

SOLICITATION FOR:

PUMP STATION GENERATORS

NANUMETT ST, OLD SALT WORKS RD. AND TERRY LANE

#19-IFB-002



WAREHAM, MASSACHUSETTS

RELEASED:
December 20, 2018

DUE BY:
January 9, 2019

DELIVER TO:
Town of Wareham
Wareham Water Pollution Control Facility
6 Tony's Lane
Wareham, MA 02571

SECTION 1.0 INSTRUCTIONS TO BIDDER

1.1 General

- When submitting bid, please identify the solicitation title and number clearly on the submitted envelope. All responses must be sealed and delivered to: Town of Wareham Water Pollution Control Facility, 6 Tony's Lane, Wareham, MA 02571
- Bids submitted must be originals.
- The completion of the following forms is necessary for consideration of a potential contract award. When submitting bid documents, please retain the order of documents as originally provided:
 - a. Signed Terms, Conditions and Certifications
 - b. Completed Bid Pricing Page
 - c. Completed Statement of Compliance Form
 - d. Completed Certificate of Authority
 - e. Completed Appendix A - Past Performance / References

NOTE: If Vendor is incorporated, an updated "CERTIFICATE OF GOOD STANDING" from the Commonwealth of Massachusetts may be required for the awarded vendor only.

- Please review and return with your sealed bids as sent. Also, insure that all forms are completed and your bid response is submitted as requested.

1.2 General Information & Submissions Instructions

1.2.1 Bid Delivery

Responses must be delivered by **January 9, 2019@ 11:00 AM** to Town of Wareham Water Pollution Control Facility. **Three (3) copies** of the response must be submitted; one **original**, one **copy** and one **electronic** copy. Responses must be sealed and marked with the solicitation title and number. All bids must include a forms listed in Section 1.1.

1.2.2 Bid Signature

A response must be signed as follows: 1) if the Bidder is an individual, by her/him personally; 2) general partner; and 3) if the Bidder is a corporation, by the authorized officer, whose signature must be attested to by the clerk/secretary of the corporation, and with the corporate seal affixed.

1.2.3 Time for Bid Acceptance

The contract will be awarded within 30 days after the bid opening. The time for award may be extended for up to 30 additional days by mutual agreement between the Town of Wareham and the apparent lowest responsive and responsible bidder (or, for a contract requiring payment, the apparent highest responsive and responsible bidder.)

1.2.4 Bonding Requirements

- 5% Bid Bond
- 100% Performance and Payment Bonds (Required for Awarded Contractor Only) provided within 10 business days of award notice.
- Bonds to be provided from a surety company qualified to do business under the Laws of the Commonwealth of Massachusetts and satisfactory to the Awarding Authority in the amount stated.

1.2.5 Changes & Addenda

If any changes are made to this solicitation, an addendum will be issued. **Addenda will be posted on the town's website.** No changes may be made to the solicitation documents by the Bidders without written authorization and/or an addendum from the Purchasing Department. **It is the responsibility of the vendor to monitor the Town's website for addenda. The web address is: www.wareham.ma.us**

1.2.6 Modification or Withdrawal of Bids, Mistakes, and Minor Informalities

A Bidder may correct, modify, or withdraw a bid by written notice received by the Town of Wareham prior to the time and date set for the bid opening. Bid modifications must be submitted in a sealed envelope clearly labeled "Modification No. ____" to the address listed in part one of this section. Each modification must be numbered in sequence, and must reference the original solicitation.

After the bid opening, a Bidder may not change any provision of the bid in a manner prejudicial to the interests of the Town or fair competition. Minor informalities will be waived or the bidder will be allowed to correct them. If a mistake and the intended bid are clearly evident on the face of the bid document, the mistake will be corrected to reflect the intended correct bid, and the bidder will be notified in writing; the bidder may not withdraw the bid. A bidder may withdraw a bid if a mistake is clearly evident on the face of the bid document, but the intended correct bid is not similarly evident.

1.2.7 Right to Cancel/Reject Bids

The Town of Wareham may cancel this solicitation, or reject in whole or in part any and all bids, if the Town determines that cancellation or rejection serves the best interests of the Town.

1.2.8 Bid Prices to Remain Firm

All bid prices submitted in response to this solicitation must remain firm for 60 days following the bid opening.

1.2.9 Unbalanced Bids

The Town reserves the right to reject unbalanced, front-loaded and conditional bids.

1.2.10 Unforeseen Office Closure

If, at the time of the scheduled bid opening, the Water Pollution Control Facility is closed due to uncontrolled events such as fire, snow, ice, wind, or building evacuation, the bid opening will be postponed until **2:00 p.m.** on the next normal business day. Bids will be accepted until that date and time.

1.2.11 Price Submission

All prices must contain the unit rate as requested on the bid price form in this solicitation. All prices are to include delivery, the cost of fuel, the cost of labor and all other charges related to the products or services listed. Prices are to remain fixed for the contract period of performance.

1.2.12 Estimated Quantities

The Town of Wareham has provided estimated quantities for services over the course of the contract period. These estimates are estimates only and not guaranteed.

1.2.13 Brand Name "or Equal"

Any references to any brand name or proprietary product in the specifications shall require the acceptance of an equal or better brand. The Town has the right to make the final determination as to whether an alternate brand is equal to the brand specified.

1.2.14 Warranty

The Bidder warrants that (1) the Supplies sold are merchantable, (2) that they are fit for the purpose for which they are being purchased, (3) that they are absent any latent defects and (4) that they are in conformity with any sample which may have been presented to the Town. The bidder guarantees that upon inspection, any defective or inferior equipment or supplies shall be replaced without additional cost to the Town. The vendor will assume any additional cost accrued by the Town due to the defective or inferior equipment or supplies. The bidder guarantees all equipment or supplies for a period of one (1) year, or as otherwise specified herein.

1.2.15 Cancellation

The Town reserves the right to cancel this contract at any time on any grounds, including the vendor's failure to comply with the Scope of Work (SOW) provided herein.

1.3 Questions about the Solicitation

Questions concerning this solicitation must be submitted in writing to: Guy Campinha, Director, Town of Wareham Water Pollution Control Facility, 6 Tony's Lane Wareham, MA 02571 **before 11:00AM on December 28, 2018**. Questions may be delivered, mailed, faxed to 508-291-0155, or e-mailed to gcampinha@wareham.ma.us . Written responses will be mailed or faxed to all bidders on record as having picked up the IFB. If any bidders or proposers contact anyone outside of the Wareham Water Pollution Control Facility regarding this bid/proposal, that bidder/proposer will be disqualified immediately.

1.4 Pre-bid Site Visit

A mandatory pre-bid site visit for this project held at the each pump station location. The pre-bid site visit will be on **December 26, 2018 beginning @ 11:00 AM**.

1.5 Rules for Award

A contract will be awarded to the responsive and responsible bidder offering the lowest total cost to complete project. This project is subject to appropriation.

SECTION 2.0 GENERAL TERMS, CONDITIONS, CERTIFICATIONS

2.1 Bid Offers

The right is reserved to reject any and all bids or parts of bids and to make an award as may be determined to be in the best interests of the Town of Wareham. Bids not submitted in duplicate may be rejected. Bids with erasures or alterations will be rejected.

2.2 Prices

Must be F.O.B. Delivered Destination-Wareham, MA. No charges will be allowed for packing, crating, freight, handling, or cartage unless specifically stated and included with bid.

2.3 Awards

To a bidder may be cancelled if the bidder shall fail to prosecute the work with promptness and diligence.

2.4. Payment

The Town of Wareham shall make no payment for a supply or service rendered prior to execution of a written Contract. Bills for services, materials, or supplies furnished by bidders under Contract should be submitted before the first day of the in which payment is to be made to insure payment by twentieth day of that month, except where the allowance for a discount differs from the above.

Contractor agrees to submit bills and delivery slips to the Town Department in sufficient time for such discounts to be taken advantage of by the Town and, in any event, shall not be less than ten (10) days from the submission to the Department of such bills and delivery slips. Time in connection with a discount offered will be computed from the date of delivery to the Town, as specified on the order or from the date a correct invoice is received by the using agency of the Town, if the latter date is later than the date of delivery.

2.5. Guarantees

The successful bidder shall repair, replace, or make good, without cost to the Town, any defects or faults arising within one (1) year after the date of acceptance of articles furnished hereunder resulting from imperfect or defective work done or materials furnished by the Seller.

2.6 Patents

The bidder shall indemnify and save harmless the Town and all persons acting for or on behalf of it from all suits and claims against them, or any of them, arising from or occasioned by the use of any material, equipment, or apparatus, or any part thereof, which infringes or is alleged to infringe on any patent rights. In case such material, equipment, or apparatus, or any part thereof, in any such suit is held to constitute an infringement, the bidder within a reasonable time, will, at its expense and as the Town may elect, replace such material, equipment, or apparatus, or remove the material, equipment, or apparatus and refund the sums paid.

2.7 Legality

The successful bidder shall comply with all applicable United States, Massachusetts, and/or Town of Wareham codes, statutes, ordinances, rules, and regulations. All applicable statutes are deemed to be included as if fully set out herein.

2.8 Taxes

Purchases made by the Town are exempt from Massachusetts Sales Tax and Federal Excise Taxes. Bid prices must exclude any such taxes. Exemption certificates will be furnished upon request.

2.9 Orders

Verbal Orders are not binding on the Town of Wareham, and any delivery made or work performed without written order or written Contract are at the risk of the Seller or Contractor and may result in an unenforceable claim. The actual needs of the Town Department shall govern the actual amount delivered under Contract to be drawn and entered into between the successful bidder and the Town. Purchase Orders issued by the Town to pay for goods or services shall be made part of Contract.

2.10 Indemnity

Contractor shall agree to Indemnify, Defend, and Hold the Town Harmless from any and all claims arising out of the performance of this contract from the negligence, willful acts or omissions of the contractor, its employees, agents, or any sub-contractors.

2.11 Equality

Where trade names or specific manufacturers are mentioned in the specifications, the Town does not intend to limit competition, but merely to indicate the general type of commodity to be supplied. The Town invites offers on comparable commodities to those named or described in the specification. Naming of any commercial name, trademark or other identifier shall not be construed to exclude any item or manufacturer not mentioned by name or as limiting competition, but shall establish a standard of equality only. An item shall be considered equal to the item so named or described if: (a) it is at least equal in quality, durability, appearance, strength, and

design; (b) it will perform at least equally the function imposed by the general design for the purpose being contracted for or the material being purchased; and (c) it conforms in a substantial way, even with deviations, to the detailed requirements for the item in the specifications. The name and identification of all materials, other than the one named, shall be submitted to the Town in writing for approval, prior to the purchase, use, or fabrication of such items. Subject to the provisions of M.G.L. Ch.30, §.39J, or other applicable statute, approval shall be at the sole discretion of the Town, it shall be in writing to be effective, and the decision of the Town shall be final. The Town may require tests of all materials so submitted to establish quality standards at the vendor's expense. All directions, specifications, and advice by the manufacturer for the proper installation, handling, storage, adjustment, or operation of their equipment shall be complied with and the responsibility for the proper performance shall continue to rest with the vendor. Include a written brochure outlining all features of the product offered whenever possible.

2.12 Minority Business Enterprise Plan

Pursuant to M.G.L. c 7, §40N and M.G.L. c. 7, §61, the Supplier Diversity Office ("SDO") (formerly SOMWBA) and the Division of Capital Asset Management ("DCAM") have set revised participation goals for Minority Business Enterprise ("MBE") and Women Business Enterprise ("WBE") participation for affected state funded building projects and state assisted municipal building projects as defined in the above referenced laws and related Executive Orders, including Executive Orders 524 and 526.

Effective January 1, 2012, and until such time as the goals may be revised, the MBE and WBE participation goals for building construction and design awards and expenditures on new projects advertised on or after the effective date will be a combined MBE/WBE goal as follows:

10.4% combined MBE/WBE participation on construction contract awards; and,
17.9% combined MBE/WBE participation on design contract awards.

Overall annual designations by awarding authorities, as well as MBEI/WBE participation on individual projects with a combined MBE/WBE participation goal, must include a reasonable representation of both MBE and WBE firms that meets or exceeds the combined goal. Proposed MBE/WBE participation plans that include solely MBE or solely WBE participation, or do not include a reasonable amount of participation by both MBE and WBE firms to meet the combined goal, will not be considered responsive. Where the prime contractor or designer is an SDO certified MBE or WBE, the prime must bring a reasonable amount of participation by a firm or firms that hold the certification which is not held by the prime contractor or designer on the project. Proposed participation on construction projects or design projects which consists solely of either an MBE or WBE representing 100% of the overall combined goal will not be considered reasonable participation.

The SDO and DCAM will determine whether there is reasonable participation by both MBE and WBE firms on individual projects under their respective oversight. Firms submitting MBE/WBE participation plans which do not provide reasonable participation by both MBE/WBE firms shall be provided an opportunity to revise and resubmit their plans within the time frame set by the awarding authority; however no price adjustments shall be permitted as a result of the revised plan. Firms failing to submit an MBE/WBE participation plan deemed reasonable and accepted by the awarding authority shall not be awarded the contract.

Participation by MBE and WBE firms must be documented, tracked and reported on separately as MBE participation and WBE participation by prime vendors, subcontractors and awarding authorities.

2.13 Right to Know Legislation

M.G.L., Ch. 111F and 454 CMR 21.06. All vendors furnishing substances or mixtures which may be classified as toxic or hazardous, pursuant to MGL,Ch.111F , are cautioned to obtain and read the Law and the Regulations referred to above. Copies may be obtained from the State House Bookstore, State House, Room 117, Boston, MA 02133 for a fee.

2.14 Non-Collusion Affidavit

M.G.L., Ch.30, s.39M and/or Ch.30B, s. 10. Any person submitting a bid or proposal for the procurement or disposal of supplies or services to any governmental body shall certify in writing on the bid or proposal, as follows: the undersigned certifies under penalties of perjury that this bid or proposal has been made and submitted in good faith and without collusion or fraud with any other person. As used in this certification, the word "person" shall mean any natural person, business, partnership, corporation, union, committee, club or other organization, entity, or group of individuals.

2.15 State Taxes Paid

Pursuant to M.G. L. Ch.62C, s.49A, the undersigned certifies that, to the best of their knowledge and belief, they have complied with all the laws of the Commonwealth relating to taxes, reporting of employees and contractors, and withholding and remitting of child support.

2.16 Bid Offers

Bid offers will be reviewed and awards made as soon as is possible. Awards will be made within 30 business days from Bid Opening. Offers must be signed to be valid.

2.17 Unit Price

The case of arithmetical error in any offer involving extension of prices quoted herein, the unit price will govern the final price of quantities offered.

2.18 Insurance

Contractor shall purchase and maintain coverage for Workers' Compensation, Comprehensive General Liability, including products, completed operations, and contractual liability; Automobile Liability to protect their employees and others from bodily injury and damages to property which may arise out of or result from the Contractor's operations under this agreement, whether such operations be the Contractor's, any subcontractor, or anyone directly or indirectly employed by any of them. This insurance shall be in limits specified by Law, or as specified in the specifications. In no case shall the limits be less than \$ 1,000,000 in Bodily Injury and in Property Damages. A certificate of insurance naming the Town of Wareham as Additional Named Insured shall be filed with the Town prior to the commencement of any contract's operations. All policies and certificates shall contain an endorsement requiring at least thirty (30) days written notice, non-renewal or cancellation of coverage to Town of Wareham. Compliance by the Contractor with the insurance requirements shall not relieve the Contractor from liability under the full indemnity provisions contained herein (see 11).

2.19 Independent Contractor

The contractor is neither an agent nor an employee of the Town of Wareham and is not authorized to act in behalf of the Town of Wareham.

2.20 Complete Agreement

The written contract supersedes all prior agreements or understandings between the parties and shall not be changed unless mutually agreed by both parties in writing.

2.21 Assignment / Sub-Contracting

The Contractor shall not assign any interest in a contract nor engage any other entity, company, subcontractor or individual to perform any obligation to the Town without prior written consent of the Town of Wareham.

2.22 Conflict of Interest

The bidder certifies that no official or employee of the Town of Wareham has a financial interest in this offer or in the contract which the bidder offers to execute or in the expected profit to arise there from, unless there has been compliance with the provisions of M.G.L.,Ch.43, s.27 (Interest in Public Contracts by Public Employees) and of provisions of M.G.L.,Ch.268A, s.20 (Conflict of Interest Law) and that this offer is made in good faith without fraud or collusion or connection with any other person submitting an offer to the Town of Wareham.

2.23 Termination

The Town of Wareham shall have the Right to terminate this Agreement, if: (A) the Contractor neglects or fails to perform or observe any of its obligations hereunder and cure is not effected by the Contractor within Fifteen (15) Days next following its receipt of a termination notice issued by the Town of Wareham, or, (B) a judgment or decree is entered against the Contractor approving a petition for arrangement, liquidation, dissolution or similar relief relating to any bankruptcy or insolvency and such judgment or decree remains vacated for Thirty (30) Days; or Immediately, if Contractor shall file a voluntary petition in bankruptcy or any petition in bankruptcy or any petition or answer seeking any arrangement, liquidation or dissolution relating to bankruptcy, insolvency or other relief of debtors, or shall seek or consent or acquiesce in appointment of any trustee, receiver or liquidation of Contractor's property; or (C) funds are not appropriated or otherwise made available to support continuation of performance in any Fiscal Year succeeding the first year of this Agreement. Town of Wareham shall pay all reasonable and supportable costs incurred prior to termination which payment shall not exceed the value of any services provided. NOTICE: The Town of Wareham may terminate this Contract or any Purchase Order issued hereunder without cause at any time, effective upon the termination date stated in the notice of termination. The Contractor shall cease performance upon the stated termination date. If the Contract or any Purchase Order is terminated under this subsection, the Contractor shall be entitled to be paid for supplies and/or services delivered and accepted prior to the notice of termination. In no event shall the Contractor be entitled to be paid for any supplies or services delivered after the effective date of termination.

2.24 Return of property

Upon termination, the Contractor shall immediately return to the Town of Wareham, without limitation, all documents, plans, drawings, tools, equipment, and items of any nature whatsoever supplied to the Contractor by the Town, or items developed by the Contractor in accordance with the terms of a Contract with the Town of Wareham.

2.25 Interpretations of Specifications

Any prospective bidder that requests an interpretation of existing specifications' terms or conditions must do so within five (5) working days before the scheduled bid opening or defined question due date located with the instructions to bidder. All requests shall be in writing to the Water Pollution Control Facility Director.

2.26 Information

The submission of a bid offer authorizes the Town to contact any and all parties referenced by the bidder in regard to financial and operational information. The Town shall have the right to request verification of any information or qualifications submitted as part of any offer to the Town.

2.27 Price Reduction

It is understood and agreed that should any price reductions occur between the opening of the bid offers and the completion of the delivery of goods or services that the benefit of all such reductions will be extended to Town.

2.28 Governing Law

The offer and any Contract which may ensue shall be governed by the Laws of the Commonwealth of Massachusetts.

2.29 Enforceability

In the event that any provision of this offer or Contract is found to be legally unenforceable, such legal unenforceability shall not prevent enforcement of any other provisions of a Contract.

2.30 Samples

Any qualified bidder may be required to submit samples of the goods offered at the request of the Purchasing Agent. Evaluation for acceptability will be a determining factor in the selection process.

2.31 Discrimination

It is understood and agreed that it shall be a material breach of Contract resulting from this bid offer for the Contractor to engage in any practice which shall violate any provision of M.G.L., Ch.151B, relative to discrimination in hiring, discharge, or, terms or conditions of employment.

2.32 Prevailing Wages

This project is subject to prevailing wage rates as established by the Commonwealth.

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CERTIFICATIONS

Statements below shall be submitted with each Bid or Proposal and shall be duly dated and signed with an **original signature** and all other information, or, the Bid or Proposal will be rejected.

In witness whereof, the undersigned certifies, under the pains and penalties of perjury that:

1. STATE TAXES PAID: Pursuant to M.G.L. Chapter 62C, s. 49A, the undersigned certifies that, to the best of my knowledge and belief, have complied with all the laws of the Commonwealth relating to taxes, reporting of employees and contractors, and withholding and remitting of child support.

2. CERTIFICATE OF NON-COLLUSION: M.G.L. C. 30, s. 39M and/or C. 30B, s.10: Any person submitting a bid or proposal for the procurement or disposal of supplies or services to any governmental body shall certify in writing, on the bid or proposal, as follows: The undersigned certifies under penalties of perjury that this bid or proposal has been made and submitted in good faith and without collusion or fraud with any other person. As used in this certification, the word "person" shall mean any natural person, business, partnership, corporation, union, committee, club or other organization, entity, or group of individuals.

3. PUBLIC CONTRACTS - DEBARMENT: M.G.L. C. 550, Acts of 1991: The undersigned certifies that the said "person" is not presently debarred from doing public construction work in the Commonwealth of Massachusetts under the provisions of C. 29, s. 29F, or any other applicable debarment provision of any other Chapter of the General Laws, or any Rule or Regulation promulgated thereunder. Additionally, the undersigned is not presently debarred by any Agency of the Federal Government.

4. HEALTH & SAFETY ON PUBLIC CONSTRUCTION PROJECTS OVER \$10,000.00:

Chapter 306 of the Acts of 2004: The undersigned certifies that the firm is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed in the work; (2) that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the U.S. OSHA that is at least 10 hours in duration at the time that the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and (3) that all employees to be employed in the work subject to this bid have successfully completed a course in construction safety and health approved by the U.S. OSHA that is at least 10 hours in duration.

5. COMPLIANCE:

The undersigned is in compliance with all of the provisions, and shall remain in full compliance with the provisions for the life of any Contract resulting from this solicitation. That the bidder is qualified to perform any such Contract and possesses, or shall obtain, all requisite licenses and/or permits to complete performance; shall maintain all unemployment, workers' compensation, professional and personal liability insurance policies sufficient to cover its performance under any such Contract; and shall comply with relevant prevailing wage rates and employment laws. To the best of its knowledge and belief has paid all local taxes, tax titles, utilities, motor vehicle excise taxes, and water and wastewater bills in MA as required by Law.

Print Name _____

Circle: Corporation Partnership Individual

Authorized Signature _____

Print Name _____

Title of Person Signing Bid or Proposal _____

Date _____

Company Federal ID # or Social Security # _____

State of Incorporation _____

Approval of a Contract, or other Agreement, will not be granted unless this form is signed and fully complete.

SECTION 3.0 INVOICING REQUIREMENTS

3.1 General

Each invoice shall be mailed to the designated billing office at the following address after completion of order:

**Town of Wareham
Water Pollution Control Facility
6 Tony's Lane
Wareham, MA 02571**

To ensure a proper invoice, the invoice must include the following information and/or attached documentation:

Name of the business concern, invoice number and invoice date;

- 1) Contract number, or authorization for delivery of property of performance of services;
- 2) Description, price, and quantity and services actually delivered or rendered;
- 3) Shipping and payment terms;
- 4) Name (where practicable), title, phone number, and complete mailing address of responsible official to whom payment is to be sent; and
- 5) Other substantiating documentation or information as required by the contract.

SECTION 4.0 SCOPE OF WORK (SOW)

4.1 General

The work to be performed under this contract consists of furnishing labor, materials, and equipment for removal and replacement of generators at pump stations. Scope includes: removal, disposal of existing generators according to standards and compliance, replacing generator units in accordance with specifications of the IFB, removal, disposal of existing transfer switches and replacing transfer switches in accordance with specification of the IFB. DCAMM certification **is required** as we estimate this project over 100k. This project will not commence until a "Letter to Proceed" has been received by the Contractor from the Town of Wareham. The final award of this bid will be contingent upon availability of sufficient funds. The Town reserves the right to award part or all of this contract pending availability of funds.

4.2 Site Description

The property locations are:

1. Nanumett St – Nanumett St, Assessors Map 3A-4, Lot 67A
2. Old Salt Works – Old Salt Works Rd., Assessors Map 7B-3, Lot TL
3. Terry Lane – Corner of Dangelo Rd & Christopher Dr., Assessors Map 57, Lot P

The structure areas are known as Pump Stations and are easily accessible via pavement driveway.

4.3 Project Specifications

The following specifications must be met for the successful completion of the contract. The contractor must consider these specifications when bidding. The bid price should include costs for all the specifications listed below. No additional costs will be considered.

4.3.1 Permits

All applicable permits and compliance with regulations are the responsibility of the Contractor. The Contractor is responsible for securing all permits and providing copies to the Town's Project Manager before commencement of work.

4.3.2 Structure Demolition and Disposal

The entirety of the existing generators, including fuel systems, and transfer switches are to be removed from the site and properly disposed. A proposed waste facility will be submitted to the Project Manager prior to commencement of work.

4.3.3 Site Condition during Work

The construction site will be kept neat and secured each day. Equipment security is the responsibility of the Contractor. Equipment may be stored at the site, but may not obstruct any roads or paths. The site will be free of trash and be kept in an orderly fashion.

4.3.4 Best Management Practices

The Contractor shall employ best management practices for construction sites to reduce erosion and maintain a clean and safe site.

4.3.5 Health and Safety

The Contractor will be responsible for ensuring the health and safety of employees and subcontractors. Work will be conducted in a safe and responsible manner and in compliance with all applicable health and safety laws and regulations.

4.3.6 Hazardous Materials

The contractor will be responsible for disposal of any and all hazardous materials in accordance with federal, state and local regulations and ordinances.

4.3.7 Contract Completion

The contract will be considered complete when:

- The site is clean of all debris
- All paperwork indicating disposal of materials has been turned in to the Project Manager.
- All permits have been signed off as complete by the managing authorities
- All items on punch list have been completed
- All invoices have been submitted

4.4 Period of Performance

The contract period shall be for a period **ninety (90)** days, however substantial completion is anticipated to take no more than **thirty (30)** days from notice to proceed.

4.5 Description

A. This section specifies generators for Nanumett St., Old Salt Works Rd. and Terry Lane sewer pump stations

B. Definitions

1. Energy Efficiency Ratio (EER)
2. Where such equipment is provided in more than one assembly the separated assemblies are to be designed to be used together and the requirement of the rating are based upon use of matched assemblies

4.5.1 RELATED WORK

A. Not used.

4.5.2 QUALITY ASSURANCE

A. All equipment must meet the required codes and standards of the industry.

4.5.3 WARRANTY

A. The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to those requirements may be considered defective. The Contractor's warrant excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

B. Warranties required by the Contract Documents shall commence on the date of Final Acceptance of the Work.

4.5.4 SUBMITTALS

A. The following shall be submitted for review and approval:

1. Manufacturer's literature and data:

- Sufficient information, including capacities, pressure drops and piping connections clearing presented, shall be included to determine compliance with specifications for units noted below:
 - a. generators
 - b. automatic transfer switch
- Unit Dimensions required clearances, operating weights accessories and start-up instructions.
- Electrical requirements, wiring diagrams, interlocking and control wiring showing factory installed and portions to be field installed.
- Mounting to meet all federal, state and local regulations and codes.

2. Certification: Submit proof of specified:

- DCAM certification
 - Electrical certification
 - All certifications necessary in accordance with the specifications of the IFB.

3. Performance Rating: Submit catalog selection data showing equipment ratings and compliance with, energy efficiency ratio (EER) and coefficient of performance (COP).

4. Operating and Maintenance Manual: Submit three copies of Operating and Maintenance manual to Engineer three weeks prior to final inspection.

5. Warranty: Submit warranty information (cards) to the Owner 2 weeks prior to Final Acceptance.

4.5.5 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

1. American National Standards Institute (ANSI):
S12.51-02 (R2007).Acoustics – Determination of Sound Power Levels of Noise Sources Using Sound Pressure – Precision Method for Reverberation Rooms (same as ISO 3741:1999)

2. National Electrical Manufacturer’s Association (NEMA):

MG 1-09 (R2010) Motors and Generators (ANSI)

ICS 1-00 (R2005, R2008).Industrial Controls and Systems: General Requirements

4.5.6 PRODUCTS

4.5.7 GENERATORS AND TRANSFER SWITCHES

1. Nanumett Street pump station

Equipment - Generator

- Equipment
 - The generator set shall be a Kohler model 80REOZJF or equivalent with a 4R9X alternator. It shall provide 103.75 kVA and 83.00 kW when operating at 277/480 volts, 60 Hz, 0.80 power factor. The generator set shall be capable of a 130°C Standby rating while operating in an ambient condition of less than or equal to 77 °F and a maximum elevation of 500 ft above sea level. The standby rating shall be available for the duration of the outage.

- Engine
 - The minimum 4.5 liter displacement engine shall deliver a minimum of 133 HP at a governed engine speed of 1800 rpm, and shall be equipped with the following:
 - Electronic isochronous governor capable of 0.25% steady-state frequency regulation
 - 12-volt positive-engagement solenoid shift-starting motor
 - 65-ampere automatic battery charging alternator with a solid-state voltage regulation
 - Positive displacement, full-pressure lubrication oil pump, cartridge oil filters, dipstick, and oil drain
 - Dry-type replaceable air cleaner elements for normal applications
 - Engine-driven or electric fuel-transfer pump including fuel filter and electric solenoid fuel shutoff valve capable of lifting fuel
 - The turbocharged engine shall be fueled by diesel

- The engine shall have a minimum of 4 cylinders and be liquid-cooled
 - The engine shall be EPA certified from the factory
 - The generator must accept rated load in one-step.
- Cooling System
 - The engine shall be liquid-cooled by a closed loop, unit mounted radiator rated to operate the generator set at full load at an ambient temperature of 50 degrees C (122 degrees F). The radiator fan and other rotating engine parts shall be guarded against accidental contact.
- Standard Air Cleaner
 - **The air cleaner shall provide engine air filtration which meets the engine manufacturer's specifications under typical operating conditions**
- Fuel oil storage
 - Double Wall Secondary Containment Sub-base Fuel Tank
- The generator set shall be supplied with a sub-base fuel tank of sufficient capacity to hold 415 gallons of diesel fuel.
- The sub-base fuel system shall be listed under UL 142, subsection entitled Special Purpose Tanks EFVT category, and will bear their mark of UL Approval according to their particular classification.
- The above ground steel secondary containment rectangular tank for use as a sub base for diesel generators is manufactured and intended to be installed in accordance with the Flammable and Combustible Liquids Code—NFPA 30, the Standard for Installation and Use of Stationary Combustible Engine and Gas Turbines—NFPA 37, and Emergency and Standby Power Systems—NFPA 110.
- The primary tank shall be rectangular in shape and constructed in clam shell fashion to ensure maximum structural integrity and allow the use of a full throat fillet weld.
- Steel Channel Support System. Reinforced steel box channel for generator support, with a load rating of 5,000 lbs. per generator mounting hole location. Full height gussets at either end of channel and at generator mounting holes shall be utilized.
- Exterior Finish. The sub-base tank exterior finish shall be Power Armor Plus™, a polyurea-textured rubberized coating.
- Normal venting shall be sized in accordance with the American Petroleum Institute Standard No 2000, Venting Atmospheric and Low Pressure Storage Tanks not less than 1-1/4" (3 cm.) nominal inside diameter.
- The emergency vent opening shall be sized to accommodate the total capacity of both normal and emergency venting and shall be not less than that derived from NFPA 30, table 2-8, and based on the wetted surface area of the tank. The wetted area of the tank shall be calculated on the basis of 100 percent of the primary tank. The vent is to be spring-pressure operated: opening pressure is 0.5/psig and full opening pressure is 2.5 psig. The emergency relief vent is to be sized to accommodate the total venting capacity of both normal and emergency vents.
- There shall be a 2" NPT opening within the primary tank and lockable manual fill cap.
- A direct reading, UL listed, magnetic fuel level gauge with a hermetically sealed, vacuum tested dial, to eliminate fogging, shall be provided.
- A float switch for remote or local annunciation of a (50% standard) low fuel level condition shall be supplied.

- Inner Tank Leak Alarm Kit – Includes one light, one horn remote annunciator panel, leak alarm switch and wiring. This kit is intended when the inner tank has leaked into the outer tank, thus indicating a need for a replacement tank.
- 5 Gallon Fill/Spill Containment- Aboveground fill/spill container, contains fuel overflow spills that may occur during fill-up.
 - Controller
- Advanced Power Management 402 (APM402) Generator Set Controller
 - The generator set controller shall be a microprocessor-based control system that will provide automatic starting, system monitoring, and protection. The controller system shall also provide local monitoring and remote monitoring. The control system shall be capable of PC based updating of all necessary parameters, firmware, and software.
 - The controller shall be mounted on the generator set and shall have integral vibration isolation. The controller shall be prototype and reliability tested to ensure operation in the conditions encountered.
- Codes and Standards
- The generator set controller shall meet NFPA 110 Level 1 requirements and shall include an integral alarm horn as required by NFPA.
- The controller shall meet NFPA 99 and NEC requirements.
- The controller shall be UL 508 listed.
- Applicability
- The controller shall be a standard offering in the manufacturer's controller product line.
- The controller shall support 12-volt and 24volt starting systems.
- The controller's environmental specification shall be: -40°C to 70°C operating temperature range and 5-95% humidity, non-condensing.
- The controller shall mount on the generator or remotely within 40 feet with viewable access.
- Controller Buttons, Display and Components
- The generator set controller shall include the following features and functions:
- Push button Master Control buttons. The buttons shall be tactile-feel membrane with an indicator light to initiate the following functions:
 - Run Mode: When in the run mode the generator set shall start as directed by the operator.
 - Off/Reset Mode: When in the Off/Reset mode the generator set shall stop, the reset shall reset all faults, allowing for the restarting of the generator set after a shutdown.
 - Auto Mode: When in Auto the mode the generator set shall be ready to accept a signal from a remote device.
- Emergency Stop Switch. The remote stop switch shall be red in color with a "mushroom" type head. Depressing the stop button will immediately stop the generator set and lockout the generator set for any automatic remote starting.
- Push Button/Rotary Selector dial. This dial shall be used for selection of all Menus and sub-menus. Rotating the dial moves you through the menus, pushing the dial selects the menu and function/features in that menu. Pushing the button selects the feature/function and sub-menus.
- Digital Display. The digital display shall be alphanumeric, with 2 lines of

data and approximately 24 characters. The display shall have back lighting for ease of operator use in high and low light conditions. The display shall display status of all faults and warnings. The display shall also display any engine faults. While the generator set is running, the display shall scroll all-important information across the screen for ease of operator use. The scroll can be stopped by pushing the rotary dial. The display shall fall asleep when the generator set is not running and will wake-up when the generator set starts, or the rotary dial is depressed.

- Fault Light. The controller shall have an annunciator fault light that glows red for faults and yellow for warnings. These faults and warnings shall be displayed in the digital display. The fault light will also glow yellow when not in AUTO.
- Alarm Horn. The controller shall provide an alarm horn that sounds when any faults or warnings are present. The horn shall also sound when the controller is not in the AUTO mode.
- Alarm Silence/Lamp Test Button. When this button is depressed, it shall test all controller lamps. This button will also silence the alarm horn when the unit is not AUTO.
- USB Connection. The controller shall have a USB connection on the face of the controller. This connection shall allow for updating of all software and firmware. This port shall also allow for all servicing of generator set parameters, fault diagnostics and viewing of all controller information via use a laptop computer.
- Dedicated user inputs. The controller shall have dedicated inputs for remote emergency stop switch, remote 2-wire star for transfer switch and auxiliary shutdown.
- The controller shall have auto resettable circuit protection integral on the circuit board.
- System Controller Monitoring and Status Features and Functions
- The generator controller shall display and monitor the following engine and alternator functions and allow adjustments of certain parameters at the controller:
- Overview menu
 - Active shutdowns and warnings shall be displayed if present and without the need of operator interface
 - Engine runtime with total hours
 - Average line to line voltage
 - Coolant temperature
 - Fuel level or pressure
 - Oil pressure
 - Battery voltage
 - Software version
 - Frequency
 - Average current
- Engine metering menu.
- Engine speed
- Oil pressure
- Coolant temperature
- Battery voltage

- Generator metering menu.
- Total power in VA
- Total power in W
- Rated power % used
- Voltage L-L and L-N for all phases
- Current L1, L2, L3
- Frequency
- Generator set information.
- Generator set model number
- Generator set serial number
- Controller set number
- Generator set run time.
- Engine run time total hours
- Engine loaded total hours
- Number of engine starts
- Total energy in kW
- Generator set system
- System voltage
- System frequency 50/60Hz
- System phase, single/three phase
- Power rating kW
- Amperage rating
- Power type standby/prime
- Measurement units, metric/English units adjustable
- Alarm silence, always or auto only
- Generator set calibration, the following are adjustable at the controller.
- Voltage L-L and L-N all phases
- Current L1, L2, L3
- Reset all calibrations
- Voltage regulation, +/-0.5% regulation, the following is adjustable at the controller.
- Voltage Adjustable +/- 10%
- Digital and Analog Inputs and outputs
- Displays settings and status
- Event Log
- Stores event history, up to 1000 events
- Controller Engine control features and functions
- Automatic restart - the controller has automatic restart feature that initiates the start routine and re-crank after a failed start attempt.
- Cyclic cranking - the controller shall have programmable cyclic cranking
- Engine starting aid - the controller shall have the capability of providing control for an optional engine starting aid.
- The control system shall include time delays for engine start and cool down.
- The control system shall interface with the engine ECM and display engine fault codes and warnings. The ECM shall also include sender failure monitoring to help distinguish between failed senders and actual failure conditions.
- The controller shall monitor and display engine governor functions with

- include steady state and transient frequency monitoring
- Controller Alternator control features and functions
- Integrated hybrid voltage regulator. The system shall have integral microprocessor-based voltage regulator system that provides +/- 5% voltage regulation, no-load to full load with three phase sensing. The system is prototype tested and control variation of voltage to frequency. The voltage regulator shall be adjustable at the controller with maximum +/- 10% adjustable of nominal voltage.
- AC output voltage regulator adjustment. The system shall allow for adjustment of the integral voltage regulator with maximum of +/- 10% adjustment of the system voltage.
- Alternator thermal overload protection. The system shall have integral alternator overload and short circuit protection matched to each alternator for the particular voltage and phase configuration.
- Power metering. The controller digitally displays power metering of kW and kVA.
- Other control features and functions
- Event logging. The controller keeps a record of up to 1000 events, for warning and shutdown faults. This fault information becomes a stored record of systems events and can be reset.
- Historical data logging. The controller total number of generator set successful start shall be recorded and displayed.
- Programmable access. The control system shall include a USB port that gives service technicians the ability to provide software and firmware upgrades. The system shall also be capable of allowing setting of all critical parameters using the service software and a laptop computer. All parameters and setting should be capable to being stored on a laptop for future upgrades of printing for analysis.
- Generator Set Warning, Shutdown Alarm and Status
- The generator set shall have alarms and status indication lamps that show non-automatic status and warning and shutdown conditions. The controller shall indicate with a warning lamp and or alarm and on the digital display screen any shutdown, warning or engine fault condition that exists in the generator set system. The following alarms and shutdowns shall exist as a minimum:
 - Engine functions
 - Critical high fuel level (alarm)
 - ECM communication loss (shutdown)
 - ECM diagnostics (alarm & shutdown)
 - Engine overspeed (shutdown)
 - Engine start aid active
 - Engine under speed (shutdown)
 - Fuel tank leak (alarm & shutdown)
 - High DC battery voltage (alarm)
 - High coolant temperature (alarm & shutdown)
 - High fuel level (alarm)
 - Low DC battery voltage (alarm)
 - Low coolant level (shutdown)
 - Low coolant temperature (alarm)

- Low cranking voltage (alarm)
- Low engine oil level (alarm & shutdown)
- Low fuel level (alarm & shutdown)
- Low fuel pressure (alarm)
- Low oil pressure (alarm & shutdown)
- No coolant temperature signal (shutdown)
- No oil pressure signal (shutdown)
- Overcrank (shutdown)
- Speed sensor fault (alarm)
- Generator functions
- AC sensing loss over & under current (alarm & shutdown)
- Alternator protection (shutdown)
- Ground fault input (alarm)
- kW overload (shutdown)
- Locked rotor (shutdown)
- Over-frequency (shutdown)
- Over AC voltage (shutdown)
- Under-frequency (shutdown)
- Under AC voltage (shutdown)
- Emergency stop (shutdown)
- Other General functions
- Battery charger fault (alarm)
- Common fault (shutdown)
- Common warning (alarm)
- Master switch not in auto (alarm)
- Generator running
- Input/output fault (alarm)
- The generator set controller shall also be capable of meeting all necessary NFPA 110 level 1 requirements that include several of the above along with; EPS supplying load, Master switch “not in auto”, and contacts for local and remote common alarm.
- Communications
- If the generator set engine is equipped with an ECM (engine control module), the controller shall communicate with the ECM for control, monitoring, diagnosis, and meet SAE J1939 standards
- Kohler proprietary RBUS communication shall be available.
- A RBUS shall be able to monitor and alter parameters and start or stop a generator.
- The controller shall have the capability to communicate to a personal computer (IBM or compatible) and appropriate application software
- A variety of connections shall be available based on requirements:
- A single control connection to a PC via USB
- Internet connection via Ethernet
- Generator and transfer switch controls shall be equipped with communications modules capable of connecting to the same communication network.
 - Generator Overcurrent and Fault Protection

- The generator shall be provided with a factory installed, 80% rated line circuit breaker rated at 125.00 amperes that is UL489 listed. Line circuit breakers shall be sized for the rated ampacity of the loads served by the breaker per the NEC.
- The circuit breaker(s) shall incorporate a thermo-magnetic trip unit.
- Load side lugs shall be provided from the factory. Load side breaker connections made at the factory shall be separated from field connections.
- The shunt trip device shall be connected to trip the generator breaker when the
- When GFI is required per the NEC, additional neutrals shall be factory installed, and the alarm indication shall be integrated with the other generator-set alarms.
 - Alternator
 - The alternator shall be salient-pole, brushless, 2/3-pitch, with 4 bus bar provision for external connections, self-ventilated, with drip-proof construction and amortisseur rotor windings, and skewed for smooth voltage waveform. The ratings shall meet the NEMA standard (MG1-32.40) temperature rise limits. The insulation shall be class H per UL1446 and the varnish shall be a vacuum pressure impregnated, fungus resistant epoxy. Temperature rise of the rotor and stator shall be limited to 130°C Standby. The PMG based excitation system shall be of brushless construction controlled by a digital, three phase sensing, solid-state, voltage regulator. The AVR shall be capable of proper operation under severe nonlinear loads and provide individual adjustments for voltage range, stability and volts-per-hertz operations. The AVR shall be protected from the environment by conformal coating. The waveform harmonic distortion shall not exceed 5% total RMS measured line-to-line at full rated load. The TIF factor shall not exceed 50.
 - The alternator shall have a maintenance-free bearing, designed for 40000 hour B10 life. The alternator shall be directly connected to the flywheel housing with a semi-flexible coupling between the rotor and the flywheel.
 - The generator shall be inherently capable of sustaining at least 300% of rated current for at least 10 seconds under a 3-phase symmetrical short circuit without the addition of separate current-support devices.
 - Motor starting performance and voltage dip determinations shall be based on the complete generator set. The generator set shall be capable of supplying 385.00 LRKVA for starting motor loads with a maximum instantaneous voltage dip of 35%, as measured by a digital RMS transient recorder in accordance with IEEE Standard 115. Motor starting performance and voltage dip determination that does not account for all components affecting total voltage dip, i.e., engine, alternator, voltage regulator, and governor will not be acceptable. As such, the generator set shall be prototype tested to optimize and determine performance as a generator set system.
 - Vibration Isolation
 - Vibration isolators shall be provided between the engine-alternator and heavy-duty steel base.
- **Accessories**
- The generator set shall be supplied with a common failure relay to provide means of signaling fault and/or shutdown conditions.
 - The common failure relay shall remotely signal auxiliary faults, emergency stop, high engine temperature, low oil pressure, overcrank, and over speed via one single-pole, double-throw relay with 10 amps at 120 VAC contacts.
 - The relay contacts shall be gold flashed to allow use of low current draw devices (100ma @ 28VDC min.).

- Once energized the relay shall remain latched until the system is reset by the main controller switch.
- The generator set shall be provided with a run relay which shall provide a three-pole, double-throw relay with 10-amp/ 250 VAC contacts to indicate that the generator is running. The run relay dry contacts can be used for energizing or de-energizing customer devices while the generator is running (e.g. louvers, indicator lamps, etc.)
- The generator set shall be supplied with a 10-ampere automatic float/equalize battery charger capable of charging both lead-acid and ni-cad type batteries, with the following features:
 - Automatic 3-stage float to equalization charge
 - Voltage regulation of 1% from no to full load over 10% AC input line voltage variations
 - Battery charging current Ammeter and battery voltage voltmeter with 5% full-scale accuracy
 - LED lamp for power ON indication
 - Current limited during engine cranking, short circuit, and reverse polarity conditions
 - Temperature compensated for ambient temperatures for -40°C to 60°C
 - Alarm circuit board featuring alarm contacts for low battery voltage, high battery voltage, and battery charger malfunction.
 - UL 1012 Listed
 - CSA Certified
- Battery rack and battery cables capable of holding the manufacturer's recommended batteries shall be supplied.
- A radiator duct flange to provide a convenient connection to duct work for the radiator discharge air shall be included.
- Supply flexible fuel lines to provide a flexible connection between the engine fuel fittings and the fuel supply tank piping and for the fuel return lines from the injector pump per engine manufacturer's recommendations. Flex line shall have a protective steel wire braid to protect the hose from abrasion.
- Block Heater - The block heater shall be thermostatically controlled, 1,500 watt, 110-120 VAC - single phase, to maintain manufacturers recommended engine coolant temperature to meet the start-up requirements of NFPA 99 and NFPA 110, Level 1.
- The exhaust piping shall be gas proof, seamless, stainless steel, flexible exhaust bellows and includes the flex exhaust tube and the mounting hardware.
- Quantity 1 - 3 year Semi-annual Maintenance contract
- **Equipment – Transfer Switch**
- Equipment
 - Furnish and install an automatic transfer switches system(s) with 3-Pole / 4-Wire, Solid Neutral, 150 Amps, 480V/60Hz. Each automatic transfer shall consist of an inherently double throw power transfer switch mechanism and a microprocessor controller to provide automatic operation. All transfer switches and controllers shall be the products of the same manufacturer.
 - Manufacturer
 - Automatic transfer switches shall be Kohler or equivalent Any Breaker Rated - Standard Transition (KCS)/KCS-AMTA-0150S. Any alternate shall be submitted for approval to the consulting engineer at least 10 days prior to bid date. Alternate bids shall include a line-by-line clarification of the specification marked with "D" for deviation; "E" for exception, and "C" for comply.

- Construction
 - The transfer switch shall be electrically operated and mechanically held with double throw construction, and operated by a momentarily energized solenoid-driven mechanism.
 - All transfer switch sizes shall use only one type of main operator for ease of maintenance and commonality of parts.
 - The switch shall be positively locked and unaffected by momentarily outages, so that contact pressure is maintained at a constant value and contact temperature rise is minimized for maximum reliability and operating life.
 - All main contacts shall be silver composition. Switches rated 600 amperes and above shall have segmented, blow-on construction for high withstand and close-on capability and be protected by separate arcing contacts.
 - Inspection of all contacts shall be possible from the front of the switch without disassembly of operating linkages and without disconnection of power conductors. Switches rated 800 amperes and higher shall have front removable and replaceable contacts. All stationary and moveable contacts shall be replaceable without removing power conductors and/or bus bars.
 - Designs utilizing components of molded-case circuit breakers, contactors, or parts thereof, which are not intended for continuous duty, repetitive switching or transfer between two active power sources, are not acceptable.
 - For two and three pole switches, where neutral conductors are to be solidly connected as shown on the plans, a neutral conductor plate with fully rated AL-CU pressure connectors shall be provided.
 - For four pole switches with a switching neutral, where neutral conductors must be switched as shown on the plans, the contactor shall be provided with fully rated switched neutral transfer contacts. Overlapping neutral contacts may be used as an alternative.
- Enclosure
 - The ATS shall be furnished in a NEMA 1 enclosure.
 - All standard door mounted switches and indicating LEDs shall be integrated into a flush-mounted, interface membrane or equivalent in the enclosure door for easy viewing & replacement. The panel shall be capable of having a manual locking feature to allow the user to lockout all membrane mounted control switches to prevent unauthorized tampering. This cover shall be mounted with hinges and have a latch that may be padlocked. The membrane panel shall be suitable for mounting by others when furnished on open type units.
- **Operation**
- Operators
- Controls
 - A four line, 20 character LCD display and dynamic 4 button keypad shall be an integral part of the controller for viewing all available data and setting desired operational parameters. Operational parameters shall also be available for viewing and control through the communications interface port or USB. The following parameters shall only be adjustable via a password protected programming on the controller:
 - Nominal line voltage and frequency
 - Single or three phase sensing
 - Operating parameter protection
 - Transfer operating mode configuration (Standard transition, Programmed transition, or Closed transition)
 - Voltage and Frequency

- Voltage (all phases) and frequency on both the normal and emergency sources shall be continuously monitored. Voltage on both normal and emergency sources and frequency on the emergency sources shall be adjustable with the following pickup, dropout, and trip setting capabilities (values shown as % of nominal unless otherwise specified):

○ Parameter	Dropout/Trip	Pickup/Reset
○ Under voltage	75 to 98%	85 to 100%
○ Over voltage	06 to 135%	95 to 100% of trip
○ Under frequency	95 to 99%	80 to 95%
○ Over frequency	01 to 115%	105 to 120%
○ Voltage unbalance	5 to 20%	3 to 18%

- Repetitive accuracy of all settings shall be within $\pm 0.5\%$ over an operating temperature range of -20°C to 70°C .
- An adjustable dropout time for transient voltage and frequency excursions shall be provided. The time delays shall be 0.1 to 9.9 seconds for voltage and .1 to 15 seconds for frequency.
- Voltage and frequency settings shall be field adjustable in 1% increments either locally with the display and keypad, remotely via the communications interface port or USB.
- The controller shall be capable of sensing the phase rotation of both the normal and emergency sources. The source shall be considered unacceptable if the phase rotation is not the preferred rotation selected (ABC or BAC). Unacceptable phase rotation shall be indicated on the LCD; the service required LED and the annunciation through the communication protocol and dry contacts. In addition, the phase rotation sensing shall be capable of being disabled, if required.
- The controller shall be capable of detecting a single phasing condition of a source, even though a voltage may be regenerated by the load. This condition is a loss of phase and shall be considered a failed source.
- Source status screens shall be provided for both normal & emergency to provide digital readout of voltage on all 3 phases (phase to phase and phase to neutral), frequency, and phase rotation.
- Time Delays
- An adjustable time delay of 0 to 6 seconds shall be provided to override momentary normal source outages and delay all transfer and engine starting signals. Capability shall be provided to extend this time delay to 60 minutes by providing an external 12 or 24 VDC power supply.
- A time delay shall be provided on transfer to the emergency source, adjustable from 0 to 60 minutes, for controlled timing of transfer of loads to emergency.
- A time delay shall be provided on re-transfer to normal. The time delays shall be adjustable from 0 to 60 minutes. Time delay shall be automatically bypassed if the emergency source fails and the normal source is acceptable.
- A time delay shall be provided on shut down of engine generator for cool down, adjustable from 0 to 60 minutes.
- A time delay activated output signal shall also be provided to drive external relay(s) for selective load disconnect and reconnect control. The controller shall be capable of controlling a maximum of 9 individual output time delays to step loads on after a transfer occurs. Each output may be individually programmed for their own time delay of up to 60 minutes. Each sequence shall be independently programmed for transferring from normal to emergency and transferring from emergency to normal.
- All time delays shall be adjustable in 1 second increments.
- All time delays shall be adjustable by using the display and keypad, with a remote device connected to the communications interface port or USB.

- Each time delay shall be identified and a dynamic countdown shall be shown on the display. Active time delays can be viewed with a remote device connected to the communications interface port or USB.
- Additional Features
 - The controller shall have 3 levels of security. Level 1 shall allow monitoring of settings and parameters only. The Level 1 shall be capable of restricted with the use of a lockable cover. Level 2 shall allow test functions to be performed and Level 3 shall allow setting of all parameters.
 - The display shall provide for the test functions, allowed through password security. The test function shall be load, no load or auto test. The auto test function shall request an elapsed time for test. At the completion of this time delay the test shall be automatically ended and a retransfer sequence shall commence. All loaded tests shall be immediately ended and retransfer shall occur if the emergency source fails and the normal source is acceptable.
 - A contact closure shall be provided for a low-voltage engine start signal. The start signal shall prevent dry cranking of the engine by requiring the generator set to reach proper output, and run for the duration of the cool down setting, regardless of whether the normal source restores before the load is transferred.
 - Auxiliary contacts shall be provided consisting of a minimum of two contacts, closed when the ATS is connected to the normal source and two contacts closed, when the ATS is connected to the emergency source.
 - LED indicating lights shall be provided; one to indicate when the ATS is connected to the normal source (green) and one to indicate when the ATS is connected to the emergency source (red).
 - LED indicating lights shall be provided and energized by controller outputs. The lights shall provide true source availability of the normal (green) and emergency sources (red), as determined by the voltage, frequency and phase rotation sensing trip and reset settings for each source.
 - A membrane switch shall be provided on the membrane panel to test all indicating lights and display when pressed.
 - Provide the ability to select “commit/no commit to transfer” to determine whether the load should be transferred to the emergency generator if the normal source restores before the generator is ready to accept the load.
 - Terminals shall be provided for a remote contact which opens to signal the ATS to transfer to emergency and for remote contacts which closes to inhibit transfer to emergency and/or retransfer to normal. Both of these inhibit signals can be activated through the keypad, communications interface port or USB. A “not-in-auto” LED shall indicate anytime the controller is inhibiting transfer from occurring.
 - An in-phase monitor shall be a standard feature in the controller. The monitor shall control transfer so that motor load inrush currents do not exceed normal starting currents, and shall not require external control of power sources. The in-phase monitor shall be specifically designed for and be the product of the ATS manufacturer. The in-phase monitor shall be capable of being enabled or disabled from the user interface, communications interface port or USB.
 - A time based load control feature shall be available to allow the prioritized addition and removal of loads based during transfer. This feature may be enabled for either or both sources. The user shall be able to control up to nine loads with independent timing sequences for pre and post transfer delays in either direction of transfer.
 - The controller shall provide 2 inputs for external controls that can be programmed from the following values:
 - Common fault, Remote test, Inhibit transfer, Low battery voltage, Peak shave, Time delay bypass, Load shed forced to OFF position (Programmed transition only)

- The controller shall provide two form "C" contact outputs rated for up to 12A @ 240VAC or 2A @ 480VAC that can be programmed from the following values:
- Aux switch open, Transfer switch aux contact fault, Alarm silenced, Alarm active, I/O communication loss, Contactor position, Exercise active, Test mode active, Fail to transfer, Fail to acquire standby source, Source available, Phase rotation error, Not in automatic mode, Common alarm, In phase monitor sync, Load bank control active, Load control active, Maintenance mode active, Non-emergency transfer, Fail to open/close, Loss of phase, Over/under voltage, Over/under frequency, Voltage unbalance, Start signal, Peak shave active, Preferred source supplying load, Standby source supplying load
- The controller shall be capable of expanding the number of inputs and outputs with additional modules.
- Optional input/output modules shall be furnished which mount on the inside of the enclosure to facilitate ease of connections.
- Engine Exerciser - The controller shall provide an internal engine exerciser. The engine exerciser shall allow the user to program up to 21 different exercise routines based on a calendar mode. For each routine, the user shall be able to:
 - Enable or disable the routine
 - Enable or disable transfer of the load during routine.
 - Set the start time, time of day, day of week, week of month (1st, 2nd, 3rd, 4th, alternate or every)
 - Set the duration of the run.
- At the end of the specified loaded exercise duration the switch shall transfer the load back to normal and run the generator for the specified cool down period. All loaded exercises shall be immediately ended and retransfer shall occur if the standby source fails. The next exercise period shall be displayed on the main screen with the type of exercise, time and date. The type of exercise and the time remaining shall be display when the exercise is active. It shall be possible of ending the exercise event with a single button push.
- Date and time - The date shall automatically adjust for leap year and the time shall have the capability of automatically adjusting for daylight saving and standard times.
- System Status - The controller shall have a default display the following on:
 - System status
 - Date, time and type of the next exercise event
 - Average voltage of the preferred and standby sources
 - Scrolling through the displays shall indicate the following:
 - Line to line and line to neutral voltages for both sources
 - Frequency of each source
 - Load current for each phase
 - Single or three phase operation
 - Type of transition
 - Preferred source
 - Commit or no commit modes of operation
 - Source/source mode
 - In phase monitor enable/disable
 - Phase rotation
 - Date and time
- Controllers that require multiple screens to determine system status or display "coded" system status messages, which must be explained by references in the operator's manual, are not permissible.
- Self-Diagnostics - The controller shall contain a diagnostic screen for the purpose of detecting system errors. This screen shall provide information on the status input signals to the controller which may be preventing load transfer commands from being completed.

- Communications Interface - The controller shall be capable of interfacing, through a standard communications with a network of transfer switches and generators. It shall be able to be connected via an RS-485 serial communication (up to 4000 ft. direct connect or multi-drop configuration). This module shall allow for seamless integration of existing or new communication transfer devices and generators.
 - The transfer switch shall also be able to interface to 3rd party applications using Modbus RTU open standard protocols utilizing Modbus register maps. Proprietary protocols shall not be acceptable.
 - The controller shall contain a USB port for use with a software diagnostic application available to factory authorized personnel for downloading the controller's parameters and settings; exercise event schedules; maintenance records and event history. The application can also adjust parameters on the controller.
 - Data Logging - The controller shall have the ability to log data and to maintain the last 2000 events, even in the event of total power loss. The following events shall be time and date stamped and maintained in a non-volatile memory. The controller shall be able to display up to the last 99 events. The remaining events shall be accessible via the communications interface port or USB.
 - Event Logging
 - Data, date and time indication of any event
 - Statistical Data
 - Total number of transfers*
 - Total number of fail to transfers*
 - Total number of transfers due to preferred source failure*
 - Total number of minutes of operation*
 - Total number of minutes in the standby source*
 - Total number of minutes not in the preferred source*
 - Normal to emergency transfer time
 - Emergency to normal transfer time
 - System start date
 - Last maintenance date
 - * The statistical data shall be held in two registers. One register shall contain data since start up and the second register shall contain data from the last maintenance reset.
 - External DC Power Supply - An optional provision shall be available to connect up to two external 12/24 VDC power supply to allow the LCD and the door mounted control indicators to remain functional when both power sources are dead for extended periods of time. This module shall contain reverse battery connection indication and circuit protection.
- Quantity 1 - 3 year Semi-annual Maintenance contract

2. Old Saltworks Road Pump Station

- **Equipment - Generator**
- **Equipment**
 - The generator set shall be a Kohler model 40REOZK or equivalent with a 4P7BX alternator. It shall provide 52.50 kVA and 42.00 kW when operating at 277/480 volts, 60 Hz, 0.80 power factor. The generator set shall be capable of a 130°C Standby rating while operating in an ambient condition of less than or equal to 77 °F and a maximum elevation of 500 ft above sea level. The standby rating shall be available for the duration of the outage.

- Engine
 - The minimum 3.4 liter displacement engine shall deliver a minimum of 67 HP at a governed engine speed of 1800 rpm, and shall be equipped with the following:
 - Mechanical governor capable of 0.5% steady-state frequency regulation
 - 12-volt positive-engagement solenoid shift-starting motor
 - 90-ampere automatic battery charging alternator with a solid-state voltage regulation
 - Positive displacement, full-pressure lubrication oil pump, cartridge oil filters, dipstick, and oil drain
 - Dry-type replaceable air cleaner elements for normal applications
 - Engine-driven or electric fuel-transfer pump including fuel filter and electric solenoid fuel shutoff valve capable of lifting fuel
 - The turbocharged engine shall be fueled by diesel
 - The engine shall have a minimum of 4 cylinders and be liquid-cooled
 - The engine shall be EPA certified tier 3 from the factory
 - The generator must accept rated load in one-step.

- Cooling System
 - The engine shall be liquid-cooled by a closed loop, unit mounted radiator rated to operate the generator set at full load at an ambient temperature of 50 degrees C (122 degrees F). The radiator fan and other rotating engine parts shall be guarded against accidental contact.

- Fuel oil storage
 - Double Wall Secondary Containment Sub-base Fuel Tank
 - The generator set shall be supplied with a sub-base fuel tank of sufficient capacity to hold 279 gallons of diesel fuel.
 - The sub-base fuel system shall be listed under UL 142, subsection entitled Special Purpose Tanks EFVT category, and will bear their mark of UL Approval according to their particular classification.
 - The above ground steel secondary containment rectangular tank for use as a sub base for diesel generators is manufactured and intended to be installed in accordance with the Flammable and Combustible Liquids Code—NFPA 30, the Standard for Installation and Use of Stationary Combustible Engine and Gas Turbines—NFPA 37, and Emergency and Standby Power Systems—NFPA 110.
 - The primary tank shall be rectangular in shape and constructed in clam shell fashion to ensure maximum structural integrity and allow the use of a full throat fillet weld.
 - Steel Channel Support System. Reinforced steel box channel for generator support, with a load rating of 5,000 lbs. per generator mounting hole location. Full height gussets at either end of channel and at generator mounting holes shall be utilized.
 - Exterior Finish. The sub-base tank exterior finish shall be Power Armor Plus™, a polyurea-textured rubberized coating.
 - Normal venting shall be sized in accordance with the American Petroleum Institute Standard No 2000, Venting Atmospheric and Low Pressure Storage Tanks not less than 1-1/4" (3 cm.) nominal inside diameter.
 - The emergency vent opening shall be sized to accommodate the total capacity of both normal and emergency venting and shall be not less than that derived from NFPA 30, table 2-8, and based on the wetted surface area of the tank. The wetted area of the tank shall be calculated on the basis of 100 percent of the primary tank. The vent is to be spring-pressure operated: opening pressure is 0.5/psig and full opening pressure is 2.5 psig. The

- emergency relief vent is to be sized to accommodate the total venting capacity of both normal and emergency vents.
- There shall be a 2" NPT opening within the primary tank and lockable manual fill cap.
 - A direct reading, UL listed, magnetic fuel level gauge with a hermetically sealed, vacuum tested dial, to eliminate fogging, shall be provided.
 - A float switch for remote or local annunciation of a (50% standard) low fuel level condition shall be supplied.
 - Fuel fill option – The fuel fill is equipped with a 5 gallon above ground fill/spill container that contains fuel over spills that may occur during fill-ups and will automatic shut off fuel to the tank when the tank becomes 95% full.
- Controller
 - Advanced Power Management 402 (APM402) Generator Set Controller
 - The generator set controller shall be a microprocessor-based control system that will provide automatic starting, system monitoring, and protection. The controller system shall also provide local monitoring and remote monitoring. The control system shall be capable of PC based updating of all necessary parameters, firmware, and software.
 - The controller shall be mounted on the generator set and shall have integral vibration isolation. The controller shall be prototype and reliability tested to ensure operation in the conditions encountered.
 - Codes and Standards
 - The generator set controller shall meet NFPA 110 Level 1 requirements and shall include an integral alarm horn as required by NFPA.
 - The controller shall meet NFPA 99 and NEC requirements.
 - The controller shall be UL 508 listed.
 - Applicability
 - The controller shall be a standard offering in the manufacturer's controller product line.
 - The controller shall support 12-volt and 24volt starting systems.
 - The controller's environmental specification shall be: -40°C to 70°C operating temperature range and 5-95% humidity, non-condensing.
 - The controller shall mount on the generator or remotely within 40 feet with viewable access.
 - Controller Buttons, Display and Components
 - The generator set controller shall include the following features and functions:
 - Push button Master Control buttons. The buttons shall be tactile-feel membrane with an indicator light to initiate the following functions:
 - Run Mode: When in the run mode the generator set shall start as directed by the operator.
 - Off/Reset Mode: When in the Off/Reset mode the generator set shall stop, the reset shall reset all faults, allowing for the restarting of the generator set after a shutdown.
 - Auto Mode: When in Auto the mode the generator set shall be ready to accept a signal from a remote device.
 - Emergency Stop Switch. The remote stop switch shall be red in color with a "mushroom" type head. Depressing the stop button will immediately stop the generator set and lockout the generator set for

- any automatic remote starting.
- Push Button/Rotary Selector dial. This dial shall be used for selection of all Menus and sub-menus. Rotating the dial moves you through the menus, pushing the dial selects the menu and function/features in that menu. Pushing the button selects the feature/function and sub-menus.
- Digital Display. The digital display shall be alphanumeric, with 2 lines of data and approximately 24 characters. The display shall have back lighting for ease of operator use in high and low light conditions. The display shall display status of all faults and warnings. The display shall also display any engine faults. While the generator set is running, the display shall scroll all-important information across the screen for ease of operator use. The scroll can be stopped by pushing the rotary dial. The display shall fall asleep when the generator set is not running and will wake-up when the generator set starts, or the rotary dial is depressed.
- Fault Light. The controller shall have an annunciator fault light that glows red for faults and yellow for warnings. These faults and warnings shall be displayed in the digital display. The fault light will also glow yellow when not in AUTO.
- Alarm Horn. The controller shall provide an alarm horn that sounds when any faults or warnings are present. The horn shall also sound when the controller is not in the AUTO mode.
- Alarm Silence/Lamp Test Button. When this button is depressed, it shall test all controller lamps. This button will also silence the alarm horn when the unit is not AUTO.
- USB Connection. The controller shall have a USB connection on the face of the controller. This connection shall allow for updating of all software and firmware. This port shall also allow for all servicing of generator set parameters, fault diagnostics and viewing of all controller information via use a laptop computer.
- Dedicated user inputs. The controller shall have dedicated inputs for remote emergency stop switch, remote 2-wire star for transfer switch and auxiliary shutdown.
- The controller shall have auto resettable circuit protection integral on the circuit board.
- System Controller Monitoring and Status Features and Functions
- The generator controller shall display and monitor the following engine and alternator functions and allow adjustments of certain parameters at the controller:
 - Overview menu
 - Active shutdowns and warnings shall be displayed if present and without the need of operator interface
 - Engine runtime with total hours
 - Average line to line voltage
 - Coolant temperature
 - Fuel level or pressure
 - Oil pressure
 - Battery voltage
 - Software version

- Frequency
- Average current
- Engine metering menu.
- Engine speed
- Oil pressure
- Coolant temperature
- Battery voltage
- Generator metering menu.
- Total power in VA
- Total power in W
- Rated power % used
- Voltage L-L and L-N for all phases
- Current L1, L2, L3
- Frequency
- Generator set information.
- Generator set model number
- Generator set serial number
- Controller set number
- Generator set run time.
- Engine run time total hours
- Engine loaded total hours
- Number of engine starts
- Total energy in kW
- Generator set system
- System voltage
- System frequency 50/60Hz
- System phase, single/three phase
- Power rating kW
- Amperage rating
- Power type standby/prime
- Measurement units, metric/English units adjustable
- Alarm silence, always or auto only
- Generator set calibration, the following are adjustable at the controller.
- Voltage L-L and L-N all phases
- Current L1, L2, L3
- Reset all calibrations
- Voltage regulation, +/-0.5% regulation, the following is adjustable at the controller.
- Voltage Adjustable +/- 10%
- Digital and Analog Inputs and outputs
- Displays settings and status
- Event Log
- Stores event history, up to 1000 events
- Controller Engine control features and functions
- Automatic restart - the controller has automatic restart feature that initiates the start routine and re-crank after a failed start attempt.
- Cyclic cranking - the controller shall have programmable cyclic cranking
- control for an optional engine starting aid.

- The control system shall include time delays for engine start and cool down.
- The control system shall interface with the engine ECM and display engine fault codes and warnings. The ECM shall also include sender failure monitoring to help distinguish between failed senders and actual failure conditions.
- The controller shall monitor and display engine governor functions with include steady state and transient frequency monitoring
- Controller Alternator control features and functions
- Integrated hybrid voltage regulator. The system shall have integral microprocessor-based voltage regulator system that provides +/- 5% voltage regulation, no-load to full load with three phase sensing. The system is prototype tested and control variation of voltage to frequency. The voltage regulator shall be adjustable at the controller with maximum +/- 10% adjustable of nominal voltage.
- AC output voltage regulator adjustment. The system shall allow for adjustment of the integral voltage regulator with maximum of +/- 10% adjustment of the system voltage.
- Alternator thermal overload protection. The system shall have integral alternator overload and short circuit protection matched to each alternator for the particular voltage and phase configuration.
- Power metering. The controller digitally displays power metering of kW and kVA.
- Other control features and functions
- Event logging. The controller keeps a record of up to 1000 events, for warning and shutdown faults. This fault information becomes a stored record of systems events and can be reset.
- Historical data logging. The controller total number of generator set successful start shall be recorded and displayed.
- Programmable access. The control system shall include a USB port that gives service technicians the ability to provide software and firmware upgrades. The system shall also be capable of allowing setting of all critical parameters using the service software and a laptop computer. All parameters and setting should be capable to being stored on a laptop for future upgrades of printing for analysis.
- Generator Set Warning, Shutdown Alarm and Status
- The generator set shall have alarms and status indication lamps that show non-automatic status and warning and shutdown conditions. The controller shall indicate with a warning lamp and or alarm and on the digital display screen any shutdown, warning or engine fault condition that exists in the generator set system. The following alarms and shutdowns shall exist as a minimum:
 - Engine functions
 - Critical high fuel level (alarm)
 - ECM communication loss (shutdown)
 - ECM diagnostics (alarm & shutdown)
 - Engine overspeed (shutdown)
 - Engine start aid active
 - Engine under speed (shutdown)
 - Fuel tank leak (alarm & shutdown)

- High DC battery voltage (alarm)
- High coolant temperature (alarm & shutdown)
- High fuel level (alarm)
- Low DC battery voltage (alarm)
- Low coolant level (shutdown)
- Low coolant temperature (alarm)
- Low cranking voltage (alarm)
- Low engine oil level (alarm & shutdown)
- Low fuel level (alarm & shutdown)
- Low fuel pressure (alarm)
- Low oil pressure (alarm & shutdown)
- No coolant temperature signal (shutdown)
- No oil pressure signal (shutdown)
- Overcrank (shutdown)
- Speed sensor fault (alarm)
- Generator functions
- AC sensing loss over & under current (alarm & shutdown)
- Alternator protection (shutdown)
- Ground fault input (alarm)
- kW overload (shutdown)
- Locked rotor (shutdown)
- Over-frequency (shutdown)
- Over AC voltage (shutdown)
- Under-frequency (shutdown)
- Under AC voltage (shutdown)
- Emergency stop (shutdown)
- Other General functions
- Battery charger fault (alarm)
- Common fault (shutdown)
- Common warning (alarm)
- Master switch not in auto (alarm)
- Generator running
- Input/output fault (alarm)
- The generator set controller shall also be capable of meeting all necessary NFPA 110 level 1 requirements that include several of the above along with; EPS supplying load, Master switch “not in auto”, and contacts for local and remote common alarm.
- Communications
 - If the generator set engine is equipped with an ECM (engine control module), the controller shall communicate with the ECM for control, monitoring, diagnosis, and meet SAE J1939 standards
 - Kohler proprietary RBUS communication shall be available.
 - A RBUS shall be able to monitor and alter parameters and start or stop a generator.
 - The controller shall have the capability to communicate to a personal computer (IBM or compatible) and appropriate application software
 - A variety of connections shall be available based on requirements:
 - A single control connection to a PC via USB
 - Internet connection via Ethernet

- Generator and transfer switch controls shall be equipped with communications modules capable of connecting to the same communication network.
- **Generator Overcurrent and Fault Protection**
 - The generator shall be provided with a factory installed, 80% rated line circuit breaker rated at 100.00 amperes that is UL489 listed. Line circuit breakers shall be sized for the rated ampacity of the loads served by the breaker per the NEC.
 - The circuit breaker(s) shall incorporate a thermo-magnetic trip unit.
 - Load side lugs shall be provided from the factory. The line circuit breaker shall include auxiliary contacts, shunt trip, undervoltage trip, alarm switch, and overcurrent switch functionality. Load side breaker connections made at the factory shall be separated from field connections.
- **Alternator**
 - The alternator shall be salient-pole, brushless, 2/3-pitch, with 4 bus bar provision for external connections, self-ventilated, with drip-proof construction and amortisseur rotor windings, and skewed for smooth voltage waveform. The ratings shall meet the NEMA standard (MG1-32.40) temperature rise limits. The insulation shall be class H per UL1446 and the varnish shall be a vacuum pressure impregnated, fungus resistant epoxy. Temperature rise of the rotor and stator shall be limited to 130°C Standby. The PMG based excitation system shall be of brushless construction controlled by a digital, three phase sensing, solid-state, voltage regulator. The AVR shall be capable of proper operation under severe nonlinear loads and provide individual adjustments for voltage range, stability and volts-per-hertz operations. The AVR shall be protected from the environment by conformal coating. The waveform harmonic distortion shall not exceed 5% total RMS measured line-to-line at full rated load. The TIF factor shall not exceed 50.
 - The alternator shall have a maintenance-free bearing, designed for 40000 hour B10 life. The alternator shall be directly connected to the flywheel housing with a semi-flexible coupling between the rotor and the flywheel.
 - The generator shall be inherently capable of sustaining at least 300% of rated current for at least 10 seconds under a 3-phase symmetrical short circuit without the addition of separate current-support devices.
 - Motor starting performance and voltage dip determinations shall be based on the complete generator set. The generator set shall be capable of supplying 180.00 LRKVA for starting motor loads with a maximum instantaneous voltage dip of 35%, as measured by a digital RMS transient recorder in accordance with IEEE Standard 115. Motor starting performance and voltage dip determination that does not account for all components affecting total voltage dip, i.e., engine, alternator, voltage regulator, and governor will not be acceptable. As such, the generator set shall be prototype tested to optimize and determine performance as a generator set system.
- **Vibration Isolation**
 - Vibration isolators shall be provided between the engine-alternator and heavy-duty steel base.
- **Accessories**
 - The generator set shall be supplied with a common failure relay to provide means of signaling fault and/or shutdown conditions.
 - The common failure relay shall remotely signal auxiliary faults, emergency stop, high engine temperature, low oil pressure, overcrank, and over speed via one single-pole, double-throw relay with 10 amps at 120 VAC contacts.
 - The relay contacts shall be gold flashed to allow use of low current draw devices (100ma @ 28VDC min.).

- Once energized the relay shall remain latched until the system is reset by the main controller switch.
 - The generator set shall be provided with a run relay which shall provide a three-pole, double-throw relay with 10-amp/ 250 VAC contacts to indicate that the generator is running. The run relay dry contacts can be used for energizing or de-energizing customer devices while the generator is running (e.g. louvers, indicator lamps, etc.)
 - Battery rack and battery cables capable of holding the manufacturer's recommended batteries shall be supplied.
 - The generator set shall be supplied with a 10-ampere automatic float/equalize battery charger capable of charging both lead-acid and ni-cad type batteries, with the following features:
 - Automatic 3-stage float to equalization charge
 - Voltage regulation of 1% from no to full load over 10% AC input line voltage variations
 - Battery charging current Ammeter and battery voltage voltmeter with 5% full-scale accuracy
 - LED lamp for power ON indication
 - Current limited during engine cranking, short circuit, and reverse polarity conditions
 - Temperature compensated for ambient temperatures for -40°C to 60°C
 - Alarm circuit board featuring alarm contacts for low battery voltage, high battery voltage, and battery charger malfunction.
 - UL 1012 Listed
 - CSA Certified
 - The generator set shall be supplied with a 2 Input/5 Output Module kit to provide two additional analog inputs and 5 additional dry contact outputs. The analog inputs can be used for analog or digital input functions. They can be set up for 0-5VDC, ±3VDC resistive or relay contact sensor devices. The dry contact outputs shall be arranged as two 120VAC or 28VDC, 10A form C contacts and three 28VDC, 2A form C contacts. Input and output functions are user defined.
 - A radiator duct flange to provide a convenient connection to duct work for the radiator discharge air shall be included.
 - Supply flexible fuel lines to provide a flexible connection between the engine fuel fittings and the fuel supply tank piping and for the fuel return lines from the injector pump per engine manufacturer's recommendations. Flex line shall have a protective steel wire braid to protect the hose from abrasion.
 - The engine exhaust silencer shall be temperature and rust resistant, and rated for critical applications. The silencer will reduce total engine exhaust noise by 25-35 db(A).
 - The exhaust piping shall be gas proof, seamless, stainless steel, flexible exhaust bellows and includes the flex exhaust tube and the mounting hardware.
- Quantity 1 - 3 Year semi-annual Maintenance Contract
 - **Equipment – Transfer Switch**
 - Equipment
 - Furnish and install an automatic transfer switches system(s) with 3-Pole / 4-Wire, Solid Neutral, 104 Amps, 480V/60Hz. Each automatic transfer shall consist of an inherently double throw power transfer switch mechanism and a microprocessor controller to provide automatic operation. All transfer switches and controllers shall be the products of the same manufacturer.

- **Manufacturer**
 - Automatic transfer switches shall be Kohler or equivalent Any Breaker Rated - Standard Transition (KCS)/KCS-AMTA-0104S. Any alternate shall be submitted for approval to the consulting engineer at least 10 days prior to bid date. Alternate bids shall include a line-by-line clarification of the specification marked with "D" for deviation; "E" for exception, and "C" for comply.
- **Construction**
 - The transfer switch shall be electrically operated and mechanically held with double throw construction, and operated by a momentarily energized solenoid-driven mechanism.
 - All transfer switch sizes shall use only one type of main operator for ease of maintenance and commonality of parts.
 - The switch shall be positively locked and unaffected by momentarily outages, so that contact pressure is maintained at a constant value and contact temperature rise is minimized for maximum reliability and operating life.
 - All main contacts shall be silver composition. Switches rated 600 amperes and above shall have segmented, blow-on construction for high withstand and close-on capability and be protected by separate arcing contacts.
 - Inspection of all contacts shall be possible from the front of the switch without disassembly of operating linkages and without disconnection of power conductors. Switches rated 800 amperes and higher shall have front removable and replaceable contacts. All stationary and moveable contacts shall be replaceable without removing power conductors and/or bus bars.
 - Designs utilizing components of molded-case circuit breakers, contactors, or parts thereof, which are not intended for continuous duty, repetitive switching or transfer between two active power sources, are not acceptable.
 - For two and three pole switches, where neutral conductors are to be solidly connected as shown on the plans, a neutral conductor plate with fully rated AL-CU pressure connectors shall be provided.
 - For four pole switches with a switching neutral, where neutral conductors must be switched as shown on the plans, the contactor shall be provided with fully rated switched neutral transfer contacts. Overlapping neutral contacts may be used as an alternative.
- **Enclosure**
 - The ATS shall be furnished in a NEMA 1 enclosure.
 - All standard door mounted switches and indicating LEDs shall be integrated into a flush-mounted, interface membrane or equivalent in the enclosure door for easy viewing & replacement. The panel shall be capable of having a manual locking feature to allow the user to lockout all membrane mounted control switches to prevent unauthorized tampering. This cover shall be mounted with hinges and have a latch that may be padlocked. The membrane panel shall be suitable for mounting by others when furnished on open type units.
- **Operation**
- **Operators**
- **Controls**
 - A four line, 20 character LCD display and dynamic 4 button keypad shall be an integral part of the controller for viewing all available data and setting desired operational parameters. Operational parameters shall also be available for viewing and control through the communications interface port or USB. The

following parameters shall only be adjustable via a password protected programming on the controller:

- Nominal line voltage and frequency
- Single or three phase sensing
- Operating parameter protection
 - Transfer operating mode configuration (Standard transition, Programmed transition, or Closed transition)
 - Voltage and Frequency
 - Voltage (all phases) and frequency on both the normal and emergency sources shall be continuously monitored. Voltage on both normal and emergency sources and frequency on the emergency sources shall be adjustable with the following pickup, dropout, and trip setting capabilities (values shown as % of nominal unless otherwise specified):

Parameter	Dropout/Trip	Pickup/Reset
Under voltage	75 to 98%	85 to 100%
Over voltage	06 to 135%	95 to 100% of trip
Under frequency	95 to 99%	80 to 95%
Over frequency	01 to 115%	105 to 120%
Voltage unbalance	5 to 20%	3 to 18%
 - Repetitive accuracy of all settings shall be within $\pm 0.5\%$ over an operating temperature range of -20°C to 70°C .
 - An adjustable dropout time for transient voltage and frequency excursions shall be provided. The time delays shall be 0.1 to 9.9 seconds for voltage and .1 to 15 seconds for frequency.
 - Voltage and frequency settings shall be field adjustable in 1% increments either locally with the display and keypad, remotely via the communications interface port or USB.
 - The controller shall be capable of sensing the phase rotation of both the normal and emergency sources. The source shall be considered unacceptable if the phase rotation is not the preferred rotation selected (ABC or BAC). Unacceptable phase rotation shall be indicated on the LCD; the service required LED and the annunciation through the communication protocol and dry contacts. In addition, the phase rotation sensing shall be capable of being disabled, if required.
 - The controller shall be capable of detecting a single phasing condition of a source, even though a voltage may be regenerated by the load. This condition is a loss of phase and shall be considered a failed source.
 - Source status screens shall be provided for both normal & emergency to provide digital readout of voltage on all 3 phases (phase to phase and phase to neutral), frequency, and phase rotation.
- Time Delays
 - An adjustable time delay of 0 to 6 seconds shall be provided to override momentary normal source outages and delay all transfer and engine starting signals. Capability shall be provided to extend this time delay to 60 minutes by providing an external 12 or 24 VDC power supply.
 - A time delay shall be provided on transfer to the emergency source, adjustable from 0 to 60 minutes, for controlled timing of transfer of loads to emergency.
 - A time delay shall be provided on re-transfer to normal. The time delays shall be adjustable from 0 to 60 minutes. Time delay shall be automatically bypassed if the emergency source fails and the normal source is acceptable.
 - A time delay shall be provided on shut down of engine generator for cool down, adjustable from 0 to 60 minutes.
 - A time delay activated output signal shall also be provided to drive external relay(s) for selective load disconnect and reconnect control. The controller shall be capable of controlling a maximum of 9 individual output time delays to step

loads on after a transfer occurs. Each output may be individually programmed for their own time delay of up to 60 minutes. Each sequence shall be independently programmed for transferring from normal to emergency and transferring from emergency to normal.

- All time delays shall be adjustable in 1 second increments.
- All time delays shall be adjustable by using the display and keypad, with a remote device connected to the communications interface port or USB.
- Each time delay shall be identified and a dynamic countdown shall be shown on the display. Active time delays can be viewed with a remote device connected to the communications interface port or USB.
- Additional Features
 - The controller shall have 3 levels of security. Level 1 shall allow monitoring of settings and parameters only. The Level 1 shall be capable of restricted with the use of a lockable cover. Level 2 shall allow test functions to be performed and Level 3 shall allow setting of all parameters.
 - The display shall provide for the test functions, allowed through password security. The test function shall be load, no load or auto test. The auto test function shall request an elapsed time for test. At the completion of this time delay the test shall be automatically ended and a retransfer sequence shall commence. All loaded tests shall be immediately ended and retransfer shall occur if the emergency source fails and the normal source is acceptable.
 - A contact closure shall be provided for a low-voltage engine start signal. The start signal shall prevent dry cranking of the engine by requiring the generator set to reach proper output, and run for the duration of the cool down setting, regardless of whether the normal source restores before the load is transferred.
 - Auxiliary contacts shall be provided consisting of a minimum of two contacts, closed when the ATS is connected to the normal source and two contacts closed, when the ATS is connected to the emergency source.
 - LED indicating lights shall be provided; one to indicate when the ATS is connected to the normal source (green) and one to indicate when the ATS is connected to the emergency source (red).
 - LED indicating lights shall be provided and energized by controller outputs. The lights shall provide true source availability of the normal (green) and emergency sources (red), as determined by the voltage, frequency and phase rotation sensing trip and reset settings for each source.
 - A membrane switch shall be provided on the membrane panel to test all indicating lights and display when pressed.
 - Provide the ability to select “commit/no commit to transfer” to determine whether the load should be transferred to the emergency generator if the normal source restores before the generator is ready to accept the load.
 - Terminals shall be provided for a remote contact which opens to signal the ATS to transfer to emergency and for remote contacts which closes to inhibit transfer to emergency and/or retransfer to normal. Both of these inhibit signals can be activated through the keypad, communications interface port or USB. A “not-in-auto” LED shall indicate anytime the controller is inhibiting transfer from occurring.
 - An in-phase monitor shall be a standard feature in the controller. The monitor shall control transfer so that motor load inrush currents do not exceed normal starting currents, and shall not require external control of power sources. The in-phase monitor shall be specifically designed for and be the product of the ATS manufacturer. The in-phase monitor shall be capable of being enabled or disabled from the user interface, communications interface port or USB.
 - A time based load control feature shall be available to allow the prioritized addition and removal of loads based during transfer. This feature may be enabled for either or both sources. The user shall be able to control up to nine loads with

independent timing sequences for pre and post transfer delays in either direction of transfer.

- The controller shall provide 2 inputs for external controls that can be programmed from the following values:
- Common fault, Remote test, Inhibit transfer, Low battery voltage, Peak shave, Time delay bypass, Load shed forced to OFF position (Programmed transition only)
- The controller shall provide two form "C" contact outputs rated for up to 12A @ 240VAC or 2A @ 480VAC that can be programmed from the following values:
- Aux switch open, Transfer switch aux contact fault, Alarm silenced, Alarm active, I/O communication loss, Contactor position, Exercise active, Test mode active, Fail to transfer, Fail to acquire standby source, Source available, Phase rotation error, Not in automatic mode, Common alarm, In phase monitor sync, Load bank control active, Load control active, Maintenance mode active, Non-emergency transfer, Fail to open/close, Loss of phase, Over/under voltage, Over/under frequency, Voltage unbalance, Start signal, Peak shave active, Preferred source supplying load, Standby source supplying load
- The controller shall be capable of expanding the number of inputs and outputs with additional modules.
- Optional input/output modules shall be furnished which mount on the inside of the enclosure to facilitate ease of connections.
- Engine Exerciser - The controller shall provide an internal engine exerciser. The engine exerciser shall allow the user to program up to 21 different exercise routines based on a calendar mode. For each routine, the user shall be able to:
 - Enable or disable the routine
 - Enable or disable transfer of the load during routine.
 - Set the start time, time of day, day of week, week of month (1st, 2nd, 3rd, 4th, alternate or every)
 - Set the duration of the run.
 - At the end of the specified loaded exercise duration the switch shall transfer the load back to normal and run the generator for the specified cool down period. All loaded exercises shall be immediately ended and retransfer shall occur if the standby source fails. The next exercise period shall be displayed on the main screen with the type of exercise, time and date. The type of exercise and the time remaining shall be display when the exercise is active. It shall be possible of ending the exercise event with a single button push.
- Date and time - The date shall automatically adjust for leap year and the time shall have the capability of automatically adjusting for daylight saving and standard times.
- System Status - The controller shall have a default display the following on:
 - System status
 - Date, time and type of the next exercise event
 - Average voltage of the preferred and standby sources
 - Scrolling through the displays shall indicate the following:
 - Line to line and line to neutral voltages for both sources
 - Frequency of each source
 - Load current for each phase
 - Single or three phase operation
 - Type of transition
 - Preferred source
 - Commit or no commit modes of operation
 - Source/source mode
 - In phase monitor enable/disable
 - Phase rotation
 - Date and time

- Controllers that require multiple screens to determine system status or display "coded" system status messages, which must be explained by references in the operator's manual, are not permissible.
- Self-Diagnostics - The controller shall contain a diagnostic screen for the purpose of detecting system errors. This screen shall provide information on the status input signals to the controller which may be preventing load transfer commands from being completed.
- Communications Interface - The controller shall be capable of interfacing, through a standard communications with a network of transfer switches and generators. It shall be able to be connected via an RS-485 serial communication (up to 4000 ft. direct connect or multi-drop configuration). This module shall allow for seamless integration of existing or new communication transfer devices and generators.
- The transfer switch shall also be able to interface to 3rd party applications using Modbus RTU open standard protocols utilizing Modbus register maps. Proprietary protocols shall not be acceptable.
- The controller shall contain a USB port for use with a software diagnostic application available to factory authorized personnel for downloading the controller's parameters and settings; exercise event schedules; maintenance records and event history. The application can also adjust parameters on the controller.
- Data Logging - The controller shall have the ability to log data and to maintain the last 2000 events, even in the event of total power loss. The following events shall be time and date stamped and maintained in a non-volatile memory. The controller shall be able to display up to the last 99 events. The remaining events shall be accessible via the communications interface port or USB.
- Event Logging
 - Data, date and time indication of any event
 - Statistical Data
 - Total number of transfers*
 - Total number of fail to transfers*
 - Total number of transfers due to preferred source failure*
 - Total number of minutes of operation*
 - Total number of minutes in the standby source*
 - Total number of minutes not in the preferred source*
 - Normal to emergency transfer time
 - Emergency to normal transfer time
 - System start date
 - Last maintenance date
 - * The statistical data shall be held in two registers. One register shall contain data since start up and the second register shall contain data from the last maintenance reset.
 - External DC Power Supply - An optional provision shall be available to connect up to two external 12/24 VDC power supply to allow the LCD and the door mounted control indicators to remain functional when both power sources are dead for extended periods of time. This module shall contain reverse battery connection indication and circuit protection.
- Quantity 1 - 3 year Semi-annual Maintenance contract

3. Terry Lane Pump Station

- **Equipment - Generator**
- **Equipment**

- The generator set shall be a Kohler model 40REOZK or equivalent with a 4P7BX alternator. It shall provide 52.50 kVA and 42.00 kW when operating at 277/480 volts, 60 Hz, 0.80 power factor. The generator set shall be capable of a 130°C Standby rating while operating in an ambient condition of less than or equal to 77 °F and a maximum elevation of 500 ft above sea level. The standby rating shall be available for the duration of the outage.
- Engine
 - The minimum 3.4 liter displacement engine shall deliver a minimum of 67 HP at a governed engine speed of 1800 rpm, and shall be equipped with the following:
 - Mechanical governor capable of 0.5% steady-state frequency regulation
 - 12-volt positive-engagement solenoid shift-starting motor
 - 90-ampere automatic battery charging alternator with a solid-state voltage regulation
 - Positive displacement, full-pressure lubrication oil pump, cartridge oil filters, dipstick, and oil drain
 - Dry-type replaceable air cleaner elements for normal applications
 - Engine-driven or electric fuel-transfer pump including fuel filter and electric solenoid fuel shutoff valve capable of lifting fuel
 - The turbocharged engine shall be fueled by diesel
 - The engine shall have a minimum of 4 cylinders and be liquid-cooled
 - The engine shall be EPA certified tier 3 from the factory
 - The generator must accept rated load in one-step.
- Cooling System
 - The engine shall be liquid-cooled by a closed loop, unit mounted radiator rated to operate the generator set at full load at an ambient temperature of 50 degrees C (122 degrees F). The radiator fan and other rotating engine parts shall be guarded against accidental contact.
- Fuel oil storage
 - Double Wall Secondary Containment Sub-base Fuel Tank
 - The generator set shall be supplied with a sub-base fuel tank of sufficient capacity to hold 279 gallons of diesel fuel.
 - The sub-base fuel system shall be listed under UL 142, subsection entitled Special Purpose Tanks EFVT category, and will bear their mark of UL Approval according to their particular classification.
 - The above ground steel secondary containment rectangular tank for use as a sub base for diesel generators is manufactured and intended to be installed in accordance with the Flammable and Combustible Liquids Code—NFPA 30, the Standard for Installation and Use of Stationary Combustible Engine and Gas Turbines—NFPA 37, and Emergency and Standby Power Systems—NFPA 110.
 - The primary tank shall be rectangular in shape and constructed in clam shell fashion to ensure maximum structural integrity and allow the use of a full throat fillet weld.
 - Steel Channel Support System. Reinforced steel box channel for generator support, with a load rating of 5,000 lbs. per generator mounting hole location. Full height gussets at either end of channel and at generator mounting holes shall be utilized.
 - Exterior Finish. The sub-base tank exterior finish shall be Power Armor Plus™, a polyurea-textured rubberized coating.
 - Normal venting shall be sized in accordance with the American Petroleum Institute Standard No 2000, Venting Atmospheric and Low Pressure Storage Tanks not less than 1-1/4" (3 cm.) nominal inside diameter.

- The emergency vent opening shall be sized to accommodate the total capacity of both normal and emergency venting and shall be not less than that derived from NFPA 30, table 2-8, and based on the wetted surface area of the tank. The wetted area of the tank shall be calculated on the basis of 100 percent of the primary tank. The vent is to be spring-pressure operated: opening pressure is 0.5/psig and full opening pressure is 2.5 psig. The emergency relief vent is to be sized to accommodate the total venting capacity of both normal and emergency vents.
- There shall be a 2" NPT opening within the primary tank and lockable manual fill cap.
- A direct reading, UL listed, magnetic fuel level gauge with a hermetically sealed, vacuum tested dial, to eliminate fogging, shall be provided.
- A float switch for remote or local annunciation of a (50% standard) low fuel level condition shall be supplied.
- Fuel fill option – The fuel fill is equipped with a 5 gallon above ground fill/spill container that contains fuel over spills that may occur during fill-ups and will automatic shut off fuel to the tank when the tank becomes 95% full.
- Controller
 - Advanced Power Management 402 (APM402) Generator Set Controller
 - The generator set controller shall be a microprocessor-based control system that will provide automatic starting, system monitoring, and protection. The controller system shall also provide local monitoring and remote monitoring. The control system shall be capable of PC based updating of all necessary parameters, firmware, and software.
 - The controller shall be mounted on the generator set and shall have integral vibration isolation. The controller shall be prototype and reliability tested to ensure operation in the conditions encountered.
- Codes and Standards
 - The generator set controller shall meet NFPA 110 Level 1 requirements and shall include an integral alarm horn as required by NFPA.
 - The controller shall meet NFPA 99 and NEC requirements.
 - The controller shall be UL 508 listed.
 - Applicability
 - The controller shall be a standard offering in the manufacturer's controller product line.
 - The controller shall support 12-volt and 24volt starting systems.
 - The controller's environmental specification shall be: -40°C to 70°C operating temperature range and 5-95% humidity, non-condensing.
 - The controller shall mount on the generator or remotely within 40 feet with viewable access.
 - Controller Buttons, Display and Components
 - The generator set controller shall include the following features and functions:
 - Push button Master Control buttons. The buttons shall be tactile-feel membrane with an indicator light to initiate the following functions:
 - Run Mode: When in the run mode the generator set shall start as directed by the operator.
 - Off/Reset Mode: When in the Off/Reset mode the generator set shall stop, the reset shall reset all faults, allowing for the restarting of the

- generator set after a shutdown.
- Auto Mode: When in Auto the mode the generator set shall be ready to accept a signal from a remote device.
- Emergency Stop Switch. The remote stop switch shall be red in color with a "mushroom" type head. Depressing the stop button will immediately stop the generator set and lockout the generator set for any automatic remote starting.
- Push Button/Rotary Selector dial. This dial shall be used for selection of all Menus and sub-menus. Rotating the dial moves you through the menus, pushing the dial selects the menu and function/features in that menu. Pushing the button selects the feature/function and sub-menus.
- Digital Display. The digital display shall be alphanumeric, with 2 lines of data and approximately 24 characters. The display shall have back lighting for ease of operator use in high and low light conditions. The display shall display status of all faults and warnings. The display shall also display any engine faults. While the generator set is running, the display shall scroll all-important information across the screen for ease of operator use. The scroll can be stopped by pushing the rotary dial. The display shall fall asleep when the generator set is not running and will wake-up when the generator set starts, or the rotary dial is depressed.
- Fault Light. The controller shall have an annunciator fault light that glows red for faults and yellow for warnings. These faults and warnings shall be displayed in the digital display. The fault light will also glow yellow when not in AUTO.
- Alarm Horn. The controller shall provide an alarm horn that sounds when any faults or warnings are present. The horn shall also sound when the controller is not in the AUTO mode.
- Alarm Silence/Lamp Test Button. When this button is depressed, it shall test all controller lamps. This button will also silence the alarm horn when the unit is not AUTO.
- USB Connection. The controller shall have a USB connection on the face of the controller. This connection shall allow for updating of all software and firmware. This port shall also allow for all servicing of generator set parameters, fault diagnostics and viewing of all controller information via use a laptop computer.
- Dedicated user inputs. The controller shall have dedicated inputs for remote emergency stop switch, remote 2-wire star for transfer switch and auxiliary shutdown.
- The controller shall have auto resettable circuit protection integral on the circuit board.
- System Controller Monitoring and Status Features and Functions
- The generator controller shall display and monitor the following engine and alternator functions and allow adjustments of certain parameters at the controller:
 - Overview menu
 - Active shutdowns and warnings shall be displayed if present and without the need of operator interface
 - Engine runtime with total hours

- Average line to line voltage
- Coolant temperature
- Fuel level or pressure
- Oil pressure
- Battery voltage
- Software version
- Frequency
- Average current
- Engine metering menu.
- Engine speed
- Oil pressure
- Coolant temperature
- Battery voltage
- Generator metering menu.
- Total power in VA
- Total power in W
- Rated power % used
- Voltage L-L and L-N for all phases
- Current L1, L2, L3
- Frequency
- Generator set information.
- Generator set model number
- Generator set serial number
- Controller set number
- Generator set run time.
- Engine run time total hours
- Engine loaded total hours
- Number of engine starts
- Total energy in kW
- Generator set system
- System voltage
- System frequency 50/60Hz
- System phase, single/three phase
- Power rating kW
- Amperage rating
- Power type standby/prime
- Measurement units, metric/English units adjustable
- Alarm silence, always or auto only
- Generator set calibration, the following are adjustable at the controller.
- Voltage L-L and L-N all phases
- Current L1, L2, L3
- Reset all calibrations
- Voltage regulation, +/-0.5% regulation, the following is adjustable at the controller.
- Voltage Adjustable +/- 10%
- Digital and Analog Inputs and outputs
- Displays settings and status
- Event Log
- Stores event history, up to 1000 events

- Controller Engine control features and functions
- Automatic restart - the controller has automatic restart feature that initiates the start routine and re-crank after a failed start attempt.
- Cyclic cranking - the controller shall have programmable cyclic cranking
 - control for an optional engine starting aid.
- The control system shall include time delays for engine start and cool down.
- The control system shall interface with the engine ECM and display engine fault codes and warnings. The ECM shall also include sender failure monitoring to help distinguish between failed senders and actual failure conditions.
- The controller shall monitor and display engine governor functions with include steady state and transient frequency monitoring
- Controller Alternator control features and functions
- Integrated hybrid voltage regulator. The system shall have integral microprocessor-based voltage regulator system that provides +/- 5% voltage regulation, no-load to full load with three phase sensing. The system is prototype tested and control variation of voltage to frequency. The voltage regulator shall be adjustable at the controller with maximum +/- 10% adjustable of nominal voltage.
- AC output voltage regulator adjustment. The system shall allow for adjustment of the integral voltage regulator with maximum of +/- 10% adjustment of the system voltage.
- Alternator thermal overload protection. The system shall have integral alternator overload and short circuit protection matched to each alternator for the particular voltage and phase configuration.
- Power metering. The controller digitally displays power metering of kW and kVA.
- Other control features and functions
- Event logging. The controller keeps a record of up to 1000 events, for warning and shutdown faults. This fault information becomes a stored record of systems events and can be reset.
- Historical data logging. The controller total number of generator set successful start shall be recorded and displayed.
- Programmable access. The control system shall include a USB port that gives service technicians the ability to provide software and firmware upgrades. The system shall also be capable of allowing setting of all critical parameters using the service software and a laptop computer. All parameters and setting should be capable to being stored on a laptop for future upgrades of printing for analysis.
- Generator Set Warning, Shutdown Alarm and Status
- The generator set shall have alarms and status indication lamps that show non-automatic status and warning and shutdown conditions. The controller shall indicate with a warning lamp and or alarm and on the digital display screen any shutdown, warning or engine fault condition that exists in the generator set system. The following alarms and shutdowns shall exist as a minimum:
 - Engine functions
 - Critical high fuel level (alarm)

- ECM communication loss (shutdown)
- ECM diagnostics (alarm & shutdown)
- Engine overspeed (shutdown)
- Engine start aid active
- Engine under speed (shutdown)
- Fuel tank leak (alarm & shutdown)
- High DC battery voltage (alarm)
- High coolant temperature (alarm & shutdown)
- High fuel level (alarm)
- Low DC battery voltage (alarm)
- Low coolant level (shutdown)
- Low coolant temperature (alarm)
- Low cranking voltage (alarm)
- Low engine oil level (alarm & shutdown)
- Low fuel level (alarm & shutdown)
- Low fuel pressure (alarm)
- Low oil pressure (alarm & shutdown)
- No coolant temperature signal (shutdown)
- No oil pressure signal (shutdown)
- Overcrank (shutdown)
- Speed sensor fault (alarm)
- Generator functions
- AC sensing loss over & under current (alarm & shutdown)
- Alternator protection (shutdown)
- Ground fault input (alarm)
- kW overload (shutdown)
- Locked rotor (shutdown)
- Over-frequency (shutdown)
- Over AC voltage (shutdown)
- Under-frequency (shutdown)
- Under AC voltage (shutdown)
- Emergency stop (shutdown)
- Other General functions
- Battery charger fault (alarm)
- Common fault (shutdown)
- Common warning (alarm)
- Master switch not in auto (alarm)
- Generator running
- Input/output fault (alarm)
- The generator set controller shall also be capable of meeting all necessary NFPA 110 level 1 requirements that include several of the above along with; EPS supplying load, Master switch “not in auto”, and contacts for local and remote common alarm.
- Communications
 - If the generator set engine is equipped with an ECM (engine control module), the controller shall communicate with the ECM for control, monitoring, diagnosis, and meet SAE J1939 standards
 - Kohler proprietary RBUS communication shall be available.
 - A RBUS shall be able to monitor and alter parameters and start or stop a generator.

- The controller shall have the capability to communicate to a personal computer (IBM or compatible) and appropriate application software
- A variety of connections shall be available based on requirements:
- A single control connection to a PC via USB
- Internet connection via Ethernet
- Generator and transfer switch controls shall be equipped with communications modules capable of connecting to the same communication network.
- **Generator Overcurrent and Fault Protection**
 - The generator shall be provided with a factory installed, 80% rated line circuit breaker rated at 100.00 amperes that is UL489 listed. Line circuit breakers shall be sized for the rated ampacity of the loads served by the breaker per the NEC.
 - The circuit breaker(s) shall incorporate a thermo-magnetic trip unit.
 - Load side lugs shall be provided from the factory. The line circuit breaker shall include auxiliary contacts, shunt trip, undervoltage trip, alarm switch, and overcurrent switch functionality. Load side breaker connections made at the factory shall be separated from field connections.
- **Alternator**
 - The alternator shall be salient-pole, brushless, 2/3-pitch, with 4 bus bar provision for external connections, self-ventilated, with drip-proof construction and amortisseur rotor windings, and skewed for smooth voltage waveform. The ratings shall meet the NEMA standard (MG1-32.40) temperature rise limits. The insulation shall be class H per UL1446 and the varnish shall be a vacuum pressure impregnated, fungus resistant epoxy. Temperature rise of the rotor and stator shall be limited to 130°C Standby. The PMG based excitation system shall be of brushless construction controlled by a digital, three phase sensing, solid-state, voltage regulator. The AVR shall be capable of proper operation under severe nonlinear loads and provide individual adjustments for voltage range, stability and volts-per-hertz operations. The AVR shall be protected from the environment by conformal coating. The waveform harmonic distortion shall not exceed 5% total RMS measured line-to-line at full rated load. The TIF factor shall not exceed 50.
 - The alternator shall have a maintenance-free bearing, designed for 40000 hour B10 life. The alternator shall be directly connected to the flywheel housing with a semi-flexible coupling between the rotor and the flywheel.
 - The generator shall be inherently capable of sustaining at least 300% of rated current for at least 10 seconds under a 3-phase symmetrical short circuit without the addition of separate current-support devices.
 - Motor starting performance and voltage dip determinations shall be based on the complete generator set. The generator set shall be capable of supplying 180.00 LRKVA for starting motor loads with a maximum instantaneous voltage dip of 35%, as measured by a digital RMS transient recorder in accordance with IEEE Standard 115. Motor starting performance and voltage dip determination that does not account for all components affecting total voltage dip, i.e., engine, alternator, voltage regulator, and governor will not be acceptable. As such, the generator set shall be prototype tested to optimize and determine performance as a generator set system.
- **Vibration Isolation**
 - Vibration isolators shall be provided between the engine-alternator and heavy-duty steel base.
- **Accessories**

- The generator set shall be supplied with a common failure relay to provide means of signaling fault and/or shutdown conditions.
 - The common failure relay shall remotely signal auxiliary faults, emergency stop, high engine temperature, low oil pressure, overcrank, and over speed via one single-pole, double-throw relay with 10 amps at 120 VAC contacts.
 - The relay contacts shall be gold flashed to allow use of low current draw devices (100ma @ 28VDC min.).
 - Once energized the relay shall remain latched until the system is reset by the main controller switch.
 - The generator set shall be provided with a run relay which shall provide a three-pole, double-throw relay with 10-amp/ 250 VAC contacts to indicate that the generator is running. The run relay dry contacts can be used for energizing or de-energizing customer devices while the generator is running (e.g. louvers, indicator lamps, etc.)
 - Battery rack and battery cables capable of holding the manufacturer's recommended batteries shall be supplied.
 - The generator set shall be supplied with a 10-ampere automatic float/equalize battery charger capable of charging both lead-acid and ni-cad type batteries, with the following features:
 - Automatic 3-stage float to equalization charge
 - Voltage regulation of 1% from no to full load over 10% AC input line voltage variations
 - Battery charging current Ammeter and battery voltage voltmeter with 5% full-scale accuracy
 - LED lamp for power ON indication
 - Current limited during engine cranking, short circuit, and reverse polarity conditions
 - Temperature compensated for ambient temperatures for -40°C to 60°C
 - Alarm circuit board featuring alarm contacts for low battery voltage, high battery voltage, and battery charger malfunction.
 - UL 1012 Listed
 - CSA Certified
 - The generator set shall be supplied with a 2 Input/5 Output Module kit to provide two additional analog inputs and 5 additional dry contact outputs. The analog inputs can be used for analog or digital input functions. They can be set up for 0-5VDC, ±3VDC resistive or relay contact sensor devices. The dry contact outputs shall be arranged as two 120VAC or 28VDC, 10A form C contacts and three 28VDC, 2A form C contacts. Input and output functions are user defined.
 - A radiator duct flange to provide a convenient connection to duct work for the radiator discharge air shall be included.
 - Supply flexible fuel lines to provide a flexible connection between the engine fuel fittings and the fuel supply tank piping and for the fuel return lines from the injector pump per engine manufacturer's recommendations. Flex line shall have a protective steel wire braid to protect the hose from abrasion.
 - The engine exhaust silencer shall be temperature and rust resistant, and rated for critical applications. The silencer will reduce total engine exhaust noise by 25-35 db(A).
 - The exhaust piping shall be gas proof, seamless, stainless steel, flexible exhaust bellows and includes the flex exhaust tube and the mounting hardware.
- Quantity 1 - 3 Year semi-annual Maintenance Contract

- **Equipment – Transfer Switch**
- Equipment
 - Furnish and install an automatic transfer switches system(s) with 3-Pole / 4-Wire, Solid Neutral, 104 Amps, 480V/60Hz. Each automatic transfer shall consist of an inherently double throw power transfer switch mechanism and a microprocessor controller to provide automatic operation. All transfer switches and controllers shall be the products of the same manufacturer.
- Manufacturer
 - Automatic transfer switches shall be Kohler or equivalent Any Breaker Rated - Standard Transition (KCS)/KCS-AMTA-0104S. Any alternate shall be submitted for approval to the consulting engineer at least 10 days prior to bid date. Alternate bids shall include a line-by-line clarification of the specification marked with "D" for deviation; "E" for exception, and "C" for comply.
- Construction
 - The transfer switch shall be electrically operated and mechanically held with double throw construction, and operated by a momentarily energized solenoid-driven mechanism.
 - All transfer switch sizes shall use only one type of main operator for ease of maintenance and commonality of parts.
 - The switch shall be positively locked and unaffected by momentarily outages, so that contact pressure is maintained at a constant value and contact temperature rise is minimized for maximum reliability and operating life.
 - All main contacts shall be silver composition. Switches rated 600 amperes and above shall have segmented, blow-on construction for high withstand and close-on capability and be protected by separate arcing contacts.
 - Inspection of all contacts shall be possible from the front of the switch without disassembly of operating linkages and without disconnection of power conductors. Switches rated 800 amperes and higher shall have front removable and replaceable contacts. All stationary and moveable contacts shall be replaceable without removing power conductors and/or bus bars.
 - Designs utilizing components of molded-case circuit breakers, contactors, or parts thereof, which are not intended for continuous duty, repetitive switching or transfer between two active power sources, are not acceptable.
 - For two and three pole switches, where neutral conductors are to be solidly connected as shown on the plans, a neutral conductor plate with fully rated AL-CU pressure connectors shall be provided.
 - For four pole switches with a switching neutral, where neutral conductors must be switched as shown on the plans, the contactor shall be provided with fully rated switched neutral transfer contacts. Overlapping neutral contacts may be used as an alternative.
- Enclosure
 - The ATS shall be furnished in a NEMA 1 enclosure.
 - All standard door mounted switches and indicating LEDs shall be integrated into a flush-mounted, interface membrane or equivalent in the enclosure door for easy viewing & replacement. The panel shall be capable of having a manual locking feature to allow the user to lockout all membrane mounted control switches to prevent unauthorized tampering. This cover shall be mounted with hinges and have a latch that may be padlocked. The membrane panel shall be suitable for mounting by others when furnished on open type units.

- **Operation**
- Operators
- Controls
 - A four line, 20 character LCD display and dynamic 4 button keypad shall be an integral part of the controller for viewing all available data and setting desired operational parameters. Operational parameters shall also be available for viewing and control through the communications interface port or USB. The following parameters shall only be adjustable via a password protected programming on the controller:
 - Nominal line voltage and frequency
 - Single or three phase sensing
- Operating parameter protection
 - Transfer operating mode configuration (Standard transition, Programmed transition, or Closed transition)
 - Voltage and Frequency
 - Voltage (all phases) and frequency on both the normal and emergency sources shall be continuously monitored. Voltage on both normal and emergency sources and frequency on the emergency sources shall be adjustable with the following pickup, dropout, and trip setting capabilities (values shown as % of nominal unless otherwise specified):

Parameter	Dropout/Trip	Pickup/Reset
○ Under voltage	75 to 98%	85 to 100%
○ Over voltage	06 to 135%	95 to 100% of trip
○ Under frequency	95 to 99%	80 to 95%
○ Over frequency	01 to 115%	105 to 120%
○ Voltage unbalance	5 to 20%	3 to 18%
 - Repetitive accuracy of all settings shall be within $\pm 0.5\%$ over an operating temperature range of -20°C to 70°C .
 - An adjustable dropout time for transient voltage and frequency excursions shall be provided. The time delays shall be 0.1 to 9.9 seconds for voltage and .1 to 15 seconds for frequency.
 - Voltage and frequency settings shall be field adjustable in 1% increments either locally with the display and keypad, remotely via the communications interface port or USB.
 - The controller shall be capable of sensing the phase rotation of both the normal and emergency sources. The source shall be considered unacceptable if the phase rotation is not the preferred rotation selected (ABC or BAC). Unacceptable phase rotation shall be indicated on the LCD; the service required LED and the annunciation through the communication protocol and dry contacts. In addition, the phase rotation sensing shall be capable of being disabled, if required.
 - The controller shall be capable of detecting a single phasing condition of a source, even though a voltage may be regenerated by the load. This condition is a loss of phase and shall be considered a failed source.
 - Source status screens shall be provided for both normal & emergency to provide digital readout of voltage on all 3 phases (phase to phase and phase to neutral), frequency, and phase rotation.
- Time Delays
 - An adjustable time delay of 0 to 6 seconds shall be provided to override momentary normal source outages and delay all transfer and engine starting signals. Capability shall be provided to extend this time delay to 60 minutes by providing an external 12 or 24 VDC power supply.
 - A time delay shall be provided on transfer to the emergency source, adjustable from 0 to 60 minutes, for controlled timing of transfer of loads to emergency.

- A time delay shall be provided on re-transfer to normal. The time delays shall be adjustable from 0 to 60 minutes. Time delay shall be automatically bypassed if the emergency source fails and the normal source is acceptable.
- A time delay shall be provided on shut down of engine generator for cool down, adjustable from 0 to 60 minutes.
- A time delay activated output signal shall also be provided to drive external relay(s) for selective load disconnect and reconnect control. The controller shall be capable of controlling a maximum of 9 individual output time delays to step loads on after a transfer occurs. Each output may be individually programmed for their own time delay of up to 60 minutes. Each sequence shall be independently programmed for transferring from normal to emergency and transferring from emergency to normal.
- All time delays shall be adjustable in 1 second increments.
- All time delays shall be adjustable by using the display and keypad, with a remote device connected to the communications interface port or USB.
- Each time delay shall be identified and a dynamic countdown shall be shown on the display. Active time delays can be viewed with a remote device connected to the communications interface port or USB.
- Additional Features
 - The controller shall have 3 levels of security. Level 1 shall allow monitoring of settings and parameters only. The Level 1 shall be capable of restricted with the use of a lockable cover. Level 2 shall allow test functions to be performed and Level 3 shall allow setting of all parameters.
 - The display shall provide for the test functions, allowed through password security. The test function shall be load, no load or auto test. The auto test function shall request an elapsed time for test. At the completion of this time delay the test shall be automatically ended and a retransfer sequence shall commence. All loaded tests shall be immediately ended and retransfer shall occur if the emergency source fails and the normal source is acceptable.
 - A contact closure shall be provided for a low-voltage engine start signal. The start signal shall prevent dry cranking of the engine by requiring the generator set to reach proper output, and run for the duration of the cool down setting, regardless of whether the normal source restores before the load is transferred.
 - Auxiliary contacts shall be provided consisting of a minimum of two contacts, closed when the ATS is connected to the normal source and two contacts closed, when the ATS is connected to the emergency source.
 - LED indicating lights shall be provided; one to indicate when the ATS is connected to the normal source (green) and one to indicate when the ATS is connected to the emergency source (red).
 - LED indicating lights shall be provided and energized by controller outputs. The lights shall provide true source availability of the normal (green) and emergency sources (red), as determined by the voltage, frequency and phase rotation sensing trip and reset settings for each source.
 - A membrane switch shall be provided on the membrane panel to test all indicating lights and display when pressed.
 - Provide the ability to select "commit/no commit to transfer" to determine whether the load should be transferred to the emergency generator if the normal source restores before the generator is ready to accept the load.
 - Terminals shall be provided for a remote contact which opens to signal the ATS to transfer to emergency and for remote contacts which closes to inhibit transfer to emergency and/or retransfer to normal. Both of these inhibit signals can be activated through the keypad, communications interface port or USB. A "not-in-auto" LED shall indicate anytime the controller is inhibiting transfer from occurring.

- An in-phase monitor shall be a standard feature in the controller. The monitor shall control transfer so that motor load inrush currents do not exceed normal starting currents, and shall not require external control of power sources. The in-phase monitor shall be specifically designed for and be the product of the ATS manufacturer. The in-phase monitor shall be capable of being enabled or disabled from the user interface, communications interface port or USB.
- A time based load control feature shall be available to allow the prioritized addition and removal of loads based during transfer. This feature may be enabled for either or both sources. The user shall be able to control up to nine loads with independent timing sequences for pre and post transfer delays in either direction of transfer.
- The controller shall provide 2 inputs for external controls that can be programmed from the following values:
 - Common fault, Remote test, Inhibit transfer, Low battery voltage, Peak shave, Time delay bypass, Load shed forced to OFF position (Programmed transition only)
- The controller shall provide two form "C" contact outputs rated for up to 12A @ 240VAC or 2A @ 480VAC that can be programmed from the following values:
 - Aux switch open, Transfer switch aux contact fault, Alarm silenced, Alarm active, I/O communication loss, Contactor position, Exercise active, Test mode active, Fail to transfer, Fail to acquire standby source, Source available, Phase rotation error, Not in automatic mode, Common alarm, In phase monitor sync, Load bank control active, Load control active, Maintenance mode active, Non-emergency transfer, Fail to open/close, Loss of phase, Over/under voltage, Over/under frequency, Voltage unbalance, Start signal, Peak shave active, Preferred source supplying load, Standby source supplying load
- The controller shall be capable of expanding the number of inputs and outputs with additional modules.
- Optional input/output modules shall be furnished which mount on the inside of the enclosure to facilitate ease of connections.
- Engine Exerciser - The controller shall provide an internal engine exerciser. The engine exerciser shall allow the user to program up to 21 different exercise routines based on a calendar mode. For each routine, the user shall be able to:
 - Enable or disable the routine
 - Enable or disable transfer of the load during routine.
 - Set the start time, time of day, day of week, week of month (1st, 2nd, 3rd, 4th, alternate or every)
 - Set the duration of the run.
 - At the end of the specified loaded exercise duration the switch shall transfer the load back to normal and run the generator for the specified cool down period. All loaded exercises shall be immediately ended and retransfer shall occur if the standby source fails. The next exercise period shall be displayed on the main screen with the type of exercise, time and date. The type of exercise and the time remaining shall be display when the exercise is active. It shall be possible of ending the exercise event with a single button push.
- Date and time - The date shall automatically adjust for leap year and the time shall have the capability of automatically adjusting for daylight saving and standard times.
- System Status - The controller shall have a default display the following on:
 - System status
 - Date, time and type of the next exercise event
 - Average voltage of the preferred and standby sources
 - Scrolling through the displays shall indicate the following:
 - Line to line and line to neutral voltages for both sources
 - Frequency of each source

- Load current for each phase
- Single or three phase operation
- Type of transition
- Preferred source
- Commit or no commit modes of operation
- Source/source mode
- In phase monitor enable/disable
- Phase rotation
- Date and time
- Controllers that require multiple screens to determine system status or display "coded" system status messages, which must be explained by references in the operator's manual, are not permissible.
- Self-Diagnostics - The controller shall contain a diagnostic screen for the purpose of detecting system errors. This screen shall provide information on the status input signals to the controller which may be preventing load transfer commands from being completed.
- Communications Interface - The controller shall be capable of interfacing, through a standard communications with a network of transfer switches and generators. It shall be able to be connected via an RS-485 serial communication (up to 4000 ft. direct connect or multi-drop configuration). This module shall allow for seamless integration of existing or new communication transfer devices and generators.
- The transfer switch shall also be able to interface to 3rd party applications using Modbus RTU open standard protocols utilizing Modbus register maps. Proprietary protocols shall not be acceptable.
- The controller shall contain a USB port for use with a software diagnostic application available to factory authorized personnel for downloading the controller's parameters and settings; exercise event schedules; maintenance records and event history. The application can also adjust parameters on the controller.
- Data Logging - The controller shall have the ability to log data and to maintain the last 2000 events, even in the event of total power loss. The following events shall be time and date stamped and maintained in a non-volatile memory. The controller shall be able to display up to the last 99 events. The remaining events shall be accessible via the communications interface port or USB.
- Event Logging
 - Data, date and time indication of any event
 - Statistical Data
 - Total number of transfers*
 - Total number of fail to transfers*
 - Total number of transfers due to preferred source failure*
 - Total number of minutes of operation*
 - Total number of minutes in the standby source*
 - Total number of minutes not in the preferred source*
 - Normal to emergency transfer time
 - Emergency to normal transfer time
 - System start date
 - Last maintenance date
 - * The statistical data shall be held in two registers. One register shall contain data since start up and the second register shall contain data from the last maintenance reset.
 - External DC Power Supply - An optional provision shall be available to connect up to two external 12/24 VDC power supply to allow the LCD and the door mounted control indicators to remain functional when both power sources are

dead for extended periods of time. This module shall contain reverse battery connection indication and circuit protection.

- Quantity 1 - 3 year Semi-annual Maintenance contract

4.5.8 EXECUTION

4.5.9 INSTALLATION

- A. Coordination with Electrical Contractor for proper installation.
- B. All electrical connections per federal, state and local regulations and codes.
- C. Hours of work shall be regular business hours from 7:30 a.m. to 4:00 p.m. – Sundays through Saturdays

4.5.10 CONNECTIONS

- A. Generator must be able to run all sewerage pumps in each pump station as specified in the IFB.
- B. Generator must be able to run all existing electric power equipment, outlets, and electric circuitry.

4.5.11 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
- B. Tests and Inspections: After installing units and after electrical circuitry has been energized, test units for compliance with requirements. Inspect for and remove shipping bolts, blocks and tie-down straps. After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment. Remove and replace malfunctioning units and retest as specified above.

4.5.12 INSTRUCTIONS

Provide services of manufacturer's technical representative for four hours to instruct Wareham staff in the operation and maintenance of units.

4.5.13 STARTUP AND TESTING

Coordinate the startup and contractor testing schedule with the Owner and Engineer. Provide a minimum of seven (7) days prior notice.

4.5.14 WARRANTY

If, within one year after the date of Final Acceptance of the Work or designated portion thereof or after the date of commencement of warranties or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contract and to make a claim for breach of warranty.

**SECTION 5.0
PRICING**

The undersigned proposes to supply and deliver the materials and services specified below in full accordance with the Contract Documents supplied by the Town of Wareham entitled:

**REMOVE, DISPOSE AND REPLACE
GENERATOR AND TRANSFER SWITCH UNITS**

The Bidder proposes to furnish and deliver the services specified at the following prices. Pricing is firm fixed price (FFP):

SEE APPENDIX D-each pump station must have its own pricing chart

CLIN	Description	Qty	Unit	Unit Price	Total Amount
001	Remove and disposal of existing generator units in accordance with specifications contained therein in the IFB.	3	EA		
	Replace and install generator units in accordance with specifications contained therein in the IFB	3	EA		
002	Removal and disposal of existing transfer switch in accordance with specifications contained therein in the IFB.	3	EA		
	Replace and install automatic transfer switch units in accordance with specifications contained therein in the IFB	3	EA		
	Firm Fixed Price (FFP)				
	FOB: Destination				

SEE FOLLOWING PAGE FOR REQUIRED SIGNATURE OR PRICING

NAME OF COMPANY/ INDIVIDUAL:

ADDRESS:

CITY/STATE/ZIP:

TELEPHONE/FAX/EMAIL:

SIGNATURE OF AUTHORIZED INDIVIDUAL:

ACKNOWLEDGEMENT OF ADDENDUMS:

Addendum #1 _____ #2 _____ #3 _____ #4 _____

SECTION 6.0 FORMS

6.1 Required Submissions

- 6.1.1** Certificate of Authority
- 6.1.2** Statement of Compliance
- 6.1.3** Insurance Certificate (Post Award)
- 6.1.4** Form for General Bid
- 6.1.5** Form for Sub-Bid (if necessary)

**APPENDIX A
PAST PERFORMANCE / REFERENCE SHEET**

The Town requires that the Contractor demonstrate experience providing similar services in **size, scope and completely** for a minimum of three (3) projects. Three (3) references shall be provided for past performance.

Please use the below format for all references submitted and provide as much detail as possible in the Summary section.

Past Performance/Reference Title:

Period of Performance	
Contract \$ Value	
Technical & Contractual POC Names & Titles	
Telephone numbers	
Email address	
Detailed summary of services provided	

**APPENDIX B
SITE PHOTOS
(if applicable)**

**APPENDIX C
PREVAILING WAGES**

APPENDIX D

PRICING SHEETS (3)

PRICING

The undersigned proposes to supply and deliver the materials and services specified below in full accordance with the Contract Documents supplied by the Town of Wareham entitled:

**REMOVE, DISPOSE AND REPLACE
GENERATOR AND TRANSFER SWITCH UNITS**

The Bidder proposes to furnish and deliver the services specified at the following prices. Pricing is firm fixed price (FFP):

Nanumett St

CLIN	Description	Qty	Unit	Unit Price	Total Amount
001	Remove and disposal of existing generator units in accordance with specifications contained therein in the IFB.	1	EA		
	Replace and install generator units in accordance with specifications contained therein in the IFB	1	EA		
002	Removal and disposal of existing transfer switch in accordance with specifications contained therein in the IFB.	1	EA		
	Replace and install automatic transfer switch units in accordance with specifications contained therein in the IFB	1	EA		
	Firm Fixed Price (FFP)				
	FOB: Destination				

PRICING

The undersigned proposes to supply and deliver the materials and services specified below in full accordance with the Contract Documents supplied by the Town of Wareham entitled:

**REMOVE, DISPOSE AND REPLACE
GENERATOR AND TRANSFER SWITCH UNITS**

The Bidder proposes to furnish and deliver the services specified at the following prices. Pricing is firm fixed price (FFP):

Old Salt Works Rd.

CLIN	Description	Qty	Unit	Unit Price	Total Amount
001	Remove and disposal of existing generator units in accordance with specifications contained therein in the IFB.	1	EA		
	Replace and install generator units in accordance with specifications contained therein in the IFB	1	EA		
002	Removal and disposal of existing transfer switch in accordance with specifications contained therein in the IFB.	1	EA		
	Replace and install automatic transfer switch units in accordance with specifications contained therein in the IFB	1	EA		
	Firm Fixed Price (FFP)				
	FOB: Destination				

PRICING

The undersigned proposes to supply and deliver the materials and services specified below in full accordance with the Contract Documents supplied by the Town of Wareham entitled:

REMOVE, DISPOSE AND REPLACE GENERATOR AND TRANSFER SWITCH UNITS

The Bidder proposes to furnish and deliver the services specified at the following prices. Pricing is firm fixed price (FFP):

Terry Lane

CLIN	Description	Qty	Unit	Unit Price	Total Amount
001	Remove and disposal of existing generator units in accordance with specifications contained therein in the IFB.	1	EA		
	Replace and install generator units in accordance with specifications contained therein in the IFB	1	EA		
002	Removal and disposal of existing transfer switch in accordance with specifications contained therein in the IFB.	1	EA		
	Replace and install automatic transfer switch units in accordance with specifications contained therein in the IFB	1	EA		
	Firm Fixed Price (FFP)				
	FOB: Destination				

AGREEMENT

THIS AGREEMENT, made this _____ day of _____ 2018, by and between the party of the first part, the Town of Wareham, hereinafter called "OWNER," acting herein through its Town Authority and the party of the second part, _____ doing business as *(an individual) (a partnership) (a joint venture) (a corporation) located in the _____ (City/ Town) of _____, County, and State of _____ hereinafter called "CONTRACTOR."

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned, to be made and performed by the OWNER, the CONTRACTOR hereby agrees with the OWNER to commence and complete the project described as follows: _____, hereinafter called the Project, for the sum of _____ Dollars (\$_____) and all extra work in connection therewith, under the terms as stated in the Bid Documents; and at his (its or their) own proper cost and expense to furnish all the materials, supplies, machinery equipment, tools, superintendence, labor, insurance, and other accessories and services necessary to complete the said project in accordance with the conditions and prices stated in the request for proposal, invitation to bid, GENERAL BID, including but not limited to all maps, plates, blue prints, and the specifications and plans , as prepared by the Owner.

CONTRACTOR hereby agrees to commence work under this Contract on or before a date to be specified in written "Notice to Proceed" of the OWNER.

The CONTRACTOR further agrees to fully complete the project within ____ consecutive calendar days of the date of the notice to proceed, but in no event later than _____

The CONTRACTOR further agrees to pay **not as a penalty** but as liquidated damages the sum of \$500.00 for each consecutive calendar day thereafter as provided in the Liquidated Damages Paragraph of Section of GENERAL CONDITIONS.

The CONTRACTOR agrees not to discriminate against or exclude any person from participation herein on grounds of race, religion, color, sex, age or national origin; and that it shall take affirmative actions to insure that applicants are employed, and that employees are treated during their employment, without regard to race, religion, color, sex, age, handicapped status, or national origin.

The OWNER agrees to pay the CONTRACTOR in current funds for the performance of the contract, subject to additions and deductions, as provided in GENERAL CONDITIONS, and to make payments on account thereof as provided in the GENERAL CONDITIONS.

IN WITNESS WHEREOF, the parties to these presents have executed this contract in three (3) counterparts, each of which shall be deemed an original, in the year and day first above mentioned.

AGREED:

Derek D. Sullivan Date
Town Administrator

Contractor Date

Approved As To Form:

Town Counsel

Certified as to the Availability of Funds:

Judith Lauzon
Town Accountant Date

Account #: _____

FORM FOR GENERAL BID

To the Awarding Authority:

A. The Undersigned proposes to furnish all labor and materials required for _____
 _____ (project) in Wareham, Massachusetts, in accordance with the
 accompanying plans and specifications prepared by _____
 _____ (name or architect or engineer) for the contract price specified below,
 subject to additions and deductions according to the terms of the specifications.

B. This bid includes addenda numbered _____.

C. The proposed contract price is _____ dollars (\$ _____).

For alternate No, _____ Add \$ _____; Subtract \$ _____

(Repeat preceding line for each alternate)

D. The subdivision of the proposed contract price is as follows:

Item 1. The work of the general contractor, being all work other than that covered by Item 2.
 \$ _____

Item 2. Sub-bids as follows: --

Sub-trade	Name of Sub-bidder	Amount	Bonds required, indicated by "Yes" or "No"
_____	_____	\$ _____	_____
_____	_____	\$ _____	_____
Total of Item 2.		\$ _____	

The undersigned agrees that each of the above named sub-bidders will be used for the work indicated at the amount stated, unless a substitution is made. The undersigned further agrees to pay the premiums for the performance and payment bonds furnished by sub-bidders as requested herein and that all of the cost of all such premiums is included in the amount set forth in Item 1 of this bid.

The undersigned agrees that if he is selected as general contractor, he will promptly confer with the awarding authority on the question of sub-bidders; and that the awarding authority may substitute for any sub-bid listed above a sub-bid filed with the awarding authority by another sub-bidder for the sub-trade against whose standing and ability the undersigned makes no objection; and that the undersigned will use all such finally selected sub-bidders at the amounts named in their respective sub-bids and be in every way as responsible for them

and their work as if they had been originally named in this general bid, the total contract price being adjusted to conform thereto.

- E. The undersigned agrees that, if he is selected as general contractor, he will within five days, Saturdays, Sundays and legal holidays excluded, after presentation thereof by the awarding authority, execute a contract in accordance with the terms of this bid and furnish a performance bond and also a labor and materials or payment bond, each of a surety company qualified to do business under the laws of the Commonwealth and satisfactory to the awarding authority and each in the sum of the contract price, the premiums for which are to be paid by the general contractor and are included in the contract price; provided, however, that if there is more than 1 surety company, the surety companies shall be jointly and severally liable.

The undersigned hereby certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work; that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and that he will comply fully with all laws and regulations applicable to awards made subject to section 44A.

The undersigned further certifies under the penalties of perjury that this bid is in all respects bona fide, fair and made with collusion or fraud with any other person. As used in this subsection the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity. The undersigned further certifies under penalty of perjury that the said undersigned is not presently debarred from doing public construction work in the Commonwealth under the provisions of section twenty-nine F of chapter twenty-nine, or any other applicable debarment provisions of any other chapter of the General Laws or any rule of regulation promulgated thereunder.

Date _____

(Name of General Bidder)

By _____
(Title and Name of Person Signing Bid)

(Business Address)

(City and State)

FORM FOR SUB-BID (If Applicable)

To all General Bidders Except those Excluded:

- A. The undersigned proposes to furnish all labor and materials required for completing, in accordance with the hereinafter described plans, specifications and addenda, all the work specified in Section No, _____ of the specifications and in any plans specified in such section, prepared by _____ (name of architect or engineer) for _____ (project) in Wareham, Massachusetts, for the contract sum of _____ dollars (\$_____).

For alternate No, _____ Add \$ _____; Subtract \$ _____

(Repeat preceding line for each alternate)

- B. This sub-bid includes addenda numbered _____.

- C. This sub-bid

may be used by any general bidder except:

may only be used by the following general bidders:

[To exclude general bidders, insert "X" in one box only and fill in blank following that box. Do not answer C if no general bidders are excluded.]

- D. The undersigned agrees that, if is selected as a sub-bidder, he will within 5 days, Saturdays, Sundays and legal holidays excluded, after presentation of a subcontract by the general bidder selected as the general contractor, execute with such general bidder a subcontract in accordance with terms of this sub-bid, and contingent upon the execution of the general contract, and, if requested so to do in the general bid by the general bidder, who shall pay the premiums therefor, or if prequalification is required pursuant to section 44D ¾, furnish a performance and payment bond of a surety company qualified to do business under the laws of the Commonwealth and satisfactory to the awarding authority, in the full sum of the subcontract price.
- E. The names all persons, firms, and corporations furnishing to the undersigned labor or labor and materials for the class or classes of part thereof of work for which the provisions of the section of the specifications for this sub-trade require a listing in this paragraph,

including the undersigned if customarily furnished by persons on his own payroll and in the absence of a contrary provision in the specifications, the name of each such class of work or part thereto and the bid price for such class of work or part thereof are:

Name	Class of Work	Bid price
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

[Do Not give bid price for any class or part thereof furnished by undersigned.]

- F. The undersigned agrees that the above list of bids to the undersigned represents bona fide bids based on the hereinbefore described plans, specifications and addenda and that, if the undersigned is awarded the contract, they will be used for the work indicated at the amounts stated, if satisfactory to the awarding authority.
- G. The undersigned further agrees to be bound to the general contractor by the terms of the hereinbefore described plans, specifications, including all general conditions stated therein, and addenda, and to assume toward him all the obligations and responsibilities that he, by those documents, assumes toward the owner.
- H. The undersigned offers the following information as evidence of his qualifications to perform the work as bid upon according to all the requirements of the plans and specifications: -

1. Have been in business under present business name _____ years.

2. Ever failed to complete any work awarded? _____.

3. List one or more recent buildings with names of the general contractor and architect on which you served as a sub-contractor for work of similar character as required for the above-named building.

Building	Architect	General Contractor	Amount of Contract
(a) _____	_____	_____	_____
(b) _____	_____	_____	_____
(c) _____	_____	_____	_____

4. Bank reference _____

FORM FOR SUB-BID – PAGE 3

1. The undersigned hereby certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work; that all employees to be employed at the worksite will have successfully completed a course of construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and that he will comply fully with all laws and regulations applicable to awards of subcontracts subject to section forty-four F.

2. The undersigned further certifies under the penalties of perjury that this sub-bid is in all respects bona fide, fair and made with collusion or fraud with any other person. As used in this subsection the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity. The undersigned further certifies under penalty of perjury that the said undersigned is not presently debarred from doing public construction work in the Commonwealth under the provisions of section twenty-nine F of chapter twenty-nine, or any other applicable debarment provisions of any other chapter of the General Laws or any rule of regulation promulgated thereunder.

Date _____

(Name of Sub-Bidder)

By _____
(Name of Person Signing Bid and Title)

CERTIFICATE OF VOTE

(to be filed if Contractor is a Corporation)

I, _____, hereby certify that I am the duly qualified and
(Secretary of the Corporation)

acting Secretary of _____ and I further certify that a meeting of the
Directors

(Name of Corporation)

of said Company, duly called and held on _____ at which all

Directors were present

(Date of Meeting)

and voting, the following vote was unanimously passed:

VOTED: To authorize and empower

Anyone acting singly, to execute Forms of General Bid, Contracts or Bonds on behalf of the Corporation.

I further certify that the above vote is still in effect and has not been changed or modified in any respect.

By: _____

(Secretary of Corporation)

A True Copy:

Attest: _____

(Notary Public)

My Commission Expires: _____

(Date)