

**BOROUGH OF SEASIDE PARK
OCEAN COUNTY, NEW JERSEY
OUR FILE: 1528-U-090**

BID #26-06 14TH AVENUE STORMWATER PUMP STATION

ADDENDUM #1

JUNE 18, 2026

The following additions to the Contract Documents will be written into any Contract for the “14TH AVENUE STORMWATER PUMP STATION” project and must be taken into account in rendering a Proposal for the work.

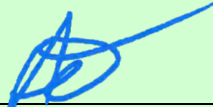
The following items shall be revised as follows at this time:

1. The access hatches for the pump station and valve vault have been revised to require Halliday Products Series F1R access hatches or approved equal. Plan Sheets 7 and 8 and Specification Section 333213.13 have been revised accordingly. The revised plan sheets and specification section are attached to this Addendum.
2. Four (4) explosion-proof terminal boxes, Larson Electronics Model EPJ-6-TB.8, or approved equal, shall be provided as intermediate transition points between wet well equipment conductors and the pump control panel. Plan Sheets E2.1 and E3.1 and Specification Section 333213.13 have been revised accordingly. The revised plan sheets and specification section are attached to this Addendum.
3. The stainless steel ladder extension for the valve vault has been removed from the Contract Documents. Plan Sheet 8 and Specification Section 333213.13 have been revised accordingly. The revised plan sheet and specification section are attached to this Addendum.
4. The specified air-cushioned check valve for the pump station discharge piping has been replaced with a check valve with outside lever and weight. Specification Section 333213.13 has been revised accordingly. The revised specification section is attached to this Addendum.
5. The **Bid Opening** date and time have been revised from June 24, 2026 at 10:30 AM to **June 30, 2026 at 10:30 AM**. All bids shall be submitted in accordance with the revised bid opening date and time.

All specifications and bids shall be revised accordingly.

Please complete the “Acknowledgement of Receipt of Addenda” (Page P-3), attached hereto, for receipt of this Addendum letter and include with bid documents submission.

The Acknowledgement of receipt of addenda page is a mandatory required document and failure to submit shall be deemed a fatal defect.



Alan B. Dittenhofer, PE, PP, CME
NJ PE License #37672



ACKNOWLEDGEMENT OF RECEIPT OF CHANGES TO BID DOCUMENTS FORM

Borough Of Seaside Park

14th Avenue Stormwater Pump Station
(Name of Project)

Our File: 1528-U-090
(Project or Bid Number)

Pursuant to N.J.S.A. 40A:11-23.1a., the undersigned bidder hereby acknowledges receipt of the following notices, revisions, or addenda to the bid advertisement, specifications or bid documents. By indicating date of receipt, bidder acknowledges the submitted bid takes into account the provisions of the notice, revision or addendum. Note that the local unit’s record of notice to bidders shall take precedence and that failure to include provisions of changes in a bid proposal may be subject for rejection of the bid.

Local Unit Reference Number Or Title of Addendum/Revision		How Received (mail, fax, pick-up, etc.)	Date Received	Bidder’s Initials
Notice, Revision or Addenda No.	Title or Description			
Addendum #1				

Acknowledged by bidder:

Name of Bidder: _____

By Authorized Representative: _____

Signature: _____

Printed Name and Title: _____

Date: _____

SECTION 33 32 13.13

SPECIFICATIONS FOR PACKAGED SEWAGE LIFT STATIONS, WET WELL TYPE

GENERAL

1.1 SECTION INCLUDES

A. Sewage/Storm Water/ Non-Potable Water

1. Pump Stations

a. Extent of packaged pump station work required by this Section is indicated on Drawings and Schedules and by requirements of this Section.

1) Under this Section the Contractor shall furnish and install one (1) pre-packaged, pre-assembled pump station complete with submersible pumps, precast concrete pump chamber with integral valve vault structure, slide rail pump removal system, discharge piping with required supports and fittings, discharge check and plug valves, access hatches, valve vault access ladder, liquid level controls, duplex pump control panel, internal wiring and other required associate options and appurtenances)as supplied by Mid Atlantic Pump & Equipment Co.(856-768-3880).

2) The pre-packaged pump station shall be manufactured and pre-assembled off site to ensure product quality and consistency. The pre-package pump station manufacturer or their distributors shall provide sole-source responsibility to the owner through the warranty period.

1.2 RELATED SECTIONS

A. 03 00 00 Concrete

B. 33 00 00 Utilities

1.3 REFERENCES

Where applicable, the latest editions of the following standards shall form a part of this specification to the extent referenced. The publications are referenced to in the text of this guide specification by the basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

ACI INTERNATIONAL (ACI)

ACI 211.1 Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete

ACI 211.2 Standard Practice for Selecting Proportions for Structural Lightweight Concrete

ACI 304R Guide for Measuring, Mixing, Transporting, and

	Placing Concrete
ACI 305R	Hot Weather Concreting
ACI 306R	Cold Weather Concreting
ACI 309R	Consolidation of Concrete
ACI 318	Building Code Requirements for Structural Concrete
ACI 350	Code Requirements for Environmental Engineering Concrete Structures and Commentary
ACI 517.2R	Accelerated Curing of Concrete at Atmospheric Pressure

AMERICAN NATIONAL STANDARDS INSTITUTE (ASTM)

ASTM A 36	Specification for Carbon Structural Steel
ASTM A 82	Specification for Steel Wire, Plain, for Concrete Reinforcement
ASTM A 615	Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM C 31	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C 33	Specification for Concrete Aggregates
ASTM C 39	Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C 40	Test Method for Organic Impurities in Fine Aggregates for Concrete
ASTM C 70	Standard Test Method for Surface Moisture in Fine Aggregate
ASTM C 117	Standard Test Method for Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C 123	Standard Test Method for Lightweight Particles in Aggregate
ASTM C 136	Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C 138	Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
ASTM C 150	Specifications for Portland Cement

ASTM C 172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C 192	Practice for Making and Curing Concrete Test Specimens in the Laboratory
ASTM C 231	Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C 260	Specification for Air-Entraining Admixtures for Concrete
ASTM C 494	Standard Specification for Chemical Admixtures for Concrete
ASTM C 566	Test Method for Total Evaporable Moisture content of Aggregate by Drying
ASTM C 595	Specification for Blended Hydraulic Cements
ASTM C 617	Standard Practice for Capping Cylindrical Concrete Specimens
ASTM C 618	Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
ASTM C 805	Test Method for Rebound Number of Hardened Concrete
ASTM C 857	Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures
ASTM C 858	Specification for Underground Precast Concrete Utility Structures
ASTM C 890	Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures
ASTM C 891	Practice for Installation of Underground Precast Concrete Utility Structures
ASTM C 913	Specification for Precast Concrete Water and Wastewater Structures
ASTM C 920	Specification for Elastomeric Joint Sealants
ASTM C 990	Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
ASTM C 1037	Practice for Inspection of Underground Precast Concrete Utility Structures

ASTM C 1064	Standard Test Method for Temperature of Freshly Mixed Concrete
ASTM C 1107	Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
ASTM C 1231	Standard Practice for Use of Unbonded Caps in Determination of Compressive Strength of Hardened Concrete Cylinders
ASTM C 1240	Standard Specification for Use of Silica Fume for Use as a Mineral Admixture in Hydraulic-Cement Concrete, Mortar, and Grout
ASTM C 1260	Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C 1293	Standard Test Method for Determination of Length Change of Concrete due to Alkali-Silica Reaction
ASTM C 1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM C 1611	Standard Test Method for Slump Flow of Self-Consolidating Concrete

CONCRETE REINFORCING STEEL INSTITUTE (CRSI)

Manual of Standard Practice

Placing Reinforcing Bars

NATIONAL PRECAST CONCRETE ASSOCIATION (NPCA)

NPCA QC Manual	Quality Control Manual for Precast Concrete Plants
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1.4 GENERAL REQUIREMENTS

- A. Precast concrete units shall be designed and fabricated by an experienced and acceptable precast concrete manufacturer. The manufacturer shall have been regularly and continuously engaged in the manufacture of precast concrete units similar to that indicated in the project specifications or drawings for at least 10 years with annual sales of more than \$40 million. In addition, the manufacturer shall employ a professional engineer registered in the state where the product is to be installed.

1.5 SUBMITTALS

The following items shall be submitted unless specified otherwise herein.

- A. Preconstruction Submittals
 1. Upon request by the customer, submit quality control procedures established by the precast manufacturer's Quality Control Manual.

- B. General
 - 1. Submit One (1) electronic copy of complete project submittals for the Engineer's review and Approval, or Four (4) hard copies as dictated by the customer prior to submission. Customer, Project Engineer and submittal date. The submittal shall be compiled in a logical and organized manner.
 - 2. Partial or incomplete submittals will not be reviewed but instead will be returned as "Incomplete- Revise and Resubmit".
- C. Drawings
 - 1. Submit manufacturer's assembly-type shop drawings indicating dimensions, mechanical & electrical components, complete bill of materials, structural layout & reinforcing per calculations and structural weights. Structural reinforcing drawings shall be stamped by a Professional Engineer registered in the State the project is being installed.
 - 2. The drawings for precast concrete units shall be furnished by the precast concrete producer for approval. These drawings shall show the design loads and standards that have been met. Installation and construction information shall be included on shop drawings upon request. It is the responsibility of the project's engineer-of-record to verify that the design assumptions are suitable for the proposed application.
 - 3. For custom-made precast concrete units, in addition to the requirements in C.1, the drawing for submittal shall show locations and dimensions to all penetrations and special embedded items. Product dimensions and thicknesses shall be shown, and the drawing shall be to a common architectural scale with the precast producer's information in the title block.
- D. Precast Concrete Unit Data
 - 1. Anchorage, Lifting Inserts and Devices
 - a. For anchors, lifting inserts and other devices, the precast concrete producer shall provide product data sheets and proper installation instructions upon request.
 - 2. Accessory Items
 - a. For items including, but not limited to sealants, gaskets, pipe entry connectors, steps, racks, and other items installed before or after delivery, the precast concrete producer shall include proper installation instructions and relevant product data upon request.
- E. Design Data
 - 1. The precast concrete producer shall supply submittals showing design loading and material specifications for supplied products. At a minimum, the following shall be shown on the submittals:
 - a. Live load used in design
 - b. Vertical and lateral earth loads used in design
 - c. Depth of soil fill on the structure
 - d. Water table depth used in calculations
 - 2. Upon request, the precast concrete producer shall supply precast concrete unit design calculations and concrete mix design proportions and appropriate mix design test data. Structural design calculations shall be sealed by a licensed professional engineer in the state of this project.
- F. Test Reports
 - 1. Upon request, the precast concrete producer shall supply copies of material

certifications and/or laboratory test reports, including mill tests and all other test data, for Portland cement, blended cement, pozzolans, ground granulated blast-furnace slag, silica fume, aggregate, admixtures, and curing compound proposed for use on this project.

2. Upon request, the precast concrete producer shall submit copies of test reports showing that the mix has been successfully tested to produce concrete with the properties specified and will be suitable for the project conditions. Such tests may include compressive strength, plastic air content, temperature of freshly mixed concrete, and slump of freshly mixed concrete. Special tests for precast concrete items shall be clearly detailed in the specifications.
3. Upon request, the precast concrete producer shall supply copies of in-plant QA/QC inspection reports.

1.6 DESIGN

All components of the pre-package submersible pump station with integral valve vault shall be designed for all stresses that may occur during continuous operation, and for any additional stresses that may occur during fabrication or erection. Workmanship shall be high quality in all respects. All equipment shall be constructed of materials that will maintain their functional integrity during continuous handling, and in contact with the liquids and atmosphere, likely to be encountered in this application. The following items shall be accounted for in the precast unit design.

A. Precast Concrete Unit Design

1. Design standard precast concrete units to withstand design load conditions in accordance with ACI 350. Design must also consider stresses induced during handling, shipping, and installation in order to avoid product cracking or other handling damage. Design loads for precast concrete units shall be indicated on the shop drawings and designed by a licensed professional engineer.
2. The structural design shall take into account discontinuities in the structure produced by openings.
3. The Precast Pump Station with Integral Valve vault shall be designed to support its own weight as well as the minimum superimposed loads tabulated below. All additional equipment shall be accounted for in the design of the elements.
 - a. Pump Station with Integral Valve Vault
 - 1) Top Slab
 - a) Live Load & Impact Load – AASHTO HS20
 - 2) Floor Slab (valve vault & base)
 - a) Live Load – 100 psf
 - 3) Exterior Walls
 - a) All exterior walls below finished grade shall be designed for an equivalent fluid pressure of 90.0 psf minimum caused by saturated earth pressure. The top of the pressure diagram is assumed to originate at finished grade. In addition to the soil pressure, a Live Load Traffic Surcharge shall be applied according to the AASHTO Specification.
4. The structures shall be designed to prevent floatation without the benefit of skin friction and the weight of mechanical equipment when the ground water level is at finished ground surface. The factor of safety against uplift calculated as a ratio of the total resistance force (excluding skin friction and the weight of the equipment) to the total hydrostatic uplift force shall be at least 1.15. The net uplift force shall be transferred to the anti-buoyancy collar.

B. Joints and Sealants

1. Joints and sealants between adjacent units shall be of the type and configuration indicated on the shop drawings meeting specified design and performance requirements.

- C. Concrete Mix Design
 - 1. Concrete type
 - a. For non-machine cast products, the concrete shall be self-consolidating concrete which produces minimal bug holes and does not segregate.
 - 2. Concrete Proportions
 - a. Selection of proportions for concrete shall be based on current self-consolidating concrete mix design techniques. At a minimum, ACI 211.1 shall be used.
 - b. Upon request, the precast concrete producer shall submit a mix design for each strength and type of concrete that will be used. Submitted mix designs shall include the quantity, type, brand and applicable data sheets for all design constituents as well as documentation indicating conformance with applicable reference specifications.
 - 3. Durability and Performance Requirements
 - a. Concrete Compressive Strength
 - 1) Precast concrete units shall have a 28-day compressive strength of 6000 psi for SCC.
 - b. Water-Cementitious Ratio
 - 1) Concrete that will be exposed to freezing and thawing shall contain air and shall have a water-cementitious ratio of 0.45 or less. Concrete which will not be exposed to freezing, but which is required to be leak resistant, shall have a water-cementitious ratio of 0.48 or less. For corrosion protection, reinforced concrete exposed to deicer salts, brackish water or seawater shall have a water-cementitious ratio of 0.40 or less.
 - c. Air Content
 - 1) The air content of concrete that will be exposed to freezing conditions shall be within the limits given below

Nominal Aggregate size (in)	Maximum	Air Content %	
		Severe Exposure	Moderate Exposure
3/8		6.0 to 9.0	4.5 to 7.5
1/2		5.5 to 8.5	4.0 to 7.0
3/4		4.5 to 7.5	3.5 to 6.5
1		4.5 to 7.5	3.0 to 6.0
1-1/2		4.5 to 7.0	3.0 to 6.0

* For specified compressive strengths greater than 5000 psi, air content may be reduced 1%

1.7 QUALITY ASSURANCE

The precast concrete producer shall demonstrate adherence to the standards set forth in the plant Quality Control Manual. The precast concrete producer shall meet the requirements written in subparagraph 1.7.A. The Precast Concrete Pump Station Manufacturer shall have a minimum of ten (10) years successful experience in the design and the assembly of factory-built, prefabricated, pre-assembled Pump Stations. In addition, the Manufacturer shall have made no less than ten (10) Pump Stations similar to the one on this project. Evidence shall be submitted to verify these requirements are met prior to being deemed an acceptable manufacturer.

- A. Qualifications, Quality Control and Inspection

1. The precast producer shall maintain a permanent quality control department.
 2. The precast concrete producer shall have a quality control program which is audited for compliance annually by persons outside that plant's employee structure.
 3. Upon request, the precast concrete producer shall supply a copy of their quality control manual.
- B. Quality Control
1. The precast concrete producer shall show that the following quality control tests are performed as required and in accordance with the ASTM International standards indicated.
 - a. Concrete Testing
 - 1) Slump: A slump test shall be performed at least once per day per mix design used. Slump tests shall be performed in accordance with ASTM C 1611 for self-consolidating concrete.
 - 2) Temperature: The temperature of fresh concrete shall be measured each time a slump, air content, or compressive strength tests are made. Temperature shall be measured in accordance with ASTM C 1064.
 - 3) Compressive Strength: At least four compressive strength specimens shall be made each day for each mix design unless otherwise specified. In accordance with ASTM C 31, C 39, C 192.
 - 4) Air Content: Tests for air content shall be performed if the mix design specifies air entrainment. The air content will be measured in accordance with ASTM C 231. The Air Content shall be measured once per day per mix design.
 - 5) Density (Unit Weight): Tests for Density (Unit Weight) shall be performed monthly for each mix design used at a minimum. Tests shall be in accordance with ASTM C 138.
 - b. Aggregate Testing
 - 1) A full set of aggregate tests shall be performed on each aggregate at least annually by an independent testing agency or an in house test lab. These tests will include gradations (ASTM C136), Soundness (ASTM C 88), Organic Impurities (ASTM C 40), Sand Equivalent for fine aggregates only (ASTM D 2419).
 - 2) Potential reactivity shall be performed once per each aggregate source, and when aggregate sources change (ASTM C 1260 or C 1293).
 - 3) Monthly, at a minimum, gradations shall be performed per ASTM C 33.
 - 4) Aggregate Moisture tests: Moisture tests on aggregates shall be performed in accordance with ASTM C 70 or ASTM C 566. Fine aggregate moisture content tests shall be performed at least once per day if there are no moisture meters, otherwise it shall be performed once per month. Alternatively the speedy moisture test is acceptable (ASTM D 4944).
 - c. Preplacement Check
 - 1) All products shall be inspected for accuracy prior to placing concrete. Checks shall include, but not be limited to, form condition and cleanliness, form dimensions, joints, release agent, blockouts, inserts and locations, lifting devices, reinforcing steel size, spacing, clearances and proper placement.
 - 2) Preplacement checks shall be documented and initialed by the inspector. A drawing with verifications of the above criteria can be used as documentation.

- d. Postplacement Check
 - 1) All products shall be inspected for accuracy after the concrete forms have been removed. Checks shall include, but not be limited to, dimensional checks, finishing, insert locations, squareness, honeycombing, cracking, marking, coatings, racking, hole size and location. Postplacement checks may require a corrective action report.
 - 2) Postplacement checks shall be documented and initiated by the inspector. A drawing with verifications of the above criteria can be used as documentation.
- 2. Copies of the test results and Inspections above shall be available upon request.
- C. Outside Inspection
 - 1. The customer or customer's agent (specifier) may place an inspector in the plant when the units covered by this specification are being manufactured. The precast concrete producer shall give notice of 3 days prior to the time the precast concrete units will be available for plant inspection.
- D. All equipment and materials furnished in the pump station shall be new and free of defects
- E. All equipment shall be the manufacturer's latest and proven design.
- F. All electrical materials, devices, and equipment shall be UL listed wherever applicable.
- G. All equipment and installations shall meet the National Electric Code.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Handling
 - 1. Precast concrete units shall be handled and transported in a manner to minimize damage. Lifting devices or holes shall be consistent with industry standards. Lifting shall be accomplished with methods or devices intended for this purpose as indicated on the shop drawings. Upon request, the precast concrete producer shall provide documentation on acceptable handling methods for the product.
- B. Storage
 - 1. Precast concrete units shall be stored in a manner that will minimize potential damage.
- C. Delivery
 - 1. Precast concrete units shall be delivered to the site in accordance with the delivery schedule. Upon delivery to the jobsite, all precast concrete units shall be inspected by the customer's agent for quality and final acceptance.
- D. Final Acceptance
 - 1. Upon final acceptance, the customer's agent acknowledges and understands the appropriate methods for handling the accepted precast concrete unit(s). Upon acceptance by the customer or customer's agent, the precast concrete manufacturer is not responsible for replacing damaged product resulting from improper handling practices on the job site.

1.9 PLANT CONDITIONS

Any plant producing precast concrete units for this specification shall have a written, implemented, comprehensive safety and environmental program. Upon request, documentation shall be provided to show the safety program meets the following minimum requirements.

- A. Safety Program Requirements
 - 1. The safety program shall include the following written and documented parts as a minimum.
 - a. Housekeeping

- b. Lock-Out Tag-Out
 - c. Machine Guarding
 - d. Risk Assessment
 - e. Personal Protective Equipment
 - i. Contractor and Visitor Safety
 - f. Cranes and Lifting Equipment Safety
 - g. Ergonomics and handling Safety
 - h. Fall Protection
- B. Health and Safety Management System Requirements
- 1. The health and safety management system shall be used to manage the safety program and all measurable aspects.
- C. Environmental Management System Requirements
- 1. The Environmental Management System shall encompass the following:
 - a. Air Pollution Control
 - b. Water and Wastewater Management
- D. Recordable rate
- a. The recordable rate shall be below the industry average. If the industry average is not readily available, assume a value of 6 recordable injuries per 200,000 hours worked as the industry average.

1.10 Single Source Responsibility

- A. To ensure that all equipment required for the installation of the pre-package pump station is properly coordinated and will function as a unit in accordance with the intent of these specifications, the Contractor shall obtain all the equipment specified under this section, from a single supplier with whom the responsibility for the proper function of all equipment, regardless of manufacturer, as an integrated and coordinated system shall be vested. This requirement is to establish unit responsibility for all the equipment with the equipment supplier. The use of the word responsibility relating to the equipment supplier is in no way intended to relieve the Contractor's ultimate responsibility for equipment coordination, installation, operation, and guarantee.
- B. Factory pre-assembly: During fabrication and before shipment, all equipment shall be fully factory installed to verify all proper clearances. All installed equipment, unless crossing structural joints, shall remain in the precast structure during travel to the jobsite and final re-assembly.
- C. When contracted to do so, the manufacturer can furnish the services of an experienced service technician to check the installation, and provide with the Owner, a certificate indicating that the pre-packaged submersible pump station has been installed in accordance with the manufacturer's recommendations.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Oldcastle Precast Inc.
1. This specification is based on the precast concrete OneLift™ package pump station product line manufactured and pre-assembled by Oldcastle Infrastructure of Avon, CT Model RC611. The OneLift™ is chosen as the basis of design for quality manufacturing, compact size, single structure differential settlement elimination, ease and speed of installation, and overall project timeline savings.
 2. Substitutions: Not permitted.
 - a. Alternative systems based upon a built-in-place, field erected pump station utilizing separate wet well/valve vault precast structures, or cast-in-place concrete shall not be accepted.

2.2 PRODUCTS

- A. Precast Concrete Pump Station Sections with Valve Vault
1. The Pump Station with Integral Valve Vault shall be composed of precast reinforced concrete units, rectangular in shape with rounded corners. The precast structures shall be monolithically cast and have minimum interior dimensions 6' wide by 11' long with 3' radius corners. The precast base section will be supplied with an extended buoyancy collar to withstand upward buoyant forces with ground water "at grade" or "otherwise listed". Overall structure heights shall be as shown on the contract drawings and range from 10'-10" to 24'-10", in product-standard 2', 3' & 4' increments.
 2. Exterior Walls shall be a minimum of 6 inches thick, integral valve vault common wall and floor shall be a minimum of 4 inches thick, station floor and buoyancy footing shall be a minimum of 8 inches thick, and the roof slab with hatches shall be a minimum of 12 inches thick.
 3. The Integral Valve Vault shall be located in the pump station structure as shown on the contract drawing, to conserve site space and to eliminate the possibility of differential settlement. Conventional means, utilizing two (2) separate structures for the pump station and the vault **will not be accepted as an equal.**
 4. The Precast Structures shall be comprised of product-standard: base, riser sections, integral valve vault, optional vault riser shims as required, and station cover.
 5. The Pump Station Manufacturer shall have a production facility in which all work associated with structural fabrication, mechanical/electrical pre-assembly and product final inspection of the pump station will be performed. The building shall keep the pump station components protected from the elements and kept at an ambient temperature of at least 45 degrees Fahrenheit. No concrete shall be batched and placed when the ambient temperature is below 50 degrees Fahrenheit.
 6. All wall penetrations shall be formed utilizing hole-formers or cored drilled holes for manhole boots, and galvanized threaded couplings with water stops for electrical connection.
 7. All cast wall openings for ductile iron, PVC or galvanized steel pipe shall incorporate adjustable rubber manhole boots for a watertight seal.
 8. All Precast components shall be fabricated on steel forms with machined rings to form accurate bell and spigot joint surfaces to ensure watertight joints.

9. The Horizontal joints between precast sections shall be sealed with a vulcanized butyl rubber joint material conforming to AASHTO M-198. The joint material shall be "Conseal CS-102" as manufactured by Concrete Sealants or approved equal.
10. All surfaces of the precast structures shall be smooth, even, and free from roughness, irregularities and other defects. The surfaces shall be suitable for receiving exterior treatments as specified elsewhere herein.
11. A Crystalline Waterproofing Additive shall be used in the concrete mix design. The system shall cause concrete to become sealed against the penetration of liquids from any direction, and shall protect the concrete, surface to surface, from deterioration due to acidic environmental conditions.
 - a. Dose rate of additive shall be per manufacturers' recommendations. All concrete used for the structural components and non-structural components (including fill concrete, common interior wall and floor of integral valve vault) shall attain a minimum 28-day compressive strength of 6,000 psi.
 - b. The Waterproofing Additive shall be ConBlock CDA, as manufactured by Concrete Sealants, Inc., or OneLift manufacturer-approved equal.
12. An exterior damp-proofing coating shall be factory applied to the below grade vertical surfaces of the structure. Damp-proofing material shall be fibered cold-applied solvent-based asphalt mastic brush or roller applied at a rate of 1-gal per 25SF. Damp-proofing material shall meet ASTM# D-4471 Type 1 and Federal Spec# SS-A-694d(AF). Damp-proofing shall be Karnak 83AF or approved equal.
13. Interior Coating Primer – Two (2) coats Sherwin William Corothane I GalvaPac 1K @ 2.5-3.5 mils DFT per coat, or approved equal. Finish: Two (2) coats Sherwin Williams UHS @ 20.0-40.0 mils DFT per coat or approved equal.

B. Pump Removal Rail System

1. The pump station shall be supplied with a stainless-steel guide rail pump removal system, to facilitate emergency and routine maintenance in removing and re-installing the submersible pumps from the top of the station. The guide rail system will include lower guide brackets incorporated in the pump base elbow, 316-stainless upper guide brackets, 316-stainless intermediate guide brackets as may be required per the pump manufacture, and 304stainless steel Sch40 guide rails of size and quantity as dictated by the select pump manufacturer and model.
2. Guide rail components shall be assembled and installed plumb to the pump station structure and shall allow for pump removal and re-installation without interfering with the access hatch or frame. All assembly hardware shall be 316-stainless steel.

C. Hazardous Location Compliance

1. The wet well and the area within 2 feet of the wet well has been classified as Class 1, Division 1, A Hazardous Location as defined by the National Electrical Code. All electric wiring and motors located within the subject area shall be in strict compliance with these standards. The shop drawings carry the manufacturer's certification that all equipment located in the subject area meets the requirements of NEC Class 1, Division 1 Criteria and the Underwriter's Laboratory (UL).

D. Pump Station Access Stainless Steel Frame and Cover

1. Furnish and install (1) stainless steel pump access hatch 36" x 54" for RC611 nominal interior dimension, flush with precast cover, H20-ASTM C1802-14- Load Level 4 for accidental traffic load rating with 316-stainless steel hardware. Cover will be minimum ¼" diamond plate with stainless steel slam lock and weather plug,

lift handle which sits flush with cover, recessed pad lock clip (pad lock by others), hold open arm to lock cover in 90-degree position, heavy duty stainless hinges. Frame to be angle style with continuous 1" anchor flange and full slab-height skirt to show no exposed concrete when hatch is open, exterior surfaces in contact with concrete to receive one coat bituminous paint.

2. Pump access hatch to be supplied with integral safety grating system. The safety grate shall be made of stainless steel. The grating shall be designed to withstand H20-ASTM C1802-14- Load Level 4 for accidental traffic load rating. Each grate shall be supplied with heavy duty, stainless-steel gas shock for ease of operation when opening. Each grate shall be provided with a permanent hinging system. Grates will lock in the 90-degree position once opened. Grates shall be coated with an OSHA type safety orange color; base coat is a thermosetting epoxy powder coat finish with a minimum thickness of 2-4 mils. The topcoat is a mar-resistant, TGIC polyester powder coating with a minimum thickness of 2-4 mils. Each coat shall be baked at 350-375 degrees F until cured.
3. The pump station access hatch shall be manufactured by Haliday Products Series F1R Access Door (F1R3654), or approved equal.

E. Valve Vault Stainless steel Access Frame and Cover

1. Furnish and install (1) stainless steel valve vault access hatch, 30" x 36" nominal interior dimension single door, flush with precast cover, H20-ASTM C1802-14- Load Level 4 for accidental traffic load rating, with 316 stainless steel hardware. Cover will be minimum ¼" diamond plate with stainless steel slam lock and weather plug, lift handle which sits flush with cover, recessed pad lock clip (pad lock by others), hold open arm to lock cover in 90-degree position, heavy duty stainless hinges. Frame to be channel style with 1 ½" NPT drain port in the bottom of the channel, continuous 1" anchor flange and full slab-height skirt to show no exposed concrete when hatch is open, exterior surfaces in contact with concrete to receive one coat bituminous paint. Hatch will be supplied with a heavy-duty, stainless steel gas shock, for ease of operation when opening cover.
2. Valve vault access hatch to be supplied with integral safety grating system - same as described for pump access hatch above.
3. The pump station access hatch shall be manufactured by Haliday Products Series F1R Access Door (F1R3036), or approved equal.

F. Stainless Steel Vault Ladder

1. The valve vault shall be supplied with an stainless steel wall-mount access ladder. The ladder shall be fastened to the concrete with 316 stainless expansion bolts and shall meet OSHA standard 1910.27 requirements.
2. The ladder rails & supports shall be all welded stainless steel construction. Rails and wall support shall be solid 3/8" x 2 ½" flat stock, and rungs shall be 15/16" square with serrated top surface extruded into the rung for slip resistance. The minimum design live load shall be a single concentrated load of 200 lbs.
3. Rung spacing shall be uniform and not exceed 12", the minimum clear length of rungs shall be 18", and the distance from the center line of the rung to the nearest permanent object shall not be less than 7".
4. The stainless steel ladder shall be manufactured by USF Fabrication, Inc., Hialeah, FL, or approved equal.

G.

H. Ductile Iron Pipe and Fittings

1. All ductile iron pipes shall be designed in accordance with ANSI A21.50, and shall be manufactured in accordance with ANSI A21.51. Pipe for use with grooved end couplings shall have grooved ends in accordance with AWWA C606.
2. Pipe thickness class shall be Class 53 for use with threaded flanges, unless specified otherwise on the product drawings.
3. Flanged joints shall conform with ANSI A21.15, utilizing long-hub flanges which shall be screwed on tight by the foundry before they are faced and drilled.
4. Fittings shall conform to the requirements or ANSI A21.10 and shall be of pressure classification at least equal to that of the pipe with which they are used. Flanged fittings shall be faced and drilled in accordance with ANSI A21.10.
5. All ductile iron piping and fittings shall be double-thick cement mortar lining and bituminous seal coat (black) on the inside and a bituminous seal coat on the outside, all in accordance with ANSI/AWWA A21.4/C104.
6. Epoxy exterior topcoat shall be Tnemec Series N69, of approved equal.

I. Flange Type Couplings

1. Flange couplings shall be mounted on each pump base elbow to ensure proper pressure seal while providing a minimum of assembly flexibility. The flange couplings shall be fusion bond epoxy coated and supplied with 304-stainless assembly and mounting hardware for harsh & wet environments. The pipe gasket and O-ring seal shall be EPDM NFS 61 Listed.
2. To ensure correct fitting of pipe and couplings, all flange couplings shall be furnished by the pipe supplier and shall be of the pressure rating of at least that of the pipeline in which they are to be installed.
3. The flange couplings shall be Universal, wide range, model 4400 or approved equal.

J. Grooved Flange Adapter

1. Grooved flange adapters shall be supplied where shown on the product drawings and shall conform to AWWA C606. The flanges are designed for use on radius cut grooved pipe with minimum wall thickness of ANSI/AWWA C151/A21.51, Class 53 DIP, or a transition coupling may be required for connection of grooved end IPS steel pipe to grooved end AWWA ductile iron pipe.
2. The housing coating shall be bituminous coated unless dictated otherwise to match special pipe coatings. the gasket shall be halogenated butyl (brown color code), and bolting hardware of 304-stainless steel.
3. The grooved coupling shall be Victaulic style 341Vic-Flange or approved equal.

K. Pipe Supports

1. Piping shall be supported in the valve vault by means of adjustable stainless steel floor supports stands which cradles the pipe/valve flanges. The support stands shall be floor mounted with 316-stainless expansion bolting hardware. Where piping enters and exits the vault structure; stainless steel wall supports angles with 304-stainless U-bolts and 316-stainless expansion bolt wall-mounting hardware shall be utilized in (3) locations.
2. Piping shall be supported in the pump station by means of a common 304-stainless fabricated angle brace spanning the width of the station and mounted with wall brackets and 316-stainless hardware. Both vertical discharge pipes shall be supported from the brace by means of individual 316-stainless U-bolts and bolting

hardware.

- a. (1) Common pipe support assembly at mid length shall be required when the vertical discharge pipe lengths exceed 10'-0".
- b. (2) Common pipe support assemblies at equal spacing shall be required when the vertical discharge pipe lengths exceed 14'-0".

L. Wall Penetrations

1. Where wall penetrations are called for on the plans; mechanical piping shall utilize cast or cored openings with flexible manhole boots. Flexible rubber boots shall consist of EPDM polymer compounds meeting ASTM C923 material performance requirements. Expansion banding and straps shall be 304-stainless material and the connection between boot and structure shall utilize an expansion wedge system with 304-stainless wedge and hardware components.
2. Electrical conduit penetrations will utilize aluminum electrical couplings assemblies with 2" wide minimum water stop, secured to the structure with watertight seal, or cored openings with mechanical rubber seals to fill the annular spacing between electrical conduit and precast wall structure. Mechanical seals shall be Link Seal by Thunder line Corp. or approved equal and shall utilize 304-stainless assembly hardware. Mechanical seals may be needed to be employed when an exterior terminal box option is factory mounted to the station.

M. Check Valve Outside L&W

1. The check valve shall have a heavy-duty body of ASTM A126 Class B cast iron with integral flanges faced and drilled to ANSI B16.1 Class 125 for horizontal installation as listed in the schedule or shown on plans. Valve clapper shall swing completely clear of the waterway when valve is full open, permitting a full flow through the valve equal to the nominal pipe diameter. Check valves shall comply with AWWA Standard C-508 latest revision. The valve shall have a bolted and gasketed cover to allow for clapper access without removing the flanged valve from line.
2. Pressure ratings: Class 125 flanged valve body shall be rated for a shell pressure of 250 PSI.
3. The check valve shall be supplied with adjustable outside lever and weight.
4. Manufacturer-paint all interior & exterior ferrous surfaces with fusion bonded epoxy coating, AWWA C550 Manufacturer standard color only applies.
5. Manufactured valve shall be Matco-Norco, mod. 120WC or approved equal.

N. Plug Valve

1. Plug valves shall be of the non-lubricated, quarter-turn, eccentric type with flanged ends and lever operated (up to 4" valves), and hand wheel operated (for 6" valves), in full conformance with the latest revision of the AWWA C517 Standard.
2. Valves sizes 3" to 6" shall have a minimum 175 PSI pressure rating. Plug Valves shall be round ported for reduced pumping costs and improved flow characteristics. The valves shall have the following minimum full open flow coefficients (Cv): 3"=569, 4"=982, 6"=1997.
3. Flange diameter, thickness, and drilling shall conform to ANSI B16.1 Class 125.
4. Valve shaft seals shall be of the self-adjusting U-cup design for reduced

maintenance and replaceable without removing the cover from the valve.

5. Valves shall have bodies and covers of ductile iron per ASTM A536 for superior strength. Valve sizes 3" and larger shall have body seats of 95% welded nickel applied directly to the body and machined to a smooth finish. Sprayed, plated or removable seats are not acceptable. Valves shall have plugs made from ductile iron per ASTM A536 with a vulcanized synthetic rubber seat facing tested per ASTM D429 for all sizes.
6. Valves shall be provided with stainless steel thrust bearings on the upper and lower plug shaft to eliminate plug-to-body contact and ensure long lasting plug-to-seat alignment. Grit seals shall be provided on the upper and lower bearing journals to minimize the entrance of grit into the shaft seal and bearing areas.
7. Valves shall be coated internally and externally with 6-8 mils NSF approved two part epoxy paint for corrosion protection.
8. Valves shall be Golden Anderson Figure 517 "ECO-Centric" or approved equal.

O. Station emergency bypass assembly

1. Where shown on the drawings or called out otherwise; provide an emergency bypass piping assembly prior to the common discharge in the valve vault. The assembly will consist of an isolation plug valve, piping and fittings conforming with adjacent, wall mounted pipe support conforming with adjacent supports, and an aluminum male quick-connect coupling with dust cap. Access to the emergency bypass quick connect shall be granted by the clear opening of the valve vault access hatch above. Bypass assembly hardware shall be 304SS minimum.

P. Gasket, Bolts, Nuts

1. For flange joints, gaskets shall be a minimum of 1/8" thick full faced gaskets. Gaskets shall be of composition suitable for exposure to fluids within the pipe. Gaskets shall meet AWWA C110, C111, and C115 performance standards.
2. Flange joints shall be bolt-assembled utilizing the full faced gasket. Bolting hardware, number & size, shall conform to the same ANSI standards as the flange. Bolts and nuts shall be 304-stainless steel, heavy hex Grade B conforming to ASTM A493/494.

Q. Station Vent

1. A passive station vent shall be supplied using 4" Sch80 PVC piping & fittings, and a top mounting carbon canister unit. The vent will be factory assembled and mounted to the exterior of the station, where the venting will rise above the station a minimum 3' above finish grade, and end with a top mounted carbon canister unit with rain shield. The canister housing shall be stainless steel with 4" mounting flange, rain shield, with power coat finish. The replaceable canister shall contain a minimum of 12 pounds of activated carbon, and shall be safe for recyclable disposal.
2. The carbon canister assembly shall be Wager 1800 Vent Scrubber or approved equal.
3. The complete factory mounted vent assembly will be removed from the station and shipped separately to the jobsite due to shipping height restrictions, for field reattachment by the site contractor.

R. Cable support

1. Pump and level control SJO jacketed cables shall be properly supported within the

pump station via stainless strain reliefs (Kellems Grip) or other support methods and hung from stainless equipment hooks positioned in the pump access hatchway. Cable weight will not be transferred to cable entre conduits or wall couplings.

S. Explosion-Proof Terminal Boxes

1. Four (4) explosion-proof terminal boxes shall be provided and installed for termination of conductors between the wet well equipment and the pump control panel. Terminal boxes shall be Larson Electronics Model EPJ-6-TB.8, or approved equal, suitable for the hazardous location classification indicated for the pump station.
2. The terminal boxes shall serve as intermediate termination points for all pump power, pump control, level transducer, float switch, and other wet well instrumentation conductors. Conductors originating from the wet well equipment shall terminate within the explosion-proof terminal boxes on suitable terminal blocks. Separate conductors shall be provided from the terminal boxes to the pump control panel.
3. The arrangement shall permit future replacement of pumps, level transducers, float switches, and other wet well equipment without disturbing conduit seals or requiring rewiring within the pump control panel. Field equipment conductors shall be capable of being disconnected and replaced at the terminal boxes while maintaining the integrity of the conduit system between the terminal boxes and the control panel.
4. Wet well equipment cables shall be properly supported within the pump station by stainless steel strain reliefs (Kellems Grip) or approved equal devices such that cable weight is not transferred to terminal blocks or conductor terminations.
5. Conduits, fittings, and sealing fittings between the wet well and the explosion-proof terminal boxes shall be rigid galvanized steel construction. Conduits, fittings, and sealing fittings between the explosion-proof terminal boxes and the pump control panel shall be provided and installed by the Electrical Contractor. All final conductor terminations and sealing fitting installations shall be completed in accordance with applicable NEC requirements and manufacturer recommendations.
6. Terminal boxes, mounting hardware, supports, fasteners, conduit fittings, terminal blocks, and all accessories required for a complete and operable installation shall be furnished and installed as part of the work.

T. Bar Screen Trash Rack

1. The trash rack shall be of the bar screen style, having 2" clear opening between between 1/4" thick bars and solid sides. The basket shall be constructed of stainless steel, with (4) 2 1/2" solid wheels and 1/2" stainless steel axles. The heavy duty guide rail system shall be of 3" corresponding structural channel, sized to facilitate easy operation of the trash rack. A trash rack stop shall be supplied loose for site installation at the exact stop location, once the inlet pipe is installed.
2. The trash rack and rail system shall be wall mounted with adequate leg-length to facilitate removal without hatch interference. The trash rack system shall be supplied with 1/4" T-304 stainless steel lifting cable with stainless safety hook of adequate length, so that an additional 10' of cable will be coiled and hung from a dedicate stainless hook in the access hatchway.
3. The trash rack system shall be:
 - a. Halliday Products B1B series stainless steel bar screen system. or approved equal.

U. Stainless Steel Pump Station Ladder

4. The pump station shall be supplied with a stainless steel wall-mount access ladder. The ladder shall be fastened to the concrete with 316 stainless expansion bolts and shall meet OSHA standard 1910.27 requirements.
5. The ladder rails & supports shall be all welded stainless steel construction. Rails and wall support shall be solid ½" x 2 ½" flat stock, and rungs shall be 1-3/8" diameter type "D" rungs with slip resistant surface. The minimum design live load shall be a single concentrated load of 200 lbs.
6. Rung spacing shall be uniform and not exceed 12", the minimum clear length of rungs shall be 24", and the distance from the center line of the rung to the nearest permanent object shall not be less than 7".
7. The stainless steel ladder shall be manufactured by Haliday Products Series L1B, or approved equal.

2.3 MANUFACTURE

Manufacture shall conform to the producer's acceptable quality control manual

A. Forms

1. Forms for manufacturing precast concrete units shall be of the type and design consistent with industry standards and practices. They should be capable of consistently providing uniform products and dimensions. Forms shall be constructed so that the forces and vibrations to which the forms will be subjected cause no damage to the precast concrete unit.
2. Forms shall be cleaned of concrete build-up after each use.
3. Form release agents shall be applied according to the manufacturer's recommendations and shall not be allowed to build up on the form casting surface.

B. Reinforcement

1. Cages of reinforcement shall be fabricated by tying the bars, wires or welded wire reinforcement. The tolerances for concrete cover shall be 3/8 in. or as specified in the design. Welding shall be allowed only for ASTM A 706 rebar.
2. Positive measures shall be taken to assure that the reinforcement does not move significantly during the casting operations.

C. Embedded Items

1. Embedded items shall be positioned at locations specified in the design documents. Inserts and other embeds shall be held rigidly in place so that they do not move significantly during casting operations.

D. Concrete

1. Concrete Mixing

- a. Mixing operations shall produce batch-to-batch uniformity of strength, consistency and appearance.
- b. Batching weight and volume measurement devices shall be annually calibrated by an independent testing laboratory or more frequently if batching irregularities or concrete inconsistencies are observed.

2. Concrete placing

- a. Concrete shall be placed in a way it flows and consolidates without segregation or air entrapment. The freefall of concrete shall be kept to a minimum.
- b. Cold Weather Concreting
 - 1) Recommendations for cold weather concreting are given in detail in ACI 306 R. Adequate equipment shall be provided for heating concrete materials and protecting concrete during freezing or

near-freezing temperatures. All concrete materials, reinforcement, and forms shall be free from frost. In cold weather, the temperature of the concrete at the time of placement shall not be below 45 degrees F. Concrete that freezes before it reaches a compressive strength of 500 psi shall be discarded.

- c. Hot Weather Concreting
 - 1) Recommendations for hot weather concreting are given in detail in ACI 305 R. During hot weather excessive concrete temperatures and water evaporation shall be minimized. The temperature of concrete at the time of placing shall not exceed 95 degrees F.
3. Concrete Curing
- a. Curing operations shall commence immediately following the initial set of the concrete and completion of surface finishing.
 - b. Curing by moisture retention
 - 1) Precast products shall be protected from drafts and wind to prevent plastic shrinkage cracking.
 - 2) Moisture shall be prevented from excessively evaporating from exposed surfaces until adequate strength for stripping the precast concrete unit from the form is reached.
 - c. Curing with Heat and Moisture
 - 1) Concrete shall not be subjected to steam or hot air until after the concrete has attained its initial set. If hot air is used, precautions shall be taken to prevent moisture loss from the concrete. The temperature of the concrete shall not be permitted to exceed 150 degrees F. The temperature gain shall not exceed 40 degrees F per hour.
4. Surface Finish
- a. The finishing surface shall be as specified on the contract documents and/or approved shop drawings.
5. Stripping Precast Concrete Units from Forms
- a. Precast concrete units shall not be removed from the forms until the concrete reaches the compressive strength for stripping required by design. Stripping strengths shall be routinely measured to ensure product has attained sufficient strength for safe handling.
6. Patching and Repair
- a. Repairing Minor Defects
 - 1) Defects that will not impair the functional use or expected life of the precast concrete unit may be repaired by any method that does not impair the product.
 - b. Repairing Honeycombed Areas
 - 1) When honeycombed areas are to be repaired, all loose material shall be removed and the areas cut back into essentially horizontal or vertical planes to a depth at which coarse aggregate particles break under chipping rather than being dislodged. Proprietary repair materials shall be used in accordance with the manufacturer's instructions. Otherwise, the area will be saturated with water. Prior to repair, the area should be damp, but free of excess water. A cement-sand grout or an approved bonding agent shall be applied to the chipped surfaces, followed immediately by consolidating an appropriate repair material into the cavity.
 - c. Repairing Major Defects

- 1) Defects in precast concrete products which impair the functional use or the expected life of products shall be evaluated by qualified personnel to determine if repairs are feasible and, if so, to establish the repair procedure.
7. Shipping Precast Concrete Units
 - a. Precast concrete units shall not be shipped until they have reached at least 70% of their specified 28-day design strength, unless damage will not result, impairing the performance of the product.

2.4 PACKAGE PUMP SYSTEM

A. Pumps and Appurtenances

1. Furnish as shown on the plans and specified herein, two (2) wet-pit submersible, solids-handling pumps complete with all appurtenances, accessories and spare parts as will be required to produce a complete and workable installation. The contractor shall be responsible for coordinating all electrical and control wiring, connections, cabling, etc. The contractor will install, test and place the pumps in satisfactory operation.
2. Data to be submitted:
 - a. Submit pump curves for the proposed submersible pumps showing Total Dynamic Head, Pump Efficiency, Brake Horsepower, Power Input to Electric Drive Motor of Pumping Unit for the various conditions under which the units are to operate along with descriptive data and specifications describing in detail the construction of the complete units.
 - b. The pump manufacturer shall have a minimum of 20 installations of similar combination of pump and motor model proposed to be furnished for this project. Installations must be in operation for a minimum of five (5) years.
3. Dimensional Data:
 - a. Submit to the OWNER'S Engineer for approval, shop drawings, showing all weights and dimensions necessary for the installation of foundations, anchor bolts, piping and valve connections.
4. Manufacturer
 - a. The pumps will be manufactured by Xylem-Flygt, or approved equal.
5. Pump Performance:
 - a. Each pump shall be identical to the other and capable of the following performance:

	PS1
Duty Point Flow, gallons per minute	750
Duty Point Total Dynamic Head, feet	13.8

Maximum Nominal Motor Power, horsepower	5
Minimum Efficiency(%)	67
Secondary Duty Flow, GPM	1000
Secondary TDH, Ft	7
Maximum Motor Speed, RPM	1120
Minimum Shut-off Pressure, feet	130

6. Pump Construction

a. General

- 1) The sewage pumping units shall be vertical, non-clogging, centrifugal sewage pumps with bottom inlet and side discharge. The pumps shall be direct driven by integral squirrel cage, electric induction motors. Each pump shall include quick removal system, anchor bolts and all accessories specified herein.

b. Volute

- 1) The volute shall be constructed of ASTM A48 Class 35B (GG25) or higher cast iron capable of prolonged resistance to raw sewage.
- 2) Suction and discharge flanges shall be 125# and meet ANSI standard B16.1.
- 3) All nuts, bolts, washers and other fastening devices supplied with the pumps shall be stainless steel.
- 4) All mating surfaces requiring a watertight seal shall be machined and fitted with FPM (Viton) O-rings. Paper gaskets are not acceptable.

c. Impeller

- 1) Pump impellers shall be of the solids handling non-clog type. The impeller vane shall be smooth, finished throughout, and shall be free from sharp edges.
- 2) Pump impellers shall be manufactured from ASTM A48 Class 35B (GG25) or higher cast iron.
- 3) Impellers shall be key driven and securely held to the shaft by a streamlined impeller washer and bolt assembly specifically designed to reduce friction in the suction eye of the impeller. The arrangement shall be such that the impeller cannot unscrew or be loosened by torque from either forward or reverse rotation. Designs based on threaded connection between pump shaft and

impeller will not be considered.

- 4) The impeller shall be capable of passing a 3.9
- 5) -inch solid non-deformable sphere. Designs that cannot pass a sphere through the impeller or rely on deforming, cutting, or chopping solid materials shall not be acceptable.

d. Wear Rings

- 1) The impeller shall be provided with an AISI 329 (1.4462) duplex stainless steel wear ring that is drive fitted to the suction eye of the impeller.
- 2) The casing shall be provided with an AISI 304 (1.4308) stainless steel wear ring that is drive fitted to the bottom suction inlet.

6. Motors

a. Submersible Motors

- 1) Each pump shall be furnished with a squirrel cage, induction motor enclosed in a watertight housing suitable for use and compatible with all variable frequency drive systems. The motor shall be cooled by the surrounding liquid.
- 2) The motor shall be air-filled and constructed with moisture resistant NEMA Class H insulation and Class H slot liners and constructed to NEMA B design standards. The copper wound stator shall be dipped in epoxy enamel and hardened to withstand a temperature of 180 °C as defined in NEMA Standard MG-1. Each winding phase or layer shall be laced with Class H glass lined paper. The use of cable ties to restrain windings shall not be allowed. The rotor shall be statically and dynamically balanced after fabrication. The rotor shall utilize aluminum amortisseur bars and short circuit rings. The motor shall be certified for continuous duty with a service factor of 1.10 and shall be non-overloading over the entire acceptable operating range of the impeller.
- 3) The motor shall be capable of sustaining 15 starts per hour (unlimited starts with VFD) at a minimum ambient temperature of 40°C.
- 4) The motor should be capable of uninterrupted operation with a voltage drop of 10%.
- 5) The motor shall bear the Factory Mutual (FM) explosion-proof label certifying its use in a Class 1, Division 1, Groups C & D hazardous location.
- 6) Thermal switches shall be furnished to monitor stator temperatures. The stator shall be equipped with three (3) thermal switches. Thermal switches shall automatically de-energize the motor when its temperature exceeds a preset limit as

recommended by the manufacturer.

- 7) The pump manufacturer's nameplates shall be engraved, laser etched or stamped on stainless steel and fastened to the motor casing.

b. Shafts

- 1) All shafts shall be dynamically balanced and shall be constructed of AISI 420 (1.4021) stainless steel. Carbon steel shafts or shafts with sleeves of any type are not acceptable. The shaft shall be one piece construction without joints or stubs attached.
- 2) Multiple row lower bearings for axial thrust and a single row upper bearing for radial thrust shall support the motor/pump shafts. Thrust bearings shall be restrained from thrust in both directions. Designs that do not protect the pump/motor from thrust in reverse directions shall not be acceptable.
- 3) Bearings shall be sealed and grease lubricated.
- 4) Minimum shaft diameter shall be 2.125-in at the lowest bearing.
- 5) Shaft overhang ratio $L3/D4$ shall not exceed 10.

c. Mechanical Seals

- 1) Each pump shall be provided with tandem mechanical seals with the seal housing constructed of AISI 420 series (1.4028) stainless steel and the spring system constructed of AISI 301 (1.4310) stainless steel. The block seal housing shall be constructed such that it can be dismantled allowing the seal faces and springs to be renewed and the seal system to be put back into service. Cartridge seals constructed such that they cannot be repaired or renewed shall not be acceptable. Both upper and lower seal faces shall be silicon carbide versus silicon carbide.
- 2) The seal shall be mounted in a separate and isolated seal chamber. The seal chamber shall be filled with non-conductive lubricating oil as recommended by the manufacturer.
- 3) A moisture sensor shall be furnished to sense moisture intrusion for each pump. This sensor shall be wired to the Pump Control Panel and shall activate an alarm light upon moisture intrusion. The sensor probe shall be mounted in the seal chamber and shall be of the conductive type, sensing moisture intrusion above the lower seal, but below the upper seal. Designs that sense moisture intrusion above the upper seal using a float switch are not acceptable.

d. Power and Control Cables

- 1) Power and control cables shall be furnished in lengths to run un-spliced from the pump to the terminal box as shown on the Contract. Cables shall terminate with conductor sleeves that bundle the entire group of strands of each phase to improve termination at the pump control panel. The sleeves shall be provided to confirm that all strands of each conductor are

terminated properly.

- 2) Termination shall be coordinated with the connection to the Pump Control Panel. Cables shall be of the "NSSHOU" type and shall be approved by the MSHA for use in hazardous locations and shall conform to industry standards for loads, resistance under submersion against sewage, and be of stranded construction. The cables shall enter the pump through a heavy-duty galvanized cast iron entry assembly that shall be provided with an external clamp assembly to protect against tension once secured providing a strain relief function as part of standard construction.
- 3) The cables for each pump shall pass through the galvanized cast iron strain relief component and then through a series of stainless-steel disks and Buna-n grommet that is sandwiched between the disks to control compression of the grommet. The cable entry design shall be of the type recommended in the FM specifications for Explosion Proof Certification. The entry shall be comprised of the cast iron fitting that will include the Buna-N strain relief grommet coupled with a poured conductor section. In the poured section, only FM-approved sealant shall be used to wick into each conductor strand that has the insulation removed in this area to provide a positively leak-proof seal for the power and sensor cords.

8. Removal System

a. General Description

- 1) The removal system shall consist of a discharge base elbow that mounts in the bottom of the wet pit, a replaceable pump coupling, guide pipes and supports and hardware as required for a complete and operational system. Connections to piping shall be standard ANSI flanges.

b. Discharge Base Elbow

- 1) The ASTM A48 Class 30B or higher cast iron discharge base elbow shall be provided to support the full weight of the submersible pump in the installation and provide a leak proof connection in which the pump coupling mates using a conformed Buna-N seal that is held in place by the combined weight of the cantilevered pump and motor.
- 2) The hydraulic pressure generated while the pump is in operation also aids the sealing. The discharge base elbow shall be provided guide pipe retention lugs

c. Pump Coupling

- 1) The pump coupling shall be close grained gray cast iron construction. The coupling shall be located between the pump discharge flange and the vertical face of the discharge base.
- 2) The purpose of the coupling shall be to allow use of a standard ANSI drilled pump-casing flange on the pump. The coupling acts

as the intermediate part between the pump and the discharge base.

- 3) The coupling vertical face is designed to seal against the vertical face of the discharge base using a replaceable Buna-N elastomeric compressible one piece seal that acts as both the discharge face seal and the gasket between the coupling and the pump flange. Wet pit installation designs that utilize the flat face of the pump flange to seal against the discharge base are not allowed.

d. Guide Rails

- 1) AISI 304 stainless steel guide rails supported by upper and intermediate brackets of AISI 316 stainless steel shall guide each pump.
- 2) The guide rails shall be supported by a AISI 316 upper guide rail bracket that will be mounted in the opening of the access cover to support and guide the pump/motor into and out of the wet well. Intermediate guide rail brackets will be provided for all installations deeper than 20-ft.
- 3) Two rail pipes shall be used to guide the pump from the surface to the discharge base connection. The guide rails shall be Type 304 stainless steel pipe. The weight of the pump shall bear solely on the discharge base and not on the guide rails. Rail systems that require the pump to be supported by legs that might interfere with the flow of solids into the pump suction will not be considered equal. The guide rail shall be firmly attached to the access hatch frame.
- 4) Before accepting the pumping station by the OWNER, the CONTRACTOR shall demonstrate the lifting, removal, and replacement of both submersible pumps, individually, in the presence of the OWNER'S Representative and Engineer. The CONTRACTOR shall only use equipment which the OWNER has or will have at the completion of the project. The CONTRACTOR shall be responsible to rectify any issues that may be found in the lifting, removal, and reinstalling of the submersible pumps. The CONTRACTOR shall test and demonstrate that the pumps are functional both before and after this "lift out" test.

e. Guarantee & Tests

- 1) Ensure that all pumps were required to meet factory performance tests when operated at rated speed and rated capacity.
- 2) Provide all pump test data and furnish the same to the OWNER'S Engineer prior to the OWNER'S CONTRACTOR installing the pumps.
- 3) The pump manufacturer guarantees that:

- a) The head, capacity, and power consumption of the pump at the required operating conditions are as stated in his equipment submittals.
- b) Design, materials, and workmanship shall be free from defects for a period of five (5) years after being placed in operation in accordance with the manufacturer's standard warranty.
- c) The pump shall be free from vibration and shall withstand all stresses that may be developed throughout the entire operating range, as well as stress due to full voltage starting.

2.5 PACKAGE CONTROL SYSTEM

1. A control panel, as shall be provided with the following features:

- a. Enclosure

- 1) The pump controls shall be contained in a NEMA type 4X enclosure manufactured of Stainless Steel. A drip shield shall be installed on top of enclosure to prevent standing water on the top door seal. A painted steel back panel shall be provided in the control enclosure to mount circuit breakers, starters, relays, and other control equipment. The enclosure shall contain full aluminum inner-door for mounting lights and switches and to protect the operator from high voltage.

- b. Electrical Service

- 1) The incoming power shall be 460 volts, 3 phase, 60 hertz. The control voltage shall be 115 volts, 1 phase, 60 hertz. A control transformer shall be provided in the control panel to provide 115 volt control power. The transformer must be properly sized to handle the maximum load of the control and accessories.

- c. Panel Indicating Lights and switches on inner door

- 1) Hand-Off-Automatic Switches
 - 2) Green Pump Running Lights
 - 3) Seal Leak Indicating Lights
 - 4) High Temp Indicating Lights
 - 5) Float Switch Back Up Indicating Lights
 - 6) Float Switch Back up Reset
 - 7) Level Indicating Control with Level Settings
 - 8) Generator Running Indicator Light(From Contact On Generator)

- d. Power Terminal Blocks

- 9) The control panel shall contain terminals for field wiring of the

utility power, pump motor(s), pump sensors and level control equipment. They shall be sized per NEC requirements and shall be as manufactured by Marathon Products, Inc. or equal.

e. Circuit Breakers/Fuses

- 1) All circuit breakers shall be thermal magnetic type and be sized per NEC requirements unless otherwise specified. Each breaker shall have a toggle handle and have a quick make, quick break switching mechanism that will trip due to overload or short circuit conditions. Upon trip, the toggle handle shall move to a center tripped position. Tripping of the breaker shall be clearly indicated by the handle position. Circuit breakers shall have a minimum 14KAIC short circuit current rating at 480v.
- 2) Circuit breakers shall be provided for each pump. A circuit breaker shall be provided for the primary winding of the control transformer. The breaker operator shall extend through the inner door.
- 3) A separate circuit breaker shall be provided for the control circuit. The breaker operators shall extend through the inner door. Circuit breakers shall have a minimum 10KAIC short circuit current rating at 120v.
- 4) Separate control and alarm fuses must be provided in the control panel as required. Spare fuses shall be supplied for each type and quantity used.

f. Starters

- 1) A properly sized NEMA rated full-voltage starter shall be provided for each pump. The use of IEC rated or definite purpose contactors with overload shall not be acceptable. The overload shall be Class10 ambient compensated bimetallic type rated with interchangeable heater elements. Solid-state overloads are not acceptable. The overloads shall be capable of being manually reset via push button located on the overload relay. Auxiliary contacts shall be provided as required for the control circuitry or required interlocks. The starters shall be manufactured by Cutler-Hammer, Square D or equal.
- 2) Upon occurrence of overload trip, an indicator light mounted on the full inner door of the control panel shall be illuminated and the corresponding pump shut off. The overload lights shall be red 22mm LED push-to-test type. The pump will not restart until overload is manually reset.

g. Pump Controller

- 1) The control panel will be operated by a submersible level transducer located in the wet well. The system shall use the TPC-X pump controller to receive a 4-20ma signal from the transducer and start and stop the pumps. A bar graph on the display screen

will show the current level. The controller shall be programmed for a fixed pumping cycle. A separate solid-state alternator shall be provided to alternate pumps on each pumping cycle, pump fail alarm or secondary/alternate pump called to run.

- 2) The pump controller shall have the following additional features:
 - a) I/O status screen for troubleshooting help
 - b) Low level and high level alarm counts
 - c) Level simulation mode
 - d) 4-20ma output of level signal
 - e) 0-99 second setpoint dwell time
- 3) Upon low level, the pumps shall be locked out until the level rises above the alarm shut off point. The pumps will restart automatically. The low-level condition alarm will then be sent via a set of dry contacts.
- 4) Upon high level, the exterior alarm light (beacon) at panel will be activated, and the high-level condition alarm will then be sent via a set of dry contacts.
- 5) Under normal operations, level control shall be by the submersible level transducer. Upon the wet well level rising to the lead pump on level, the lead pump shall be automatically started and shall run until the off level is reached. The next pump to run shall automatically cycle to the next pump, and so on. Should the level rise beyond the lag pump on level, both pumps shall run until the off level is reached.

h. Transducer

- 1) The transducer shall be a submersible type and shall provide a 4-20ma signal to the controller based upon a 0-23.1ft (0-10psi) level in the wet well. The unit shall have a 316 stainless steel body. The transducer shall come equipped with (minimum) 75 ft of continuous cable wired by the manufacturer and be rated for use in hazardous locations. The unit shall be model 6100MP Back-up Level Control
- 2) The back-up level control will be by two (2) mercury-free float switches located in the wet well. The levels will correspond as follows:
 - a) Pump Off
 - b) High (Float) Level – in float back-up control initiated
- 2) A separate float back-up control will be initiated by the high-level float. Upon closure of the high-level float, the lead pump (that cycle) shall be automatically powered on to start. The pump will run until the level drops below the off level. An adjustable time delay relay will start the lag pump if the level does not drop below the high-level float within the user set time. A solid-state alternator shall be provided to alternate pumps on each pumping cycle. The triggering of the High (Float) Level float shall automatically send

the "Float Back-Up Enabled" alarm.

- 3) The floats shall be mounted inside the wet well by a stainless-steel float bracket, Model #100-4SS

i. Intrinsically Safe level Control

- 1) Each float switch shall be connected to an intrinsically safe relay (ISR), model # ISS101 as manufactured by Symcom, located in the control panel. The submersible transducer, if required, shall be connected to an intrinsically safe barrier located in the control panel. The barrier shall be model # 900213280110001 as manufactured by R. Stahl. The ISRs and IS barriers shall be UL 913 listed and labeled.

j. Relays

- 1) Controls relays shall be a 4PDT type that plugs into a 12-blade socket. The contacts shall be rated 10amp at 250VAC. The relay shall have an LED indicator to show when the relay is activated. The relays shall be model RXM4AB2F7 as manufactured by Square D or equal.
- 2) Time delay relays shall be DPDT type that plug into 8-pin or 11-pin sockets. The contacts shall be rated 5amp at 240VAC minimum. The relay shall have an LED indicator to show the output contacts status. The relays shall be RTE series or GE1A series, manufactured by IDEC or equal, as required for function.

k. Run Light and Selector Switches

- 1) A separate run light and hand-off-auto switch shall be provided for each pump. The lights and switches must be mounted to the full inner door. A separate on-off-test switch shall be provided to test the exterior mounted alarm light. The run lights shall be green 22mm LED push-to-test type. The switches shall be 22mm oil tight.

l. Elapsed Time Meters

- 1) A separate elapsed meter shall be provided for each pump and must be mounted to the inner door. The meter shall be a non-resettable type with a minimum 6 figure measuring in tenths of hours, operating from 120VAC. The meter shall be Redington series #722 or equal.

m. Pump Sensors

- 1) Each pump shall contain sensors for over-temperature (heat sensor). The heat sensor shall stop the corresponding pump based upon the pump manufacturer's temperature requirements. A 22mm selector switch on the inner door will allow the operator to choose automatic or manual reset of the alarm and pump restart. A 22mm reset push button will be provided on the inner door for the manual reset option. Upon occurrence of over-

temperature alarm, an indicator light mounted on the full inner door of the control panel shall be illuminated and the corresponding pump shut off. The over-temperature lights shall be red 22mm LED push-to-test type.

- 2) Each pump shall contain sensors for seal failure (probe). A probe in the pump shall detect moisture leakage through the pump seal. Relays in the control panel shall work in conjunction with the probes to detect moisture in the pump. Upon occurrence of moisture in the pump seal chamber, an indicator light mounted on the full inner door of the control panel shall be illuminated. This shall serve as an indicator light only and will not remove the pump from service. The seal fail lights shall be red 22mm LED push-to-test type. The probe sensing relays shall be type as required by the pump manufacturer.

n. Alarm

- 1) A visual flashing alarm shall be mounted to the top, exterior of the control panel. The alarm shall contain an LED bulb rated at 50,000 hours. The alarm shall contain a lexan lens and provide bulb replacement without removal of the lens from the control panel. The visual alarm must be rated NEMA 4X and shall be one as manufactured by Ohio Electric Control, Inc. An audible alarm shall be mounted to the side of the enclosure. A silence circuit shall be provided to silence the audible alarm. The visual alarm shall be initiated by the high water level transducer level, high water back up float and pump failure alarms.

o. Aux Alarm Contacts

- 1) Dry Contacts for connection to a remote alarm device or telemetry unit. The following alarms are to be monitored at panel and transmitted to remote location:
 - a) Pump 1 Run
 - b) Pump 2 Run
 - c) Low Level Alarm (transducer only)
 - d) High Level Alarm (transducer)
 - e) Float Back-Up Enabled
 - f) Redundant High Float Level/Alt Pump Call
 - g) Pump Fail Alarm – P1 (Over Temperature, Seal Fail, Overload Trip)
 - h) Pump Fail Alarm – P2 (Over Temperature, Seal Fail, Overload Trip)
- 2) Provide minimum of four (4) additional spare contacts, beyond those listed in 1) of this Section.

p. Panel Heater

- 1) A strip heater and thermostat shall be provided in the control panel. The heater shall be properly sized to keep temperature inside control panel above freezing and to prevent condensation from forming inside panel. The heater will be mounted on an L-shaped bracket for mounting to the enclosure back panel. Heating

requirements will be based upon enclosure size, component requirements and ambient outside temperature of panel location.

q. Duplex GFI Receptacles

- 1) A 15amp ground fault receptacle shall be provided and wired inside the control panel. The receptacle will be mounted on the control panel inner door.

r. Labeling

- 1) Each component mounted on the inner door will be labeled with a plastic engraved nameplate. The back panel will be labeled with laminated paper labels.
- 2) All wires shall be labeled at both ends.
- 3) All terminal blocks shall be labeled.
- 4) Duplicate pump name plates shall be installed to inner door of panel.
- 5) UL labels shall be provided and visible without opening inner door.
- 6) Panel nameplate with electrical requirements and withstand ratings shall be installed on interior of outer door.

s. Wiring

- 1) All wiring shall be sized according to NEC and shall be placed in plastic wireway or similar devices.

t. Spare Parts

- 1) Spare fuses shall be provided for each type and quantity provided in the control panel.

u. Shop Drawings and Submittal Information

- 1) The submitted information shall include the following:
 - a) Electrical Schematics with:
 - (1) *Sequence of Operations*
 - b) Bill of Materials
 - c) Manufacturers Component Catalog Sheets
- 2) An "as-built" electrical schematic shall be mounted inside the electrical panel enclosure door.

v. Compliance

- 1) The control panel must comply with the National Electric Code including a listing of the panel short circuit protection. The control panel shall have a minimum short circuit current rating (SCCR) of 5KAIC. The control panel will be UL 698A listed as an assembly.

w. Installation

- 1) All equipment shall be installed, configured, interconnected, and commissioned by qualified people, in accordance with the manufacturer's instructions and guidelines, and in compliance with all governing regulations and accepted engineering practices.

x. Warranty

- 1) The manufacturer shall warrant the equipment described herein, to be free of defects in materials and workmanship, for a period of twelve (12) months from the date registered start-up or acceptance. The manufacturer's liability shall be limited to the repair or replacement of the materials supplied, free of charge F.O.B. the manufacturer's facility. Other limitations may apply. Contact the manufacturer for complete warranty details.

2.6 PORTABLE HOIST

- A. The pump station will be supplied with a portable hoist to facilitate equipment removal and placement for periodic and emergency maintenance. The hoisting equipment has been sized for the proposed submersible pumps. Basis of design is Thern Commander 500 (5PT10 Series).
- B. Lift Capacity: davit crane shall have a variable lift capacity based on boom length, to vary between 1,200 pounds (295 kg) lift capacity with the boom in the shortest length when positioned at 45 degrees from horizontal, and 300 pounds (135 kg) with the boom fully extended and in the horizontal position.
- C. Hook Reach: boom shall telescope up to 4 different lengths with a minimum hook reach of 23 inches (584 mm) in the shortest position and a maximum hook reach of 66 inches (1676 mm) with the boom fully extended, measured from mast center to hook center.
- D. Hook Height: hook height shall be adjustable by moving the boom up or down between horizontal and 45 degrees from horizontal, with a minimum of 42 inches (1066 mm) between the lowest position and the highest position with the fully extended boom.
- E. Boom Angle: boom angle shall be adjustable with a hand operated screw jack acting to raise or lower the boom between horizontal and 45 degrees from horizontal.
- F. Boom Sheave: wire rope shall pass over a sheave at the end of the boom. Sheave shall have a bearing and shall be supported by a machined clevis pin which shall be keyed to the boom to keep the pin from rotating.
- G. Rotation: Mast and boom shall rotate 360 degrees in the base on a Nylatron bushing in the bottom of the mast, with a rotational handle attached to the mast to facilitate rotation. Crane shall include a Nylatron bearing sleeve to support the mast at the top of the base.
- H. Fastening Pins: crane components shall be fastened together using stainless steel clevis style pins, secured with lynch pins with lanyards fastening the lynch pins to primary structural components.
- I. Portability: Davit crane shall break down into portable components with no single component weighing more than 30 pounds (14 kg). Carrying handles shall be welded to the mast and boom.
- J. Winch Location: lifting winches shall be located such that the center point of the drive shaft is behind the centerline of the mast.

- K. Winch Mounting Bracket: crane shall be equipped with a winch mounting bracket that connects to the crane with a pin allowing the winch with bracket to be attached or removed without tools. Winch shall attach to the bracket using standard fasteners.
- L. Identification: Davit crane shall be labeled with a non-corrosive metal identification plate labeled or imprinted with the manufacturer's name, model number and serial number.
- M. Design Factor: yield design factor shall be a minimum of 1.5 under static conditions for all crane components including winch and base. Breaking strength safety factor shall be a minimum of 2.5 under static conditions.
- N. Winch: winch shall have a quick-disconnect cable anchor, and a positive load holding mechanical brake able to stop and hold the load automatically when operation is halted. 4WM2-K worm gear hand winch (drill drivable).
- O. Base: 5BP5 Pedestal Base.
- P. Material and Finish for Crane and Base: steel meeting ASTM standards. Finish powder coated.
- Q. Wire Rope: wire rope assembly including swivel hook with latch. 1/4-inch diameter wire rope includes quick-disconnect swaged ball fitting. Wire rope construction shall be 7x19 type 304 stainless steel cable. Minimum cable shall be 28' length.
- R. Base Extension: to extend mast to provide additional 15 inch (380 mm) hook height and maintain lift capacity.
- S. Positional Lock: to provide multi-position lock to keep crane from rotating.
- T. Headache Ball: to apply tension to wire rope when crane is not under load.
- U. Wire Rope Keeper: used with quick-disconnect feature. The swaged ball fitting on the wire rope (the end that attaches to the drum of the winch) can be inserted into the slot on the wire rope keeper to allow the wire rope to remain attached to the load when the crane is moved to another base location.

2.8 SYSTEM WARRANTY

- A. The manufacturer of the lift station shall guarantee for one (1) year from the date of installation, or 15 months from the date of factory completion (whichever occurs first), that the structure and all equipment associated with the package will be free from defects in design, material and workmanship.
- B. Warranties and guarantees by the suppliers of various components in lieu of a single source of responsibility by the manufacturer will not be accepted. The manufacturer shall be solely responsible for the warranty of the station and all components.
- C. In the event a component fails to perform as specified or is proved defective in service during the warranty period, the manufacturer shall provide a replacement part without cost to the Owner. The Contractor shall further provide, without cost to the Owner such labor as may be required to replace, repair or modify major components such as the station structure, pumps, pump motors sewage piping manifold, etc.

PART 3 EXECUTION

3.1 SURVEY

- A. The installation area shall be surveyed using the work print and a checklist to identify the work to be done and to determine that the plans are correct.
- B. All underground facilities and structures such as gas, water, sewer, power, telephone cable, and so forth shall be located and identified. Location markings shall be placed by the affected utilities before construction.

- C. The survey shall identify obstacles such as overhead wires, building structures that will interfere with crane operations, work progress, or create a safety hazard.
- D. The survey shall give consideration to the soil structure so that proper shoring, sloping, or both may be planned in advance of the excavation work.

3.2 PLANNING

- A. Permits required to do work in accordance with the detail plans shall be secured before starting the job. All permits or a record of the permits shall be retained on the job for immediate reference.
- B. All utilities and owners of surface and subsurface facilities and structures in the area shall be given advance notification of proposed excavation. Every effort shall be made to avoid damage to the facilities of others. If any damage occurs, the owner of the damaged facility shall be notified immediately.
- C. Planning shall include the coordination of all responsible parties to ensure that arrangements for removal of excess and damaged material have been made.
- D. Should it appear that a structure location interferes with traffic, review the situation with the engineer and notify appropriate authorities.
- E. Provide access to call boxes, fire hydrants, etc.

3.3 SAFETY REQUIREMENTS

- A. Safety requirements for construction shall be in accordance with all federal, state, and local regulations.

3.4 EXCAVATING

- A. If unforeseen facilities or obstructions are encountered, stop excavation operations immediately. Expose the obstruction with wood handled digging tools and investigate them with caution. If there is any doubt as to the type of obstruction exposed, request positive identification from those suspected of owning the facility and then proceed as circumstances dictate.
- B. Inspect excavations after every rainstorm or other hazard-increasing occurrence, and increase the protection against slides and cave-ins, if necessary.
- C. In dewatering excavations, make certain that the discharge is carried to a suitable runoff point. Also verify that the design accounts for the level of groundwater encountered.
- D. Excavation size should be large enough to allow access around the structure after it is installed.
- E. All excavating shall be under the full guidelines for on-site OSHA regulations and shall be under the supervision of an OSHA-certified safety coordinator.

3.5 SHORING

- A. Shoring for construction shall be in accordance with all federal, state, and local regulations.

3.6 INSTALLATION

- A. General

Installation of the pump chamber sections and related equipment shall be done in accordance with written instructions supplied by the manufacturer. Installation oversight service (1-day) can be provided by the pump station manufacture (as may be required by the owner), when specifically stated as necessary site service. Additional days for factory technicians shall be paid for at the

standard daily rate.

B. Assembly

1. The pump station shall be factory assembled and shipped to the job site as follows:
 - a. Wet well precast base assembly with interior fillet and extended base. Pump base elbow & slide couplings will be factory mounted.
 - b. Precast concrete riser shims as required, shall include holes and factory installed rubber boots as required.
 - c. Integral valve pit assembly shall include factory installed: piping, valves, supports, gauges, bypass, ladder, hatch drain to pump station – as required. Valve pit assembly may incorporate riser sections of 2' & 4' as may be required.
 - d. Precast pump station top slab shall include HS20 stainless steel access covers and will be factory sealed to the lower valve vault or valve vault riser.
 - e. Miscellaneous items provided and field installed shall include pumps, control panel, level control devices, vertical discharge piping, dresser couplings, pump guide rails, and any other equipment that may cross a structural joint, having to be removed for transport.

C. Site Access

1. The general contractor shall be responsible for providing adequate access to the site to facilitate hauling, storage, and proper handling of the precast concrete units.

D. Subgrade Bedding Materials and compaction

1. The installation contractor shall be responsible for ensuring that the subgrade is compacted to 95% of ASTM D558 density. The subgrade shall be a minimum of 6" in depth. A granular material shall be used to create a level surface for placing the precast concrete unit.

E. Installation

1. Precast concrete units shall be installed: to the lines and grades shown on the contract documents or otherwise specified; be lifted by suitable lifting devices at points provided by the precast concrete producer; in accordance with applicable industry standards. Upon request, the precast concrete producer shall provide installation instructions and oversight.
2. Field modifications to the product shall relieve the precast producer of liability and warranty regardless of if such modifications result in the failure of the precast concrete unit.

F. Leak Resistance

1. Where leak resistance is a necessary performance characteristic of the precast concrete unit's end use, joint sealant, pipe-entry connectors and other penetrations shall be sealed according to manufacturer's requirements to ensure the integrity of the system. Structural leak testing at the joints can only be completed with an exfiltration test after complete backfilling.

3.7 BACKFILLING AND RESTORATION

- A. Do the backfilling as soon as possible after the structure has been placed.**

- B. Backfill material shall be granular and free from large stones, rocks, and pavement. Expansive soil material shall not be used as backfill around the structure.
- C. Backfilling shall be achieved by lifts (layers) to the required compaction.
- D. Follow up inspections for settlements are required. Should settlement occur, the contractor shall be responsible for all necessary repairs.

3.8 FIELD QUALITY CONTROL

- A. Inspection
 - 1. Final field elevations and compaction properties shall be verified and documented.

3.9 O&M MANUALS

- A. One (1) electronic copy of complete project O&M manual shall be furnished for the pump station, or Four (4) hard copies as dictated by the owner.
- B. The manuals shall include the station As-Built drawing package showing final mechanical layout and updated mechanical BOM.
- C. The Manuals contain specific pump station instructions which will enable personnel to operate and maintain the pump station and all equipment associated with each individual system installed within the station.
- D. Manuals that are a compilation of generalized manufacturer's literature that are not solely applicable to the particular pumping station will not be accepted.
- E. The Manuals shall contain, but not be limited to:
 - 1. Pump service and maintenance instructions, as detailed in the pump specification section.
 - 2. Duplex pump control panel programming and maintenance instruction and wiring diagrams, as detailed in the control panel specification section.
 - 3. AS-BUILT fabrication and assembly drawings.
 - 4. Start-up & training reports.
 - 5. Product warranties.
 - 6. Product contact information and project reference information.

END OF SECTION