

VILLAGE OF WELLSVILLE

WELLSVILLE, OHIO

SPECIFICATIONS FOR PUMP STATION #1 AND FORCE MAIN IMPROVEMENTS

ADDENDUM NO. 2

SEPTEMBER 30, 2011

All prospective bidders are hereby notified that this addendum forms a part of the contract documents and modifies the original bidding documents dated SEPTEMBER, 2011. Acknowledge receipt of this addendum in the space provided in the bid proposal section of the specifications. Failure to do so may subject the bidder to disqualification.

PREPARED BY:

GGJ, INC.
35585 Curtis Boulevard, Unit C
Eastlake, Ohio 44095
(440) 953-1567 (voice)
(440) 953-0580 (fax)

****THIS ADDENDUM IS BEING TRANSMITTED VIA
FAX ONLY. NO "HARD COPY" WILL BE SENT.****

**Please acknowledge receipt by signing below
and faxing back this cover sheet only ASAP
to (440)953-0580.**

COMPANY _____

NAME _____

DATE _____

GENERAL COMMENTS AND CLARIFICATIONS

- Bob Boris is the contact at AEP, he can be reached at (330) 382-1473 or rjboris@aep.com
- A disconnect before the meter is a utility company requirement. Please coordinate with Bob Boris as to AEP requirements
- Generator dampers need power. They are fed from circuit #9 in panel PA as shown on drawingE1.
- There have been discussions with AEP regarding moving of overhead feeders and transformer to a new pole and bucking over to another small pole, and then to the proposed building. To date AEP has not issued final drawings or confirmation of which poles are going to be installed and where. This is to be coordinated with Bob Boris.
- Section 03535 shall govern the interior and exterior treatments of the wet well.

CONTRACT SPECIFICATIONS

1. SECTION 00300 (BID PROPOSAL FORM)

REMOVE: Entire Section

REPLACE: Entire Section

2. SECTION 02446 (HORIZONTAL DIRECTIONAL DRILLING)

ADD: Entire Section

3. SECTION 16630 (ENGINE GENERATOR)

REMOVE: Entire Section

REPLACE: Entire Section

CONTRACT DRAWINGS

1. THE FOLLOWING SHEETS SHALL BE REMOVED AND REPLACED

- **E1**
- **E2**
- **E3**
- **E4**
- **M1**
- **P2**

The drawings will only be faxed unless otherwise requested. Plan holders may request 11"x17" hard copies of the drawings by contacting the offices of GGJ Inc. at (440) 953-1567. The plan holder may also request an electronic copy be sent via email. A copy of this addendum will also be posted on www.ggjengineers.com

**VILLAGE OF WELLSVILLE
PUMP STATION #1 AND FORCEMAIN IMPROVEMENTS**

BASIS OF PAYMENT

GENERAL: Payment for the work Items shall be at the total unit or lump sum price Bid for each unit of work completed and accepted in accordance with the Contract Documents.

The latest "State of Ohio, Department of Transportation, Construction and Material Specifications" manual shall govern the material and procedures used in this project, if not otherwise specified in the project Specifications or noted on the Drawings.

PRICES TO INCLUDE: For each Bid Item, the total unit price or lump sum price Bid shall be considered full compensation for the completed and accepted work, and shall include all labor, materials, tools, equipment and transportation needed to perform the work in accordance with the Contract Documents so as to provide a complete and properly functional system. The General Contractor shall be responsible for reviewing the contents and conditions of all Contract Documents as they may relate to the work under this Contract and comply with the requirement thereof.

ITEM 1 - BONDS AND INSURANCE

A. Payment:

1. The lump sum amount stated in the Bid Schedule for bonds and insurance shall include all bonds and insurance required to be in force at the commencement of the work. Successful bidder will be required to provide receipts verifying the actual costs of this item when known.
2. Subsequent expenses for bonds and insurance as may be necessary throughout the contract period for changes to the contract or for other occurrences, shall not be a part of this item.
3. Fees for bonds and insurance due to changes in the work shall be respectively a part of the cost of that work.

ITEM 2 - MOBILIZATION

A. Work included: As described in Section 00800 Supplementary Conditions SC-22 and other work incidental to this Item.

B. Payment: Lump Sum price with payments as specified in Section 00800 Supplementary Conditions SC-22.

ITEM 3 – MAINTENANCE OF TRAFFIC

A. Description: This work in this Item shall consist of work shall consists of maintaining and protecting vehicular and pedestrian traffic at the work area while the contract is in force, in accordance with the latest Ohio Department of Transportation Construction and Material Specifications, including all current supplemental specifications and standard construction drawings and all specifications and drawings in these Contract Documents and in this contract book.

B. Payment: The Lump Sum Price bid for Item Maintaining Traffic shall include the cost of removal of conflicting pavement markings and placement of interim markings, maintaining the existing roadways in a safe condition for public use, providing flaggers and their equipment, furnishing and maintaining and subsequently removing temporary traffic control items as required by the plans and specifications.

ITEM 4 – RESTORATION: TOPSOIL, SEEDING & MULCHING

A. Description: The quantity of each type of restoration: topsoil, seeding and mulching will be measured for unit price payment purposes will be the number of square yards of topsoil, seeding and mulching acceptably placed

and compacted when required per detail as specified over an area within the contract (pay) limits. Areas outside of pay limits will be the Contractor's responsibility

- B. Payment: The unit price stipulated to be paid per square yard of restoration: topsoil, seeding and mulching work performed and measured for payment purposes shall be full compensation for the actual number of square yards furnished and installed which is directly or indirectly caused by the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 5 – REMOVE AND RESET EXISTING PLAY EQUIPMENT, BENCHES, FENCE, AND REPLACE SHRUBS

- A. Description: This work in this Item shall consist of removing and resetting existing play equipment, benches, fencing, and shrubs as shown in the Drawings and/or specified in the Contract Documents.
- B. Payment: The unit price stipulated shall be a lump sum for all work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 6 – REMOVE AND RESET EXISTING BRICK WALKWAY

- A. Description: This work in this Item shall consist of removing and resetting existing brick walkway as shown in the Drawings and/or specified in the Contract Documents.
- B. Payment: The unit price stipulated shall be full compensation for each square foot of brick walkway removed and reset as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 7 – SANITARY PUMP STATION - COMPLETE

- A. Measurement: Shall be on the lump sum basis for the total amount of work to be performed under this item.
- B. Payment: The lump sum price stipulated to be paid for the pump station installation shall be full compensation for the complete installation including all work beginning with the connection of the new sanitary sewers and the furnishing and installation of the wet well vault, valve vault, pumps and all accessories, D.I. piping and fittings (originating in the wet well through the valve vault to the mechanical joint outside the valve vault), sump pit, sheeting, shoring, bypass pumping, sump pump with discharge piping, valves and fittings, discharge valves (check and plug), manhole steps, access doors, vent pipe, concrete pads, foundations, slabs, fencing, stoned drive areas, control building, etc., dehumidifier, unit heater, all electrical work pertaining to the Pump Station including all components, controls, and appurtenances necessary as shown on electrical drawings and specified in the electrical specifications and restoration of all disturbed areas and utilities, and other work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 8 – EXISTING PUMP STATION MODIFICATIONS

- A. Measurement: Shall be on an allowance basis for the total amount of work to be performed under this item.
- B. Payment: The lump sum price stipulated to be paid for the pump station modifications shall be full compensation for the modification of the existing sanitary pump station #1 to an overflow pump station. Work shall include depowering existing sanitary pumps from the existing control panel and running new power feed into building to connect to existing control panel. Conduit and wiring from the proposed building to a foot outside of the existing building will be paid under other bid item. Work under this item will include the work from 1 foot outside of building through the building to existing control panel.

ITEM 9 – ELECTRICAL

- A. Measurement: Shall be made on a lump sum basis for the actual work performed under this item.
- B. Payment: The unit price stipulated to be paid for the electrical shall be full compensation for electrical work related to pump station and control building construction. It shall also include providing and installing an emergency generator, transformers, switches, and all appurtenances related to providing a standby power to the pump station. The lump sum price shall be for all the electrical work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 10 – 24" POLYVINYL CHLORIDE (PVC) GRAVITY SEWER PIPE – ASTM D-3034, SDR 26 (SANITARY)

- A. Description: The work in this Item shall consist of furnishing and installing PVC Sanitary Sewer Pipe as shown on the Drawings and/or specified, including removal and disposal of existing sewers. Measurements shall be made on a lump sum basis for the actual work performed under this item.
- B. Payment: The unit price stated on the Bid Schedule shall be compensation for the lump sum price of pipe installed including all fittings and plugs measured for payment. The price shall include furnishing labor, backfill, compaction, laying, sheeting, shoring, inspection, testing of pipe and fittings, restoring all disturbed areas and utilities, removing existing sewers, coring, concrete encasement and all appurtenances to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 11 – 12" PVC OVERFLOW IN EXISTING SANITARY MANHOLE

- A. Measurement: Shall be on the lump sum basis for the total amount of work to be performed under this item.
- B. Payment: The lump sum price stipulated to be paid for this item shall be full compensation for the complete installation of the PVC overflow pipe including all work, materials and appurtenances necessary as shown on drawings and specified in the specifications for a complete and ready-for-use installation.

ITEM 12 – AIR RELEASE AND CLEANOUT STATIONS

- A. Description: The unit bid price shall be made on each Air Release and Cleanout Station performed under this item.
- B. Payment: The unit price stated for each Air Release and Cleanout Station shall be full compensation for the manholes, furnished, installed, and connected in accordance with the Drawings and Specifications including excavation, backfill, labor, material, equipment, and restoration. The unit price stated in the Bid Schedule shall include precast sections, waterproofing, steps, grade adjusting, labor, construction, backfill, compaction, frame and covers, restoration of all disturbed areas and utilities, air release valve, isolation and drain valve, DIP Class 52 tee with blind flanged branch, DIP Class 52 wye with blind flanged branches, and all other appurtenances for the work shown on the Drawings and/or specified in the Construction Documents for a complete and ready-for-use installation.

ITEM 13 – 12" HDPE FORCE MAIN (DR17)

- A. Description: The work in this Item shall consist of furnishing and installing a 12" HDPE Forcemain as shown on the Drawings and/or specified. Measurements shall be made on a linear foot basis for the actual work performed under this item, measured along the horizontal projection of the longitudinal axis of the pipe. Price includes the installation of tracer wire, metallic tape, and 6 tracing wire stations.
- B. Payment: The unit price in the Bid Schedule shall be full compensation for each linear foot of forcemain installed and measured for payment. The price shall include furnishing, all fittings required including the cost of fittings, pipe fusion, excavation, backfill, compaction, laying sheeting, shoring, inspection, testing of pipe and fittings, restoring all disturbed areas and utilities, concrete encasement and all appurtenances to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-to-use installation.

ITEM 14 – BORE & JACK 20" STEEL CASING (12" DIP CL 52 CARRIER PIPE)

- A. Measurement: The footage measured will be the actual number of lineal feet of Bore & Jack Construction complete in place as work performed under this item and measured from beginning to end along the longitudinal axis of each pipe run end to end of its respective steel casing.
- B. Payment: The unit price stipulated to be paid for each lineal foot of Bore & Jack sewer shall be full compensation for the actual number of lineal feet of Bore & Jack Construction including steel casing, DIP carrier pipe and boring and receiving pits installed, measured and accepted for payment purposes and shall include furnishing labor, materials, tools, appliances and equipment necessary to provide and install and test pipe, fittings and specials as specified and, in connection with same, to excavate, bed, backfill, shore, sheet, clear site, remove and dispose of existing structures, restore all disturbed utilities, structures, and site features plus

provide all appurtenances to complete the work as shown on the drawings and specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 15 –24" DUCK BILL VALVE

- A. Description: The unit bid price shall be made on each 24" Duck Bill Valve installed under this item.
- B. Payment: The unit price stated for each 24" Duck Bill Valve shall be full compensation for each valve, furnished, installed, and connected in accordance with the Drawings and Specifications including removal and disposal of existing flap gate, excavation, backfill, labor, material, equipment, restoration, and all other appurtenances for the work shown on the Drawings and/or specified in the Construction Documents for a complete and ready-for-use installation

ITEM 16 – VERTICAL CURB, TYPE 6

- A. Description: This work shall consist of the construction of Type 6 Vertical Curb and shall conform to the plans and specifications.
- B. Payment: The unit price stipulated to be paid for each linear foot of Type 6 Curb shall be full compensation for the actual number of linear feet installed including all labor, laying, restoring all disturbed areas, and all appurtenances to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 17 – GRAVEL DRIVEWAY REMOVAL & REPLACEMENT

- A. Description: This work shall consist of removal and disposal of existing driveway materials and constructing gravel driveway as shown on the plans and specifications.
- B. Payment: The unit price stipulated shall be paid per square yard installed of this item, and shall be full compensation for removal, disposal, furnishing and placing all materials including labor, equipment, and saw cutting to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 18 – TYPE C PAVEMENT REPLACEMENT

- A. Description: The work in this Item shall consist of the Type C pavement replacement in the areas shown on the Drawings.
- B. Payment: The unit price stipulated to be paid for each square yard of Type C Pavement Replacement shall be full compensation for the actual number of square yards, calculated from payment limits as called for in the contract drawings, completed in compliance with the contract drawings and specifications and accepted for payment purposes and shall include furnishing all labor, materials, tools, appliances and equipment necessary thereto and, in connection with same, restore all disturbed site features and other items plus provide all appurtenances to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 19 – 4" CONCRETE SIDEWALK

- A. Description: This item of work shall consist of constructing concrete walks in reasonable close conformity with lines, grades and dimensions shown on the plans or established by the Engineer.
- B. Payment: The unit price stated for 4" concrete sidewalk walk shall be full compensation for the actual number of square foot, calculated from pay limits, including labor, excavation, backfill, base course, expansion joint, truncated dome pavers, forming, and excavation and removal of all excavated material, completed in compliance with the contract Drawings and Specifications.

ITEM 20 – 12" HDPE FORCE MAIN (DIRECTIONAL DRILLING) DR11

- A. Description: The work in this Item shall consist of furnishing and installing a 12" HDPE Forcemain as shown on the Drawings and/or specified. Measurements shall be made on a linear foot basis for the actual work performed under this item, measured along the horizontal projection if the longitudinal axis of the pipe.
- B. Payment: The unit price in the Bid Schedule shall be full compensation for each linear foot of forcemain installed and measured for payment. The price shall include furnishing, all fittings required including the cost of fittings, pipe fusion, excavation, backfill, compaction, laying sheeting, shoring, inspection, testing of pipe and fittings, restoring all disturbed areas and utilities, concrete encasement and all appurtenances to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-to-use installation.

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PROPOSAL TO THE VILLAGE OF WELLSVILLE, OHIO
PUMP STATION #1 AND FORCEMAIN IMPROVEMENTS

TO: MAYOR JOSEPH SURACE
VILLAGE OF WELLSVILLE
1200 MAIN STREET
WELLSVILLE, OHIO 43968

Gentlemen:

Proposal of _____(hereinafter called "BIDDER"), organized and existing under the laws of the State of Ohio doing business as _____.
To the VILLAGE OF WELLSVILLE (hereinafter called "Owner").

In compliance with your Advertisement for Bids, BIDDER hereby proposes to perform all WORK for the construction of the PUMP STATION #1 AND FORCEMAIN IMPROVEMENTS in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

By submitting this BID, the BIDDER, or in the case of a joint BID, each party thereto, certifies as to its own organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

The undersigned have full knowledge of the project site, Drawings, and the conditions of the proposal. The undersigned also, hereby agrees to furnish all the services, labor, materials and equipment necessary to complete these projects according to the Drawings and Specifications and to accept as full compensation the lump sum or unit prices stated in the Bid Schedule for the work and for use when calculating the price of a deduction or an increase in quantities.

BIDDER hereby agrees to commence WORK under this Contract on or before a date to be specified in the NOTICE TO PROCEED and to fully complete the PROJECT within the period stipulated in the INSTRUCTIONS TO BIDDERS. BIDDER further agrees to pay as liquidated damages and that the CITY may retain from monies that are, or which may become due. The amount of such liquidated damages shall be as stipulated in the CONTRACT AGREEMENT FORM (Section 00500 herein).

- Insert "a corporation", "a partnership", or "an individual" as applicable.

The Bidder hereby acknowledges receipt of the following addenda:

ADDENDUM NO.

DATE

_____	_____
_____	_____
_____	_____

We further agree that the Owner may reject any or all bids.

SUBMITTED BY:

Firm, Corporation or Individual

Address

Telephone Number

Contractor License Number _____

Signature: _____ Date: _____

NOTE: Evidence of authority to sign and the corporate seal must be affixed and attested by the Secretary.

COMPLETION DATE: 240 Calendar Days commencing on the date as shown on Notice to Proceed for Final Completion.

PROPOSAL TO THE VILLAGE OF WELLSVILLE, OHIO
PUMP STATION #1 AND FORCEMAIN IMPROVEMENTS

BID SCHEDULE

Bid Item	Item Description	Est. Qty.	Unit	Unit Cost Material	Unit Cost Labor	Total Unit Cost	Total Cost
1	BONDS AND INSURANCE	1	Lump Sum				
2	MOBILIZATION	1	Lump Sum				
3	MAINTENANCE OF TRAFFIC	1	Lump Sum				
4	RESTORATION: TOPSOIL, SEEDING & MULCHING	4000	SY				
5	REMOVE AND RESET EXISTING PLAY EQUIPMENT, BENCHES, FENCE, AND SHRUBS	1	Lump Sum				
6	REMOVE AND RESET EXISTING BRICK WALKWAY	50	SF				
7	SANITARY PUMP STATION – COMPLETE	1	Lump Sum				
8	EXISTING PUMP STATION MODIFICATIONS	1	Allowance			\$10,000.00	\$10,000.00
9	ELECTRICAL	1	Lump Sum				
10	24" POLYVINYL CHLORIDE (PVC) GRAVITY SEWER PIPE – ASTM D-3034, SDR 26 (SANITARY)	1	Lump Sum				
11	12" PVC OVERFLOW IN EXISTING SANITARY MANHOLE	1	Lump Sum				
12	AIR RELEASE AND CLEANOUT STATIONS	4	Each				
13	12" HDPE FORCE MAIN (DR17)	6675	LF				
14	BORE & JACK 20" STEEL CASING (12" DIP CL 52 CARRIER PIPE)	125	LF				
15	24" DUCK BILL VALVE	1	Each				
16	VERTICAL CURB, TYPE 6	675	LF				
17	GRAVEL DRIVEWAY REMOVAL & REPLACEMENT	200	SY				
18	TYPE C PAVEMENT REPLACEMENT	1400	SY				
19	4" CONCRETE SIDEWALK	30	SF				
20	12" HDPE FORCE MAIN (DIRECTIONAL DRILLING) DR11	470	LF				
TOTAL							

TOTAL AMOUNT OF PROJECT (IN FIGURES)

TOTAL AMOUNT OF PROJECT (IN WORDS)

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HORIZONTAL DIRECTIONAL DRILLING

PART ONE - GENERAL

1.01 SUMMARY

- A. Directional drilling including all work necessary for the installation of high-density polyethylene (H.D.P.E.) pipe. Provide services in accordance with the best industry practice and these specifications. Furnish all labor, equipment and materials necessary to accomplish the work.

1.02 QUALITY ASSURANCE

- A. At all times provide and maintain instrumentation which will accurately locate the pilot hole and measure drilling fluid flow discharge rate and pressure.
- B. Provide hydraulic pressure regulations of load sensor between pulling equipment and pipe.
- C. Engineer shall have access to instruments, gages and readings at all times.
- D. Provide "as-built" data including horizontal and vertical location of pipe line at 50' intervals.

1.03 SUBMITTALS

- A. Prior to commencing directional drilling, submit details of equipment and detailed working drawings describing the proposed method of directional drilling. This shall include arrangement of equipment, location and size of drilling and receiving pits, method of dewatering, method of removing spoils material, size and capacity of equipment, method of installing carrier pipe, method of fusing pipe segments, type of cutting head, method of installing monitoring and controlling line and grade, and method of abandonment of pilot hole. Sufficient material shall be submitted to show compliance with the Contract Documents and to show that articles proposed for use in the work are acceptable.

All drawings, catalog cuts and other descriptive data covering several related items in the same system shall be submitted at the same time in order that their complete integrated applicability in the entire system be adequately reviewed.

- B. Bentonite/drilling mud; product information, material specifications, handling procedures, special precautions required, and method of mixing and installation.

1.04 EXPERIENCE

- A. Contractor to have a minimum of 5 years of experience in utilizing this technology with installing water and sewer lines with a minimum of 1,000 L.F. and these type of ground concentrations.

PART TWO - PRODUCTS

2.01 Horizontal Directional Drilling Equipment: All equipment required to install pipeline in accordance with the drawings and specifications.

2.02 Tracing Wire: The tracer wire shall be designed specifically for the purpose of detecting buried utilities. Tracer wire shall be 12 AWG (min.) solid copper wire coated with a 45-mil (min.) polyethylene jacket designed specifically for buried use.

2.03 Drilling Fluids: Provide drilling fluid meeting all environmental regulations which provide lubrication to the pipe, annular flushing of the borehole, and stability and support to the bored hole.

PART THREE - EXECUTION

3.01 DIRECTIONAL TOLERANCE

- A. Drill pilot hole along the path shown on the Plan and Profile drawing to the following tolerances:

Elevations - Plus or minus six (6") inches.

Alignment - Plus or minus six (6") inches.

Curve Radius - No curves will be accepted with a radius less than that shown on the Plan and Profile Drawing.

3.02 REAM AND PULL BACK

- A. Pre-reaming: Pre-reaming operations shall be conducted at the discretion of the horizontal drilling contractor. All provisions of this specification relating to the simultaneous reaming and pulling back operations shall also pertain to pre-reaming operations.
- B. Pulling Loads: The maximum allowable tensile load imposed on the pipeline pull section shall not exceed that recommended by pipe manufacturer of the following:

<u>Nominal Size</u>	<u>Allowable Tensile Load</u>
2" SDR 11	1760 lbs.
3" SDR 11	3830 lbs.
4" SDR 11	6330 lbs.
6" SDR 11	13730 lbs.
8" SDR 11	23200 lbs.
10" SDR 11	34520 lbs.
16" SDR 11	76400 lbs.
18" SDR 11	96800 lbs.
20" SDR 11	127600 lbs.

- C. Torsional Stress: Provide a swivel to connect the pull section to the reaming assembly to minimize torsional stress imposed on the section.
- D. Pull Section Support: Support the pull section as it proceeds during pull back so that it moves freely.
- E. Pull 2 tracing wires along with the carrier pipe.
- F. Pull back in one continuous operation. Notify engineer of any pull back which is resumed.

3.03 DRILLING FLUIDS

- A. Disposal: Disposal of drilling fluids shall be in compliance with all relative environmental regulations, right-of-way and workspace agreements.
- B. Inadvertent Returns: Minimize drilling fluid returns at locations other than the entry and exit points minimized. Clean up any inadvertent returns.

3.04 COMPLETION OF INSTALLATION

- A. After installation of the work is complete, restore drilling and receiving pits.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

ENGINE GENERATOR**1. GENERAL****1.1. DESCRIPTION OF SYSTEM & SITE**

- 1.1.1. Provide a 150 kW standby power system to supply electrical power at 277/480 Volts, 60 Hertz, _____ Three Phase. The generator shall consist of a liquid cooled spark-ignited engine, a synchronous AC alternator, and system controls with all necessary accessories for a complete operating system, including but not limited to the items as specified hereinafter.
- 1.1.2. The site is an NEC ordinary location with no specific harsh environment requirements.
- 1.1.3. The on-site gas pressure is 11 to 14 inches of water column.

1.2. REQUIREMENTS OF REGULATORY AGENCIES

- 1.2.1. An electric generating system, consisting of a prime mover, generator, governor, coupling and all controls, must have been tested, as a complete unit, on a representative engineering prototype model of the equipment to be sold.
- 1.2.2. The generator set must conform to applicable NFPA requirements.
- 1.2.3. The generator set must be available with the Underwriters Laboratories listing (UL2200) for a stationary engine generator assembly.
- 1.2.4. The generator set must be pre-certified to meet EPA federal emission requirements for stationary standby. On-site emission testing & certification will not be acceptable for standby applications.

1.3. MANUFACTURER QUALIFICATIONS

- 1.3.1. This system shall be supplied by an original equipment manufacturer (OEM) who has been regularly engaged in the production of engine-alternator sets, automatic transfer switches, and associated controls for a minimum of 25 years, thereby identifying one source of supply and responsibility. Approved suppliers are Generac Industrial Power, Cat Olympian or Cummins. Dealer produced generator sets are not acceptable.
- 1.3.2. The manufacturer shall have printed literature and brochures describing the standard series specified, not a one of a kind fabrication.
- 1.3.3. Manufacturer's authorized service representative shall meet the following criteria:
 - 1.3.3.1. Certified, factory trained, industrial generator technicians
 - 1.3.3.2. Service support 24/7
 - 1.3.3.3. Service location within 200 miles
 - 1.3.3.4. Response time of 4 hours
 - 1.3.3.5. Service & repair parts in-stock at performance level of 95%
 - 1.3.3.6. Offer optional remote monitoring and diagnostic capabilities

1.4. SUBMITTALS

- 1.4.1. Engine Generator specification sheet
- 1.4.2. Controls specification sheet(s)
- 1.4.3. Installation / Layout dimensional drawing
- 1.4.4. Wiring schematic
- 1.4.5. Sound data
- 1.4.6. Emission certification
- 1.4.7. Warranty statement

2. Engine**2.1. Engine Rating and Performance**

- 2.1.1. The prime mover shall be a liquid cooled, spark-ignited, 4-cycle engine. It will have adequate horsepower to achieve rated kW output.
- 2.1.2. The engine shall support a 100% load step.
- 2.1.3. The generator system shall support generator start-up and load transfer within 10 seconds.
- 2.1.4. The generator shall accept a load step of 100% of rated kW with a maximum frequency dip of 12 Hz.
- 2.1.5. The engine shall be factory EPA certified. Field certification is not acceptable.

2.2. Engine Oil System

- 2.2.1. Full pressure lubrication shall be supplied by a positive displacement lube oil pump. The engine shall have a replaceable oil filter(s) with internal bypass and replaceable element(s).
- 2.2.2. The engine shall operate on mineral based oil. Synthetic oils shall not be required.

2.3. Engine Cooling System

- 2.3.1. The engine is to be cooled with a unit mounted radiator, fan, water pump, and closed coolant recovery system. The coolant system shall include a coolant fill box which will provide visual means to determine if the system has adequate coolant level. The radiator shall be designed for operation in 122 degrees F, (50 degrees C) ambient temperature.
- 2.3.2. The engine shall have (a) unit mounted, thermostatically controlled water jacket heater(s) to aid in quick starting. The wattage shall be as recommended by the manufacturer.
- 2.3.3. Engine coolant and oil drain extensions, equipped with pipe plugs and shut-off valves, must be provided to the outside of the mounting base for cleaner and more convenient engine servicing.

2.4. Engine Starting System

- 2.4.1. Starting shall be by a solenoid shift, DC starting system.
- 2.4.2. The engine's cranking batteries shall be lead acid. The batteries shall be sized per the manufacturer's recommendations. The batteries supplied shall meet NFPA 110 cranking requirements of 90 seconds of total crank time. Battery specifications (type, amp-hour rating, cold cranking amps) to be provided in the submittal.
- 2.4.3. The genset shall have an engine driven, battery charging alternator with integrated voltage regulation.
- 2.4.4. The genset shall have an automatic dual rate, float equalize, 10 amp battery charger. The charger must be protected against a reverse polarity connection. The chargers charging current shall be monitored within the generator controller to support remote monitoring and diagnostics. The battery charger is to be factory installed on the generator set. Due to line voltage drop concerns, a battery charger mounted in the transfer switch will be unacceptable.

2.5. Engine Fuel System

- 2.5.1. The engine shall be configured to operate on pipe line grade natural gas.
- 2.5.2. The engine shall utilize a fuel system inclusive of carburetor, gas regulator, , low gas pressure switch, and fuel shut-off solenoid. Generators larger than 80 kW are to include air-fuel-ratio control.
- 2.5.3. The engines internal fuel connections shall be terminated to the generator frame via an NPT fitting for easy installation.

2.6. Engine Controls

- 2.6.2. Engine speed shall be controlled with an integrated isochronous governor function with no change in alternator frequency from no load to full load. Steady state regulation is to be 0.25%.

2.6.3. To support EPA emission requirements, gensets larger than 80 kW will incorporate an active air-fuel-ratio controller. The air-fuel-ratio controller shall be integrated into the generator controller to ensure security of settings and to support monitoring and remote diagnostics. External air-fuel-ratio controllers are not acceptable.

2.6.1. Engine sensors used for monitoring and control are to be conditioned to a 4-20ma signal level to enhance noise immunity.

2.6.2. All engine sensor connections shall be sealed to prevent corrosion and improve reliability.

2.7. Engine Exhaust & Intake

2.7.1. The engine exhaust emissions shall meet the EPA emission requirements for standby power generation.

2.7.2. For generators larger than 80 kW, the engine will incorporate a 3-way catalytic convertor to meet EPA emission requirements.

2.7.3. The manufacturer shall supply its recommended stainless steel, flexible connector to couple the engine exhaust manifold to the exhaust system. All components must be properly sized to assure operation without excessive back pressure when installed.

2.7.4. The manufacturer shall supply a critical grade exhaust silencer as standard.

2.7.5. The engine intake air is to be filtered with engine mounted, replaceable, dry element filters.

3. Alternator

3.1. The alternator shall be the voltage and phase configuration as specified in section 1.1.1.

3.2. The alternator shall be a 4-pole, revolving field, stationary armature, synchronous machine. The excitation system shall utilize a brushless exciter with a three phase full wave rectifier assembly protected against abnormal transient conditions by a surge protector. Photo-sensitive components will not be permitted in the rotating exciter. The alternator shall be connected to the engine through a gear drive assembly.

3.3. The alternator shall include a permanent magnet generator (PMG) for excitation support. The system shall supply a minimum short circuit support current of 300% of the rating (250% for 50Hz operation) for 10 seconds.

3.4. The alternator shall support 464 skVA with a maximum voltage dip of 35 %. Data referencing 90% recovery is not acceptable.

3.5. Three phase alternators shall be 12 lead, broad range capable of supporting voltage reconnection.

3.6. The alternator shall use a single, sealed bearing design. The rotor shall be connected to the engine flywheel using flexible drive disks. The stator shall be direct connected to the engine to ensure permanent alignment.

3.7. The alternator shall meet temperature rise standards of UL2200 (120 degrees C). The insulation system material shall be class "H" capable of withstanding 150 degrees C temperature rise.

3.8. The alternator shall be protected against overloads and short circuit conditions by advanced control panel protective functions. The control panel is to provide a time current algorithm that protects the alternator against short circuits. To ensure precision protection and repeatable trip characteristics, these functions must be implemented electronically in the generator control panel -- thermal magnetic breaker implementation are not acceptable.

3.9. An alternator strip heater shall be installed to prevent moisture condensation from forming on the alternator windings. A tropical coating shall also be applied to the alternator windings to provide additional protection against the entrance of moisture.

4. Controls

4.1. The generator control system shall be a fully integrated microprocessor based control system for standby emergency engine generators meeting all requirements of NFPA 110 level 1.

4.2. The generator control system shall be a fully integrated control system enabling remote diagnostics and easy building

management integration of all generator functions. The generator controller shall provide integrated and digital control over all generator functions including: engine protection, alternator protection, speed governing, voltage regulation, air-fuel-ratio control (as required) and all related generator operations. The generator controller must also provide seamless digital integration with the engine's electronic engine control module (ECM) if so equipped. Generator controller's that utilize separate voltage regulators and speed governors or do not provide seamless integration with the engine management system are considered less desirable.

- 4.3. Communications shall be supported with building automation via the Modbus protocol without network cards. Optional internet and intranet connectivity shall be available.
- 4.4. The control system shall provide an environmentally sealed design including encapsulated circuit boards and sealed automotive style plugs for all sensors and circuit board connections. The use of non-encapsulated boards, edge cards, and pc ribbon cable connections are considered unacceptable.
- 4.5. Circuit boards shall utilize surface mount technology to provide vibration durability. Circuit boards that utilize large capacitors or heat sinks must utilize encapsulation methods to securely support these components.
- 4.6. A predictive maintenance algorithm that alarms when maintenance is required. The controller shall have the capability to call out to the local servicing dealer when maintenance is required.
- 4.7. Diagnostic capabilities should include time-stamped event and alarm logs, ability to capture operational parameters during events, simultaneous monitoring of all input or output parameters, callout capabilities, support for multi-channel digital strip chart functionality and .2 msec data logging capabilities.
- 4.8. In addition to standard NFPA 110 alarms, the application loads should also be protected through instantaneous and steady state protective settings on system voltage, frequency, and power levels.
- 4.9. The control system shall provide pre-wired customer use I/O: 4 relay outputs (user definable functions), communications support via RS232, RS485, or an optional modem. Additional I/O must be an available option.
- 4.10. Customer I/O shall be software configurable providing full access to all alarm, event, data logging, and shutdown functionality. In addition, custom ladder logic functionality inside the generator controller shall be supported to provide application support flexibility. The ladder logic function shall have access to all the controller inputs and customer assignable outputs.
- 4.11. The control panel will display all user pertinent unit parameters including: engine and alternator operating conditions; oil pressure and optional oil temperature; coolant temperature and level alarm; fuel level (where applicable); engine speed; DC battery voltage; run time hours; generator voltages, amps, frequency, kilowatts, and power factor; alarm status and current alarm(s) condition per NFPA 110 level 1.

5. Engine / Alternator Packaging

- 5.1. The engine/alternator shall be mounted with internal vibration isolation onto a welded steel base. These units shall not need external vibration isolation for normal pad mounted applications.
- 5.2. A mainline, thermal magnetic circuit breaker carrying the UL mark shall be factory installed. The breaker shall rated between 100 to 125% of the rated ampacity of the genset. The line side connections are to be made at the factory. Output lugs shall be provided for load side connections. A second mainline, thermal magnetic circuit breaker carrying the UL mark shall be factory installed. The breaker shall be rated 250 amps. The line side connections are to be made at the factory. Output lugs shall be provided for load side connections.

6. Loose Items

- 6.1. Supplier to itemize loose parts that require site mounting and installation. Preference will be shown for gensets that factory mount items like mufflers, battery chargers, etc.
- 6.2. Flexible fuel hose for use in gas piping installation.
- 6.3. Spare Parts:
 - 6.3.1. Fuses: One spare set
 - 6.3.2. Filters One spare set (air, fuel, oil)
- 6.4. The generator package shall include an exhaust kit including catalyst muffler, oxygen sensor, exhaust flex pipe and O2 sensor pipe. These components shall be loose for field mounting by the mechanical contractor. Installation contractor

must consult with generator supplier for specific location of each component.

7. Additional project requirements

7.1. Factory testing

7.1.1. Before shipment of the equipment, the engine-generator set shall be tested under rated load for performance and proper functioning of control and interfacing circuits. Tests shall include:

- 7.1.1.1. Verify voltage & frequency stability.
- 7.1.1.2. Verify transient voltage & frequency dip response.
- 7.1.1.3. Load test the generator for 30 minutes.

7.2. OWNER'S MANUALS

7.2.1. Three (3) sets of owner's manuals specific to the product supplied must accompany delivery of the equipment. General operating instruction, preventive maintenance, wiring diagrams, schematics and parts exploded views specific to this model must be included.

7.3. INSTALLATION

7.3.1. Contractor shall install the complete electrical generating system including all external fuel connections in accordance with requirements of NEC, NFPA, and the manufacturer's recommendations as reviewed by the Engineer.

7.4. SERVICE

7.4.1. Supplier of the genset and associated items shall have permanent service facilities in this trade area. These facilities shall comprise a permanent force of factory trained service personnel on 24 hour call, experienced in servicing this type of equipment, providing warranty and routine maintenance service to afford the owner maximum protection. Delegation of this service responsibility for any of the equipment listed herein will not be considered fulfillment of these specifications. Service contracts shall also be available.

7.5. WARRANTY

7.5.1. The standby electric generating system components, complete genset and instrumentation panel shall be warranted by the manufacturer against defective materials and factory workmanship for a period of five (5) years. Such defective parts shall be repaired or replaced at the manufacturer's option, free of charge for parts, labor and travel.

7.5.2. The warranty period shall commence when the standby power system is first placed into service. Multiple warranties for individual components (engine, alternator, controls, etc.) will not be acceptable. Satisfactory warranty documents must be provided. Also, in the judgment of the specifying authority, the manufacturer supplying the warranty for the complete system must have the necessary financial strength and technical expertise with all components supplied to provide adequate warranty support.

7.6. STARTUP AND CHECKOUT

7.6.1. The supplier of the electric generating plant and associated items covered herein shall provide factory trained technicians to checkout the completed installation and to perform an initial startup inspection to include:

- 7.6.1.1. Ensuring the engine starts (both hot and cold) within the specified time.
- 7.6.1.2. Verification of engine parameters within specification.
- 7.6.1.3. Verify no load frequency and voltage, adjusting if required.
- 7.6.1.4. Test all automatic shutdowns of the engine-generator.
- 7.6.1.5. Perform a load test of the electric plant, ensuring full load frequency and voltage are within specification by using building load.

7.7. Training

7.7.1. Training is to be supplied by the start-up technician for the end-user during commissioning. The training should cover basic generator operation and common generator issues that can be managed by the end-user.