclosures from bottom or sides.

3.3.9. Scratches or areas of exposed basic metal shall be painted with a durable waterproof paint of such color to match the finish of box.

END OF SECTION 16135
SECTION 16140  WIRING DEVICES

PART 1 - GENERAL

1.1. RELATED DOCUMENTS

1.1.1. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, and Section 16010 apply to work of this section.

1.2. DESCRIPTION OF WORK

1.2.1. Furnish and install all wiring devices including switches, receptacles and boxes as shown on the drawings and herein specified.

1.3. QUALITY ASSURANCE

1.3.1. STANDARDS:

1.3.1.a. Where products are specified by naming one manufacturer or vendor, supply the product so named. Refer to Section 16010, paragraph 2.2 for material substitutions.

1.3.1.b. All material shall be listed and labeled by the Underwriter's Laboratories and shall comply with appropriate NEMA standards.

1.3.1.c. All devices shall be heavy duty specification grade at a minimum unless noted otherwise.

1.4. SUBMITTALS

1.4.1. SHOP DRAWINGS:

1.4.1.a. Refer to Section 16010, paragraph 2.3 for general submittal requirements.

1.4.1.b. Submit manufacturer's name, catalog no. and cut sheets for all products supplied under this section.

PART 2 - PRODUCTS

2.1. SWITCHES

2.1.1. GENERAL:

2.1.1.a. Provide wall switches at each location shown on the drawings or specified herein.

2.1.1.b. All wall switches shall be by the same manufacturer.

2.1.1.c. Refer to drawings for special switches that may be required.

2.2. TOGGLE LIGHT SWITCHES

2.2.1. SINGLE POLE SWITCHES: Flush tumbler type. 120/277 VAC, 20 amp. Hubbell 1221 Series, or approved equal. 3-way, 4-way and other toggle type switches shall be the same series. 30 Amp, DPST, SPDT or DPDT toggle switches shall be similar.

2.3. SPECIALTY SWITCHES

2.3.1. In all areas other than the electrical room provide toggle switches for hazardous area, basis of design: Crouse-Hinds EFS series or equal.
2.4. RECEPACIES

2.4.1. GENERAL:

2.4.1.a. Provide receptacles at each location shown on drawings or specified herein.

2.4.1.b. All receptacles of similar type shall be by the same manufacturer.

2.4.2. STANDARD RECEPACIES:

2.4.2.a. Duplex receptacles shall be 20A, 120 VAC heavy duty specification grade, Hubbell 5362 Series or approved equal. Single receptacles shall be of similar series.

2.4.2.b. Receptacles connected to emergency circuits shall be red in color.

2.4.2.c. Ground fault receptacles shall be 5mA rated with reset and test buttons, Hubbell GF5362 Series or approved equal.

2.4.3. SPECIAL RECEPACIES:

2.4.3.a. Locking receptacles or receptacles of different voltages, amperage or phase are identified on the drawings. Provide heavy duty specification grade receptacles of NEMA type specified or as required for voltage, amperage, phase and number of poles specified.

2.4.3.b. Where special receptacles are provided for equipment identified on the drawings or in the specifications. Provide a matching male cord cap for connection of the equipment.

2.5. PLATES AND COVERS

2.5.1. GENERAL: Provide plates and covers as required for switches, outlets, receptacles or devices.

2.5.2. FINISHED AREAS: Provide stainless steel plates in finished areas. Hubbell S Series or approved equal.

2.5.3. OUTDOOR, PROCESS OR WET LOCATIONS: Cast aluminum, with Teymac or approved equal hinged cover and gasket. Cover shall be construction so that when receptacle is mounted horizontally, cover can be completely closed while cords are plugged in.

2.5.4. SURFACE MOUNTED INDOOR DRY LOCATIONS:

2.5.4.a. Covers for surface sheet steel boxes shall be 316 stainless steel, Steel City RS Series, or equal.

2.5.4.b. Covers for FS type boxes shall be Appleton FSK Series, or equal.

PART 3 - EXECUTION

3.1. GENERAL

3.1.1. Contractor shall carefully check the drawings of all other trades to determine exact location and manner of installing electrical outlets and electrical connections.

3.1.2. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for wiring devices. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminal to comply with tightening torques specified in UL Standards 485A.

3.1.3. Mounting heights indicated by the plans and specifications may change for projects subject to the Americans with Disabilities Act, or state or local requirements based on ADA. Contractor shall
establish whether or not such requirements apply, and adjust mounting heights to comply with applicable requirements.

3.2. SWITCHES

3.2.1. Room light switches shall be installed on the strike side of the doors entering the area, with first switch located within 4 to 8 inches from jamb. Check architectural drawings to verify correct door swing.

3.2.1.a. If an intersecting wall interferes with switch installation as cited above, the devices shall be installed on the intersecting wall with the first switch located within 12 to 16 inches from the corner.

3.2.2. Mounting heights for switches shall be 3'-10" above finished floor to center of outlet, unless shown otherwise on drawings.

3.3. RECEPTACLES

3.3.1. All interior duplex receptacles shall be installed with the long dimension orientated vertical unless noted otherwise.

3.3.1.a. Duplex receptacles installed outside or in wet locations shall be installed with the long dimension orientated horizontal.

3.3.1.b. Orient ground blade at top of vertically mounted receptacles, and at the right of horizontally mounted devices.

3.3.2. All receptacles shall be grounding type with a positive ground connection to outlet box, in addition to the ground connection provided by the green equipment ground wire.

3.3.3. Receptacles shall be installed at the heights indicated on the drawings.

3.3.3.a. Where flush mounted receptacles are installed in block walls these dimensions may be adjusted slightly to match course lines.

3.4. DEVICE PLATES

3.4.1. Devices must be installed so when plates are mounted they are aligned horizontally and vertically with building structure.

3.4.2. All plates covering switches controlling items out of sight shall be engraved to properly identify item controlled.

3.5. ATTACHMENTS

None.

END OF SECTION 16140
PART 1 - GENERAL

1.1. RELATED DOCUMENTS

1.1.1. Drawings and General Provisions of Contract, including General and Supplementary Conditions, Division 1, and Section 16010 specification sections, apply to work of this section.

1.2. DESCRIPTION OF WORK

1.2.1. Furnish and install nameplates, labels, signs, tags, and stencils on electrical equipment and wiring as indicated by the drawings and herein specified.

1.3. QUALITY ASSURANCE

1.3.1. STANDARDS: Refer to Section 16010, paragraph 2.2 for material substitutions.

1.4. SUBMITTALS

1.4.1. SHOP DRAWINGS:

1.4.1.a. Refer to Section 16010, paragraph 2.3 for General Requirements.

1.4.1.b. Unless otherwise indicated by the Contract Documents, Shop Drawings are not required for material provided under this Section.

1.5. PRODUCT DELIVERY, STORAGE AND HANDLING

1.5.1. All materials shall be transported, stored and handled in a manner that will avoid damage or deformation.

1.5.2. Material shall be new and unused.

1.6. COORDINATION

1.6.1. When exact identification nomenclature is not given on the drawings, verify labeling with Owner or Engineer.

1.6.2.

PART 2 - PRODUCTS

2.1. LAMINATED PLASTIC NAMEPLATES

2.1.1. The following plastic nameplate type designations are used elsewhere in this specification and on the drawings. All shall be rigid laminated, three layer, black with white core, unless otherwise noted, engraving grade phenolic plastic.

2.1.1.a. Type "1" shall have 1/4 inch lettering on a 3/4 by approximately 2-1/2 inch nameplate.

2.1.1.b. Type "2" shall have 3/16 inch lettering on a 3/8 by approximately 1-1/4 inch nameplate.

2.1.1.c. Type "3" shall be a 3/4 inch x 3-1/2 inch nameplate. The first line shall be the panelboard number with 1/4 inch lettering, and the second line shall be "Fed from XXXXXX" with 3/16 inch lettering.
2.1.1.d. Type "4" nameplate to have white letters on red background. Nameplate to be 3" wide x 5" high with the following text: "WARNING 1/4" lettering and underscored, followed by:

"DO NOT CHANGE TRIP SETTING WITHOUT CONSULTING ELEC. ENGINEERING. IGNORING THE WARNING MAY CAUSE LIFE/PROPERTY DAMAGE WITH POTENTIAL LEGAL LIABILITY", lettering to be 5/32".

2.1.1.e. Type "5" shall have 1/4" lettering on a 1/2" x 1" nameplate.

2.1.2. Nameplates shall be securely attached to equipment with double back pressure sensitive tape.

2.2. STENCILLED LETTERING

2.2.1. Paint used shall be durable enamel and shall contrast in color to the background color of the equipment. Where exposed to harsh environments such as corrosive solvents, below grade, etc., the paint shall be compatible.

2.2.2. All lettering shall be 1" to 2" high machine lettered, unless space available dictates use of smaller lettering.

2.3. CONDUIT/CABLE TAGS

2.3.1. Conduit and cable tags shall be made of semi-rigid polyolefin and secured by tie wraps, Raychem type TMS-CM or approved equal. Markers shall be produced and installed per manufacturer's recommendations.

2.4. WIRE MARKERS

2.4.1. All wires shall be marked at all termination or splice points with permanent, heat-shrinkable, machine lettered identification markers, Raychem type TMS or approved equal. Markers shall be produced and installed per manufacturer's recommendations.

PART 3 - EXECUTION

3.1. Contractor shall provide identification for equipment installed under this Contract. All such equipment shall be clearly and permanently identified as indicated herein and as shown on the plans.

3.1.1. Temporary marking of devices utilizing felt tip pens, magic markers, etc. shall be just that and not permanent.

3.1.2. Abbreviations shall conform to standard acceptable abbreviations used by construction trades and shall be used sparingly and only when there can be absolutely no confusion as to the meaning or interpretation.

3.1.3. Locate identification signs, tags, stencils, etc. such that they are conspicuous as possible.

3.1.4. Signs, nameplates and directories shall indicate function and location as well as motor or equipment number shown on the electrical drawings.

3.1.5. Panelboard identification shall be as indicated on the electrical drawings, or panel schedules.

3.2. NAMEPLATES

3.2.1. Type "1" engraved plastic nameplates shall be securely attached to the following equipment:

3.2.1.a. Each panelboard. Marker to be located within unit where panels are open to the public.
3.2.1.b. Each item of service equipment.

3.2.1.c. Each feeder circuit breaker or disconnect switch.

3.2.1.d. Each motor starter.

3.2.1.e. Each separately mounted circuit breaker or safety switch.

3.2.1.f. Each separately mounted control contractor or relay.

3.2.1.g. Each time switch.

3.2.1.h. Any other equipment that requires identification as to function or use.

3.2.2. All electrical equipment that is dedicated part of an emergency power distribution system shall have labels with white letters on a red background.

3.2.3. Contractor shall provide and install Type "5" nameplate with circuit and panelboard identification numbers for all receptacles and special purpose outlets.

3.3. CONDUIT IDENTIFICATION

3.3.1. If conduit or cable numbers are indicated on the Electrical Drawings, install a permanent tag bearing number at each termination, where conduit or cable passes through wall or floor and every 100 feet for straight runs. If no conduit or cable numbers are shown, tag all feeders and motor circuits with from and to designation.

3.3.2. Conduits, pull-boxes and other raceways for circuits in excess of 600 volts, whether buried or above grade, shall be stenciled HIGH VOLTAGE with bright red paint on white background. Stencilling shall be approximately 25 percent of the circumference of the conduit prominent and readable from the logical point of access. Spacing between stencils shall not exceed 50 feet. Where conduits traverse walls, partitions and barriers the conduit shall be stenciled on each side.

3.4. WIRE IDENTIFICATION

3.4.1. All wires shall be permanently marked at all termination or splice points.

3.4.2. Identification of wires shall be as indicated on the drawings or as directed by Owner/Engineer. All lighting and power circuits shall indicate panel and circuit number.

3.4.3. All temporary control wire jumpers for check-out or temporary operation shall have a large red tag attached to each indicating it as a temporary jumper with the name of the person who installed it. Mark outside of panel or motor control center to indicate that a temporary jumper is installed. Remove all temporary jumpers prior to project completion.

3.5. UNDERGROUND ELECTRICAL LINE

3.5.1. During trench backfilling, for exterior underground power, signal, and communications lines, install a continuous underground plastic line marker, located directly above line at 6 to 8 inches below finished grade. Where multiple lines exceed 16 inches in width install multiple markers.

3.5.2. Marking tape shall be permanent, bright-colored, continuous-printed, plastic tape compounded for direct-burial service not less than 6 inches wide by 4 mils thick. Printed legend indicative of general type of underground line below.
3.6. Arc-Flash Warning Labeling

3.6.1 Provide self-adhesive labels in accordance with the NFPA 70E and the arc-flash analysis performed for this project.

END OF SECTION 16195
SECTION 16210 - SHORT-CIRCUIT STUDIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes a computer-based, fault-current study to determine the minimum interrupting capacity of circuit protective devices.

1.3 DEFINITIONS

A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed and salvaged, or removed and reinstalled. Existing to remain items shall remain functional throughout the construction period.

B. One-Line Diagram: A diagram that shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.

C. Power Systems Analysis Specialist: Professional engineer in charge of performing the study and documenting recommendations, licensed in the state where Project is located.

D. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion of the circuit from the system.

E. SCCR: Short-circuit current rating.

F. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.


1.4 ACTION SUBMITTALS

A. Product Data:
   1. Submit the following after the approval of system protective devices submittals. Submittals shall be in digital form.
      a. Short-circuit study input data, including completed computer program input data sheets.
      b. Short-circuit study and equipment evaluation report; signed, dated, and sealed by a qualified professional engineer.
1) Submit study report for action prior to receiving final approval of distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Architect for preliminary submittal of sufficient study data to ensure that selection of devices and associated characteristics is satisfactory.

2) Revised one-line diagram, reflecting field investigation results and results of short-circuit study.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data:
   1. For Power System Analysis Specialist.

B. Product Certificates: For short-circuit study software, certifying compliance with IEEE 399.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data:
   1. For overcurrent protective devices to include in emergency, operation, and maintenance manuals.
   2. The following are from the Short-Circuit Study Report:
      a. Final one-line diagram.
      b. Final Short-Circuit Study Report.
      c. Short-circuit study data files.
      d. Power system data.

1.7 QUALITY ASSURANCE

A. Manual calculations are unacceptable.

B. Power Systems Analysis Specialist Qualifications: Professional engineer licensed in the state where Project is located. All elements of the study shall be performed under the direct supervision and control of this professional engineer.

C. Short-Circuit Study Certification: Short-Circuit Study Report shall be signed and sealed by Power Systems Analysis Specialist.

PART 2 - PRODUCTS

2.1 POWER SYSTEM ANALYSIS SOFTWARE DEVELOPERS

A. SKM software shall be used for power system analysis. No other software is acceptable.

B. Comply with IEEE 399 and IEEE 551.
   1. Analytical features of power systems analysis software program shall have capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.
2.2 SHORT-CIRCUIT STUDY REPORT CONTENTS

A. Executive summary of study findings.

B. Study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpretation of results.

C. One-line diagram of modeled power system, showing the following:
   1. Protective device designations and ampere ratings.
   2. Conductor types, sizes, and lengths.
   3. Transformer kilovolt ampere (kVA) and voltage ratings.
   4. Motor and generator designations and kVA ratings.
   5. Switchboard, motor-control center, panelboard and disconnect designations and ratings.
   6. Derating factors and environmental conditions.
   7. Any revisions to electrical equipment required by the study.

D. Comments and recommendations for system improvements or revisions in a written document, separate from one-line diagram.

E. Protective Device Evaluation:
   1. Evaluate equipment and protective devices and compare to available short-circuit currents. Verify that equipment withstand ratings exceed available short-circuit current at equipment installation locations.
   2. Tabulations of circuit breaker, fuse, and other protective device ratings versus calculated short-circuit duties.
   3. For 600-V overcurrent protective devices, ensure that interrupting ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.
   4. For devices and equipment rated for asymmetrical fault current, apply multiplication factors listed in standards to 1/2-cycle symmetrical fault current.
   5. Verify adequacy of phase conductors at maximum three-phase bolted fault currents; verify adequacy of equipment grounding conductors and grounding electrode conductors at maximum ground-fault currents. Ensure that short-circuit withstand ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.

F. Short-Circuit Study Input Data:
   1. One-line diagram of system being studied.
   2. Power sources available.
   3. Manufacturer, model, and interrupting rating of protective devices.
   4. Conductors.
   5. Transformer data.

G. Short-Circuit Study Output Reports:
   1. Low-Voltage Fault Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:
      a. Voltage.
      b. Calculated fault-current magnitude and angle.
      c. Fault-point X/R ratio.
      d. Equivalent impedance.

   2. Momentary Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:
a. Voltage.
b. Calculated symmetrical fault-current magnitude and angle.
c. Fault-point X/R ratio.
d. Calculated asymmetrical fault currents:
   1) Based on fault-point X/R ratio.
   2) Based on calculated symmetrical value multiplied by 1.6.
   3) Based on calculated symmetrical value multiplied by 2.7.

3. Interrupting Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:
   a. Voltage.
   b. Calculated symmetrical fault-current magnitude and angle.
   c. Fault-point X/R ratio.
   d. No AC Decrement (NACD) ratio.
   e. Equivalent impedance.
   f. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a symmetrical basis.
   g. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a total basis.

PART 3 - EXECUTION

3.1 POWER SYSTEM DATA

A. Obtain all data necessary for conduct of the study.
   1. Verify completeness of data supplied on one-line diagram. Call any discrepancies to Architect’s attention.
   2. For equipment included as Work of this Project, use characteristics submitted under provisions of action submittals and information submittals for this Project.

B. Gather and tabulate the required input data to support the short-circuit study. Record data on a Record Document copy of one-line diagram. Comply with recommendations in IEEE 551 as to the amount of detail that is required to be acquired in the field. Field data gathering shall be under direct supervision and control of the engineer in charge of performing the study. Data include, but are not limited to, the following:
   1. Product Data for Project’s overcurrent protective devices involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
   2. Obtain electrical power utility impedance at the service.
   3. Power sources and ties.
   4. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.
   5. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip, SCCR, current rating, and breaker settings.
   6. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.
   7. Motor horsepower and NEMA MG 1 code letter designation.
   8. Conductor sizes, lengths, number, conductor material and conduit material (magnetic or nonmagnetic).
3.2 SHORT-CIRCUIT STUDY

A. Perform study following the general study procedures contained in IEEE 399.

B. Calculate short-circuit currents according to IEEE 551.

C. Base study on device characteristics supplied by device manufacturer.

D. Extent of electrical power system to be studied is indicated on Drawings.

E. Begin short-circuit current analysis at the service, extending down to system overcurrent protective devices as follows:
   
   1. To normal system low-voltage load buses where fault current is 10 kA or less.

F. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Study all cases of system-switching configurations and alternate operations that could result in maximum fault conditions.

G. Include the ac fault-current decay from induction motors, synchronous motors, and asynchronous generators and apply to low- and medium-voltage, three-phase ac systems. Also account for the fault-current dc decrement to address asymmetrical requirements of interrupting equipment.

H. Calculate short-circuit momentary and interrupting duties for a three-phase bolted fault and a single line-to-ground fault at each equipment indicated on one-line diagram.

   1. For grounded systems, provide a bolted line-to-ground fault-current study for areas as defined for the three-phase bolted fault short-circuit study.

I. Include in the report identification of any protective device applied outside its capacity.

END OF SECTION 16210
SECTION 16220 - COORDINATION STUDIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes computer-based, overcurrent protective device coordination studies to determine overcurrent protective devices and to determine overcurrent protective device settings for selective tripping.

1. Study results shall be used to determine coordination of series-rated devices.

1.3 DEFINITIONS

A. One-Line Diagram: A diagram that shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.

B. Power System Analysis Specialist: Professional engineer in charge of performing the study and documenting recommendations, licensed in the state where Project is located.

C. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion of the circuit from the system.

D. SCCR: Short-circuit current rating.

E. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.


1.4 ACTION SUBMITTALS

A. Product Data:

1. For computer software program to be used for studies.

2. Submit the following after the approval of system protective devices submittals. Submittals shall be in digital form.

a. Coordination-study input data, including completed computer program input data sheets.

b. Study and equipment evaluation reports.
3. Overcurrent protective device coordination study report; signed, dated, and sealed by a qualified professional engineer.
   a. Submit study report for action prior to receiving final approval of distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Architect for preliminary submittal of sufficient study data to ensure that selection of devices and associated characteristics is satisfactory.

1.5 INFORMATIONAL SUBMITTALS

   A. Qualification Data:
      1. For Power Systems Analysis Specialist.

   B. Product Certificates: For overcurrent protective device coordination study software, certifying compliance with IEEE 399.

1.6 CLOSEOUT SUBMITTALS

   A. Operation and Maintenance Data: For overcurrent protective devices to include in emergency, operation, and maintenance manuals.
      1. The following are from the Coordination Study Report:
         a. Final one-line diagram.
         b. Final protective device coordination study.
         c. Coordination study data files.
         d. List of all protective device settings.
         e. Time-current coordination curves.
         f. Power system data.

1.7 QUALITY ASSURANCE

   A. Studies shall be performed using commercially developed and distributed software designed specifically for power system analysis.

   B. Software algorithms shall comply with requirements of standards and guides specified in this Section.

   C. Manual calculations are unacceptable.

   D. Power Systems Analysis Specialist Qualifications: Professional engineer licensed in the state where Project is located. All elements of the study shall be performed under the direct supervision and control of this professional engineer.
PART 2 - PRODUCTS

2.1 POWER SYSTEM ANALYSIS SOFTWARE DEVELOPERS

A. SKM software shall be used for power system analysis. No other software is acceptable.

B. Comply with IEEE 242 and IEEE 399.

C. Analytical features of device coordination study computer software program shall have the capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

D. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output. Computer software program shall report device settings and ratings of all overcurrent protective devices and shall demonstrate selective coordination by computer-generated, time-current coordination plots.

1. Optional Features:
   a. Arcing faults.

2.2 COORDINATION STUDY REPORT CONTENTS

A. Executive summary of study findings.

B. Study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpretation of results.

C. One-line diagram of modeled power system, showing the following:
   1. Protective device designations and ampere ratings.
   2. Conductor types, sizes, and lengths.
   3. Transformer kilovolt ampere (kVA) and voltage ratings.
   4. Motor and generator designations and kVA ratings.
   5. Switchboard, motor-control center, panelboard, and disconnect designations.
   6. Any revisions to electrical equipment required by the study.
   7. Study Input Data: As described in "Power System Data" Article.

   a. Short-Circuit Study Output: As specified in "Short-Circuit Study Output Reports" Paragraph in "Short-Circuit Study Report Contents" Article in Section 16210 "Short-Circuit Studies."

D. Protective Device Coordination Study:

1. Report recommended settings of protective devices, ready to be applied in the field. Use manufacturer's data sheets for recording the recommended setting of overcurrent protective devices when available.

   a. Circuit Breakers:
      1) Adjustable pickups and time delays (long time, short time, and ground).
      2) Adjustable time-current characteristic.
      3) Adjustable instantaneous pickup.
4) Recommendations on improved trip systems, if applicable.

b. Fuses: Show current rating, voltage, and class.

E. Time-Current Coordination Curves: Determine settings of overcurrent protective devices to achieve selective coordination. Graphically illustrate that adequate time separation exists between devices installed in series, including power utility company’s upstream devices. Prepare separate sets of curves for the switching schemes and for emergency periods where the power source is local generation. Show the following information:

1. Device tag and title, one-line diagram with legend identifying the portion of the system covered.
2. Terminate device characteristic curves at a point reflecting maximum symmetrical or asymmetrical fault current to which the device is exposed.
3. Identify the device associated with each curve by manufacturer type, function, and, if applicable, tap, time delay, and instantaneous settings recommended.
4. Plot the following listed characteristic curves, as applicable:
   a. Power utility’s overcurrent protective device.
   b. Low-voltage equipment circuit-breaker trip devices, including manufacturer’s tolerance bands.
   c. Transformer full-load current, magnetizing inrush current, and ANSI through-fault protection curves.
   d. Cables and conductors damage curves.
   e. Ground-fault protective devices.
   f. Motor-starting characteristics and motor damage points.
   g. Generator short-circuit decrement curve and generator damage point.
   h. The largest feeder circuit breaker in each switchboard, motor-control center and panelboard.
5. Maintain selectivity for tripping currents caused by overloads.
6. Provide adequate time margins between device characteristics such that selective operation is achieved.
7. Comments and recommendations for system improvements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine Project overcurrent protective device submittals for compliance with electrical distribution system coordination requirements and other conditions affecting performance of the Work. Devices to be coordinated are indicated on Drawings.

1. Proceed with coordination study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved prior to coordination study may not be used in study.

3.2 POWER SYSTEM DATA

A. Obtain all data necessary for conduct of the overcurrent protective device study.

1. Verify completeness of data supplied in one-line diagram on Drawings. Call any discrepancies to Architect’s attention.
2. For equipment included as Work of this Project, use characteristics submitted under provisions of action submittals and information submittals for this Project.

B. Gather and tabulate all required input data to support the coordination study. List below is a guide. Comply with recommendations in IEEE 551 for the amount of detail required to be acquired in the field. Field data gathering shall be under direct supervision and control of the engineer in charge of performing the study. Data include, but are not limited to, the following:

1. Product Data for overcurrent protective devices specified in other Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
2. Electrical power utility impedance at the service.
3. Power sources and ties.
4. Short-circuit current at each system bus (three phase and line to ground).
5. Full-load current of all loads.
6. Voltage level at each bus.
7. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.
8. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip and available range of settings, SCCR, current rating, and breaker settings.
9. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.
10. For relays, provide manufacturer and model designation, current transformer ratios, potential transformer ratios, and relay settings.
11. Maximum demands from service meters.
12. Motor horsepower and NEMA MG 1 code letter designation.
13. Low-voltage cable sizes, lengths, number, conductor material, and conduit material (magnetic or nonmagnetic).
14. Data sheets to supplement electrical distribution system one-line diagram, cross-referenced with tag numbers on diagram, showing the following:
   a. Special load considerations, including starting inrush currents and frequent starting and stopping.
   b. Transformer characteristics, including primary protective device, magnetic inrush current, and overload capability.
   c. Motor full-load current, locked rotor current, service factor, starting time, type of start, and thermal-damage curve.
   d. Generator thermal-damage curve.
   e. Ratings, types, and settings of utility company's overcurrent protective devices.
   f. Special overcurrent protective device settings or types stipulated by utility company.
   g. Time-current-characteristic curves of devices indicated to be coordinated.
   h. Manufacturer, frame size, interrupting rating in amperes root mean square (rms) symmetrical, ampere or current sensor rating, long-time adjustment range, short-time adjustment range, and instantaneous adjustment range for circuit breakers.
   i. Manufacturer and type, ampere-tap adjustment range, time-delay adjustment range, instantaneous attachment adjustment range, and current transformer ratio for overcurrent relays.
   j. Switchboards, motor-control centers, panelboards, and disconnects ampacity, and SCCR in amperes rms symmetrical.
3.3 COORDINATION STUDY

A. Comply with IEEE 242 for calculating short-circuit currents and determining coordination time intervals.

B. Comply with IEEE 399 for general study procedures.

C. Base study on device characteristics supplied by device manufacturer.

D. Extent of electrical power system to be studied is indicated on Drawings.

E. Begin analysis at the service, extending down to system overcurrent protective devices as follows:

1. To normal system low-voltage load buses where fault current is 10 kA or less.

F. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Study all cases of system-switching configurations and alternate operations that could result in maximum fault conditions.

G. Transformer Primary Overcurrent Protective Devices:

1. Device shall not operate in response to the following:
   a. Inrush current when first energized.
   b. Self-cooled, full-load current or forced-air-cooled, full-load current, whichever is specified for that transformer.
   c. Permissible transformer overloads according to IEEE C57.96 if required by unusual loading or emergency conditions.

2. Device settings shall protect transformers according to IEEE C57.12.00, for fault currents.

H. Motor Protection:

1. Select protection for low-voltage motors according to IEEE 242 and NFPA 70.
2. Select protection for motors served at voltages more than 600 V according to IEEE 620.

I. Conductor Protection: Protect cables against damage from fault currents according to ICEA P-32-382, ICEA P-45-482, and protection recommendations in IEEE 242. Demonstrate that equipment withstands the maximum short-circuit current for a time equivalent to the tripping time of the primary relay protection or total clearing time of the fuse. To determine temperatures that damage insulation, use curves from cable manufacturers or from listed standards indicating conductor size and short-circuit current.

J. Generator Protection: Select protection according to manufacturer’s written instructions and to IEEE 242.

K. Include the ac fault-current decay from induction motors, and asynchronous generators and apply to low-voltage, three-phase ac systems. Also account for fault-current dc decrement, to address asymmetrical requirements of interrupting equipment.

L. Calculate short-circuit momentary and interrupting duties for a three-phase bolted fault and a single line-to-ground fault at each equipment indicated on one-line diagram.

1. For grounded systems, provide a bolted line-to-ground fault-current study for areas as defined for the three-phase bolted fault short-circuit study.
M. Protective Device Evaluation:

1. Evaluate equipment and protective devices and compare to short-circuit ratings.
2. Adequacy of switchboard, motor-control centers, and panelboard bus bars to withstand short-circuit stresses.
3. Include in the report identification of any protective device applied outside its capacity.

3.4 FIELD ADJUSTING

A. Adjust protective device settings according to recommended settings provided by the coordination study.

B. Make minor modifications to equipment as required to accomplish compliance with short-circuit and protective device coordination studies.

END OF SECTION 16220
SECTION 16230 - ARC-FLASH HAZARD ANALYSIS

PART 1 - GENERAL

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

1.2 SUMMARY
   A. Section includes a computer-based, arc-flash study to determine the arc-flash hazard distance
      and the incident energy to which personnel could be exposed during work on or near electrical
      equipment.

1.3 DEFINITIONS
   A. One-Line Diagram: A diagram that shows, by means of single lines and graphic symbols, the
      course of an electric circuit or system of circuits and the component devices or parts used
      therein.
   B. Power Systems Analysis Specialist: Professional engineer in charge of performing the study and
      documenting recommendations, licensed in the state where Project is located.
   C. Protective Device: A device that senses when an abnormal current flow exists and then removes
      the affected portion from the system.
   D. SCCR: Short-circuit current rating.
   E. Service: The conductors and equipment for delivering electric energy from the serving utility to
      the wiring system of the premises served.

1.4 ACTION SUBMITTALS
   A. Product Data: For computer software program to be used for studies.
   B. Study Submittals: Submit the following submittals after the approval of system protective
      devices submittals. Submittals shall be in digital form:
      1. Arc-flash study input data, including completed computer program input data sheets.
      2. Arc-flash study report; signed, dated, and sealed by Power Systems Analysis Specialist.
      3. Submit study report for action prior to receiving final approval of distribution equipment
         submittals. If formal completion of studies will cause delay in equipment manufacturing,
         obtain approval from Architect for preliminary submittal of sufficient study data to
         ensure that selection of devices and associated characteristics is satisfactory.
1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data:
   
   1. For Power System Analysis Specialist.

B. Product Certificates: For arc-flash hazard analysis software, certifying compliance with IEEE 1584 and NFPA 70E.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data:

   1. Provide maintenance procedures in equipment manuals according to requirements in NFPA 70E.

1.7 QUALITY ASSURANCE

A. Study shall be performed using commercially developed and distributed software designed specifically for power system analysis.

B. Software algorithms shall comply with requirements of standards and guides specified in this Section.

C. Manual calculations are unacceptable.

D. Power Systems Analysis Specialist Qualifications: Professional engineer in charge of performing the arc-flash study, analyzing the arc flash, and documenting recommendations, licensed in the state where Project is located. All elements of the study shall be performed under the direct supervision and control of this professional engineer.

E. Arc-Flash Study Certification: Arc-Flash Study Report shall be signed and sealed by Power Systems Analysis Specialist.

PART 2 - PRODUCTS

2.1 COMPUTER SOFTWARE DEVELOPERS

A. SKM software shall be used for arc-flash analysis. No other software is acceptable.

B. Comply with IEEE 1584 and NFPA 70E.

C. Analytical features of device coordination study computer software program shall have the capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

2.2 ARC-FLASH STUDY REPORT CONTENT

A. Executive summary of study findings.
B. Study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpretation of results.

C. One-line diagram, showing the following:

1. Protective device designations and ampere ratings.
2. Conductor types, sizes, and lengths.
3. Transformer kilovolt ampere (kVA) and voltage ratings, including derating factors and environmental conditions.
4. Motor and generator designations and kVA ratings.
5. Switchboard, motor-control center, panelboard and disconnect designations, and ratings.

D. Study Input Data: As described in "Power System Data" Article.

E. Short-Circuit Study Output Data: As specified in "Short-Circuit Study Output Reports" Paragraph in "Short-Circuit Study Report Contents" Article in Section 16210 "Short-Circuit Studies."

F. Protective Device Coordination Study Report Contents: As specified in "Coordination Study Report Contents" Article in Section 16210 "Coordination Studies."

G. Arc-Flash Study Output Reports:

1. Interrupting Duty Report: Three-phase and unbalanced fault calculations, showing the following for each equipment location included in the report:

   a. Voltage.
   b. Calculated symmetrical fault-current magnitude and angle.
   c. Fault-point X/R ratio.
   d. No AC Decrement (NACD) ratio.
   e. Equivalent impedance.
   f. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a symmetrical basis.
   g. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a total basis.

H. Incident Energy and Flash Protection Boundary Calculations:

1. Arcing fault magnitude.
2. Protective device clearing time.
3. Duration of arc.
5. Restricted approach boundary.
7. Working distance.
8. Incident energy.

I. Fault study input data, case descriptions, and fault-current calculations including a definition of terms and guide for interpretation of computer printout.

2.3 ARC-FLASH WARNING LABELS

A. Produce a 3.5-by-5-inch self-adhesive equipment label for each work location included in the analysis.
B. Label shall have an orange header with the wording, "WARNING, ARC-FLASH HAZARD," and shall include the following information taken directly from the arc-flash hazard analysis:

1. Location designation.
2. Nominal voltage.
3. Protection boundaries.
   a. Arc-flash boundary.
   b. Restricted approach boundary.
   c. Limited approach boundary.
4. Arc flash PPE category.
5. Required minimum arc rating of PPE in Cal/cm squared.
6. Available incident energy.
7. Working distance.
8. Engineering report number, revision number, and issue date.

C. Labels shall be machine printed, with no field-applied markings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine Project overcurrent protective device submittals. Proceed with arc-flash study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved prior to arc-flash study may not be used in study.

3.2 ARC-FLASH HAZARD ANALYSIS

A. Comply with NFPA 70E and its Annex D for hazard analysis study.

B. Preparatory Studies: Perform the Short-Circuit and Protective Device Coordination studies prior to starting the Arc-Flash Hazard Analysis.

2. Coordination Study Report Contents: As specified in "Coordination Study Report Contents" Article in Section 16220 "Coordination Studies."

C. Calculate maximum and minimum contributions of fault-current size.

1. Maximum calculation shall assume a maximum contribution from the utility and shall assume motors to be operating under full-load conditions.
2. Calculate arc-flash energy at 85 percent of maximum short-circuit current according to IEEE 1584 recommendations.
3. Calculate arc-flash energy at 38 percent of maximum short-circuit current according to NFPA 70E recommendations.
4. Calculate arc-flash energy with the utility contribution at a minimum and assume no motor contribution.
D. Calculate the arc-flash protection boundary and incident energy at locations in electrical distribution system including the switchboard, motor control center, panelboards, dry-type transformers, and disconnects.

E. Calculate the limited, restricted, and prohibited approach boundaries for each location.

F. Incident energy calculations shall consider the accumulation of energy over time when performing arc-flash calculations on buses with multiple sources. Iterative calculations shall take into account the changing current contributions, as the sources are interrupted or decremented with time. Fault contribution from motors and generators shall be decremented as follows:

1. Fault contribution from induction motors shall not be considered beyond three to five cycles.
2. Fault contribution from generators shall be decayed to match the actual decrement of each as closely as possible (for example, contributions from permanent magnet generators will typically decay from 10 per unit to three per unit after 10 cycles).

G. Arc-flash energy shall generally be reported for the maximum of line or load side of a circuit breaker. However, arc-flash computation shall be performed and reported for both line and load side of a circuit breaker as follows:

1. When the circuit breaker is in a separate enclosure.
2. When the line terminals of the circuit breaker are separate from the work location.

H. Base arc-flash calculations on actual overcurrent protective device clearing time. Cap maximum clearing time at two seconds based on IEEE 1584, Section B.1.2.

3.3 POWER SYSTEM DATA

A. Obtain all data necessary for conduct of the arc-flash hazard analysis.

1. Verify completeness of data supplied on one-line diagram on Drawings and under "Preparatory Studies" Paragraph in "Arc-Flash Hazard Analysis" Article. Call discrepancies to Architect's attention.
2. For new equipment, use characteristics from approved submittals under provisions of action submittals and information submittals for this Project.
3. For existing equipment, whether or not relocated, obtain required electrical distribution system data by field investigation and surveys conducted by qualified technicians and engineers.

B. Electrical Survey Data: Gather and tabulate the following input data to support study. Comply with recommendations in IEEE 1584 and NFPA 70E as to the amount of detail that is required to be acquired in the field. Field data gathering shall be under the direct supervision and control of the engineer in charge of performing the study. Data include, but are not limited to, the following:

1. Product Data for overcurrent protective devices specified in other Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
2. Obtain electrical power utility impedance or available short circuit current at the service.
3. Power sources and ties.
4. Short-circuit current at each system bus (three phase and line to ground).
5. Full-load current of all loads.
6. Voltage level at each bus.
7. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.
8. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip and available range of settings, SCCR, current rating, and breaker settings.
9. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.
10. Motor horsepower and NEMA MG 1 code letter designation.
11. Low-voltage conductor sizes, lengths, number, conductor material and conduit material (magnetic or nonmagnetic).

3.4 LABELING

A. Apply one arc-flash label on the front cover of each section of the equipment for each equipment included in the study. Base arc-flash label data on highest values calculated at each location.

B. Each piece of equipment listed below shall have an arc-flash label applied to it:

1. Motor-control center.
2. Low-voltage switchboard.
3. Low voltage transformers.
4. Panelboard and safety switch.
5. Control panel.

C. Note on record Drawings the location of equipment where the personnel could be exposed to arc-flash hazard during their work.

1. Indicate arc-flash energy.
2. Indicate protection level required.

3.5 APPLICATION OF WARNING LABELS

A. Install arc-flash warning labels under the direct supervision and control of Power System Analysis Specialist.

3.6 DEMONSTRATION

A. Engage Power Systems Analysis Specialist to train Owner's maintenance personnel in potential arc-flash hazards associated with working on energized equipment and the significance of arc-flash warning labels.

END OF SECTION 16230
SECTION 16443  MOTOR-CONTROL CENTERS

PART 1 - GENERAL

1.1. RELATED DOCUMENTS: Drawings and General Provisions of Contract, including General and Supplementary Conditions, Division I Specification Section and Section 16010, apply to work in this Section.

1.2. SUMMARY: This Section includes motor-control centers for use on ac circuits rated 600 V and less.

1.3. SUBMITTALS

1.3.1. Product Data: For each type of controller and each type of motor-control center. Include dimensions and manufacturer's technical data on features, performance, electrical characteristics, ratings, and finishes.

1.3.2. Shop Drawings: Provide shop drawings showing horizontal and vertical bus, top cable entrance window, motor starter function and control details including reversing, H-O-A switches, etc.

1.4. PROJECT CONDITIONS: Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated.

1.4.1. Notify Architect at least seven days in advance of proposed utility interruptions. Identify extent and duration of utility interruptions.

1.4.2. Do not proceed with utility interruptions without Architect's written permission.

1.5. COORDINATION

1.5.1. Coordinate layout and installation of motor-control centers with other construction including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

1.5.2. Coordinate features of motor-control centers, installed units, and accessory devices with pilot devices and control circuits to which they connect.

1.5.3. Coordinate features, accessories, and functions of each controller, and each installed unit with ratings and characteristics of supply circuit, motor, required control sequence, and duty cycle of motor and load.

PART 2 - PRODUCTS

2.1. MANUFACTURERS

2.1.1. Manufacturers: Subject to compliance with requirements, provide products by General Electric. Equivalent products by Siemens, Cutler Hammer and Square D are approved equal.

2.2. FUNCTIONAL FEATURES

2.2.1. Description: Modular arrangement of controllers, control devices, overcurrent protective devices, transformers, panelboards, instruments, indicating panels, blank panels, and other items mounted in compartments of motor-control center.
2.2.2. Controller Units: Combination controller units of types and with features, ratings, and circuit assignments indicated.

2.2.2.a. Install units with full-voltage, (and/or reversing) across-the-line, magnetic controllers on drawout mountings with connectors that automatically line up and connect with vertical-section buses while being racked into their normal, energized positions.

2.2.2.b. Provide units with short-circuit current ratings equal to or greater than short-circuit current rating of motor-control center section. Equipment shall be fully rated.

2.2.2.c. Equip units in Type B motor-control centers with pull-apart terminal strips or drawout terminal boards for external control connections.

2.2.3. Overcurrent Protective Devices: Individual feeder-tap units through 225-A rating shall have drawout mountings with connectors that automatically line up and connect with vertical-section buses while being racked into their normal, energized positions.

2.2.4. Spaces and Blank Units: Compartments fully bused and equipped with guide rails or equivalent, ready for insertion of drawout units.

2.2.5. Provide matching functions with existing similar motor controllers.

2.3. MAGNETIC MOTOR CONTROLLERS

2.3.1. Description: NEMA ICS 2, Class A, full voltage, non-reversing, across the line, unless otherwise indicated.

2.3.2. Control Circuit: 120 V; obtained from integral control power transformer with a control power transformer source of sufficient capacity to operate connected pilot, indicating and control devices, plus 100 percent spare capacity.


2.3.4. Adjustable Overload Relay: Dip switch selectable for motor running overload protection with NEMA ICS 2, Class 20 tripping characteristic, and selected to protect motor against voltage and current unbalance and single phasing. Provide relay with Class II ground-fault protection, with start and run delays to prevent nuisance trip on starting.

2.4 REDUCED-VOLTAGE SOLID STATE STARTERS

2.4.1 See Section 16478 SOLID STATE STARTERS for more information.

2.5. MOTOR-CONTROL CENTER ACCESSORIES

2.5.1. Devices shall be factory installed in controller enclosure, unless otherwise indicated.


2.5.3. Stop and Lockout Push-Button Station: Momentary-break, push-button station with a factory-applied hasp arranged so padlock can be used to lock push button in depressed position with control circuit open.

2.5.4. Control Relays: Auxiliary and adjustable time-delay relays.

2.5.5. Elapsed Time Meters: Heavy duty with digital readout in hours.
2.6. FACTORY FINISHES

2.6.1. Manufacturer's standard prime-coat finish ready for field painting.

2.6.2. Finish: Manufacturer's standard paint applied to factory-assembled and -tested controllers before shipping.

PART 3 - EXECUTION

3.5. EXAMINATION

3.5.1. Examine surfaces to receive motor-control centers for compliance with requirements, installation tolerances, and other conditions affecting performance.

3.5.2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.6. APPLICATIONS

3.6.1. Select features of each controller to coordinate with ratings and characteristics of supply circuit and motor; required control sequence; duty cycle of motor, drive, and load; and configuration of pilot device and control circuit affecting controller functions.

3.6.2. Select horsepower rating of controllers to suit motor controlled.

3.7. INSTALLATION

3.7.1. See Section 16010 "General Provisions - Electrical" for general installation instructions.

3.7.2. Anchor each motor-control center assembly to steel-channel sills arranged and sized according to manufacturer's written instructions. Attach by bolting. Level and grout sills flush with motor-control center mounting surface.

3.7.3. Install motor-control centers on concrete bases complying with Section 03300 "Cast-in-Place Concrete."

3.7.4. Comply with mounting and anchoring requirements specified in Section 16071 "Seismic Controls for Electrical Work."

3.7.5. Controller Fuses: Install fuses in each fusible switch. Comply with requirements in Section 16476 "Fuses."

3.8. IDENTIFICATION

3.8.1. Identify motor-control center, motor-control center components, and control wiring according to Section 16195 "ELECTRICAL IDENTIFICATION."

3.8.2. Operating Instructions: Frame printed operating instructions for motor-control centers, including control sequences and emergency procedures. Fabricate frame of finished metal and cover instructions with clear acrylic plastic. Mount on front of motor-control centers.

3.9. CONTROL WIRING INSTALLATION

3.9.1. Install wiring between motor-control devices according to Section 16120 "Low Voltage Wires and Cables – 0-600 Volts."

3.9.2. Bundle, train, and support wiring in enclosures.
3.9.3. Connect hand-off-automatic switch and other automatic-control devices where available.

3.9.3.a. Connect selector switches to bypass only manual- and automatic-control devices that have no safety functions when switch is in hand position.

3.9.3.b. Connect selector switches with motor-control circuit in both hand and automatic positions for safety-type control devices such as low- and high-pressure cutouts, high-temperature cutouts, and motor overload protectors.

3.9.4. Drawings depict typical control cabinet. Connect per cabinet actually received in accordance with manufacturer's requirements.

3.10. CONNECTIONS

3.10.1. Coordinate conduit installations and specialty arrangements with schematics on Drawings and with requirements specified. If Drawings are explicit enough, these requirements may be reduced or omitted.

3.10.2. Conduit installation requirements are specified in other Section 1612 “Raceways”. Drawings indicate general arrangement of conduit, fittings, and specialties.

3.10.3. Ground equipment.

3.10.4. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A.

3.11. FIELD QUALITY CONTROL

3.11.1. Prepare for acceptance tests as follows:

3.11.1.a. Test insulation resistance for each motor-control center element, bus, component, connecting supply, feeder, and control circuit.

3.11.1.b. Test continuity of each circuit.

3.11.2. Testing: Perform the following field quality-control testing with the assistance of a factory-authorized service representative.

3.11.2.a. Perform each electrical test and visual and mechanical inspection indicated in NETA ATS, Sections 7.5, 7.6, and 7.16. Tests indicated as “optional” are not required.

3.11.2.b. Certify compliance with test parameters.

3.11.2.c. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

3.11.3. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including pretesting and adjusting solid-state controllers.

3.11.4. Test Reports: Prepare a written report to record the following:

3.11.4.a. Test procedures used.

3.11.4.b. Test results that comply with requirements.
3.11.4.c. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.


3.13. CLEANING: Clean controllers internally, on completion of installation, according to manufacturer's written instructions. Vacuum dirt and debris; do not use compressed air to assist in cleaning.

3.14. STARTUP SERVICE


3.14.2. Verify that motor-control centers and components are installed and connected according to the Contract Documents.

3.14.3. Verify that electrical wiring installation complies with manufacturer's submittal and installation requirements in Division 16 Sections.

3.14.4. Complete installation and startup checks according to manufacturer's written instructions.

3.15. DEMONSTRATION: Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain motor-control centers.

3.15.1. Train Owner's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, and maintaining equipment and schedules.

3.15.2. Schedule training with Owner, through Architect, with at least seven days' advance notice.

END OF SECTION 16443
SECTION 16455    LIGHTNING PROTECTION FOR STRUCTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Include layouts of the lightning protection system, with details of the components to be used in the installation.
2. Include raceway locations needed for the installation of conductors.
3. Details of air terminals, ground rods, ground rings, conductor supports, splices, and terminations, including concealment requirements.
4. Include roof attachment details, coordinated with roof installation.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Lightning protection system Shop Drawings, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Lightning protection cabling attachments to roofing systems and accessories.
2. Lightning protection strike termination device attachment to roofing systems, coordinated with the roofing system manufacturer.
3. Lightning protection system components penetrating roofing and moisture protection systems and system components, coordinated with the roofing system manufacturer.

B. Qualification Data: For Installer.

C. Product Certificates: For each type of roof adhesive for attaching the roof-mounted air terminal assemblies, approved by the roofing-material manufacturer.

D. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For lightning protection system to include in maintenance manuals.

1. In addition to items specified in Section 01700 "Operation and Maintenance Data," include the following:
a. Dimensioned site plan showing dimensioned route of the ground loop conductor and the ground rod locations.
b. A system testing and inspection record, listing the results of inspections and ground resistance tests, as recommended by NFPA 780, Annex D.

B. Completion Certificate:
   1. LPI Master Certificate.

1.5 QUALITY ASSURANCE
A. Installer Qualifications: LPI Master Installer.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS
A. NFPA Lightning Protection Standard: Comply with NFPA 780 requirements for Class I buildings.
B. Lightning Protection Components, Devices, and Accessories: Listed and labeled by a qualified testing agency as complying with UL 96, and marked for intended location and application.

2.2 MATERIALS
A. Air Terminals:
   1. Stainless steel unless otherwise indicated.
   2. 1/2-inch diameter by 12 inches long.
   3. Rounded tip.
   4. Threaded base support.
B. Class I Main Conductors:
   1. Stranded Copper: 57,400 circular mils in diameter.
C. Secondary Conductors:
   1. Stranded Copper: 26,240 circular mils in diameter.
D. Ground Loop Conductor: Tinned copper.
E. Ground Rods:
   3. Rods shall be not less than 120 inches long.
F. Conductor Splices and Connectors: Compression fittings that are installed with hydraulically operated tools, or exothermic welds, approved for use with the class type.
PART 3 - EXECUTION

3.1 INSTALLATION

A. Install lightning protection components and systems according to NFPA 780.

B. Install conductors with direct paths from air terminals to ground connections. Avoid bends less than 90 degrees and 8 inches (203 mm) in radius and narrow loops.

C. Conceal conductors within normal view from exterior locations at grade within 200 feet (60 m) of building. Comply with requirements for concealed systems in NFPA 780.

   1. Roof penetrations required for down conductors and connections to structural-steel framework shall be made using listed through-roof fitting and connector assemblies with solid rods and appropriate roof flashings. Use materials approved by the roofing manufacturer for the purpose. Conform to the methods and materials required at roofing penetrations of the lightning protection components to ensure compatibility with the roofing specifications and warranty.

   2. Install conduit where necessary to comply with conductor concealment requirements.

   3. Air Terminals on Single-Ply Membrane Roofing: Comply with adhesive manufacturer’s written instructions.

3.2 CONNECTIONS

A. Aboveground concealed connections, and connections in earth or concrete, shall be done by exothermic welds.

B. Aboveground exposed connections shall be done using the following types of connectors, listed and labeled for the purpose: bolted connectors.

C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.

   1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.

   2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.

3.3 CORROSION PROTECTION

A. Do not combine materials that can form an electrolytic couple that will accelerate corrosion in the presence of moisture unless moisture is permanently excluded from junction of such materials.

B. Use conductors with protective coatings where conditions would cause deterioration or corrosion of conductors.
3.4 FIELD QUALITY CONTROL

A. Special Inspections: Engage a qualified special inspector to perform the following special inspections:
   1. Perform inspections to obtain an LPI certification.

B. Prepare test and inspection reports and certificates.

END OF SECTION 16455
PART 1 GENERAL

1.1 SCOPE: The Panels, Consoles and Appurtenances section covers the furnishing of panels, consoles, and appurtenances as indicated on the Drawings, and listed in the attached Equipment Schedules 17070-S01.

1.1.1 This section also describes requirements for panels furnished under other sections whose respective specification refers to this section. Panels furnished under other sections are not listed in the attached Equipment Schedules.

1.1.2 Control System: The Instrumentation and Control System section shall apply to all equipment furnished under the Panels, Consoles and Appurtenances section.

1.2 GENERAL: Equipment furnished and installed under this section shall be fabricated and assembled in full conformity with the Drawings, specifications, equipment schedules, engineering data, instructions, and recommendations of the equipment manufacturer, unless exceptions are noted by Engineer.

1.2.1 General Equipment Stipulations

1.2.1.1 The General Equipment Stipulations shall apply to all equipment and materials provided under this section. If requirements in this specification differ from those in the General Equipment Stipulations, the requirements specified herein shall take precedence.

1.2.2 Seismic Design Requirements

1.2.2.1 Seismic design requirements for products specified herein shall be as indicated in the Meteorological and Seismic Design Criteria section.

1.2.3 Drawings

1.2.3.1 General dimensions and arrangements are indicated on the attached equipment schedules. Control Systems Integrator shall be responsible for coordinating the console and enclosure sizes and arrangements to accommodate the equipment to be provided.

1.3 SUBMITTALS: Submittals shall be made as specified in Section 01300 – Submittals.

1.3.1 Contractor shall submit drawings showing both the interior and exterior layout of the proposed panel to include interior and exterior components, the local gauge panel, labels, HMI screen locations, and other pertinent information.

1.3.2 Contractor shall submit cut sheets and specifications for all components to be installed in, on, or as a part of the panel(s).

PART 2 PRODUCTS

2.1 PANEL DESIGN AND FABRICATION FEATURES: All panels furnished shall conform to the stipulations of NEMA ICS-6-1993 (R2001, R2006). Unless indicated otherwise on the Drawings, the following paragraphs describe general fabrication specifications for the PLC cabinets, instrument panels, consoles, enclosures, and subpanels.
2.1.1 Piping: Pneumatic tubing shall be 1/4-inch OD, soft annealed copper with compression fittings. Tubing and fittings shall be as specified in the Miscellaneous Piping section.

2.1.1.1 Fittings
a) Compression type bulkhead fittings shall be provided near the bottom or the top of the panel for all field connections. Compression nuts and sleeves shall be provided for the field connections. Indicators, recorders, controllers, and other pneumatic devices shall be provided with plugged test connections and shutoff valves for isolation.

2.1.1.2 Valves
a) All devices shall have separate air supply shutoff valves. Valves and compression fittings shall be as manufactured by Nupro, Parker Hannifin, Swagelock, Tylor, or Whitey.

2.1.2 Power Entrance
2.1.2.1 The power entrance to each panel shall be provided with a surge protection device. Refer to the Instrumentation and Controls section for surge suppression requirements.

2.1.3 Power Wiring
2.1.3.1 Power distribution wiring on the line side of panel fuses shall be minimum 12 AWG. Secondary power distribution wiring shall be minimum 14 AWG. Wiring for ac power distribution, dc power distribution, intrinsically safe, and control circuits shall have different colors and shall agree with the color-coding legend on Control Systems Integrator's panel wiring diagrams. With the exception of electronic circuits, all interconnecting wiring and wiring to terminals for external connection shall be stranded copper, insulated for not less than 600 volts, with a moisture resistant and flame retardant covering rated for not less than 90°C. All wiring shall be done in accordance with NFPA 79 and NEC 2008.

2.1.4 Instrument and Control Wiring
2.1.4.1 All internal panel wiring shall be type MTW stranded copper wiring rated not less than 600 volts. Electronic analog circuits shall be twisted and shielded pairs rated not less than 300 volts. Analog circuits shall be separated from ac power circuits. Intrinsically safe circuits shall be physically separated from other circuits in accordance with applicable codes. Wires within the panel shall conform to the minimum size as shown in Table 1 below.

<table>
<thead>
<tr>
<th>Type</th>
<th>Min. Wire Size</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC Control</td>
<td>16 AWG</td>
<td>Red</td>
</tr>
<tr>
<td>DC Control</td>
<td>16 AWG</td>
<td>Blue</td>
</tr>
<tr>
<td>Analog Circuits</td>
<td>18 AWG Twisted Pair</td>
<td>White &amp; Black</td>
</tr>
</tbody>
</table>

2.1.5 All wiring shall be grouped or cabled and firmly supported inside the panel. Each individual wire in power, control, and instrumentation circuits shall be provided with identification markers at each point of termination. The wire markers shall be positioned to be readily visible for inspection and the
identification numbers shall match the identification on the supplier's panel wiring drawings. Wiring shall be bundled in groups and bound with nylon cable ties or routed in Panduit or similar nonmetallic slotted ducts. Ducts shall be readily accessible within the panel, with removable covers, and with space equal to at least 40 percent of the depth of the duct remaining available for future use after completion of installation and field wiring. Sufficient space shall be provided between cable groups or ducts and terminal blocks for easy installation or removal of cables. Wireducts shall not exceed 60% wire fill, including field wires. All wiring shall be done in accordance with NFPA 79 and NEC 2008.

2.1.6 Terminal Blocks

2.1.6.1 Terminal blocks for external connections shall be suitable for 12 AWG wire and shall be rated 30 amperes at not less than 300 volts. Terminal blocks shall be fabricated complete with marking strip, covers, and pressure connectors. Terminals shall be labeled to agree with identification shown on the supplier's submittal drawings. A terminal shall be provided for each conductor of external circuits, plus one ground for each shielded cable. Not less than 8 inches of clearance shall be provided between the terminal strips and the base of vertical panels for conduit and wiring space. Not less than 25 percent spare terminals shall be provided. Each control loop or system shall be individually fused, and all fuses or circuit breakers shall be clearly labeled and located for easy maintenance.

2.1.7 Backup Power

2.1.7.1 Power supply to the panels shall be from electrical sources shown on the Drawings, which may be backed by redundant utility feeds, engine generators, or externally mounted uninterruptible power supplies (UPSs) specified in other sections.

a) Where indicated free-standing vertical panels and wall cabinets shall each be provided with an interior-mounted UPS to provide backup power to critical loads upon loss of power supply to the panel. UPS-backed power shall be provided to the programmable logic controller CPU, instrument loops, I/O modules (operating and wetting voltages), all network communications devices, and any other load essential to preventing loss of control system function. Backup power for panel interior lights, heaters, and convenience receptacles is not required. UPSs for free-standing vertical panels and wall cabinets shall meet the requirements specified below.

2.1.8 UPS for Free-Standing Vertical Panels and Wall Cabinets

2.1.8.1 Each UPS shall accept incoming 120 volts AC, 60Hz, single-phase utility power, apply surge protection, and supply power to the connected loads.

2.1.8.2 The UPS shall be a double-conversion ("on-line") type to provide a breakless transfer to backup power. In the event of incoming power failure, the UPS shall provide 120 volts AC, 60 Hz, single-phase power to its connected loads by inverting power stored within integral storage batteries.
2.1.8.3 The UPS shall be contained inside the enclosure and supported by a dedicated shelf attached to the backplane or sidewall. The shelf shall be between 12 and 18 inches from the bottom of the enclosure and shall not be directly above any electronic or electromechanical devices.

2.1.8.4 The UPS shall have at least two integral NEMA 5-15R receptacles for connection of battery-backed loads.

2.1.8.5 Upon restoration of incoming power, the UPS shall recharge the batteries and return its connected loads to the incoming power source.

2.1.8.6 The factory-installed line cord and plug shall not be altered. The UPS output shall be connected by plug and line cord to terminal blocks as necessary to distribute power to loads not having a power cord and plug; all other loads shall be connected directly to the UPS’s integral receptacles or to permanently installed receptacles fed from the UPS output.

2.1.8.7 The UPS shall maintain a temperature-compensated, float charge voltage on the batteries when utility power is available. Overcurrent protection when utility power is available shall be from a circuit breaker internal to the UPS. The UPS shall be intrinsically current-limiting when the unit is on battery.

2.1.8.8 The UPS shall meet the performance requirements identified in Table 2.

<table>
<thead>
<tr>
<th>Specification or Condition</th>
<th>Required Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity (Minimum)</td>
<td>1000 VA / 700 watts</td>
</tr>
<tr>
<td>Filtering and Surge Protection (on utility power)</td>
<td>Meets IEEE/ANSI C62.41 Category B (IEEE 587)</td>
</tr>
<tr>
<td>Voltage output (on battery)</td>
<td>120 volts ±3 percent</td>
</tr>
<tr>
<td>Voltage output (on-line)</td>
<td>Nominal ±5 percent</td>
</tr>
<tr>
<td>Frequency and waveform Output (on battery)</td>
<td>60 ±0.3 Hz, true sine-wave</td>
</tr>
<tr>
<td>Efficiency (minimum, on-line)</td>
<td>90 percent</td>
</tr>
<tr>
<td>Operating environment</td>
<td>0 to 40°C; 0 to 95 percent relative humidity, non-condensing</td>
</tr>
<tr>
<td>Backup time (minimum, at half of rated load)</td>
<td>10 minutes</td>
</tr>
<tr>
<td>Recharge time to 90 percent of full charge (maximum)</td>
<td>12 hours</td>
</tr>
</tbody>
</table>

2.1.8.9 The UPS shall have spare capacity of at least 30 percent based on actual connected loads. The Control Systems Integrator shall advise the Engineer if the UPS capacity needs to be higher than specified above to meet this requirement.

2.1.8.10 The UPS shall have a visual status indicator for low (or faulty) battery and incoming ac power failure. The UPS shall emit an audible signal when the UPS is operating on battery power. A relay shall be installed within the panel and its coil connected across the UPS input power as a means of providing a contact for remote indication of a power failure condition.

2.1.8.11 The UPS shall be furnished with an Ethernet network card with RJ-45 connector for communicating status and alarm conditions to the Instrumentation and Control System HMI.
shall be via 10/100-BaseT Ethernet and shall use HTTP, SMTP, SNMP, Modbus TCP, or other protocol as necessary to transfer the information into the HMI database for display and alarming. Special software or drivers necessary to complete the communications link shall be furnished with the UPS systems. One copy of any special software or drivers necessary to allow monitoring over the network shall be provided for all UPSs furnished under this section.

2.1.8.12 Batteries shall be sealed maintenance-free, gelled electrolyte lead-acid, or valve-regulated, maintenance-free, lead-acid. Flooded-electrolyte type batteries will not be acceptable.

2.1.8.13 The UPS shall be APC “Smart-UPS”, Vertiv/Liebert “GXT4”, Toshiba “1000 Series”, or equal.

2.1.9 Rack-Mounted Uninterruptible Power Supply (UPS)

2.1.9.1 Not Used.

2.1.10 Device Tag Numbering System

2.1.10.1 All devices shall be provided with permanent identification tags. The tag numbers shall agree with the Instrument Device Schedule and with the supplier's equipment drawings. All field-mounted transmitters and devices shall have stamped stainless steel identification tags. Panel, subpanel, and rack-mounted devices shall have laminated phenolic identification tags securely fastened to the device. Hand-lettered labels or tape labels will not be permitted.

2.1.11 Nameplates

2.1.11.1 Nameplates shall be provided on the face of the panel or on the individual device. Panel nameplates shall have legends and approximate dimensions as indicated on the Drawings and shall be made of laminated phenolic material having engraved letters approximately 3/16 inch high extending through the black face into the white layer. Nameplates shall be secured firmly to the panel. Panel face nameplates do not replace the requirement for device identification tags as specified under the Device Tag Numbering System paragraph.
2.1.12 Panel Front Mounted Visual Indicating Light Color Designations

2.1.12.1 Indicating lights shall be colored as specified in Table 3 unless indicated otherwise on the Drawings, in other specification sections, or in the instrument device schedule.

2.1.12.2 Light sizes shall be as indicated in Table 5.

2.1.12.3 Where so indicated in Table 3 light types shall be either constant LED (CON) on/off or LED strobe (STR).

2.1.12.4 Indicating lights shall be LED and shall be of sufficient brightness to be visible in direct sunlight.

2.1.12.5 Indicating lights shall be rated to NEMA 4X.

<table>
<thead>
<tr>
<th>Color</th>
<th>Meaning</th>
<th>Light Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green (GN)</td>
<td>Associated equipment or device is &quot;running,&quot; &quot;open,&quot; or is in an &quot;unsafe&quot; state or position</td>
<td>CON</td>
</tr>
<tr>
<td>Red (RD)</td>
<td>Associated equipment or device is &quot;stopped,&quot; &quot;closed,&quot; or is in a &quot;safe&quot; state or position</td>
<td>CON</td>
</tr>
<tr>
<td>Yellow (YL)</td>
<td>Associated equipment or device has a process alarm &quot;imminent or present.&quot;</td>
<td>CON</td>
</tr>
<tr>
<td>Amber (AM)</td>
<td>Associated equipment has &quot;failed.&quot;</td>
<td>CON</td>
</tr>
<tr>
<td>White (WT)</td>
<td>All other conditions not defined above.</td>
<td>CON</td>
</tr>
</tbody>
</table>

2.1.13 Panel Top Mounted Visual Indicating Light Color Designations

2.1.13.1 Each panel shall be equipped with a five-color top mounted light stack which will annunciate the state of each machine train package (MTP). Colors and light types shall be as specified in Table 4.

2.1.13.2 Where so indicated in Table 4 light types shall be either constant LED (CON) on/off or LED strobe (STR).

2.1.13.3 Stack lights (both constant (CON) (on/off) and strobe (STR)) shall be of sufficient brightness to be visible in direct sunlight.

2.1.13.4 Stack lights shall be rated to NEMA 4X.

<table>
<thead>
<tr>
<th>Color</th>
<th>Meaning</th>
<th>Light Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green (GN)</td>
<td>Associated equipment or device is &quot;running,&quot; &quot;open,&quot; or is in an &quot;unsafe&quot; state or position</td>
<td>CON</td>
</tr>
<tr>
<td>Red (RD)</td>
<td>Associated equipment or device is &quot;stopped,&quot; &quot;closed,&quot; or is in a &quot;safe&quot; state or position</td>
<td>CON</td>
</tr>
<tr>
<td>Yellow (YL)</td>
<td>Associated equipment or device has a process alarm &quot;imminent or present.&quot;</td>
<td>STR</td>
</tr>
<tr>
<td>Amber (AM)</td>
<td>Associated equipment has &quot;failed.&quot;</td>
<td>STR</td>
</tr>
<tr>
<td>White (WT)</td>
<td>All other conditions not defined above.</td>
<td>STR</td>
</tr>
</tbody>
</table>

2.1.14 Coatings

2.1.14.1 Interior and exterior surfaces of all carbon-steel panels shall be thoroughly cleaned and coated with rust inhibitive (universal) primer. The panel interior shall be coated white with the manufacturer's standard coating. All pits and blemishes in the exterior surface shall be filled. Exterior surfaces shall be coated with one or more finish coats of the manufacturer's standard coating. Finish coats shall have a dry film thickness of at least 4
mils. Color shall be One quart of touch-up paint shall be furnished with the panels.

2.1.15 Panel-Mounted Instruments

2.1.15.1 Instrument Type:

a) Instruments shall be of the analog gauge type and shall receive an analog signal from an appropriately calibrated transmitter, or display information obtained from the local control system (LCS) PLC data stream.

b) All instruments shall be rated for outdoor use in a wet environment.

2.1.15.2 Instrument Size:

a) Analog gauge type instruments shall have a minimum face diameter of two (2) inches or as indicated in Table 5.

2.1.15.3 Instrument Range, Accuracy, and Resolution:

a) For each individual piece of equipment and associated parameters to be monitored, instrument range, accuracy and resolution shall be coordinated with the manufacturer of the equipment to be monitored, and be selected by the Contractor based on the expected operating range of the machinery for each specific monitored parameter. See Table 5.

2.1.15.4 Instrument Arrangement and Layout:

a) Instruments shall be neatly laid out and grouped by the individual piece(s) of equipment to be monitored.

b) Within each group of instruments for each individual piece of equipment, instruments shall be laid out and grouped according to each individual sub-system (e.g., engine speed, engine lube oil, engine coolant, etc.).

c) Panel-mounted instruments and control devices shall be arranged in a logical configuration for the plant operators. The centerline of recorders shall be within 3 feet and 5'-9" above the base of the panel for convenient reading and chart replacement. Control switches shall be within six (6) feet and 2'-6" above the base of the panel. Indicators may be located within 2'-6" and 6'-6" above the base of the panels. Annunciators and clocks may be mounted near the top of the panels.

2.1.15.5 Instrument Panel Tags and Labels:

a) Instrument tags shall be made of stainless steel and be inscribed with the instrument number and other relevant information.

b) Equipment group labels and instrument labels shall be made of laminated phenolic material having engraved letters. Individual labels shall be made of the colors, text heights, case, and fonts identified in Table 5.

c) Individual instrument tags and labels shall be of the colors, text heights, case, and fonts identified in
2.1.15.6 Instruments, power supplies, pilot devices, and appurtenances mounted within or on the face of the panel shall meet applicable industry standards, and shall be a pre-assembled, packaged unit.

2.1.16 Panel-Mounted Visual Indication

2.1.16.1 Panel mounted visual indication shall be provided in accordance with the colors identified in Table 3 and shall be of the sizes shown in Table 5.

2.1.16.2 Visual indication shall be placed for each parameter shall be placed below and adjacent to the associated instrument or gauge and associated label. If no gauge or instrument is required, the visual indication shall be placed below and adjacent to the label identifying the monitored parameter.

2.1.16.3 All panel mounted visual indication shall be rated for outdoor use in wet locations.

Table 5: Panel Mounted Instrument, Label, and Visual Indication

<table>
<thead>
<tr>
<th>Equip. Group</th>
<th>Parameter</th>
<th>Instrument Requirements</th>
<th>Label Requirements</th>
<th>Visual Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Face Dia.</td>
<td>Range, Accuracy</td>
<td>Res.</td>
<td>Text Color</td>
</tr>
<tr>
<td>Group Label</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>WT</td>
</tr>
<tr>
<td>Speed</td>
<td>3&quot;</td>
<td>&lt;Coord. &lt;Coord.</td>
<td>-</td>
<td>WT</td>
</tr>
<tr>
<td>Lube Oil Level Low</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>WT</td>
</tr>
<tr>
<td>Lube Oil Level Low Low</td>
<td>Min. &lt;Coord. &lt;Coord.</td>
<td>-</td>
<td>WT</td>
<td>BK</td>
</tr>
<tr>
<td>Lube Oil Press. Low</td>
<td>Min. &lt;Coord. &lt;Coord.</td>
<td>-</td>
<td>WT</td>
<td>BK</td>
</tr>
<tr>
<td>Lub Oil Press. Low Low</td>
<td>Min. &lt;Coord. &lt;Coord.</td>
<td>-</td>
<td>WT</td>
<td>BK</td>
</tr>
<tr>
<td>Lub Oil Temp. High</td>
<td>Min. &lt;Coord. &lt;Coord.</td>
<td>-</td>
<td>WT</td>
<td>BK</td>
</tr>
<tr>
<td>Lub Oil Temp High High</td>
<td>Min. &lt;Coord. &lt;Coord.</td>
<td>-</td>
<td>WT</td>
<td>BK</td>
</tr>
<tr>
<td>Engine</td>
<td>Cooling Water Level Low</td>
<td>-</td>
<td>WT</td>
<td>BK</td>
</tr>
<tr>
<td></td>
<td>Cooling Water Level Low Low</td>
<td>-</td>
<td>WT</td>
<td>BK</td>
</tr>
<tr>
<td></td>
<td>Cooling Water Temp. High</td>
<td>Min. &lt;Coord. &lt;Coord.</td>
<td>WT</td>
<td>BK</td>
</tr>
<tr>
<td></td>
<td>Cooling Water Temp. High High</td>
<td>Min. &lt;Coord. &lt;Coord.</td>
<td>WT</td>
<td>BK</td>
</tr>
<tr>
<td></td>
<td>Running Time</td>
<td>Min. 0-99,000 hrs</td>
<td>0.1 hrs</td>
<td>WT</td>
</tr>
<tr>
<td></td>
<td>Fuel Press. Low</td>
<td>Min. &lt;Coord.</td>
<td>&lt;Coord.</td>
<td>WT</td>
</tr>
</tbody>
</table>
Table 5: Panel Mounted Instrument, Label, and Visual Indication

<table>
<thead>
<tr>
<th>Equip. Group</th>
<th>Parameter</th>
<th>Instrument Requirements</th>
<th>Label Requirements</th>
<th>Visual Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Face</td>
<td>Range, Accuracy</td>
<td>Res.</td>
</tr>
<tr>
<td>Engine</td>
<td>Fuel Water Separator Level High</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Running</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Stopped</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>MIL</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>E-Stop Depressed</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Group Label</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Clutch Engaged</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Clutch Dis-Engaged</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Clutch Fault (of any type)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Right Angle Gearbox</td>
<td>Group Label</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Lube Oil Temp High</td>
<td>Min</td>
<td>&quot;Coord.</td>
<td>&quot;Coord.</td>
</tr>
<tr>
<td></td>
<td>Lube Oil Temp High High</td>
<td>Min</td>
<td>&quot;Coord.</td>
<td>&quot;Coord.</td>
</tr>
<tr>
<td></td>
<td>Pump Shaft Reverse Rotation</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

1. Instrument shall display US-based imperial units.
2. Coordinate with equipment manufacturer, see §2.1.15.3

2.1.17 Factory Test

2.1.17.1 Panels shall be factory tested electrically and pneumatically by the panel fabricator before shipment.

2.1.18 Fuses

2.1.18.1 All fuse holders shall include a blown fuse indicator.

2.2 FREESTANDING VERTICAL PANELS: The following paragraphs specify the freestanding vertical panels:

2.2.1 Construction

2.2.1.1 Panel construction shall be an indoor, dusttight, completely enclosed cubicle formed from steel structural members and steel plates. The base shall be formed of steel channels, with flanges extending upwards. The base shall be provided with 3/4 inch diameter holes at 12 inch centers so that the base can be bolted to the concrete equipment base. Welds, seams, and edges on all exposed surfaces shall be ground smooth. Suitable lifting facilities shall be provided for handling and shipment.

2.2.2 Structure
2.2.2.1 Panel structure shall be suitably braced and of sufficient strength to support all equipment mounted on or within, to withstand handling and shipment, to remain in proper alignment, and to be rigid and freestanding. Top, sides, and back shall be fabricated from USS 10 gage or heavier carbon steel sheets, with stationary back suitable for back to wall installation, or designed for rear access with hinged back doors. Doors shall not be greater than 24 inches wide or spaced not greater than 36 inches center to center. Rear access doors shall be fabricated from USS 14 gage or heavier carbon steel.

2.2.3 Panel Front

2.2.3.1 The front shall be a hinged door, or doors, with mounted instruments and control devices, fabricated from USS 10 gage stainless steel sheet and suitably braced and supported to maintain alignment. Panels with hinged fronts shall be of sufficient width to permit door opening without interference with rear projection of flush mounted instruments.

2.2.4 Sun-Shade and Drip Shield

2.2.4.1 HMI screens located on the front of the panel shall be supplied with lockable a sun shield.

2.2.4.2 Panels shall be supplied with a top-mounted drip shield.

2.2.5 Doors

2.2.5.1 Doors shall be essentially full height, having turned back edges and additional bracing to ensure rigidity and prevent sagging. Doors shall be mounted with strong, continuous, piano type hinges. Positive latches, acting from a common door handle, shall hold doors securely compressed at top, side, and bottom against rubber gaskets.

2.2.6 Mounted Instruments

2.2.6.1 The front shall be a hinged door, with mounted instruments and control devices. Panel fronts shall be suitably reinforced between mounting cutouts and drilling to support instruments and devices without deformation and shall be free from waves and other imperfections. Panel fronts shall be recessed at the base. Adjoining panel sections shall be accurately shop fitted to assure satisfactory assembly in the field.

2.2.7 Conduit Entrance

2.2.7.1 The bottom shall be open, and components shall be arranged for external wiring conduit and piping to enter from below.

2.2.8 Size and Arrangement

2.2.8.1 Panel dimensions and general instrument arrangement shall be as required to accommodate the required instruments and HMI panels.

2.2.9 Interior Lighting

2.2.9.1 Illumination of panel interiors shall be provided by ceiling mounted lamp fixtures spaced at approximately 2'-6" and near the door. Fixtures shall be nominal 40-watt fluorescent tube type or 17070 - 10 of 12
LED, with a common "On-Off" switch near each end door. Duplex-grounded receptacles shall be provided for service and maintenance tools at spacing not greater than 5 feet throughout the length of a panel. The lighting and receptacle circuit shall be fused separately from the instrumentation systems.

2.2.10 Grounding

2.2.10.1 Enclosures shall be provided with a 24VDC common ground and be provided with a door to ground bus.

2.3 FILTER CONSOLES.

2.3.1 Not used.

2.4 WALL-MOUNTED CABINETS.

2.4.1 Not used.

2.5 FIBER OPTIC PATCH PANELS.

2.5.1 Not used.

2.6 FREESTANDING EIA 19-INCH RACK ENCLOSURES. Not used.

2.7 WALL MOUNTED INSTRUMENT SUBPANELS.

2.7.1 Not used.

2.8 CONTROL SYSTEM CONSOLES AND ENCLOSURES.

2.8.1 Not used.

2.9 CONTROL SYSTEM FURNITURE.

2.9.1 Not used.

PART 3 EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

3.1.1 Installation requirements are specified in the Instrumentation and Control System section. In addition, equipment furnished under this section shall conform to the following manufacturing stipulations.

3.1.1.1 Piping

a) All tubing shall be run in horizontal and vertical planes and shall be rigidly supported to withstand handling and shipment. Flexible polyethylene tubing shall be used to connect devices mounted on hinged doors.

3.1.1.2 Wiring

a) All wiring shall be grouped or cabled and firmly supported inside the panel. Wiring shall be bundled in groups and routed in Panduit or similar nonmetallic slotted ducts. Ducts shall be readily accessible within the panel with removable covers and shall have a space of at least 40 percent of the depth of the duct available for future use after installation is complete and all field wiring installed. Sufficient space shall be provided between cable groups or ducts and terminal blocks for easy installation or removal of cables.

3.1.1.3 More Than One Panel

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a) Where signal or loop wiring must be routed to more than one panel or device, the required circuit routing shall be as indicated on the one-line diagrams. The panel fabricator shall provide such additional circuits as may be indicated on the electrical schematic Drawings.

(End of Section 17070)
## Equipment Schedule 17070-S01
### FREESTANDING VERTICAL PANELS

<table>
<thead>
<tr>
<th>1.000</th>
<th>General</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.010</td>
<td>Specification Section 17070</td>
</tr>
<tr>
<td>2.000</td>
<td>Freestanding Vertical Panels</td>
</tr>
<tr>
<td>2.010</td>
<td>Tag Number/Panel ID</td>
</tr>
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<td>2.020</td>
<td>NEMA Enclosure Rating</td>
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<td>4</td>
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<td>2.030</td>
<td>Materials of construction</td>
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<tr>
<td></td>
<td>Carbon steel</td>
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<tr>
<td></td>
<td>316 Stainless steel</td>
</tr>
<tr>
<td></td>
<td>Fiberglass polyester</td>
</tr>
<tr>
<td>2.040</td>
<td>Environmental provisions</td>
</tr>
<tr>
<td></td>
<td>Sunshade and drip shield</td>
</tr>
<tr>
<td></td>
<td>Cooling fan</td>
</tr>
<tr>
<td></td>
<td>Air conditioner</td>
</tr>
<tr>
<td>2.050</td>
<td>Door Arrangements</td>
</tr>
<tr>
<td></td>
<td>Hinged rear doors</td>
</tr>
<tr>
<td></td>
<td>Hinged front door with instruments</td>
</tr>
<tr>
<td></td>
<td>Hinged front door without instruments</td>
</tr>
<tr>
<td></td>
<td>Fixed front</td>
</tr>
<tr>
<td></td>
<td>Recessed base</td>
</tr>
<tr>
<td>2.060</td>
<td>Dimensions (min. L x W x H)</td>
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<tr>
<td>2.070</td>
<td>Panel interior-mounted UPS</td>
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<tr>
<td>2.080</td>
<td>Conduit entrance</td>
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<td></td>
<td>Bottom open</td>
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<td></td>
<td>Removable top plates</td>
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### Exceptions, Clarifications, and Comments

<table>
<thead>
<tr>
<th>3.000</th>
<th>Panel Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Panel Dimensions should fit within the space allotted atop the engine pedestal and allow for access to and maintenance on the panel and associated equipment.</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>3.010</th>
<th>Panel Standardization and Interchangeability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Each of the three control panels shall be identical in components furnished, interior and exterior layout, and construction materials. Components used shall be interchangeable between panels and shall maintain a common supply of spare parts.</td>
</tr>
</tbody>
</table>

17070-S01
PART 1 GENERAL

1.1 DESCRIPTION OF WORK

1.1.1 This specification section provides the Functional Description for the pump operations necessary to produce the process control logic. Programming, equipment configuration, and field adjustments shall be performed by the equipment vendor. All work in this section shall be performed in accordance with Division 17 - INSTRUMENTATION.

1.1.2 Control logic described in this section is a general description of basic control logic of the processes and equipment used in the pump station. It is by no means a complete or detailed description of all control logic required to build a fully functional system. The equipment manufacturers shall provide and implement all necessary algorithms and programming that are necessary for successful implementation of the process control system.

1.2 RELATED WORK

1.2.1 Division 11 - Equipment
1.2.2 Division 16 - Electrical
1.2.3 Division 17 - Instrumentation

1.3 SUBMITTALS

1.3.1 The contractor shall submit the following in accordance with Section 11010, EQUIPMENT GENERAL PROVISIONS:

1.3.1.1 Detailed control logic description including a list of all functions monitored, controlled, and alarmed.

1.3.1.2 Description of interface with pump station instrumentation and control systems

1.3.1.3 Program Flow Charts

1.3.1.4 Program Ladder Logic

1.3.1.5 Program test results

1.3.1.6 MCS HMI (Human Machine Interface) screen graphics and configuration files.

1.3.1.7 LCS HMI (Human Machine Interface) screen graphics and configuration files.

PART 2 PRODUCTS

2.1 EXISTING MAIN SYSTEM CONTROLLER

2.1.1 The existing PLC based Main Control System (MCS) has been installed in the pump station electrical room and controls the following equipment:

17200-1 of 17
2.1.1.1 Tunnel Drain Pumps (DP1 and DP2)
2.1.1.2 Small Tunnel Drain Pump (SDP1)
2.1.1.3 Silt Pumps (MP1 and MP2)
2.1.1.4 Sump Agitation Pump (SAP1)
2.1.1.5 Mechanically Cleaned Bar Screens (SCR1, SCR2, and SCR3)
2.1.1.6 Conveyor System
2.1.1.7 Emergency Backup Diesel Generator (Monitor Only)

2.1.2 The following proposed equipment shall be controlled or monitored by the MCS:
2.1.2.1 Pump power modules (D-1, D-2, and D-3) and appurtenant equipment
2.1.2.2 Power module fuel supply system
2.1.2.3 Proposed stormwater pumps (SP-1, SP-2, and SP-3)
2.1.2.4 Future building ventilation system (Ceiling vent fan, air intake and exhaust fans)

2.1.3 The existing MCS was specified and configured to control the proposed diesel engines and main stormwater pumps and appurtenant equipment (machine train package or MTP) and shall communicate to and be able to remotely control, as identified herein, the MTP. This control is intended to be carried out via an ethernet/IP connection from the MCS to local, individual (three), local control systems (LCSs) contained within local control panel(s) located next to each MTP.

2.1.4 The MTPs shall be controlled by the MCS based on the water level (HGL) in the wet well as measured by level sensors and transmitters.

2.1.4.1 Upon the HGL in the wet well reaching a pre-determined set point for a specific operation, the MCS shall send a command to the LCS for the specific MTP, and the command shall be executed by the LCS associated with the specific MTP.

2.2 LOCAL CONTROL SYSTEM

2.2.1 Each MTP shall be controlled by a Local Control System (LCS). The LCS shall contain the logic to generate alarms, readouts, and control the startup, shutdown, and operation of the MTP.

2.2.2 Each LCS shall contain an ethernet/IP connection link to the MCS which will control the interaction of the MTP with other pump station equipment and systems.

2.2.3 The LCS control panel/local gauge panel shall be of a free-standing design and located adjacent to each MTP.

2.2.4 Each MTP shall have a Hand (Local-Manual), Auto (Remote-Automatic), Off control system at each LCS which is selectable by the operator (as defined below). The MTP controls shall be designed for individual operation or operation of identical units in parallel.
2.2.4.1 Control Modes

a) Hand (Local-Manual)

i. The MTP is operated manually from the local control and instrument panel located adjacent to the unit. The LCS will execute logic sequences initiated from the local control panel and operate the MTP. The LCS will monitor MTP conditions and transmit condition data to the MCS for data logging and monitoring purposes. The MCS shall be unable to control the MTP in this mode.

ii. Use of and access to the LCS panel and changing the LCS control mode from 'Auto' to hand shall be limited to authorized users only. Authorized users shall have a user access code to allow for hand operation of the LCS. This system shall not restrict access to or use of any stop or e-stop functions or changing the LCS control mode from 'Auto' to 'OFF'.

b) Auto (Remote-Automatic)

i. MTP receives commands from the MCS through the LCS, and all logic sequences are automatically executed by the LCS. The LCS monitors MTP conditions and transmits condition data to the MCS for data logging and monitoring purposes.

c) Off (Unavailable for operation)

i. In Off mode there will be no response to MCS or LCS signals to the MTP and the MTP shall remain unavailable for operation.

2.2.5 Machine Train Package Controls

2.2.5.1 The starting, idling, clutch engagement, clutch dis-engagement and stop sequences associated with the MTP shall be automatic, requiring only a single command to initiate the sequence.

2.2.5.2 The LCS for each MTP shall contain hardware and logic sequences for accomplishing the following actions:

a) Startup

i. After four failed start attempts of 10 seconds cranking and 10 seconds rest the MTP shall switch to "Overcrank" lockout requiring manual reset at the MTP control panel only.

b) Shutdown

c) Idling of the Engine (e.g., select low idle or standby idle speeds)

d) Operation of the HPTO clutch (engagement and dis-engagement) and control of engine speed

e) Lock-out tag-out (LOTO) points for safety purposes during MTP maintenance

2.2.6 Machine Train Package Monitoring and Protection System
2.2.6.1 The conditions described in this subsection and the data sheets are the minimum protection that must be provided during MTP operation.

a) Protection and alarm systems shall be fail-safe and first out design.

b) Vendor shall add any devices, indicators, controls, or shutoff as required for any particular system as recommended by the supplier of that system if not shown herein, including, but not limited to, charge air cooler water circuits and tanks, additional lube oil circuits and coolers, combined circuits, etc.

c) On “Overspeed”, “Engine Fuel Pressure Low,” or operator initiated “Emergency Stop” shutdown, a fail-close emergency shutdown device shall close an air intake shutoff valve in line with the outlet piping of the compressor side of the turbocharger for each turbocharger as well as the engine inlet fuel solenoid valve. All other shutdowns shall only cut fuel to the engine and close the engine inlet fuel solenoid valve.

d) The air inlet shutoff valve shall be capable of remote reset and latching and shall have a manual reset as well. Any other safety shutdown that does not actuate and stop the unit within a preset time shall cause the air inlet shutoff valve to actuate as a backup.

e) All shutdown devices shall be fail-safe designs (i.e., de-energize to trip) and hardwired.

f) Alarms or engine shutdowns shall be annunciated at the LCS and MCS panel on a first-out status basis.

g) Panel logic shall incorporate closing the engine inlet fuel solenoid valve only after the engine has reached zero speed, but in any case, 40 seconds after a signal to close has been initiated, regardless of engine RPM (as a fail-safe).

h) Triggering of the fire detection system in the building shall automatically close the engine inlet fuel solenoid valve to each MTP simultaneously without delay, regardless of engine speed and shall actuate the engine emergency stop sequence for all units simultaneously as well.

i) The “Engine Fuel Pressure Low” safety shutdown logic shall bypass any delays in closing the inlet fuel solenoid valve and shall close the inlet fuel solenoid valve regardless of engine RPM.

j) Alternative instrumentation arrangements which will similarly ensure equipment operability, reliability, and protection may be proposed for review and approval by the Engineer.

k) Remote annunciation:

i. The LCS shall be equipped with a remote annunciation system that will provide remote annunciation of all alarms identified in Table 2. This system shall incorporate ring-back capability so that after silencing the initial alarm, any subsequent alarms will be annunciated.

l) The column heading definitions for Table 2 and Table 3 are as defined in Table 1 below:

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m) **Table 2** lists the minimum instrumentation, indication, and control points to be provided, and their intended functions for the MTPs.

n) **Table 3** lists the commands and the control signals to be provided and indicated.

<table>
<thead>
<tr>
<th>Table 1: Column Heading Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Column Heading</strong></td>
</tr>
<tr>
<td>1 Class of Shutdown (COS)</td>
</tr>
<tr>
<td>2 A</td>
</tr>
<tr>
<td>3 B</td>
</tr>
<tr>
<td>4 C</td>
</tr>
<tr>
<td>5 D</td>
</tr>
<tr>
<td>6 Alarm</td>
</tr>
<tr>
<td>7 Local Indication Device (LID)</td>
</tr>
<tr>
<td>8 Control Panel Indication (CPI)</td>
</tr>
<tr>
<td>9 Panel-Mounted Instrument (PMI)</td>
</tr>
<tr>
<td>10 Panel Mounted Visual Indication (PMVI)</td>
</tr>
<tr>
<td>11 MCS Indication or Control (MCS IOC)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2: Discrete Points (for each MTP)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>1 Engine lube oil level low</td>
</tr>
<tr>
<td>2 Engine lube oil level, low</td>
</tr>
<tr>
<td>3 Engine lube oil pressure, low (psig)</td>
</tr>
<tr>
<td>4 Engine lube oil pressure low, (psig)</td>
</tr>
<tr>
<td>5 Engine lube oil temperature, high</td>
</tr>
<tr>
<td>6 Engine lube oil temperature high, high</td>
</tr>
<tr>
<td>7 Engine pre-lubrication system fault</td>
</tr>
<tr>
<td>8 Engine cooling water level low</td>
</tr>
<tr>
<td>9 Engine cooling water level, low</td>
</tr>
<tr>
<td>10 Engine cooling water temperature low, low</td>
</tr>
<tr>
<td>11 Engine cooling water temperature high</td>
</tr>
<tr>
<td>12 Engine cooling water temperature high, high</td>
</tr>
<tr>
<td>13 Engine cooling system vibration high (radiator fan bearing)</td>
</tr>
<tr>
<td>14 Engine overspeed</td>
</tr>
<tr>
<td>15 Engine running time (hour meter, hours, to the tenth of an hour)</td>
</tr>
<tr>
<td>16 Engine turbo exhaust gas outlet temp. high (LT Bank)</td>
</tr>
<tr>
<td>17 Engine turbo exhaust gas outlet temp. high, high (LT Bank)</td>
</tr>
<tr>
<td>18 Engine turbo exhaust gas outlet temp. high (RT Bank)</td>
</tr>
<tr>
<td>19 Engine turbo exhaust gas outlet temp. high, high (RT Bank)</td>
</tr>
<tr>
<td>20 Engine vibration high</td>
</tr>
<tr>
<td>21 Engine failure to start (overcrank)</td>
</tr>
<tr>
<td>22 Engine fuel pressure low (monitor after engine filters)</td>
</tr>
<tr>
<td>17200-5 of 17</td>
</tr>
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</table>
### Table 2: Discrete Points (for each MTP)

<table>
<thead>
<tr>
<th>Description</th>
<th>COS</th>
<th>Alarm</th>
<th>LID</th>
<th>CPI</th>
<th>PMI</th>
<th>PMVI</th>
<th>MCS IOC</th>
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<tbody>
<tr>
<td>Engine fuel pressure low, low (monitor after engine filters)</td>
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<tr>
<td>Engine fuel water separator water level high</td>
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<td>X</td>
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<tr>
<td>Engine charging system voltage low</td>
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<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Engine charging system voltage high</td>
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<tr>
<td>Engine emergency stop button depressed</td>
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<td>X</td>
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<tr>
<td>HPTO clutch oil temperature high</td>
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<td>HPTO clutch oil temperature high, high</td>
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<td>HPTO clutch output shaft speed</td>
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<td>HPTO clutch fault (if any type)</td>
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<tr>
<td>Gear box lube oil temp high</td>
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<td>X</td>
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<tr>
<td>Gear box lube oil temp high, high</td>
<td></td>
<td>BD</td>
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<td>X</td>
<td>X</td>
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<tr>
<td>Gear box case vibration high</td>
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<tr>
<td>Pump shaft reverse rotation</td>
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<td>A</td>
<td>X</td>
<td></td>
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<td>X</td>
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<tr>
<td>Pump shaft vibration high</td>
<td></td>
<td>CD</td>
<td>X</td>
<td></td>
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<tr>
<td>Loss of AC power to battery charger (LT bank)</td>
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<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
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<tr>
<td>Loss of AC power to battery charger (RT bank)</td>
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<td>X</td>
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<td></td>
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</tr>
</tbody>
</table>

### Table 3: Controls (commands, permissives, and status, for each MTP) to and from MCS

<table>
<thead>
<tr>
<th>Description</th>
<th>COS</th>
<th>Alarm</th>
<th>LID</th>
<th>CPI</th>
<th>PMI</th>
<th>PMVI</th>
<th>MCS IOC</th>
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<tbody>
<tr>
<td>Initiate engine pre-start sequence</td>
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<td>Engine pre-start sequence active, status</td>
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<tr>
<td>Engine start</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td>Engine start sequence active, status</td>
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<tr>
<td>Engine running</td>
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<tr>
<td>Engine stopped</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Engine speed (RPM, rev/min)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Engine to Low Idle Speed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Engine to Standby idle Speed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Engine to Warm Up Speed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Engine to Rated Speed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Engine malfunction indicator lamp (MIL) status (on/off)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Engine running time (hour meter, hours, to the tenth of an hour)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Engine shutdown</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Engine emergency stop button depressed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Engine lube oil pressure (psig)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Engine intake manifold pressure (in Hg vacuum, psig pressure)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Engine coolant temperature (°F)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Charging system voltage (volts)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Loss of AC power to battery charger (LT bank)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Loss of AC Power to battery charger (RT bank)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>HPTO clutch engage(d)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>HPTO clutch dis-engage(d)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
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<tr>
<td>HPTO clutch status, parameters, and diagnostic codes (any)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>X</td>
</tr>
<tr>
<td>Pump shaft reverse rotation</td>
<td></td>
<td></td>
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2.3 SEQUENCE VARIABLES

2.3.1 Variables identified shall be adjustable within the LCS PLC logic to allow for changes during equipment startup and subsequent pump station operation.

2.3.1.1 Pump Control Hydraulic Grade Lines (Elevations relative to NAVD88)

a) ① Lead Pump On: -6.15'
b) ② Lag 1 Pump On: -4.90'
c) ③ Lag 2 Pump On: -3.65'
d) ④ Lag 2 Pump Off: -9.40'
e) ⑤ Lag 1 Pump Off: -10.65'
f) ⑥ Lead Pump Off: -11.90'
g) ⑦ Engine Start Offset: 1.00'
h) ⑧ Lead Pump On (Gravity Flow Mode): +1.00'
i) ⑨ Lag 1 Pump On (Gravity Flow Mode): +2.00'
j) ⑩ Lag 2 Pump On (Gravity Flow Mode): +2.00'
k) ΔWHGLMAX: 0.04 ft/s (2.4 ft/min)

2.3.1.2 Flows

a) \( Q_{HGL} = \) Incoming flow rate calculated by rate of change of wet well HGL.
b) \( Q_T = \) Incoming flow rate as measured by the tunnel flow meter.
c) \( Q_i = \) The incoming flow rate to the pump station
d) \( Q_{G-MAX} = \) The maximum gravity flow capacity of the pump station

2.3.1.3 Timers

a) Timer A: 30 Minutes
b) Timer B: 30 Minutes
c) Timer 1: 1 Minute
d) Timer 2: 10 Seconds
e) Timer 3: 10 Seconds
f) Timer 4: 10 Seconds
g) Timer 5: 10 Seconds
h) Timer 6: 5 Minutes
i) Timer 7: 10 Seconds
2.3.1.4 Engine Speeds
   a) Low Idle: 700 rpm
   b) Clutch Dis-engagement Speed: 1,000 rpm
   c) Standby Idle: 1,100 rpm
   d) Class C Enable Speed: 1,100 rpm (Only with HPTO clutch engaged)
   e) Warm-up Speed: 1,800 rpm

2.3.1.5 Engine Speed Rates of Change
   a) Ramp Speed 1: 50 rpm/second
   b) Ramp Speed 2: 100 rpm/second
   c) Ramp Speed 3: 110 rpm/second
   d) Ramp Speed 4: 220 rpm/second

2.3.1.6 Pressures
   a) Y, fuel pressure: 20 psig

2.3.1.7 Miscellaneous
   a) X, pulses of grease: 5

2.4 MTP SEQUENCES EXECUTED BY THE LCS AND CALLED FOR BY LOCAL CONTROL OR BY THE MCS

2.4.1 Engine Start Sequence

2.4.1.1 The LCS shall control the startup of the engine, to include pre-start operations and sequences as necessary for the start, warmup, and idle of each engine. Commands for startup shall be issued by the MCS or through the LCS HMI panel and the LCS shall execute the required commands. A conceptual flow diagram of the Main Engine Start Sequence is presented as Figure 1. It should be noted that this, and other sequences presented, are conceptual in nature and may not include all necessary logic for satisfactory operation. It shall be the responsibility of the Contractor to provide a complete, fully functional system. At pump start up, the plenum fans will not be installed, but will be installed in a future phase. Logic is to be in place for this future installation.
Figure 1: Engine Start Sequence
2.4.2 Main Engine Shutdown Sequence

2.4.2.1 The LCS shall control the shutdown of the engine, to include any pre-shutdown operations and sequences as necessary for the shutdown of each engine. Commands for shutdown shall be issued by the MCS or through the LCS HMI panel and the LCS shall execute the required commands. A conceptual flow diagram of the Main Engine Shutdown Sequence is presented as Figure 2. It should be noted that this, and other sequences presented, are conceptual in nature and may not include all necessary logic for satisfactory operation. It shall be the responsibility of the Contractor to provide a complete, fully functional system.

![Figure 2: Main Engine Shutdown Sequence](image)

2.4.3 HPTO Clutch Engagement Sequence

2.4.3.1 The LCS shall control the engagement of the HPTO clutch, to include any necessary changes in engine speed to allow for a smooth and successful engagement of the HPTO clutch and pumping at rated engine speed. A conceptual HPTO clutch dis-engagement sequence is presented as Figure 3. It should be noted that this, and other sequences presented, are conceptual in nature and may not include all necessary logic for satisfactory operation. It shall be the responsibility of the Contractor to provide a complete, fully functional system.

2.4.3.2 Minimum and maximum engine speed for clutch engagement shall be coordinated with the HPTO clutch manufacturer and the logic contained within the LCS shall reflect these limits with the actual clutch engagement setpoint being adjustable within the required limits.

![Figure 3: HPTO Clutch Engagement Sequence](image)

17200-10 of 17
2.4.4 HPTO Clutch Dis-engagement Sequence

2.4.4.1 The LCS shall control the dis-engagement of the HPTO clutch, to include any necessary changes in engine speed to allow for a smooth and successful dis-engagement of the HPTO clutch. A conceptual HPTO clutch dis-engagement sequence is presented as Figure 4. It should be noted that this, and other sequences presented, are conceptual in nature and may not include all necessary logic for satisfactory operation. It shall be the responsibility of the Contractor to provide a complete, fully functional system.

![Flowchart of HPTO Clutch Dis-Engagement Sequence]

Figure 4: HPTO Clutch Dis-Engagement Sequence
2.5 SEQUENCES EXECUTED BY THE MCS IN CONJUNCTION WITH THE LCS

2.5.1 The control of pumping operations shall be managed by the MCS in conjunction with the LCS located at each MTP. Each of the three MTPs shall be operated, and pumps shall be engaged, based on the water level (Hydraulic Grade Line, HGL) in each wet well bay.

2.5.2 The MCS shall monitor MTP run time and alternate the operation of each MTP in sequence to balance the run time between MTPs.

2.5.3 The lead MTP shall remain in its lead position through pre-determine length of time (Lead Time, see §2.3.1) associated with the average length of a storm. Following this duration, the MCS shall select the next lead MTP based on §2.5.2.

2.5.4 HGL levels for Lead Pump On, Lag 1 Pump On, and Lag 2 Pump On will vary based on pump station operating mode.

2.5.5 Pump Station Operation Modes

2.5.5.1 Selection of Operation Mode

a) The MCS shall monitor the HGL in the wet well, the rate of HGL change in the wet well HGL, the flow rate in the influent tunnel, and the HGL in outfall headbox to determine the operating mode of the pump station.

b) The MCS shall select the operating mode of the pump station by the logic diagram presented in Figure 5. It should be noted that this, and other sequences presented, are conceptual in nature and my not include all necessary logic for satisfactory operation. It shall be the responsibility of the Contractor to provide a complete, fully functional system.

![Figure 5: Pump Station Operation Mode Selection](image-url)
c) Based these conditions, the pumpstation will operate in one of two modes as identified below:

i. **Normal Operation Mode**: Normal Operation Mode will operate the pump station with the pump on elevations at typical levels below the invert elevation of the pump discharge to the headbox, and will require that all influent stormwater be pumped to the headbox and discharged to the Ashley River. **Figure 6** depicts the logic diagram associated with Normal Operation Mode. It should be noted that this, and other sequences presented, are conceptual in nature and may not include all necessary logic for satisfactory operation. It shall be the responsibility of the Contractor to provide a complete, fully functional system.
ii. **Gravity Flow Mode:** Gravity Flow Mode will operate the pump station with the pump on elevations set higher than both the invert and centerline elevations of the pump discharge to the headbox. With the appropriate tidal conditions (headbox HGL), and inflow to the pump station, the effluent stormwater will be allowed to pass by gravity through the pump column, and ultimately to the headbox and the Ashley River, reducing fuel consumption and running hours on the MTPs. Meeting or exceeding the "Lead Pump On" elevation will result in the pump station switching back to "Normal Operation" mode and Gravity Flow mode will be disabled until the lead pump engine has shutdown and the MCS determines that the pump station can again operate in Gravity Flow Mode. The logic diagram for this mode is shown in **Figure 7.** It should be noted that this, and other sequences presented, are conceptual in nature and may not include all necessary logic for satisfactory operation. It shall be the responsibility of the Contractor to provide a complete, fully functional system.
Figure 7: Gravity Pump Station Operation Mode
2.5.6 **EMERGENCY STOP (E-STOP)**

2.5.6.1 Any activated E-Stop shall signal to the MCS and the MCS shall set an alarm indicating an emergency stop and the associated piece of equipment.

2.6 **WATER LEVEL CONTROL SYSTEM**

2.6.1 Water level sensors have been installed for monitoring of water levels in the shaft, wet well, and the headbox by the MCS. **Table 4** provides a list of level sensors, transmitters, and functions:

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<th>Sensor/Transmitter ID</th>
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<td>Pressure</td>
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2.7 **EMERGENCY STOP (E-STOP)**

2.7.1 Any activated E-Stop shall signal to the MCS and the MCS shall set an alarm indicating an emergency stop and the associated piece of equipment.

**PART 3 EXECUTION**

3.1 **PLC PROGRAM TESTING**

3.1.1 The PLC program for the Pump Station Gravity Flow and Dewatering Scenarios shall be shop tested to confirm operation as described in the control logic. The input to the program shall be level variations in the shaft, wet well, and headbox. The pump start-stop sequence output in relation to level variation shall be submitted for review and approval by the Engineer.

(End of Section 17200)
TO: John J. Tecklenburg, Mayor  
FROM: Steve Kirk / Andrew Jones  
DEPT. Stormwater Management  
SUBJECT: SPRING-FISHBURNE US17 PHASE 5 FEE AMENDMENT #22  

REQUEST: Approval of Fee Amendment #22 with Davis & Floyd in the amount of $1,456,700.00 for pre-construction services to support bidding and awarding of contract of the pump station superstructure, permitting, code review and design updates.

COMMITTEE OF COUNCIL: Ways & Means  
DATE: January 11, 2022  

COORDINATION: This request has been coordinated with: (attach all recommendations/reviews)

CPR Committee Chair  
Corporate Counsel  
Dir. of SW Management  
MBE Manager  

FUNDING: Was funding previously approved? Yes  
If yes, provide the following: Dept/Div SW Mgmt-Project Mgmt Acct #  
Balance in Account $1,456,700.00  
Amount needed for this item $1,456,700.00  

NEED: Identify any critical time constraint(s).

FISCAL IMPACT: Approval of Fee Amendment #22 will increase the Phase 5 portion of the professional services contract by $1,456,700.00 (from $337,842.00 to $1,794,542.00). The funding sources for this project are: King Street Gateway TIF ($26,003,011.00) and South Carolina Transportation Infrastructure Bank ($12,449,652.00).

ORIGINATING OFFICE PLEASE NOTE: A FULLY STAFFED/APPROVED (except Mayor’s Signature) PACKAGE IS DUE IN THE CLERK OF COUNCIL’S OFFICE NO LATER THAN 10:00 A.M THE DAY OF THE CLERK’S AGENDA MEETING.
AMENDMENT NO. 22
TO THE
STANDARD FORM OF AGREEMENT
BETWEEN OWNER AND ENGINEER
FOR
PROFESSIONAL SERVICES

****

Project: Spring/Fishburne Stormwater Drainage Improvements
Division IV (Phase 5) Pump Station Superstructure Preconstruction Services

INITIAL:
OWNER: __________________
ENGINEER: __________________

This is an Amendment to the Agreement between the City of Charleston (Owner) and Davis & Floyd, Inc. (Engineer) dated March 26, 1999 (hereafter referred to as the Agreement). This said Amendment is effective as of ____________________.

1. Owner and Engineer, in consideration of their mutual covenants as set forth herein, agree to expand the Scope of Work of the Agreement.

   Division IV Pump Station Superstructure Preconstruction Services: The Scope of Services will be expanded to provide pre-construction services to support the bidding and award of a contract for the construction of Division IV (Phase 5) – Pump Station Superstructure as further described in Engineer’s Proposal for Professional Services dated December 17, 2021.

2. Engineer shall submit to the Owner an itemized statement identifying the individuals that worked on the task, the hourly rate for each individual and an itemized statement of any reimbursable expenses.

   Services provided will be billed on a time and expense basis not to exceed $1,456,700 without written authorization.

3. Owner and Engineer agree to amend Exhibit C, Article 4, C4.01, A.1 of the Agreement to increase the total contract amount to $30,434,916.65 (an increase of $1,456,700).

4. In all other respects, the Agreement remains unmodified and in full force and effect.
City of Charleston
OWNER

By: ____________________________
Name: John J. Tecklenburg
Title: Mayor
Address: P.O. Box 652
        Charleston, SC 29402

Davis & Floyd, Inc.
ENGINEER

By: ____________________________
Name: Michael V. Horton, PE, CFM, LEED-AP
Title: Chief Engineering Officer
Address: P.O. Box 61599
        Charleston, SC 29419
December 17, 2021

via Email: FountainM@charleston-sc.gov

Matthew Fountain, PE, PG
Director of Stormwater Management
City of Charleston
2 George Street, Suite 2100
Charleston, SC 29401

Re: Revised Proposal for Professional Services (Amendment No.22)
Division IV (Phase 5) Pump Station Superstructure Preconstruction Services
D&F Job Number: 30895.00

Dear Mr. Fountain:

Davis & Floyd, Inc. (D|F) is pleased to continue a partnership with the City on the Spring / Fishburne US17 Drainage Improvements Project. D|F respectfully submits this proposal to continue effort for professional services to provide pre-construction services to support the bidding and award of a contract for the construction of Division IV (Phase 5) – Pump Station Superstructure. Descriptions of the services to be provided are summarized in the narrative below and detailed further in the attached Scope of Services and other supporting documents.

D|F, in coordination with Black & Veatch, proposes professional services to continue to support the bidding and awarding of a construction contract for the Pump Station Superstructure to house the large stormwater pumps through the revisions, updates, and further coordination of the Division IV Preliminary Drawings for the Pump Station Building and Mechanical Equipment dated October 2009 (not otherwise included in Phase 4). Services provided will include building code review and associated revisions; updating of Basis of Design Report; project permit review and coordination; and the production of final design and contract documents suitable for bidding by the City. Additionally, D|F will provide project administration and bidding support.

D&F proposes to provide the above-described services to support the bidding and award of Division IV (Phase 5) Pump Station Superstructure project for an amount not-to-exceed $1,456,700 without written approval as identified in the following table. Services will be invoiced on a time and expense basis in accordance with the standard D|F Schedule of Rates. The proposed fee for services maintains the reduced markup of 5% on work to be provided by Black & Veatch.
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<th>F</th>
<th>B&amp;V</th>
<th>Cumming</th>
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*Upon City request

We truly appreciate the opportunity to continue offering our services to support this phase of the project.

Very truly yours,

DAVIS & FLOYD

Michael V. Horton, PE, CFM, LEED-AP
Chief Engineering Officer

Enclosures
- City of Charleston Form of Agreement
- Organization Responsibilities Chart
- Design Team Responsibility Matrix
- Fee Analysis – Amendment 22
- Scope of Services – Division IV (Phase 5) Pump Station Superstructure Preconstruction Services
- Major Subconsultant Proposal (MEP Design) – Black & Veatch
- Construction Estimation Subconsultant Proposal – Cumming Corporation
Responsibility Matrix
Amendment No. 22
Spring/Fishburne US17 Drainage Improvements
Division IV (Phase 5) Pump Station Superstructure Preconstruction Services

| P | Primary Responsibility | DAVIS & FLOYD | BLACK & VEATCH |
| S | Secondary Responsibility |
| E | Equal Responsibility |

**TASK PA-1. PROJECT ADMINISTRATION**
- PA 1.1 Project Administration: P S E E
- PA 1.2 Project Execution Plan: P S S P
- PA 1.3 Monthly Progress Meetings: P S S P
- PA 1.4 Risk Registry: S P S P
- PA 1.5 Project Scheduling: E E E E
- PA 1.6 Project Information: P S E E
- PA 1.7 Quarterly Program Construction Contract and Engineering Cost Projections: P S E E

**TASK PA-2. CONSTRUCTION CONTRACT APPROACH COORDINATION**
- PA 2.1 Contracting Approach Planning Meetings: E E E E
- PA 2.2 Preliminary Alternate Project Scheduling Exhibits: P S E E
- PA 2.3 Rough Order of Magnitude Cost Estimates for Alternates (Project Sequencing Considerations): E E E E
- PA 2.4 Updated ROM Preferred Alternate Cost Estimate (Project Sequencing Considerations): E E E E
- PA 2.5 Preferred Alternate Project Schedule: E E E E

**TASK PA-3. PREQUALIFICATION OF CONTRACTORS (UPON CITY AUTHORIZATION)**
- PA 3.1 Evaluation Criteria Planning Meeting: E E E E
- PA 3.2 Invitation for Contractor Prequalification / Request for Qualification Packages: E E E E
- PA 3.3 Prequalification Document FTP Site Hosting: P - E E
- PA 3.4 Contractor Question Documentation / Response: E E E E
- PA 3.5 Evaluation and Summary of Contractor Statement of Qualification Packages: E E E E
- PA 3.6 Recommendation for Contractor Prequalification: E E E E
- PA 3.7 Contractor Notification of Prequalification Results: P - E E

**TASK DR-1. PERMITTING, CODE REVIEW, & BASIS OF DESIGN**
- DR 1.1 Review October 2009 Design Drawings w/ reference to Current Design Std. and Bldg. Codes: E E E E
- DR 1.2 Technical Memoranda: E E E E
- DR 1.3 Permit Matrix Updates / Maintenance: P - E E
- DR 1.4 Permit Submittals: P - E E
- DR 1.5 Agency Coordination (Per respective design responsibilities): E E E E
### Responsibility Matrix
Amendment No. 22

Spring/Fishburne US17 Drainage Improvements
Division IV (Phase 5) Pump Station Superstructure Preconstruction Services

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#### TASK DR-2. DESIGN UPDATES

| DR 2.1 | Design Discipline Coordination | E | E |
| DR 2.2 | Architectural Design and Drawings | P | - |
| DR 2.3 | Structural Design and Drawings | P | - |
| DR 2.4 | Civil Site Design and Drawings | P | - |
| DR 2.5 | Landscape Architecture Design and Drawings | P | - |
| DR 2.6 | Hydraulics Design and Drawings | P | - |
| DR 2.7 | Mechanical Design and Drawings | - | P |
| DR 2.8 | Electrical Design and Drawings | - | P |
| DR 2.9 | Plumbing / Fire Protection Design and Drawings | - | P |
| DR 2.10 | Instrumentation & Controls Design and Drawings | - | P |
| DR 2.11 | Project Manual Contract Documents | P | S |
| DR 2.12 | Technical Specifications (Per respective design responsibilities) | E | E |
| DR 2.13 | Project Requirements Specification | E | E |

#### TASK BP-1. BIDDING SERVICES

| BP 1.1 | Review IFB Estimate of Probable Construction Costs (Per respective design responsibilities) | E | E |
| BP 1.2 | IFB Construction Schedule | E | E |

#### TASK BP-2. BIDDING SERVICES

| BP 2.1 | Advertisement to Bidders (or Prequalified Contractors, as applicable) | P | - |
| BP 2.2 | Pre-Bid Conference Agenda, Attendance, and Minutes | P | S |
| BP 2.3 | Bid Document FTP Site Hosting | P | - |
| BP 2.4 | Contractor Question Documentation / Response | E | E |
| BP 2.5 | Addenda | E | E |
| BP 2.6 | Bid Opening Attendance | E | E |
| BP 2.7 | Bid Evaluation and Tabulation Summary of Contractor Bids | P | S |
| BP 2.8 | Recommendation for Award | E | E |
| BP 2.9 | Contractor Notification of Bid Results | P | - |
| BP 2.10 | Hard Copy Construction Contract Executions and Distribution | P | - |
### Project Name:
Spring / Fishburne Stormwater Drainage Improvements Division IV (Phase 5)
Pump Station Superstructure Preconstruction Services

### D&F Project #:
3029500 / TBD

### Date:
12/17/2021

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**Estimated Cost** $1,456,700
### Hourly Fee Estimate

**Spring / Fishburne Stormwater Drainage Improvements Division IV (Phase 5)**

**Pump Station Superstructure Preconstruction Services**

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**DAVIS & FLOYD**

*Since 1944*

**CONFIDENTIAL**

1 of 1
Scope of Services
Spring / Fishburne Stormwater Drainage Improvements
Division IV (Phase 5) Pump Station Superstructure Preconstruction Services

PROJECT ADMINISTRATION

Task PA-1. Project Administration
Project Administration includes the set up and use of a project execution plan for services provided. This plan will establish project guidelines and procedures, roles and responsibilities, Quality Management and include the project scope of services with an overall project schedule. Progress Meetings will be held with the City for administrative updates on a monthly basis, and D|F monthly updates in conjunction with the monthly invoicing. Design teams will assemble for weekly meetings during the Design Review task that will cover the completion of remaining technical design elements. The Risk Register will be updated to identify potential project risks and be periodically reviewed and updated to manage identified risks as the design is finalized. The Project Schedule will be updated to monitor and track progress of the various tasks to support timely completion of work. Engineering and construction contract costs will be shared quarterly to reflect expenditures to date as well as yearly costs through the end of this project phase.

This task will include coordination of the work completed as a part of Phase 4 and Phase 5a of the project to include schedule; as-built conditions; laydown areas; transfer of temporary utilities; etc. as well as anticipated needs for coordination with the City’s Medical District Drainage Tunnel Extension at Ehrhardt Street project.

Deliverables
- Monthly Progress Reports
- Monthly Progress Meetings
- Risk Register Updates
- Project Schedule
- Quarterly Construction Contract and Engineering Cost Projections


Task PA-3. Prequalification of Contractors (Upon City Authorization)
Should the City determine that Prequalification of Contractors is desired, the Design Team will prepare an Invitation for Contractor Prequalification/Request for Qualifications package (Prequalification Documents).

Through the prequalification process, the Design Team will assist the City with identification of evaluation criteria, host the Prequalification Documents on the D|F File Transfer Protocol (FTP) site, respond to contractor questions during solicitation, analyze Statement of Qualification (SOQ) packages received from potential contractors, and prepare a recommendation for the City’s determination of Contractor prequalification status.
Scope of Services
Spring / Fishburne Stormwater Drainage Improvements
Division IV (Phase 5) Pump Station Superstructure Preconstruction Services

Deliverables
- City / Design Team Evaluation Criteria Planning Meeting
- Invitation for Contractor Prequalification / Request for Qualification Package
- Prequalification Document Hosting on D|F FTP Site
- Contractor Question Documentation / Design Team Response
- Evaluation and Summary of Contractor Statement of Qualification Packages
- Recommendation for Contractor Prequalification Status
- Contractor Notification of Prequalification Results

DESIGN REVIEW and UPDATES

Task DR-1. Permitting, Code Review, & Basis of Design
All design disciplines will review the current design (October 2009 design drawings and specifications) with reference to the most recent design standards in use through industry standard and/or by codes approved by the City. The 2018 International Building Code (IBC) with South Carolina adopted amendments, is the current code adopted by the City. D|F will also update the existing Technical Memoranda to be incorporated with the pump station Operations & Maintenance Manual, as well as those that require code updates and comments, or changes adopted after completion of the Technical Memos and/or the Design Documents dated October 2009. Additionally, existing project permits will be reviewed, and an updated project permit matrix will be prepared. Permits with expiration dates prior to anticipated project completion will be submitted to agencies to request extensions. Following suitable completion of the design resulting from this Task DR-1, permits known to require updates due to design revisions will be submitted to applicable agencies. It is anticipated that associated agency coordination and permitting submittals will need to be provided for Charleston Water System (CWS) for Water Service, CWS for Sanitary Sewer Grinder Pump, SCDOT for Sanitary Sewer Encroachment, SCDHEC for sanitary sewer force main extension tie-in, and City of Charleston Board of Zoning Appeals (BZA) for necessary Height Variance. It is assumed that a formal City TRC submittal will not be required, and the project will be reviewed at staff level. D|F will provide the necessary coordination and submittals for City staff reviews.

If requested by the City in writing, D|F will engage McMillan Pazdan Smith Architecture as a subconsultant to advise and facilitate coordination with City of Charleston DRC and/or BAR requirements and approval processes. These support services will be provided on an as-needed basis and may include services such as providing guidance on construction drawings / materials specifications, providing consultation over review needs, scheduling and anticipated approval timelines, support for BAR-related meetings, consultation on specifications to support Contractor requirements in response to City requirements, and other services upon request.
Scope of Services
Spring / Fishburne Stormwater Drainage Improvements
Division IV (Phase 5) Pump Station Superstructure Preconstruction Services

Also, as part of this Task, D|F geotechnical engineering sub-consultant S&ME will perform additional field investigations and soil testing to assess site settlement and soil consolidation from Phase 4 construction fill placement to make final pavement recommendations for the Phase 5 site design. S&ME will also perform a site-specific response analysis as required by the 2018 building code to update the seismic coefficients for the Phase 5 building structural design.

Deliverables
- Basis of Design / Technical Memoranda Updates
- Updated Project Permit Matrix
- Permit Submittals / Updates / Extension Requests
  - CWS Water Service
  - Charleston Water System (CWS) sanitary sewer force main connection
  - SCDOT Encroachment Permit (sewer force main crossing of Lockwood Blvd.)
  - SCDHEC sewer permit to operate
  - City of Charleston BZA - Height Variance
  - City TRC Coordination for Staff Review
  - City BAR Final Drawing Coordination
  - USACE 404 / SCDHEC Critical Area

Task DR-2, Design & DR-3, Contracting Update
Design updates to the October 2009 design drawings and specifications include engineering and design to specify and detail the installation of the stormwater pumping equipment (Mechanical) and construction of the Pump Station (Building) necessary due to advancement of Phase 4 Design and Construction, code updates, as-built conditions, and sequence of construction identified in Task DR-1. The design disciplines will include Civil Site, Landscaping, Architectural, Structural, Mechanical, Electrical, Plumbing, Fire Protection, and Instrumentation. The product of this effort will be Construction Documents - Contract Documents (Front-end), Technical Specifications, and Drawings for the work to be constructed. The Contract Documents will utilize EJCDC 2018 General and Supplementary Conditions and coordinating documents.

Contract Documents (Front-End) will be prepared to support construction of the Project under one (final phase) construction contract. The Design Team will utilize the Front-End documents prepared for use with the City’s Ehrhardt Drainage Improvement as approved by the City of Charleston in September 2021. These documents will be revised to support the City’s bidding and contracting of the pump equipment installation and construction of the Pump Station building.

Deliverables
- Project Manual (Front-end Documents and Technical Specifications)
- IFB Design Drawings
Scope of Services
Spring / Fishburne Stormwater Drainage Improvements
Division IV (Phase 5) Pump Station Superstructure Preconstruction Services

BIDDING SERVICES

Task BP-1. Construction Budget and Schedule
As the Design Review and Updates phase concludes, a Final Engineering Estimate of Probable Construction Cost and Construction Schedule will be produced. This estimate will again be based upon an Engineer's opinion of probable costs, with project elements and unit measurements being updated and better defined using the drawings and specifications approved for construction. This deliverable will also be used as a basis for the evaluation of all bids to be received. The schedule will also be based upon the Engineer's opinion of anticipated construction activity durations.

Deliverables
- Construction Schedule
- Final Engineering Estimate of Probable Construction Costs

Task BP-2. Project Bidding
Upon completion of the Design Review and Updates phase, assistance will be provided as the City authorizes the Bidding of the project. Included in this task will be the Advertisement, distribution of Documents, conducting a Pre-Bid Conference, receipt and responses to Bidder Questions, producing and distribution of Addenda, Receipt and Review of Bids, Bid Tabulation, and the Recommendation for Award. After these tasks, D&F will prepare a Notice of Award, solicit Bonding and Insurance Documents, and prepare and coordinate Execution of Agreement and Notice-to-Proceed.

Deliverables
- Advertisement to Bidders
- Pre-Bid Conference Agenda, Attendance, and Minutes
- Bidding Document Hosting on D&F FTP Site
- Contractor Question Documentation / Design Team Response
- Addenda
- Bid Opening Attendance
- Bid Tabulation Summary of Contractor Bids
- Recommendation for Award
- Contractor Notification of Bid Results
- 6 Original Copies of Construction Contract for Contractor / City Use
SUPPLEMENTAL SERVICES
Any work requested by the City that is not included in this detailed Scope of Services will be performed by the Design Team upon the City’s request and will be considered classified as Supplemental Services, to include effort for tasks which require effort above that estimated and included in the attached Fee Summary. Supplemental Services will be invoiced on a time and expense basis. Such services include, but are not necessarily limited to the following:

- Additional meetings with City, local, state, or federal agencies to discuss the project, in particular project funding meetings, briefings, and negotiations
- City-requested support for / at public meetings
- Support to City for full TRC / DRC / BAR coordination / determinations for approval.
- Supplemental engineering work required to meet the requirements of regulatory or funding agencies that become effective subsequent to the date of the Contract Agreement
- Significant redesign due to major code change(s)
- Special consultants or independent professional associates requested or authorized by the City
- Preparation for litigation, arbitration, or other legal or administrative proceedings; and appearances in court or at arbitration sessions in connection with bid protests, change orders, or construction incidents
- Value Engineering reviews and services
- Changes in the general scope, extent, or character of the project, including, but not limited to; changes in size or complexity, City’s schedule, design, or character of construction, City equipment operation and maintenance accommodations or additional associated design revisions, method of financing, or revision of previously accepted studies, reports, design documents, or construction contract documents when such revisions are required by changes in laws, rules, regulations, ordinances, codes, or orders enacted subsequent to the preparation of such studies, reports, documents, or designs; or are required by any other causes beyond Engineer’s control.
November 18, 2021

Davis & Floyd, Inc
3229 W. Montague Avenue
North Charleston, SC 29418

Attention: Mr. Michael Putnam, PE

Subject: Spring/Fishburne Phase 5B Pump Station Superstructure (Amend. No. 13)

Dear Mr. Putnam:

Black & Veatch Corporation is pleased to submit this scope of services to Davis & Floyd to provide design and bidding phase services for the Spring/Fishburne Phase 5B Pump Station Superstructure Project. As described in the Scope of Services Black & Veatch will be assuming Engineer of Record for Building Mechanical, Instrumentation, Electrical, and Fire Protection design. The following attachments are provided to outline our scope, responsibilities and fee.

Attachment No. 01 – Scope of Services
Attachment No. 02 – Responsibility Matrix
Attachment No. 03 – Fee Estimate
Attachment No. 04 – Rate Schedule

Our fee to perform the scope of services described in this document is $503,575, see Attachment No. 03 for a fee breakdown.

If you have any questions or comments, please do not hesitate to contact me.

Sincerely,
Black & Veatch

[Signature]

Stephen A. O’Connell, P.G.
Project Manager

Enclosure(s)
Attachment No. 01 – Scope of Services
Attachment No. 02 – Responsibility Matrix
Attachment No. 03 – Fee Estimate
Attachment No. 04 – Rate Schedule

cc: Mike Horton, P.E. – Davis & Floyd
    Jonathan Ladd, P.E. – Black & Veatch
ATTACHMENT NO. 01 – SCOPE OF SERVICES

Spring/Fishburne Phase 5B
Pump Station Superstructure

Project Summary

This Scope of Services is between Davis & Floyd, Inc. (Engineer) and Black & Veatch (Consultant). Consultant will provide professional engineering services to the Engineer to support the City of Charleston with the Spring/Fishburne Drainage Improvements-Division IV (Phase 5B) Pump Station Superstructure project. Attached for reference is a Responsibility Matrix outlining the responsibilities between Engineer and Consultant.

This Scope of Services duration is based upon a start date from authorized Notice to Proceed (scheduled as February 23, 2022). Based on the design schedule provided by Engineer a design duration of four (4) months and a bidding duration of two (2) months has been assumed.

Engineer’s Responsibilities:
Engineer shall provide Consultant with all criteria and full information as to Engineer’s requirements for the Project, including design objectives and constraints, capacity and performance requirements; and furnish copies of all design and construction standards which Consultant will require to be included in the Drawings and Specifications.

Furnish to Consultant any other available information pertinent to the Project including the following:

- Pump Station building (superstructure) cost estimate (performed by Cummings)
- List of existing technical memorandum required to be updated along with a list of responsible party
- Process logic for operation of pumping system
- Existing electronic drawing files (all CAD drawings assumed in 2-D)
- Existing specifications
- Existing design calculations for systems Consultant is taking responsibility over

Task PA-1: Project Administration
Engineer will have primary responsibility for this task. Consultant will provide services as follows:

1.1 Project Administration: Provide administration of this Scope of Services and coordination with Engineer.
1.2 Monthly Progress Meetings: Consultant’s Project Manager and Engineering Manager will attend 6 monthly progress meetings with the City in support of Engineer.
1.3 Risk Registry: Develop a Risk Registry to identify potential project risks and review periodically to track progress of mitigation or risk management activities.
1.4 Project Scheduling: Prepare and monitor (jointly with Engineer) a project schedule to support timely completion of the work.
1.5 Project Information: Provide supporting information to Engineer for the coordination of the project.
Task PA-2: Construction Contract Approach Coordination
Engineer will have primary responsibility for coordination of the project team in identifying Construction Contracting Approaches and Alternatives (one General Contractor or 2 General Contractors under a design-bid-build procurement method) for the receipt and installation of Owner-furnished equipment, and the construction of the Pump Station Building/Superstructure. Consultant will provide services as follows:

2.1 Contracting Approach Planning Meetings: Consultant’s Project Manager will attend up to two (2) planning meetings with the City (jointly with Engineer).
2.2 Preliminary Alternate Project Scheduling Exhibits: Provide support to Engineer for their development of project scheduling exhibits.
2.3 Order of Magnitude Cost Estimates for Alternates: Review and provide comments on rough order of magnitude cost estimates already completed for the areas of design responsibility assigned to Consultant in Task DR-2.
2.4 Preferred Alternate Project Schedule: Provide construction schedule input and review to Engineer for development of the project schedule for the City’s preferred alternative.

Task PA-3: Preevaluation of Contractors (Upon City Authorization)
Should the City determine that Preevaluation of Contractor’s is desired, the design team will develop up to two Invitation for Contractor Preevaluation / Request for Qualifications (RFQ) packages. Engineer will lead coordination and communication for development and evaluation of RFQ and Contractor Statement of Qualification (SOQ) packages. Consultant will provide services as follows:

3.1 Evaluation Criteria Planning Meeting: Attend a Design Team evaluation criteria planning meeting (jointly with Engineer).
3.2 Invitation for Contractor Preevaluation / Request for Qualification Packages: Provide criteria for preevaluation of Contractors appropriate to the work involving Consultant’s design responsibilities in Task DR-2 (jointly with Engineer).
3.3 Preevaluation Document FTP Site Hosting: Engineer shall host FTP site and be responsible for database management for Task PA-3.
3.4 Contractor Question Documentation / Response: Review Contractor questions and provide Engineer with responses pertaining to qualification statements involving the Consultant’s areas of responsibility outlined in Task DR-2. Engineer is responsible for communicating responses to the City and/or Contractors.
3.5 Evaluation and Summary of Contractor Statement of Qualification Packages: Provide Engineer with an assessment of the submitted SOQs with respect to Consultant’s areas of responsibility.
3.6 Recommendation for Contractor Preevaluation: Evaluate Contractor SOQs and develop a Design Team recommendation for selection of qualified Contractors (jointly with Engineer).
3.7 Contractor Notification of Preevaluation Results: Engineer shall be responsible for communication preevaluation results to Contractors and other appropriate agencies.
DESIGN REVIEW and UPDATES

Task DR-1 Permitting, Code Review, & Basis of Design
Design disciplines, for which the Consultant is responsible, will review the current design with reference to the most recent design standards of practice and/or Codes adopted by the City. Engineer will update existing permits and basis of design. Consultant will provide services as follows:

1.1 **Review October 2009 Design Drawings (Spring/Fishburne US 17 Drainage Improvements, Division IV) w/ reference to Current Design Std. and Bldg. Codes:** Review design drawings specific to the areas of responsibility designated to Consultant in Task DR-2 (jointly with Engineer).

1.2 **Technical Memoranda:** Provide updates to Technical Memoranda (Preliminary Engineering Report, dated 2007) that are required for the basis of design and/or those memoranda that will be incorporated into the Operations and Maintenance Manual. Consultant's responsibility for review and updating technical information specific to those areas of design responsibility designated in Task DR-2 (jointly with Engineer). Technical Memoranda to be updated are TM-PS-1 (Pump Station — Design Criteria, Equipment Selection, Instrumentation and Controls), TM-PS-5 (Pump Station — Mechanical Elements), TM-PS-6 (Pump Station — Electrical Systems).

1.3 **Permit Matrix Updates / Maintenance:** Engineer is responsible for reviewing existing permits and updating the Permit Matrix.

1.4 **Permit Submittals:** Engineer will request extensions for permits that expire prior to anticipated project completion dates.

1.5 **Agency Coordination:** Communicate and coordination of agencies having jurisdiction over areas of the project specific to those design responsibilities designated in Task DR-2 (jointly with Engineer).

Task DR-2 Design Updates
Engineer will coordinate and provide design updates to the 2009 design drawings and specifications for the installation of the stormwater pumping equipment (Process Mechanical) and construction of the Pump Station (Building). The City's preferred contracting approach, determined in Task PA-2, will determine the form and format of the Contracting Documents. Consultant has provided a base scope and fee for the baseline approach of one General Contractor (GC).

Engineer's scope for design will include Civil Site, Landscaping, Architectural, and Process Mechanical (pumping) design. Consultant's scope for design will include Building Mechanical, Electrical, Fire Protection, and Instrumentation and will be the Engineer of Record (EOR) for these disciplines. Consultant will provide services as follows:

2.1 **Design Discipline Coordination:** Provide coordination of design elements for those areas designated to Consultant in this task (jointly with Engineer).

2.2 **Building Mechanical Design and Drawings:** Consultant shall provide Building Mechanical Design commensurate to take over as EOR.

2.3 **Process Mechanical Design:** Engineer shall provide Process Mechanical Design. Consultant has established a budget of 40 hours for general consultation on Engineer's Process Mechanical Design. This budget does not include quality control or detailed investigation/review of Engineer's Process Mechanical Design.
2.4 **Electrical Design and Drawings:** Consultant shall provide Electrical Design commensurate to take over as EOR.

2.5 **Plumbing / Fire Protection Design and Drawings:** Consultant shall provide Plumbing and Fire Protection Design commensurate to take over as EOR.

2.6 **Instrumentation & Controls Design and Drawings:** Consultant shall provide Instrumentation & Controls Design commensurate to take over as EOR.

2.7 **Project Manual Contract Documents:** Provide feedback to Engineer regarding Contract Documents utilizing the City’s Contract Documents or EJCDC (2018) depending on which contracting alternatives are selected (jointly with Engineer).

2.8 **Technical Specifications:** Provide design and technical specification updates for equipment and facilities those areas of design assigned to Consultant in this Task.

2.9 **Project Requirement Specification:** Identify and provide Engineer with updates to the Project Requirements Specification pertaining to areas of the design updates assigned to Consultant in this Task (jointly with Engineer).

**Drawing List**
The Drawing list below was developed based on the October 2009 Drawing Set as provided by the Engineer. Additional Drawings were added where applicable.

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<td>PLUMBING SCHEDULES AND DETAILS</td>
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**Specifications**

Consultant, as EOR, will prepare technical specifications required for Building Mechanical, Electrical, Fire Protection, and Instrumentation design.

**BIDDING SERVICES**

**Task BP-1 Construction Budget and Schedule**

Engineer will have primary responsibility for the Final Engineering Estimate of Probable Construction Costs and Construction Schedule delivered to the City based on the final design updates. Consultant will provide services as follows:

1.1 **Engineering Estimate of Probable Construction Cost (IFB Design):** Provide review and comments on Engineer’s OPCC (secondary to Engineer).

1.2 **IFB Construction Schedule:** Provide updates to project schedules produced in Task PA-2 based on the completed design. Schedule information shall be provided for construction activities pertaining to areas of design assigned to Consultant in Task DR-2 (jointly with Engineer).

**Task BP-2 Bidding Services**

Engineer will coordinate communication with the City for Advertisement and Bidding services associated with the City’s preferred alternative for construction. Consultant will provide services as follows:

2.1 **Pre-Bid Conference Agenda, Attendance, and Minutes:** Attend a Pre-Bid conference for the purpose of explaining project elements for areas of design assigned to Consultant. Engineer shall be responsible for coordinating the meeting and producing meetings or other communications.

2.2 **Contractor Question Documentation / Response:** Review Contractor questions and provide Engineer with responses pertaining to the design involving the Consultant’s areas of responsibility outlined in Task DR-2.

2.3 **Addenda:** Provide revisions to Technical Specifications or Design Drawings pertaining to design elements assigned to Consultant based on Contractor Questions or updated information.
(jointly with Engineer). Engineer shall be responsible for assembling and distribution of Addenda and other Bidding Communication.

2.4 Bid Opening Attendance: Attend Bid Opening (jointly with Engineer).

2.5 Bid Evaluation and Tabulation Summary of Contractor Bids: Provide feedback to Engineer for the evaluation of Bids and Bid Tabulation (jointly with Engineer).

2.6 Recommendation for Award: Review the Bid Tabulation with the Design Team to develop a recommendation for Award (jointly with Engineer).

SUPPLEMENTAL SERVICES

The following items are not included in the scope of services but can be added as supplemental services:

1. Construction Phase Services including but not limited to construction administration, installation, inspections, field testing, and startup of the engine-driven pump system.
2. Attendance at factory testing.
3. Public Outreach
4. Site Civil consultation and design services.
5. Geotechnical consultation and design services.
6. Structural and Architectural consultation and design services.
7. Additional meetings with City, State, or Federal agencies to discuss the project or project funding.
8. Support to City for full Technical Review Committee (TRC) or Design Review Committee (DRC) coordination or determinations for approval.
9. Supplemental engineering work required to meet the requirements of regulatory or funding agencies that become effective subsequent to the date of the Agreement.
10. Special consultants or independent professional associates requested or authorized by the City or Engineer not otherwise included in the Scope of Services.
11. Value Engineering reviews and services.
12. Renderings or photo realistic drawings.
13. Establishing a project communications site.
14. Preparation for litigation, arbitration, or other legal or administrative proceedings; and appearances in court or at arbitration sessions in connection with bid protests, change orders, or construction incidents.
15. Environmental, cultural, or archaeological assessments.
16. Laboratory and field testing and any reports or studies on materials and equipment requested by Owner or Engineer.
17. Hazardous Environmental Conditions:
   a. Remedial investigation/feasibility study or Phase I environmental site assessment to determine the quantity and location of contamination.
   b. Conduct asbestos or lead based paint abatement or other hazardous material abatement of existing facilities.
18. Changes in the general scope, extent, or character of the project, including, but not limited to:
   a. Changes in size or complexity.
   b. Owner’s schedule, design, or character of construction.
c. Method of financing.

d. Revision of previously accepted studies, reports, design documents, or construction contract documents when such revisions are required by changes in laws, rules, regulations, ordinances, codes, or orders enacted subsequent to the preparation of such studies, reports, documents, or designs; or are required by any other causes beyond Engineer's control.

e. Extension of Study, Permitting, Procurement, Bidding, or Construction Phase Services to incorporate long-term capital equipment replacement in excess of the Scope of Services identified above.
## ATTACHMENT NO. 02 – DESIGN AND BIDDING RESPONSIBILITY MATRIX

Spring/Fishburne Phase 5B Pump Station Superstructure

<table>
<thead>
<tr>
<th>Task No.</th>
<th>Task</th>
<th>Davis &amp; Floyd</th>
<th>Black &amp; Veatch</th>
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<td>PA 1.1</td>
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<td>Project Execution Plan</td>
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<td>Project Scheduling</td>
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<td>Project Information</td>
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<td>Quarterly Program Construction Contract and Engineering Cost Projections</td>
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<td>PA 2.1</td>
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<td>Preliminary Alternate Project Scheduling Exhibits</td>
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<td>ROM Cost Estimates for Alternates (Project Sequencing Considerations)</td>
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<td>PA 2.4</td>
<td>Update ROM Preferred Alternate Cost Estimate (Project Sequencing Considerations)</td>
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<td>Invitation for Contractor Prequalification/Request for Qualification Packages</td>
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<td>Prequalification Document FTP Site Hosting</td>
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<td>Contractor Question Documentation/Response</td>
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<td>Evaluation and Summary of Contractor Statement of Qualification Packages</td>
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<td>Recommendation for Contractor Prequalification</td>
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<td>DR 2.8</td>
<td>Electrical Design and Drawings</td>
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# ATTACHMENT NO. 02 – DESIGN AND BIDDING RESPONSIBILITY MATRIX

Spring/Fishburne Phase 5B Pump Station Superstructure

| DR 2.9 | Plumbing/Fire Protection Design and Drawings | - | P |
| DR 2.10 | Instrumentation & Controls Design and Drawings | - | P |
| DR 2.11 | Project Manual Contract Documents | P | S |
| DR 2.12 | Technical Specifications (per respective design responsibilities) | E | E |
| DR 2.13 | Project Requirements Specification | E | E |

**BP-1. Bidding Services**

| BP 1.1 | Review IFB Estimate or OPCC (per respective design responsibilities) | E | E |
| BP 1.2 | IFB Construction Schedule | E | E |

**BP-2. Bidding Services**

<p>| BP 2.1 | Advertisement of Bidders (or Prequalified Contractors, as applicable) | P | - |
| BP 2.2 | Pre-Bid Conference Agenda, Attendance, and Minutes | P | S |
| BP 2.3 | Bid Document FTP Site Hosting | P | - |
| BP 2.4 | Contractor Questions Documentation/Response | E | E |
| BP 2.5 | Addenda | E | E |
| BP 2.6 | Bid Opening Attendance | E | E |
| BP 2.7 | Bid Evaluation and Tabulation Summary of Contractor Bids | P | S |
| BP 2.8 | Recommendation for Award | E | E |
| BP 2.9 | Contractor Notification of Bid Results | P | - |
| BP 2.10 | Hard Copy Construction Contract Executions and Distribution | P | - |</p>
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November 18, 2021
### Black & Veatch - Standard 2021 Personnel Rate Schedule

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The standard hourly rates will be adjusted annually, as of January 1 to reflect equitable changes in the compensation payable to the consultant and shall not exceed a 3% adjustment on any given year.

### Reimbursable Expenses Schedule

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</table>
November 18, 2021

Jim Steverson, AIA
Senior Project Manager
Davis & Floyd, Inc.
1319 Highway 72/221 East
Greenwood, SC 29649

Re: Spring/Fishburne US 17 Drainage Superstructure
Proposal for 90% CD Cost Estimating Services
FP# 20-0351

Dear Jim:

Thank you for offering us the chance to provide a proposal for this project.

We understand that the proposed development comprises:

- New Pump Station Superstructure for the Spring/Fishburne US 17 Drainage project. Consisting of a steel frame structure with precast and brick veneer walls, cylindrical exhaust plenums consisting of steel frame and metal panels, as well as various concrete wells, mezzanines, platforms, and other substructure components.

Our scope of services will include the following:

- Kick-off conference call/meeting (prior to the estimate); and
- 30%, 60%, 90% and final submittal documents detailed estimate
- Follow-up call/meeting to review estimate and update any comments/minor revisions

Our lump sum fixed fee for the 4 estimates is **$30,500 (Thirty Thousand and Five hundred Dollars)**.

Any additional revisions, estimate reconciliation, bid reconciliation, meetings or site visits will be completed on a time and material basis per agreed hourly rates. We have allowed for no significant alternates in our estimate.

We have not included for any extensive value engineering or design option reviews. Reconciliation of our estimates is excluded from the lump sum fee. We can provide these services on a time and material basis.
Our fees assume drawings, specifications, and reports required for the performance of our work will be provided in hard-copy form (one full size set and one ½ size set) and electronically at no cost to Cumming Corporation.

Fees are valid for ninety days from the date of this proposal. Should any of the above tasks be deleted from our scope of services, we reserve the right to adjust the above fees, to reflect possible resultant changes to the scope of the remaining service.

Please note we will require a written authorization to proceed.

We look forward to proceeding with you on this project. We trust the above will be to your satisfaction. We are available to discuss any questions you may have regarding this fee proposal. Please indicate your acceptance by signing below and returning a copy of this document to our office.

Respectfully,

CUMMING:

Jeremy Holt
Managing Director

ACCEPTED:

Jim Steverson
Davis & Floyd

Date: ____________________
TO: John J. Tecklenburg, Mayor
FROM: Luther T. Reynolds DEPT. Police Department
SUBJECT: COST SHARING MOU: CELLEBRITE PREMIUM EXTRACTION SOFTWARE
REQUEST: Approve MOU between CPD and Beaufort County Sheriff's Office and other partnering agencies to share in the application and use of Cellebrite Premium Extraction Software.

COMMITTEE OF COUNCIL: Public Safety DATE: January 11, 2022

COORDINATION: This request has been coordinated with: (attach all recommendations/reviews)

Deputy Chief of Police [X] N/A Signature of Individual Contacted [X] Attachment [X]
Corporation Counsel [X] [ ] [ ] [ ]

FUNDING: Was funding previously approved? Yes [X] No [ ] N/A [ ]

If yes, provide the following: Dept./Div: ___________ Account #: ___________
Balance in Account _________ Amount needed for this item ___________

NEED: Identify any critical time constraint(s).

CFO's Signature: __________________________

FISCAL IMPACT: THERE IS NO COST FOR FY22 USE.

Mayor’s Signature: __________________________

ORIGINATING OFFICE PLEASE NOTE: A FULLY STAFFED/APPROVED (except Mayor’s Signature) PACKAGE IS DUE IN THE CLERK OF COUNCIL’S OFFICE NO LATER THAN 10:00AM THE DAY OF THE CLERK’S AGENDA MEETING.
THIS AGREEMENT is entered by and between the Beaufort County Sheriff's Office and the below listed South Carolina Law Enforcement Agency.

PURPOSE. It is the intent of the parties to share and leverage assets for the benefit of the citizens of the State of South Carolina by better investigating and enforcing criminal laws through a cooperative approach to law enforcement. The goal of this project is to provide use of the equipment for Partnering Agencies. Partnering Agencies will share the Cellebrite Premium ES Extraction Software Program (PREM), and its application and use. This program will have the capability to assist in entry into the mobile phones where security measures have blocked entry into the phone for investigative purposes to retrieve data evidence. It is envisioned that participating law enforcement agencies at all levels will communicate with each other to ensure that PREM is used properly and managed accordingly among those trained to use the equipment and software.

LIABILITY. All Partnering Agencies shall develop and maintain a PREM usage policy that addresses privacy concerns. The Partnering Agencies shall maintain ownership of all data submitted to PREM. Therefore, all ownership rights are to the authority and responsibility of the Partnering Agencies. All data use and handling shall comply with the current laws and statutes with respect to the data. All Partnering Agencies are responsible for developing and maintaining a PREM data retention policy to address privacy concerns in accordance with current federal and state law, and may be limited by system capability. All Partnering Agencies shall adhere to the data retention policy. Partnering Agencies may provide further assistance to neighboring jurisdictions but must maintain control of devices to be utilized on PREM until the data extraction is completed. The data for neighboring or assisted jurisdictions will become the property of that jurisdiction and need not be retained by the Partnering Agency. No party shall assign any rights or delegate any obligations hereunder without the prior written consent of both parties unless specifically provided for in this MOU.

MANAGEMENT. The Beaufort County Sheriff's Office will purchase PREM and maintain the annual lease for the software and equipment. Ownership of any and all equipment will be between BCSO and all Partnering Agencies. The Partnering Agencies will work together to determine the actions, if any, that are appropriate for the department's Information Technology environment, and for implementing any changes deemed to be appropriate to the purposes of this program. The Partnering Agencies will adopt appropriate data sharing policies and procedures document, which is governing MOU. The Partnering Agencies will make reasonable accommodations for all trained partnering agencies officers to access the equipment and software. The Partnering Agencies will ensure that appropriate personnel are made available as reasonably necessary to assist with development, Implementation, and testing of any hardware / software solutions, as well as for any training required, for the purposes of this project.
TRAINING. All partnering Agencies will be responsible for the cost of any training required to implement the use of Cellebrite UFED Premium.

AFFECT ON ANY PRIOR MOU / AGREEMENT. This MOUS superseded and/or replaces any prior contracts or agreements between the parties related to the subject matter contained herein.

EFFECTIVE DATES AND TERMINATION. This MOU will commence immediately upon signature by all parties. The MOU will automatically renew during each successive year. Any party may opt out of the MOU open thirty (30) day written notice as provided for in this agreement.

AMMENDMENTS. This MOU may not be modified or amended except by an instrument of instruments in writing signed by the party against whom enforcement of any such modification or amendment is sought. Either BCSO or the Partnering Agencies may, by an instrument in writing, waive compliance by the other party with any term or provision of this MOU on the part of such other party to be performed or complied with.

MULTIPLE ORIGINALS. This agreement shall be executed in multiple originals and each counterpart shall be given full force and effect.

WITNESS OUR HANDS AND SEALS This ___day of _____________, 2022.

Witness

Date:________________________

Witness

Date:________________________

Witness

Date:________________________

Witness

Date:________________________
TO: John J. Tecklenburg, Mayor
FROM: Chief Luther Reynolds
DEPT. Police Department

SUBJECT: FFY21 DOJ BUREAU OF JUSTICE ASSISTANCE GRANT
REQUEST: Approval to accept an award for the 2021 BJA FY21 Comprehensive Opioid, Stimulant, and Substance Abuse Site-based Program in the amount of $900,000 to be used to fund a Project Coordinator, two Peer Support Specialists and Software to support Overdose follow-up.

COMMITTEE OF COUNCIL: Ways & Means
DATE: January 11, 2022

COORDINATION: This request has been coordinated with: (attach all recommendations/reviews)

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<th>Corporate Counsel</th>
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<td>Cap. Proj. Cmte. Chair</td>
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<td>Grants Coordinator</td>
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Signature of Individual Contacted: [Signature]
Attachment: [Attachment]

FUNDING: Was funding previously approved? Yes [ ] No [X] N/A [ ]
If yes, provide the following: Dept./Div.: [ ] Account #: [ ]
Balance in Account [ ] Amount needed for this item [ ]

Does this document need to be recorded at the RMC's Office? Yes [ ] No [X]

NEED: Identify any critical time constraint(s).

FISCAL IMPACT: There is no match required for this grant. The CPD estimated annual cost of program for conclusion of grant if continued would be $285,000.

Mayor's Signature: John J. Tecklenburg, Mayor

ORIGINATING OFFICE PLEASE NOTE: A FULLY STAFFED/APPROVED (except Mayor's Signature) PACKAGE IS DUE IN THE CLERK OF COUNCIL'S OFFICE NO LATER THAN 10:00AM THE DAY OF THE CLERK'S AGENDA MEETING.
Award Letter

December 17, 2021

Dear Chelsea Taylor,

On behalf of Attorney General Merrick B. Garland, it is my pleasure to inform you the Office of Justice Programs (OJP) has approved the application submitted by CHARLESTON, CITY OF for an award under the funding opportunity entitled 2021 BJA FY 21 Comprehensive Opioid, Stimulant, and Substance Abuse Site-based Program. The approved award amount is $900,000.

Review the Award Instrument below carefully and familiarize yourself with all conditions and requirements before accepting your award. The Award Instrument includes the Award Offer (Award Information, Project Information, Financial Information, and Award Conditions) and Award Acceptance.

Please note that award requirements include not only the conditions and limitations set forth in the Award Offer, but also compliance with assurances and certifications that relate to conduct during the period of performance for the award. These requirements encompass financial, administrative, and programmatic matters, as well as other important matters (e.g., specific restrictions on use of funds). Therefore, all key staff should receive the award conditions, the assurances and certifications, and the application as approved by OJP, so that they understand the award requirements. Information on all pertinent award requirements also must be provided to any subrecipient of the award.

Should you accept the award and then fail to comply with an award requirement, DOJ will pursue appropriate remedies for non-compliance, which may include termination of the award and/or a requirement to repay award funds.

To accept the award, the Authorized Representative(s) must accept all parts of the Award Offer in the Justice Grants System (JustGrants), including by executing the required declaration and certification, within 45 days from the award date.

Congratulations, and we look forward to working with you.

Amy Solomon
Principal Deputy Assistant Attorney General

Office for Civil Rights Notice for All Recipients

The Office for Civil Rights (OCR), Office of Justice Programs (OJP), U.S. Department of Justice (DOJ) has been delegated the responsibility for ensuring that recipients of federal financial assistance from the OJP, the Office of Community Oriented Policing Services (COPS), and the
Office on Violence Against Women (OVW) are not engaged in discrimination prohibited by law. Several federal civil rights laws, such as Title VI of the Civil Rights Act of 1964 and Section 504 of the Rehabilitation Act of 1973, require recipients of federal financial assistance to give assurances that they will comply with those laws. Taken together, these civil rights laws prohibit recipients of federal financial assistance from DOJ from discriminating in services and employment because of race, color, national origin, religion, disability, sex, and, for grants authorized under the Violence Against Women Act, sexual orientation and gender identity. Recipients are also prohibited from discriminating in services because of age. For a complete review of these civil rights laws and nondiscrimination requirements, in connection with DOJ awards, see https://ojp.gov/funding/Explore/LegalOverview/CivilRightsRequirements.htm.

Under the delegation of authority, the OCR investigates allegations of discrimination against recipients from individuals, entities, or groups. In addition, the OCR conducts limited compliance reviews and audits based on regulatory criteria. These reviews and audits permit the OCR to evaluate whether recipients of financial assistance from the Department are providing services in a nondiscriminatory manner to their service population or have employment practices that meet equal-opportunity standards.

If you are a recipient of grant awards under the Omnibus Crime Control and Safe Streets Act or the Juvenile Justice and Delinquency Prevention Act and your agency is part of a criminal justice system, there are two additional obligations that may apply in connection with the awards: (1) complying with the regulation relating to Equal Employment Opportunity Programs (EEOPs); and (2) submitting findings of discrimination to OCR. For additional information regarding the EEO requirement, see 28 CFR Part 42, subpart E, and for additional information regarding requirements when there is an adverse finding, see 28 C.F.R. §§ 42.204(c), .205(c)(5).

The OCR is available to help you and your organization meet the civil rights requirements that are associated with DOJ grant funding. If you would like the OCR to assist you in fulfilling your organization’s civil rights or nondiscrimination responsibilities as a recipient of federal financial assistance, please do not hesitate to contact the OCR at askOCR@ojp.usdoj.gov.

Memorandum Regarding NEPA

NEPA Letter Type
OJP - Categorical Exclusion

NEPA Letter

Awards under the Comprehensive Opioid, Stimulant, and Substance Abuse Site-based Program (COSSAP) will be used to develop, implement, or expand comprehensive programs in response to illicit opioids, stimulants, or other substances of abuse. None of the following activities will be conducted whether under the Office of Justice Programs federal action or a related third party action:

1. New construction.
2. Renovation or remodeling of a property located in an environmentally or historically sensitive area, including property (a) listed on or eligible for listing on the National Register of Historic Places, or (b) located within a 100-year flood plain, a wetland, or habitat for an endangered species.
3. A renovation that will change the basic prior use of a facility or significantly change its size.
4. Research and technology whose anticipated and future application could be expected to have an effect on the environment.
5. Implementation of a program involving the use of chemicals.

https://justgrants.usdoj.gov/binweb/PRAutht/app/NGITS_F3yZ5Bod_kpOExTOT4XnApJXmVNeWxWf1TABTHREAD1?pyActivity=PrintWork&Prompt=false ... 2/3
Additionally, the proposed action is neither a phase nor a segment of a project which when reviewed in its entirety would not meet the criteria for a categorical exclusion. Consequently, the subject federal action meets the Office of Justice Programs' criteria for a categorical exclusion as contained in paragraph 4(b) of Appendix D to Part 61 of Title 28 of the Code of Federal Regulations.

NEPA Coordinator
First Name    Middle Name    Last Name
Orbin        ——             Terry
Award Letter

This award is offered subject to the conditions or limitations set forth in the Award Information, Project Information, Financial Information, and Award Conditions.

Recipient Information

Recipient Name
CHARLESTON, CITY OF

DUNS Number
077990786

Street 1
116 MEETING ST

Street 2

City
CHARLESTON

State/U.S. Territory
South Carolina

Zip/Postal Code
29401

Country
United States

County/Parish

Province

Award Details

Federal Award Date
12/17/21

Award Type
Initial

Award Number
15PBJA-21-GG-04555-COAP

Supplement Number
00

Federal Award Amount

Funding Instrument Type

https://justgrants.usdoj.gov/pweb/PRAuth/app/PGITs_f0y25Bxol7pDExT0T4XnAjxAmV/NeW%3fTABThiREAd17py&Activity=PrintWork&Prompt=false... 1/2
Assistance Listing Number  Assistance Listings Program Title

16.838

Statutory Authority

34 USC 10701; Public Law 116-260, 134 Stat. 1182, 1259. Any awards under this solicitation would be made under statutory authority provided by a full-year appropriations act for FY 2021.

I have read and understand the information presented in this section of the Federal Award Instrument.

› Project Information
› Financial Information
› Award Conditions
› Award Acceptance
This award is offered subject to the conditions or limitations set forth in the Award Information, Project Information, Financial Information, and Award Conditions.

Solicitation Title
2021 BJA FY 21 Comprehensive Opioid, Stimulant, and Substance Abuse Site-based Program

Awarding Agency
OJP

Program Office
BJA

Application Number
GRANT13410547

Grant Manager Name
Dawn Hill

Phone Number
202-598-7513

E-mail Address
Dawn.K.Hill@ojp.usdoj.gov

Project Title
Charleston County Addiction Crisis Task Force: Police Assisted Peer Recovery Outreach Initiative

Performance Period Start Date
10/01/2021

Performance Period End Date
09/30/2024

Budget Period Start Date
10/01/2021

Budget Period End Date
09/30/2024

Project Description
PROJECT ABSTRACT

Project Title: Charleston County Addiction Crisis Task Force:

https://justgrants.usdoj.gov/prweb/PRAuth/app/UGITS_/Sy26Sod_JpDExTOT4XnAjtjAXmVNeW*/%20ABTHREAD1?pyActivity=PrintWork&Prompt=false
Problem Statement

Charleston County continues to be disproportionately impacted by substance use disorder and overdoses. In 2019, Charleston had the second highest number of residents diagnosed with Opioid Use Disorder by state-funded treatment services among South Carolina counties. This is particularly alarming given that South Carolina ranked No.1 in increases of overdose deaths in 2020, with a 64.7% increase in the first eight months compared to the prior year. The City of Charleston has taken great lengths to address the opioid crisis, namely in their partnership with the Police Assisted Addiction and Recovery Initiative (PAARI), and their participation in the Charleston County Addiction Crisis Task Force. In 2018, the CPD, along with other jurisdictional stakeholders, engaged in data reporting to the Overdose Detection Mapping Application Program. Despite this success in information sharing, the region still struggles to synchronize overdose data collection and analysis. Further, county-wide efforts at overdose follow-up are fragmented and inconsistent with regards to each Police Department’s access to a peer support specialist. As the City continues to experience unprecedented increases in drug overdose that often involve multi-jurisdictional victims, it is critical that the region engage in a county-wide outreach and data tracking effort to combat this crisis.

Utilization of Award

To maximize the efficiency and effectiveness of police-based post-overdose outreach teams, the City of Charleston seeks to fund three positions: (1) Project Coordinator to provide data collection and analysis services to all law enforcement agencies in Charleston County; and (2) Peer Support Specialists to support law enforcement officers while conducting this outreach. Additionally, the City seeks to enhance and expand their existing partnership with PAARI to include officer training, oversight of Peer Support Specialists, and the design of multimedia products to be used to inform the officers and the community of this outreach initiative. Finally, if awarded this project will fund a Critical Incident Management Software to facilitate communication between police-based outreach programs and treatment facilities to track follow-up success.

Outcomes

The primary project outcome is to establish a consistent, evidence-based law enforcement diversion program. The ultimate goal of this project is to achieve a 15% reduction in the number of days from overdose to outreach. The project will also improve the ability to track follow-up success that previously was unattainable.
I have read and understand the information presented in this section of the Federal Award Instrument.

› Financial Information
› Award Conditions
› Award Acceptance
Award Letter
Award Information
Project Information
Financial Information

This award is offered subject to the conditions or limitations set forth in the Award Information, Project Information, Financial Information, and Award Conditions.

The recipient budget is currently under review.

I have read and understand the information presented in this section of the Federal Award Instrument.

Award Conditions
Award Acceptance
This award is offered subject to the conditions or limitations set forth in the Award Information, Project Information, Financial Information, and Award Conditions.

Applicability of Part 200 Uniform Requirements

The Uniform Administrative Requirements, Cost Principles, and Audit Requirements in 2 C.F.R. Part 200, as adopted and supplemented by DOJ in 2 C.F.R. Part 2800 (together, the “Part 200 Uniform Requirements”) apply to this FY 2021 award from OJP.

The Part 200 Uniform Requirements were first adopted by DOJ on December 26, 2014. If this FY 2021 award supplements funds previously awarded by OJP under the same award number (e.g., funds awarded during or before December 2014), the Part 200 Uniform Requirements apply with respect to all funds under that award number (regardless of the award date, and regardless of whether derived from the initial award or a supplemental award) that are obligated on or after the acceptance date of this FY 2021 award.

For more information and resources on the Part 200 Uniform Requirements as they relate to OJP awards and subawards (“subgrants”), see the OJP website at https://ojp.gov/funding/Part200UniformRequirements.htm.

Record retention and access: Records pertinent to the award that the recipient (and any subrecipient (“subgrantee”) at any tier) must retain — typically for a period of 3 years from the date of submission of the final expenditure report (SF 425), unless a different retention period applies — and to which the recipient (and any subrecipient (“subgrantee”) at any tier) must provide access, include performance measurement information, in addition to the financial records, supporting documents, statistical records, and other pertinent records indicated at 2 C.F.R. 200.333.

In the event that an award-related question arises from documents or other materials prepared or distributed by OJP that may appear to conflict with, or differ in some way from, the provisions of the Part 200 Uniform Requirements, the recipient is to contact OJP promptly for clarification.

Requirement to report actual or imminent breach of personally identifiable information (PII)

The recipient (and any “subrecipient” at any tier) must have written procedures in place to respond in the event of an actual or imminent “breach” (OMB M-17-12) if it (or a subrecipient) —
(1) creates, collects, uses, processes, stores, maintains, disseminates, discloses, or disposes of "Personally Identifiable Information (PII)" (2 CFR 200.1) within the scope of an OJP grant-funded program or activity, or (2) uses or operates a "Federal information system" (OMB Circular A-130). The recipient's breach procedures must include a requirement to report actual or imminent breach of PII to an OJP Program Manager no later than 24 hours after an occurrence of an actual breach, or the detection of an imminent breach.

3

Required training for Grant Award Administrator and Financial Manager

The Grant Award Administrator and all Financial Managers for this award must have successfully completed an "OJP financial management and grant administration training" by 120 days after the date of the recipient's acceptance of the award. Successful completion of such a training on or after January 1, 2019, will satisfy this condition.

In the event that either the Grant Award Administrator or a Financial Manager for this award changes during the period of performance, the new Grant Award Administrator or Financial Manager must have successfully completed an "OJP financial management and grant administration training" by 120 calendar days after the date the Entity Administrator enters updated Grant Award Administrator or Financial Manager information in JustGrants. Successful completion of such a training on or after January 1, 2019, will satisfy this condition.

A list of OJP trainings that OJP will consider "OJP financial management and grant administration training" for purposes of this condition is available at https://www.ojp.gov/training/fmmts.htm. All trainings that satisfy this condition include a session on grant fraud prevention and detection.

The recipient should anticipate that OJP will immediately withhold ("freeze") award funds if the recipient fails to comply with this condition. The recipient's failure to comply also may lead OJP to impose additional appropriate conditions on this award.

4

Safe policing and law enforcement subrecipients

If this award is a discretionary award, the recipient agrees that it will not make any subawards to State, local, college, or university law enforcement agencies unless such agencies have been certified by an approved independent credentialing body or have started the certification process. To become certified, law enforcement agencies must meet two mandatory conditions: (1) the agency's use of force policies adhere to all applicable federal, state, and local laws; and (2) the agency's use of force policies prohibit chokeholds except in situations where use of deadly force is allowed by law. For detailed information on this certification requirement, see https://cops.usdoj.gov/SafePolicingEO.

5

Effect of failure to address audit issues

The recipient understands and agrees that the DOJ awarding agency (OJP or OVW, as appropriate) may withhold award funds, or may impose other related requirements, if (as determined by the DOJ awarding agency) the recipient does not satisfactorily and promptly address outstanding issues from audits required by the Part 200 Uniform Requirements (or by the terms of this award), or other outstanding issues that arise in connection with audits, investigations, or reviews of DOJ awards.
Requirements of the award; remedies for non-compliance or for materially false statements

The conditions of this award are material requirements of the award. Compliance with any assurances or certifications submitted by or on behalf of the recipient that relate to conduct during the period of performance also is a material requirement of this award.

Limited Exceptions. In certain special circumstances, the U.S. Department of Justice ("DOJ") may determine that it will not enforce, or enforce only in part, one or more requirements otherwise applicable to the award. Any such exceptions regarding enforcement, including any such exceptions made during the period of performance, are (or will be during the period of performance) set out through the Office of Justice Programs ("OJP") webpage entitled "Legal Notices: Special circumstances as to particular award conditions" (ojp.gov/funding/Explore/LegalNotices-AwardReqs.htm), and incorporated by reference into the award.

By signing and accepting this award on behalf of the recipient, the authorized recipient official accepts all material requirements of the award, and specifically adopts, as if personally executed by the authorized recipient official, all assurances or certifications submitted by or on behalf of the recipient that relate to conduct during the period of performance.

Failure to comply with one or more award requirements — whether a condition set out in full below, a condition incorporated by reference below, or an assurance or certification related to conduct during the award period — may result in OJP taking appropriate action with respect to the recipient and the award. Among other things, the OJP may withhold award funds, disallow costs, or suspend or terminate the award. DOJ, including OJP, also may take other legal action as appropriate.

Any materially false, fictitious, or fraudulent statement to the federal government related to this award (or concealment or omission of a material fact) may be the subject of criminal prosecution (including under 18 U.S.C. 1001 and/or 1621, and/or 34 U.S.C. 10271-10273), and also may lead to imposition of civil penalties and administrative remedies for false claims or otherwise (including under 31 U.S.C. 3729-3730 and 3601-3612).

Should any provision of a requirement of this award be held to be invalid or unenforceable by its terms, that provision shall first be applied with a limited construction so as to give it the maximum effect permitted by law. Should it be held, should the provision is utterly invalid or unenforceable, such provision shall be deemed severable from this award.

Compliance with DOJ regulations pertaining to civil rights and nondiscrimination - 28 C.F.R. Part 38

The recipient, and any subrecipient ("subgrantee") at any tier, must comply with all applicable requirements of 28 C.F.R. Part 38 (as may be applicable from time to time), specifically including any applicable requirements regarding written notice to program beneficiaries and prospective program beneficiaries.

Currently, among other things, 28 C.F.R. Part 38 includes rules that prohibit specific forms of discrimination on the basis of religion, a religious belief, a refusal to hold a religious belief, or refusal to attend or participate in a religious practice. Part 38, currently, also sets out rules and requirements that pertain to recipient and subrecipient ("subgrantee") organizations that engage in or conduct explicitly religious activities, as well as rules and requirements that pertain to
recipients and subrecipients that are faith-based or religious organizations.


Compliance with DOJ regulations pertaining to civil rights and nondiscrimination - 28 C.F.R. Part 42

The recipient, and any subrecipient ("subgrantee") at any tier, must comply with all applicable requirements of 28 C.F.R. Part 42, specifically including any applicable requirements in Subpart E of 28 C.F.R. Part 42 that relate to an equal employment opportunity program.

Compliance with DOJ regulations pertaining to civil rights and nondiscrimination - 28 C.F.R. Part 54

The recipient, and any subrecipient ("subgrantee") at any tier, must comply with all applicable requirements of 28 C.F.R. Part 54, which relates to nondiscrimination on the basis of sex in certain "education programs."

Compliance with 41 U.S.C. 4712 (including prohibitions on reprisal; notice to employees)

The recipient (and any subrecipient at any tier) must comply with, and is subject to, all applicable provisions of 41 U.S.C. 4712, including all applicable provisions that prohibit, under specified circumstances, discrimination against an employee as reprisal for the employee's disclosure of information related to gross mismanagement of a federal grant, a gross waste of federal funds, an abuse of authority relating to a federal grant, a substantial and specific danger to public health or safety, or a violation of law, rule, or regulation related to a federal grant.

The recipient also must inform its employees, in writing (and in the predominant native language of the workforce), of employee rights and remedies under 41 U.S.C. 4712.

Should a question arise as to the applicability of the provisions of 41 U.S.C. 4712 to this award, the recipient is to contact the DOJ awarding agency (OJP or OVW, as appropriate) for guidance.

Compliance with applicable rules regarding approval, planning, and reporting of conferences, meetings, trainings, and other events

The recipient, and any subrecipient ("subgrantee") at any tier, must comply with all applicable laws, regulations, policies, and official DOJ guidance (including specific cost limits, prior approval and reporting requirements, where applicable) governing the use of federal funds for expenses related to conferences (as that term is defined by DOJ), including the provision of food and/or beverages at such conferences, and costs of attendance at such conferences.

Information on the pertinent DOJ definition of conferences and the rules applicable to this award appears in the DOJ Grants Financial Guide (currently, as section 3.10 of "Postaward Requirements" in the "DOJ Grants Financial Guide").
Requirement for data on performance and effectiveness under the award

The recipient must collect and maintain data that measure the performance and effectiveness of work under this award. The data must be provided to OJP in the manner (including within the timeframes) specified by OJP in the program solicitation or other applicable written guidance. Data collection supports compliance with the Government Performance and Results Act (GPRA) and the GPRA Modernization Act of 2010, and other applicable laws.

Requirements related to "de minimis" indirect cost rate

A recipient that is eligible under the Part 200 Uniform Requirements and other applicable law to use the "de minimis" indirect cost rate described in 2 C.F.R. 200.414(f), and that elects to use the "de minimis" indirect cost rate, must advise OJP in writing of both its eligibility and its election, and must comply with all associated requirements in the Part 200 Uniform Requirements. The "de minimis" rate may be applied only to modified total direct costs (MTDC) as defined by the Part 200 Uniform Requirements.

Determination of suitability to interact with participating minors

SCOPE. This condition applies to this award if it is indicated -- in the application for the award (as approved by DOJ) or in the application for any subaward, at any tier, the DOJ funding announcement (solicitation), or an associated federal statute -- that a purpose of some or all of the activities to be carried out under the award (whether by the recipient, or a subrecipient at any tier) is to benefit a set of individuals under 18 years of age.

The recipient, and any subrecipient at any tier, must make determinations of suitability before certain individuals may interact with participating minors. This requirement applies regardless of an individual’s employment status.

The details of this requirement are posted on the OJP web site at https://ojp.gov/funding/Explore/Interact-Minors.htm (Award condition: Determination of suitability required, in advance, for certain individuals who may interact with participating minors), and are incorporated by reference here.

Requirement to disclose whether recipient is designated "high risk" by a federal grant-making agency outside of DOJ

If the recipient is designated "high risk" by a federal grant-making agency outside of DOJ, currently or at any time during the course of the period of performance under this award, the recipient must disclose that fact and certain related information to OJP by email at OJP.ComplianceReporting@ojp.usdoj.gov. For purposes of this disclosure, high risk includes any status under which a federal awarding agency provides additional oversight due to the recipient’s past performance, or other programmatic or financial concerns with the recipient. The recipient’s disclosure must include the following: 1. The federal awarding agency that currently designates the recipient high risk, 2. The date the recipient was designated high risk, 3. The
high-risk point of contact at that federal awarding agency (name, phone number, and email address), and 4. The reasons for the high-risk status, as set out by the federal awarding agency.

16
Compliance with DOJ Grants Financial Guide

References to the DOJ Grants Financial Guide are to the DOJ Grants Financial Guide as posted on the OJP website (currently, the "DOJ Grants Financial Guide" available at https://ojp.gov/financialguide/DOJ/index.htm), including any updated version that may be posted during the period of performance. The recipient agrees to comply with the DOJ Grants Financial Guide.

17
Encouragement of policies to ban text messaging while driving

Pursuant to Executive Order 13513, "Federal Leadership on Reducing Text Messaging While Driving," 74 Fed. Reg. 51225 (October 1, 2009), DOJ encourages recipients and subrecipients ("subgrantees") to adopt and enforce policies banning employees from text messaging while driving any vehicle during the course of performing work funded by this award, and to establish workplace safety policies and conduct education, awareness, and other outreach to decrease crashes caused by distracted drivers.

18
Compliance with general appropriations-law restrictions on the use of federal funds (FY 2021)

The recipient, and any subrecipient ("subgrantee") at any tier, must comply with all applicable restrictions on the use of federal funds set out in federal appropriations statutes. Pertinent restrictions, including from various "general provisions" in the Consolidated Appropriations Act, 2021, are set out at https://ojp.gov/funding/Explore/FY21AppropriationsRestrictions.htm, and are incorporated by reference here.

Should a question arise as to whether a particular use of federal funds by a recipient (or a subrecipient) would or might fall within the scope of an appropriations-law restriction, the recipient is to contact OJP for guidance, and may not proceed without the express prior written approval of OJP.

19
Potential imposition of additional requirements

The recipient agrees to comply with any additional requirements that may be imposed by the DOJ awarding agency (OJP or OVW, as appropriate) during the period of performance for this award, if the recipient is designated as "high-risk" for purposes of the DOJ high-risk grantee list.

20
Employment eligibility verification for hiring under the award

1. The recipient (and any subrecipient at any tier) must--

A. Ensure that, as part of the hiring process for any position within the United States that is or will be funded (in whole or in part) with award funds, the recipient (or any subrecipient) properly verifies the employment eligibility of the individual who is being hired, consistent with the

B. Notify all persons associated with the recipient (or any subrecipient) who are or will be involved in activities under this award of both—

(1) this award requirement for verification of employment eligibility, and

(2) the associated provisions in 8 U.S.C. 1324a(a)(1) that, generally speaking, make it unlawful, in the United States, to hire (or recruit for employment) certain aliens.

C. Provide training (to the extent necessary) to those persons required by this condition to be notified of the award requirement for employment eligibility verification and of the associated provisions of 8 U.S.C. 1324a(a)(1).

D. As part of the recordkeeping for the award (including pursuant to the Part 200 Uniform Requirements), maintain records of all employment eligibility verifications pertinent to compliance with this award condition in accordance with Form I-9 record retention requirements, as well as records of all pertinent notifications and trainings.

2. Monitoring

The recipient’s monitoring responsibilities include monitoring of subrecipient compliance with this condition.

3. Allowable costs

To the extent that such costs are not reimbursed under any other federal program, award funds may be obligated for the reasonable, necessary, and allocable costs (if any) of actions designed to ensure compliance with this condition.

4. Rules of construction

A. Staff involved in the hiring process

For purposes of this condition, persons "who are or will be involved in activities under this award" specifically includes (without limitation) any and all recipient (or any subrecipient) officials or other staff who are or will be involved in the hiring process with respect to a position that is or will be funded (in whole or in part) with award funds.

B. Employment eligibility confirmation with E-Verify

For purposes of satisfying the requirement of this condition regarding verification of employment eligibility, the recipient (or any subrecipient) may choose to participate in, and use, E-Verify (www.e-verify.gov), provided an appropriate person authorized to act on behalf of the recipient (or subrecipient) uses E-Verify (and follows the proper E-Verify procedures, including in the event of a "Tentative Nonconfirmation" or a "Final Nonconfirmation") to confirm employment eligibility for each hiring for a position in the United States that is or will be funded (in whole or in part) with award funds.

C. "United States" specifically includes the District of Columbia, Puerto Rico, Guam, the Virgin Islands of the United States, and the Commonwealth of the Northern Mariana Islands.

D. Nothing in this condition shall be understood to authorize or require any recipient, any subrecipient at any tier, or any person or other entity, to violate any federal law, including any applicable civil rights or nondiscrimination law.
E. Nothing in this condition, including in paragraph 4.B., shall be understood to relieve any recipient, any subrecipient at any tier, or any person or other entity, of any obligation otherwise imposed by law, including 8 U.S.C. 1324a(a)(1).

Questions about E-Verify should be directed to DHS. For more information about E-Verify visit the E-Verify website (https://www.e-verify.gov/) or email E-Verify at E-Verify@dhs.gov. E-Verify employer agents can email E-Verify at E-VerifyEmployerAgent@dhs.gov.

Questions about the meaning or scope of this condition should be directed to OJP, before award acceptance.

Restrictions and certifications regarding non-disclosure agreements and related matters

No recipient or subrecipient ("subgrantee") under this award, or entity that receives a procurement contract or subcontract with any funds under this award, may require any employee or contractor to sign an internal confidentiality agreement or statement that prohibits or otherwise restricts, or purports to prohibit or restrict, the reporting (in accordance with law) of waste, fraud, or abuse to an investigative or law enforcement representative of a federal department or agency authorized to receive such information.

The foregoing is not intended, and shall not be understood by the agency making this award, to contravene requirements applicable to Standard Form 312 (which relates to classified information), Form 4414 (which relates to sensitive compartmented information), or any other form issued by a federal department or agency governing the nondisclosure of classified information.

1. In accepting this award, the recipient--

a. represents that it neither requires nor has required internal confidentiality agreements or statements from employees or contractors that currently prohibit or otherwise currently restrict (or purport to prohibit or restrict) employees or contractors from reporting waste, fraud, or abuse as described above; and

b. certifies that, if it learns or is notified that it is or has been requiring its employees or contractors to execute agreements or statements that prohibit or otherwise restrict (or purport to prohibit or restrict), reporting of waste, fraud, or abuse as described above, it will immediately stop any further obligations of award funds, will provide prompt written notification to the federal agency making this award, and will resume (or permit resumption of) such obligations only if expressly authorized to do so by that agency.

2. If the recipient does or is authorized under this award to make subawards ("subgrants"), procurement contracts, or both--

a. it represents that--

(1) it has determined that no other entity that the recipient's application proposes may or will receive award funds (whether through a subaward ("subgrant"), procurement contract, or subcontract under a procurement contract) either requires or has required internal confidentiality agreements or statements from employees or contractors that currently prohibit or otherwise currently restrict (or purport to prohibit or restrict) employees or contractors from reporting waste, fraud, or abuse as described above; and

(2) it has made appropriate inquiry, or otherwise has an adequate factual basis, to support this
representation; and

b. it certifies that, if it learns or is notified that any subrecipient, contractor, or subcontractor entity that receives funds under this award is or has been requiring its employees or contractors to execute agreements or statements that prohibit or otherwise restrict (or purport to prohibit or restrict), reporting of waste, fraud, or abuse as described above, it will immediately stop any further obligations of award funds to or by that entity, will provide prompt written notification to the federal agency making this award, and will resume (or permit resumption of) such obligations only if expressly authorized to do so by that agency.

Reclassification of various statutory provisions to a new Title 34 of the United States Code

On September 1, 2017, various statutory provisions previously codified elsewhere in the U.S. Code were editorially reclassified (that is, moved and renumbered) to a new Title 34, entitled "Crime Control and Law Enforcement." The reclassification encompassed a number of statutory provisions pertinent to OJP awards (that is, OJP grants and cooperative agreements), including many provisions previously codified in Title 42 of the U.S. Code.

Effective as of September 1, 2017, any reference in this award document to a statutory provision that has been reclassified to the new Title 34 of the U.S. Code is to be read as a reference to that statutory provision as reclassified to Title 34. This rule of construction specifically includes references set out in award conditions, references set out in material incorporated by reference through award conditions, and references set out in other award requirements.

OJP Training Guiding Principles

Any training or training materials that the recipient — or any subrecipient ("subgrantee") at any tier — develops or delivers with OJP award funds must adhere to the OJP Training Guiding Principles for Grantees and Subgrantees, available at https://ojp.gov/funding/Implement/TrainingPrinciplesForGrantees-Subgrantees.htm.

All subawards ("subgrants") must have specific federal authorization

The recipient, and any subrecipient ("subgrantee") at any tier, must comply with all applicable requirements for authorization of any subaward. This condition applies to agreements that — for purposes of federal grants administrative requirements — OJP considers a "subaward" (and therefore does not consider a procurement "contract").

The details of the requirement for authorization of any subaward are posted on the OJP web site at https://ojp.gov/funding/Explore/SubawardAuthorization.htm (Award condition: All subawards ("subgrants") must have specific federal authorization), and are incorporated by reference here.

Requirements related to System for Award Management and Universal Identifier Requirements

The recipient must comply with applicable requirements regarding the System for Award Management (SAM), currently accessible at https://www.sam.gov/. This includes applicable requirements regarding registration with SAM, as well as maintaining the currency of Information
The recipient also must comply with applicable restrictions on subawards ("subgrants") to first-tier subrecipients (first-tier "subgrantees"), including restrictions on subawards to entities that do not acquire and provide (to the recipient) the unique entity identifier required for SAM registration.

The details of the recipient's obligations related to SAM and to unique entity identifiers are posted on the OJP web site at https://ojp.gov/funding/Explore/SAM.htm (Award condition: System for Award Management (SAM) and Universal Identifier Requirements), and are incorporated by reference here.

This condition does not apply to an award to an individual who received the award as a natural person (i.e., unrelated to any business or non-profit organization that he or she may own or operate in his or her name).

Restrictions on "lobbying"

In general, as a matter of federal law, federal funds awarded by OJP may not be used by the recipient, or any subrecipient ("subgrantee") at any tier, either directly or indirectly, to support or oppose the enactment, repeal, modification, or adoption of any law, regulation, or policy, at any level of government. See 18 U.S.C. 1913. (There may be exceptions if an applicable federal statute specifically authorizes certain activities that otherwise would be barred by law.)

Another federal law generally prohibits federal funds awarded by OJP from being used by the recipient, or any subrecipient at any tier, to pay any person to influence (or attempt to influence) a federal agency, a Member of Congress, or Congress (or an official or employee of any of them) with respect to the awarding of a federal grant or cooperative agreement, subgrant, contract, subcontract, or loan, or with respect to actions such as renewing, extending, or modifying any such award. See 31 U.S.C. 1352. Certain exceptions to this law apply, including an exception that applies to Indian tribes and tribal organizations.

Should any question arise as to whether a particular use of federal funds by a recipient (or subrecipient) would or might fall within the scope of these prohibitions, the recipient is to contact OJP for guidance, and may not proceed without the express prior written approval of OJP.

Specific post-award approval required to use a noncompetitive approach in any procurement contract that would exceed $250,000

The recipient, and any subrecipient ("subgrantee") at any tier, must comply with all applicable requirements to obtain specific advance approval to use a noncompetitive approach in any procurement contract that would exceed the Simplified Acquisition Threshold (currently, $250,000). This condition applies to agreements that -- for purposes of federal grants administrative requirements -- OJP considers a procurement "contract" (and therefore does not consider a subaward).

The details of the requirement for advance approval to use a noncompetitive approach in a procurement contract under an OJP award are posted on the OJP web site at https://ojp.gov/funding/Explore/NoncompetitiveProcurement.htm (Award condition: Specific post-award approval required to use a noncompetitive approach in a procurement contract (if contract would exceed $250,000)), and are incorporated by reference here.
Requirements pertaining to prohibited conduct related to trafficking in persons (including reporting requirements and OJP authority to terminate award)

The recipient, and any subrecipient ("subgrantee") at any tier, must comply with all applicable requirements (including requirements to report allegations) pertaining to prohibited conduct related to the trafficking of persons, whether on the part of recipients, subrecipients ("subgrantees"), or individuals defined (for purposes of this condition) as "employees" of the recipient or of any subrecipient.

The details of the recipient's obligations related to prohibited conduct related to trafficking in persons are posted on the OJP website at https://ojp.gov/funding/Explore/ProhibitedConduct-Trafficking.htm (Award condition: Prohibited conduct by recipients and subrecipients related to trafficking in persons (including reporting requirements and OJP authority to terminate award)), and are incorporated by reference here.

Requirement to report potentially duplicative funding

If the recipient currently has other active awards of federal funds, or if the recipient receives any other award of federal funds during the period of performance for this award, the recipient promptly must determine whether funds from any of those other federal awards have been, are being, or are to be used (in whole or in part) for one or more of the identical cost items for which funds are provided under this award. If so, the recipient must promptly notify the DOJ awarding agency (OJP or OVW, as appropriate) in writing of the potential duplication, and, if so requested by the DOJ awarding agency, must seek a budget-modification or change-of-project-scope Grant Award Modification (GAM) to eliminate any inappropriate duplication of funding.

Reporting potential fraud, waste, and abuse, and similar misconduct

The recipient, and any subrecipients ("subgrantees") at any tier, must promptly refer to the DOJ Office of the Inspector General (OIG) any credible evidence that a principal, employee, agent, subrecipient, contractor, subcontractor, or other person has, in connection with funds under this award— (1) submitted a claim that violates the False Claims Act; or (2) committed a criminal or civil violation of laws pertaining to fraud, conflict of interest, bribery, gratuity, or similar misconduct.

Potential fraud, waste, abuse, or misconduct involving or relating to funds under this award should be reported to the OIG by—(1) online submission accessible via the OIG webpage at https://oig.justice.gov/hotline/contact-grants.htm (select "Submit Report Online"); (2) mail directed to: U.S. Department of Justice, Office of the Inspector General, Investigations Division, ATTN: Grantee Reporting, 950 Pennsylvania Ave., NW, Washington, DC 20530; and/or (3) by facsimile directed to the DOJ OIG Investigations Division (Attn: Grantee Reporting) at (202) 616-9881 (fax).

Additional information is available from the DOJ OIG website at https://oig.justice.gov/hotline.

FFATA reporting: Subawards and executive compensation

https://justgrants.usdoj.gov/prweb/PRAuth/app/UGITS_3yZ6Gxvd_jp/DExTO7YkJzjA7YIT78N строки#/T713BRD?ppActivity=PrintWork%2526Prompt=flat...
The recipient must comply with applicable requirements to report first-tier subawards ("subgrants") of $30,000 or more and, in certain circumstances, to report the names and total compensation of the five most highly compensated executives of the recipient and first-tier subrecipients (first-tier "subgrantees") of award funds. The details of recipient obligations, which derive from the Federal Funding Accountability and Transparency Act of 2006 (FFATA), are posted on the OJP website at https://ojp.gov/funding/Explore/FFATA.htm (Award condition: Reporting Subawards and Executive Compensation), and are incorporated by reference here.

This condition, including its reporting requirement, does not apply to—(1) an award of less than $30,000, or (2) an award made to an individual who received the award as a natural person (i.e., unrelated to any business or nonprofit organization that he or she may own or operate in his or her name).

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Justification of consultant rate

Approval of this award does not indicate approval of any consultant rate in excess of $650 per day. A detailed justification must be submitted to and approved by the OJP program office prior to obligation or expenditure of such funds.

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The recipient agrees to submit to BJA for review and approval any curricula, training materials, proposed publications, reports, or any other written materials that will be published, including web-based materials and web site content, through funds from this grant at least thirty (30) working days prior to the targeted dissemination date. Any written, visual, or audio publications, with the exception of press releases, whether published at the grantee’s or government’s expense, shall contain the following statement: "This project was supported by Grant No. <AWARD_NUMBER> awarded by the Bureau of Justice Assistance. The Bureau of Justice Assistance is a component of the Department of Justice's Office of Justice Programs, which also includes the Bureau of Justice Statistics, the National Institute of Justice, the Office of Juvenile Justice and Delinquency Prevention, the Office for Victims of Crime, and the SMART Office. Points of view or opinions in this document are those of the author and do not necessarily represent the official position or policies of the U.S. Department of Justice." The current edition of the DOJ Grants Financial Guide provides guidance on allowable printing and publication activities.

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The recipient agrees to cooperate with any assessments, national evaluation efforts, or information or data collection requests, including, but not limited to, the provision of any information required for the assessment or evaluation of any activities within this project.

35
Recipient integrity and performance matters: Requirement to report information on civil, criminal, and administrative proceedings to SAM and FAPIIS

The recipient must comply with any and all applicable requirements regarding reporting of information on civil, criminal, and administrative proceedings connected with (or connected to the performance of) either this OJP award or any other grant, cooperative agreement, or procurement contract from the federal government. Under certain circumstances, recipients of OJP awards are required to report information about such proceedings, through the federal...
System for Award Management (known as "SAM"), to the designated federal integrity and performance system (currently, "FAPIIS").

The details of recipient obligations regarding the required reporting (and updating) of information on certain civil, criminal, and administrative proceedings to the federal designated integrity and performance system (currently, "FAPIIS") within SAM are posted on the OJP web site at https://ojp.gov/funding/FAPIIS.htm (Award condition: Recipient Integrity and Performance Matters, including Recipient Reporting to FAPIIS), and are incorporated by reference here.

Applicants must certify that Limited English Proficiency persons have meaningful access to the services under this program(s). National origin discrimination includes discrimination on the basis of limited English proficiency (LEP). To ensure compliance with Title VI and the Safe Streets Act, recipients are required to take reasonable steps to ensure that LEP persons have meaningful access to their programs. Meaningful access may entail providing language assistance services, including oral and written translation when necessary. The U.S. Department of Justice has issued guidance for grantees to help them comply with Title VI requirements. The guidance document can be accessed on the Internet at www.lep.gov.

Cooperating with OJP Monitoring

The recipient agrees to cooperate with OJP monitoring of this award pursuant to OJP’s guidelines, protocols, and procedures, and to cooperate with OJP (including the grant manager for this award and the Office of Chief Financial Officer (OCFO)) requests related to such monitoring, including requests related to desk reviews and/or site visits. The recipient agrees to provide to OJP all documentation necessary for OJP to complete its monitoring tasks, including documentation related to any subawards made under this award. Further, the recipient agrees to abide by reasonable deadlines set by OJP for providing the requested documents. Failure to cooperate with OJP’s monitoring activities may result in actions that affect the recipient’s DOJ awards, including, but not limited to: withholdings and/or other restrictions on the recipient’s access to award funds; referral to the DOJ OIG for audit review; designation of the recipient as a DOJ High Risk grantee; or termination of an award(s).

Verification and updating of recipient contact information

The recipient must verify its Grant Award Administrator, Financial Manager, and Authorized Representative contact information in JustGrants, including telephone number and e-mail address. If any information is incorrect or has changed, the award recipient’s Entity Administrator must make changes to contact information through DIAMD. Instructions on how to update contact information in JustGrants can be found at https://justicegrants.usdoj.gov/training/training-entity-management.

Protection of human research subjects

The recipient (and any subrecipient at any tier) must comply with the requirements of 28 C.F.R. Part 46 and all OJP policies and procedures regarding the protection of human research subjects, including obtaining of Institutional Review Board approval, if appropriate, and subject informed consent.
Limit on use of grant funds for grantees' employees' salaries

With respect to this award, federal funds may not be used to pay cash compensation (salary plus bonuses) to any employee of the award recipient at a rate that exceeds 110% of the maximum annual salary payable to a member of the federal government's Senior Executive Service (SES) at an agency with a Certified SES Performance Appraisal System for that year. (An award recipient may compensate an employee at a higher rate, provided the amount in excess of this compensation limitation is paid with non-federal funds.)

This limitation on compensation rates allowable under this award may be waived on an individual basis at the discretion of the OJP official indicated in the program announcement under which this award is made.

Any Web site that is funded in whole or in part under this award must include the following statement on the home page, on all major entry pages (i.e., pages (exclusive of documents) whose primary purpose is to navigate the user to interior content), and on any pages from which a visitor may access or use a Web-based service, including any pages that provide results or outputs from the service:

"This Web site is funded (insert "in part," if applicable) through a grant from the [insert name of OJP component], Office of Justice Programs, U.S. Department of Justice. Neither the U.S. Department of Justice nor any of its components operate, control, are responsible for, or necessarily endorse, this Web site (including, without limitation, its content, technical infrastructure, and policies, and any services or tools provided)."

The full text of the foregoing statement must be clearly visible on the home page. On other pages, the statement may be included through a link, entitled "Notice of Federal Funding and Federal Disclaimer," to the full text of the statement.

Confidentiality of data

The recipient (and any subrecipient at any tier) must comply with all confidentiality requirements of 34 U.S.C. 10231 and 28 C.F.R. Part 22 that are applicable to collection, use, and revelation of data or information. The recipient further agrees, as a condition of award approval, to submit a Privacy Certificate that is in accord with requirements of 28 C.F.R. Part 22 and, in particular, 28 C.F.R. 22.23.

The award recipient agrees to participate in a data collection process measuring program outputs and outcomes. The data elements for this process will be outlined by the Office of Justice Programs.

Any organization using Office of Justice Programs grant funds, in whole or in part, to collect, aggregate, and/or share data on behalf of a government agency, must guarantee that the agency that owns the data and its approved designee(s) will retain unrestricted access to the...
data, in accordance with all applicable law, regulations, and BJA policy: a) in an expeditious manner upon request by the agency; b) in a clearly defined format that is open, user-friendly, and unfettered by unreasonable proprietary restrictions; and c) at a minimal additional cost to the requestor (which cost may be borne by using grant funds).

Copyright; Data rights

The recipient acknowledges that OJP reserves a royalty-free, non-exclusive, and irrevocable license to reproduce, publish, or otherwise use, and authorize others to use (in whole or in part, including in connection with derivative works), for Federal purposes: (1) any work subject to copyright developed under an award or subaward (at any tier); and (2) any rights of copyright to which a recipient or subrecipient (at any tier) purchases ownership with Federal support.

The recipient acknowledges that OJP has the right to (1) obtain, reproduce, publish, or otherwise use the data first produced under any such award or subaward; and (2) authorize others to receive, reproduce, publish, or otherwise use such data for Federal purposes. "Data" includes data as defined in Federal Acquisition Regulation (FAR) provision 52.227-14 (Rights in Data - General).

It is the responsibility of the recipient (and of each subrecipient (at any tier), if applicable) to ensure that the provisions of this condition are included in any subaward (at any tier) under this award.

The recipient has the responsibility to obtain from subrecipients, contractors, and subcontractors (if any) all rights and data necessary to fulfill the recipient's obligations to the Government under this award. If a proposed subrecipient, contractor, or subcontractor refuses to accept terms affording the Government such rights, the recipient shall promptly bring such refusal to the attention of the OJP program manager for the award and not proceed with the agreement in question without further authorization from the OJP program office.

Justice Information Sharing

Information sharing projects funded under this award must comply with DOJ's Global Justice Information Sharing Initiative (Global) guidelines. The recipient (and any subrecipient at any tier) must conform to the Global Standards Package (GSP) and all constituent elements, where applicable, as described at: https://it.ojp.gov/gsp_grantcondition. The recipient (and any subrecipient at any tier) must document planned approaches to information sharing and describe compliance with the GSP and appropriate privacy policy that protects shared information, or provide detailed justification for why an alternative approach is recommended.

The recipient agrees to budget funds for two staff representatives to attend one three-day national meeting in Washington, D.C. each year for the life of the grant. In addition, the recipient agrees to participate in BJA training events, technical assistance events, or conferences held by BJA or its designees, upon request.

The recipient understands that, in accepting this award, the Authorized Representative declares and certifies, among other things, that he or she possesses the requisite legal authority to accept
the award on behalf of the recipient entity and, in so doing, accepts (or adopts) all material requirements that relate to conduct throughout the period of performance under this award. The recipient further understands, and agrees, that it will not assign anyone to the role of Authorized Representative during the period of performance under the award without first ensuring that the individual has the requisite legal authority.

Conditional Clearance

The recipient may not obligate, expend or draw down funds until the Office of the Chief Financial Officer (OCFO) has approved the budget and budget narrative and an Award Condition Modification (ACM) has been issued to remove this award condition.

Recipient may not obligate, expend, or drawdown funds until the Bureau of Justice Assistance, Office of Justice Programs has reviewed and approved the Budget Narrative portion of the application and has issued an Award Condition Modification (ACM) informing the recipient of the approval.

I have read and understand the information presented in this section of the Federal Award Instrument.

Award Acceptance