ADDENDUM No. 1

for the

Town of Mt. Jackson WWTP
Influent Equalization Project

Prepared For

Town of Mt. Jackson

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Addendum Date: December 2, 2022

This Addendum No. 1, dated December 2, 2022 amends or supplements the Contract Documents titled Town of Mt. Jackson WWTP Influent Equalization Project dated October 28, 2022 as indicated below:

Changes to Drawings:

Item 1: Drawing D-001, hydraulic profile of influent screen tank. Screen tank height shall be 60 inches resulting in top of tank elevation being 890.19 ft msl. Refer to Section 110002 Package Headworks for details on integral overflow weir on upstream side of screen.

Item 2: Drawing D-301, for note 10 on the drawing, remove the asterisk from the note callout.

Changes to Specifications:

Specification 110002 Package Headworks is attached to the end of this addendum.

Questions & Responses:

Question 1: "Article 3 States the Qual is to be submitted five days after the bid. The Bid Form states the qual is to be submitted with the bid."
Response 1*:* Contractor qualifications to be submitted with the bid.

Question 2*: "*Section 01 52 00 notes to provide Engineer's field office for RPR. However supplementary conditions notes no RPR is to be provided. Please confirm if an additional office will be required for owner's representative."
Response 2*:* An Engineer's field office will not be required to be provided by the Contractor".

Question 3: "Project specs include section 033001 Cast-in-Place concrete for liquid retention structures. This is noted as an alternative to Pre-cast Post-Tensioned Tanks. I was under the impression the intent of the project was to provide a Dutchland tank. Please confirm a cast-in-place structure is not an optional alternative."
Response 3: The bid for this project shall be based upon a pre-cast post-tensioned concrete tank as specified in the contract documents.

Question 4: Control valve Vault noted on C104. There do not appear to be any details to size or components related to this vault. Is there a hatch? Is the Valve inside flanged?
Response 4: Valve vault to be a precast concrete structure with gravel bottom (1 ft) and grating for top. Grating to be recessed so that top of grating matches top of vault. Grating to be 2" deep pultruded 33% opening, non-slip type, color yellow. Vault shall extent a 6 inches above grade. Interior vault dimensions shall be 72 inches wide, by 60 inches long, with a depth adequate for the plug valve to be fully exposed and have 6

inches between bottom of valve and gravel floor. Actuator shall have an extended bonnet and extension stem per D-002 note N and shall extend 48 inches above grating. Grating shall be removable type.

Question 5: “Please confirm the pipe material for the 2” waterline going to the Headworks.”
Response 5: Copper type K.

Question 6: “Please confirm the only heat tracing & Insulation that is required is at the Waterline at the Headworks. “
Response 6: There are several electrical circuits provided for heat trace and insulation of backflow prevented exposed water lines in and around the new package headworks system.

Question 7: “On Drawing D-101 Item 12. Grit Screening Discharge is not * to be denoted by the package supplier. On drawing D-301 it is. Please advise.”
Response 7: Grit screening discharge piping is not part of the package supplier scope.

Question 8: “Please provide tank backfill material requirements. If the backfill material is select, please provide specification.”
Response 8: Select structural fill to be densely graded aggregate compacted in 6-inch compacted lifts to 98% max density per modified proctor at optimal moisture content. Densely graded aggregate to be GW, GP, SW, SP by ASTM D2487.

Attachments

Specification 110002 Package Headworks (16 pages).

END OF ADDENDUM NO. 1

SECTION 110002
PACKAGED HEADWORKS

Part 1 GENERAL

1.1 SCOPE – Furnished all equipment and **s**upply all labor, materials, equipment and incidentals required to install and place into operation the stainless steel packaged headworks system (Fine Screen, Washing Compactor, Grit Trap and Grit Classifier) as shown on the Drawings and as specified herein.

1.2 REFERENCE STANDARDS - The properties of all materials, design, fabrication and performance of the equipment to be furnished under this section shall be in accordance with the latest issue of applicable standard specifications. The governing authorities of these standards are listed below.

A. AICS, American Institute of Steel Construction
B. AISI American Iron and Steel Institute
C. ANSI, American National Standards Institute
D. ASCE, American Society of Civil Engineers
E. ASME, American Society of Mechanical Engineers
F. ASTM, American Society of Testing and Materials
G. AWS, American Welding Society
H. IBC, International Building Code
I. IEC, International Electric Code
J. IEEE, Institute of Electrical and Electronics Engineers
K. NEC, National Electrical Code
L. NEMA, National Electrical Manufacturers Association
M. Underwriters Laboratory (UL and cUL)

1.3 SUBMITTALS - Submittals shall be provided to the engineer that includes all the following information and in accordance with DIVISION 1 of the project manual:

A. Certified shop drawings showing all important details of construction, dimensions, and anchor bolt locations.
B. Descriptive product literature.
C. Schematic electrical wiring diagram and electrical controls information and FLA of control panel(s).
D. Complete motor and drive data.
E. The total weight of the equipment.
F. A complete bill of materials of all equipment.
G. A valid certificate of registration naming manufacturer, and supplier if equipment is relabeled, as ISO 9001:2015 certified.

1.4 QUALIFICATIONS

A. All the equipment specified under this Section shall be supplied by a single manufacturer whose Quality Management System is ISO 9001:2015 certified and applicable to the manufacture of water and wastewater treatment equipment.

B. If equipment is not manufactured by supplier, including welding and machining, the name and contact information of manufacturing facility must be supplied. If more than one manufacturer is used all companies and facilities must be provided.

C. If patents protecting equipment are not owned by supplier, then an affidavit must be supplied stating owner of design and expiration of licensing agreement.

D. The Manufacturer shall warrant the use of this system and its equipment will not infringe on any U.S. or foreign patent.

1.5 DESIGN REQUIREMENTS

A. Screen System Description

1. The screen will have a continuous stainless steel belt that automatically rotates within the internal guide system of the static frame.

2. The screen herein specified will be of the straight through type that will present a clean screening grid to the influent flow at all times.

3. The solids will collect as a mat on the front face of the continuous belt. The belt will intermittently rotate and elevate the solids to the discharge point. Larger objects will be picked up by a series of hooks.

4. The solids will be automatically removed at the top of the screen into an internal hopper and be fed to the screening handling system.

5. The continuous belt will be directly driven by drive sprockets that shall support and rotate the grid assembly.

6. The screen will be totally enclosed and have access covers that will be lightweight and easily removable for maintenance. Maintenance, inspection, access and lubrication points shall be no higher than 60 inches above grade or platform level.

7. The Washing Compactor will sit under the discharge point of the screens.

8. The Washing Compactor will be adequately sized to handle all the screenings and wash water that will be generated by the screen at peak flow. The system will be required to wash the screenings to reduce the organic content and compact the remaining solids into a dry plug.

9. The Washing Compactor will generally comprise of a screw auger rotating within the washing and drainage trough, a wash water system, a compaction zone and an outlet chute arrangement.

10. All stainless steel (including frame, grid, and drive components) mentioned below as stainless steel shall be T304 stainless steel. All hardware shall be T316 stainless steel.

B. System Performance - The fine screening system will be designed to meet the following design parameters:

1.	Number of screens	1
2.	Peak flow per screen	2.5 MGD
3.	Velocity through the grid	6.32 ft/s
4.	Screen grid opening	6 mm
5.	Head loss at peak flow	10 inches @ 30% blinding and 23 inches upstream water level
6.	Structural design differential of frame/grid	60 inches minimum @ 100% blinding
7.	Drive design differential (operating)	60 inches minimum
8.	Screen grid supporting drive sprockets	2 minimum – all stainless steel
9.	Channel width	18 inches
10.	Channel height	60 inches
11.	Number of Washing Compactors	1
12.	Diameter of screw	6 inches
13.	Minimum diameter of shaft	2.375 inches
14.	System wash water requirements	6 GPM @ 40 PSI

15. Internal overflow weir that allows water to bypass screen when water level reaches 24 inches from top of screen tank. Weir length shall be long enough to allow the peak flow of screen (2.5 MGD) to go over the weir leaving at least 12 inches of free board.

C. Vortex Collector System Description

1. The Grit Trap will be a “vortex” style system designed to operate continuously.

2. The internal rotating mechanism will be installed into the circular stainless steel chamber as shown on the contract drawings. The chamber will consist of an upper separation chamber and a lower collection hopper.

3. The wastewater flow will enter the chamber tangentially, flow around the upper separation chamber and exit via an outlet channel running parallel to the inlet.

4. The grit solids will fall through the upper separation chamber to settle in the lower collection hopper. The transfer grit pump will regularly cycle and transport the grit particles to the de-watering Grit Classifier.

5. Consistent performance of the grit chamber throughout the flow ranges will be maintained by the motor driven impeller that continuously rotates within the upper separation chamber. The device will provide the ideal conditions to enhance grit settlement and maximize the ejection of light organic solids from the chamber.

6. The floor of the upper separation chamber must be sloped to prevent grit accumulation and allow the grit to fall be gravity into the collection hopper.

7. All stainless steel (including drive tube, impeller and hardware) mentioned below as stainless steel shall be T304 stainless steel. All hardware shall be T316 stainless steel.

D. Vortex Collector System Performance

1. The Grit Trap will be designed to meet the following grit removal performance guarantee at all flows up to and including the peak flow. Grit is defined as silica sand; specific gravity = 2.65 g/cc:

a. Grit greater than 50 mesh	95%
b. Grit greater than 70 mesh but not less than 50 mesh	85%
c. Grit greater than 100 mesh but not less than 70 mesh	65%

2. The Grit Trap model will be selected to meet the following design parameters:

a. Number of chambers required	1
b. Peak flow per chamber	2.5 MGD
c. Maximum allowable head loss at peak flow	¼ inches

E. Grit Pump System Description

1. The manufacturer shall supply a grit pump to transfer the grit and liquid from the collection hopper to the grit screw classifier system.

2. The grit pump shall be mounted as shown on the contract drawings.

3. The contractor shall supply the interconnecting 4 inch pipe from the top of the suction pipe to the grit pump inlet and the grit pump outlet to the grit screw classifier.

4. System Performance – The grit pump will fully comply with the following criteria:

a. Number of grit pumps	1
b. Maximum pump capacity	250 GPM
c. Motor HP rating	5 hp
d. Inlet connection	4 inches
e. Outlet connection	4 inches

F. Grit Classifier System Description

1. The Grit Classifier system will be adequately sized to receive and process a mixture of grit and liquid regularly pumped at the maximum specified rate from the vortex grit chamber.

2. A cyclone, mounted on top of the Grit Classifier will provide initial dewatering. The excess liquid will be immediately returned to the main flow.

3. The partially dewatered grit will be deposited into the main body of the Grit Classifier. The heavy grit will settle in the collection hopper while the excess liquid will overflow an internal weir and be returned to the main flow.

4. The grit will be elevated by a rotating screw to a discharge point above the internal water level. By this time the grit material will be free of any free standing liquid.

5. All stainless steel (including Grit Classifier, grit cyclone and hardware) mentioned below as stainless steel shall be T304 stainless steel.

G. Grit Classifier System Performance – The Grit Classifier system will fully comply with the following criteria:

1. Number of cyclones	1
2. Maximum capacity of cyclone	250 GPM
3. Inlet flanged spool piece connection	4 inches
4. Overflow flanged spool piece connection	6 inches
5. Maximum underflow to screw classifier	30 GPM Maximum
6. Number of screw classifiers	1
7. Maximum capacity of screw classifier	30 GPM
8. Diameter of screw	12 inches
9. Diameter of screw shaft	3 inches
10. Minimum length of screw	8 feet
11. Speed of screw	12 RPM
12. Motor Size	1/2 HP

Part 2 PRODUCTS

2.1 MANUFACTURER

A. The equipment shall be the Continuous Belt Through Flow Screen, Washing Compactor, Grit Trap and Grit Classifier as provided by Hydro-Dyne Engineering, Inc., Clearwater, FL. The grit pump shall be the Gorman Rupp T4A.

B. If submitted equipment requires arrangement differing from that specified, prepare and submit for review complete structural, mechanical, and electrical drawings and equipment lists showing all necessary changes and embodying all special features of equipment proposed.

2.2 THE CONTINUOUS BELT THROUGH FLOW SCREEN

A. Laced Link Grid - The Continuous Screening Belt

1. The screenings belt will consist of heavy duty stainless steel laced links connected in parallel and separated by Delrin spacers to maintain specified opening. Each laced link hook element shall be fabricated from 14 gauge (minimum) stainless steel. Each straight element shall be fabricated from 16 gauge (minimum) stainless steel. All elements shall be a minimum of 1 inch wide forming a slotted opening of the specified width and minimum 1 inch deep in the direction of flow. Hooks on elements shall form horizontal lifting trays or shelves for removing large solids and rags every 8 inches.

2. Links, hooks and screening lifting members must be manufactured out of stainless steel. Plastic is not acceptable.

3. The stainless steel laced links will be connected by heavy duty stainless steel axles every 8 inches to form a continuous belt that will rotate within the frame's guide system. Axle diameter shall be a minimum 5/8 inch. The axle design will allow the row of laced links to pivot. The links shall support the screening grid and bear tension loads across the entire width and length of the screen belt.

4. The axles will be extended to fix a UHMWPE guide link to the side of each row of laced link elements. These guides will interlock to create a continuous guide link system that will slide within the frame.

5. Guide links shall be precision machined from solid virgin UHMWPE. Injection molded links are not acceptable.

6. The heavy duty guide links will be minimum 2 inches thick to protect against undue wear from grit and will be specially machined to form a closure seal between the rotating belt and the static frame.

7. The seal shall be continuous from grade level through the water flow forming an uninterrupted closure between the traveling screen grid and the stationary frame. The seal shall be fixed to the screen frame and be adjustable so that it will remain in contact with the rotating screen belt at all times.

8. Guide systems that use rollers, stainless or hardened steel chains will not be acceptable.

9. Grid sealing systems that use neoprene seals or stainless steel hinges will not be acceptable.

10. Grid to frame sealing systems that use adjustable UHMWPE strips attached to the frame will not be acceptable.

11. The bottom of the grid shall be sealed with a replaceable front lower seal brush with a stainless steel holder and polypropylene bristles.

12. Intermittent stainless steel laced link elements that form sharp hooks will be regularly placed along the face of each row of the grid to effectively remove larger particles.

B. The Frame

1. The continuous belt will rotate within a heavy duty stainless steel static support frame that shall stand at a 75 degree angle in the channel.

2. The screen will not be fixed within the channel to allow the entire machine, including screen grid, to pivot/lift out of the channel for repair or bypass. All routine maintenance will be achieved without removing the screen from the channel and shall be performed at grade level.

3. The guide link system will travel around a guide wear track that is integral to the support frame.

4. The design will ensure that the support frame meshes with the closure seal on each guide link to prevent passage of screening material and grit particles.

5. All components of the lower wear tracks shall be bolt in, field replaceable and manufactured from stainless steel.

6. The frame shall accommodate stainless steel protective covers designed to prevent leakage and contain spray wash. All access covers for maintenance will be lightweight

and easily removable. Screens with covers requiring neoprene, rubber or plastic seals are not acceptable.

7. If required, the screen manufacturer will supply the stainless steel angled filler plates with neoprene seals to connect from the upstream corners of the support frame to the channel walls.

C. The Offloading of Screenings

1. A stainless steel spray wash header will be located in the head space of the screen to offload the screenings from the continuous belt.

2. The spray bar will incorporate brass nozzles at 2 inch spaces that can easily be replaced or removed for cleaning.

3. The spray bar will be positioned behind the rotating belt and will backwash the solids into a discharge hopper manufactured from stainless steel. The wash water will be used to continuously flush the screenings from this hopper into the directly into the Washing Compactor.

4. The addition of a mechanically rotating brush system to aid offloading will not be acceptable.

D. Screen Drive Mechanism

1. Each screen will have a minimum 0.5 hp, inverter duty electric motor suitable for a 460/3/60 supply and rated for a Class 1 Div. 2 environment. As a minimum, the motor will be TEFC with an IP55 enclosure rating and will conform to NEMA MG-1 requirements. The motor will be located outside of the screen covers and above the top of the channel.

2. The gear reducer shall be directly coupled to a heavy duty shaft machined from stainless steel.

3. The continuous belt will be supported and rotated around heavy duty stainless steel sprockets located on the drive shaft in the head space of the screen.

4. These sprockets will have removable bolted-on lugs that transmit torque directly from the gear reducer to notches on the underside of the UHMWPE guide links. Driving forces shall be transmitted to areas located behind the screen's grid to prevent solids from contacting drive surfaces.

5. Chain driven systems or screens with wheels submerged in the wastewater are not acceptable.

6. Drive systems that use an external track and pinion to drive or push the band against grid weight supporting wear tracks will not be acceptable. Drive shall lift, and be capable of bearing, the full weight of the grid.

2.3 THE WASHING COMPACTOR

A. The main body will be the washing trough that will receive screenings and wash water directly from the discharge point of the screen.

B. The washing trough will house the screw auger and provide a dedicated section to reduce organic content.

C. The stainless steel drainage section will be slots with 5mm openings. This drainage section shall be removable and easily replaceable in the field with no special tools. The flights of the screw will be fitted with a stiff nylon brush that will maintain contact with the drainage section, preventing blockages. The replaceable brushes will be supplied in pre-coiled lengths with stainless steel removable clamps.

D. The steel screw auger will sit in the washing trough. Washing compactors with shaftless screws are not acceptable as a shaft is required to support the flight and provide necessary torque and compaction.

E. The auger will be a varied pitch screw supported at the compaction end by steel wear and anti-rotation bars designed to prevent the compacted screening from spinning within the compaction zone.

F. The screw will rotate allowing wash water and free organic/fecal material finer than trough openings to escape and return to the plant flow. The wash water system will flush the separated organic material through the drainage section in solution or as small particles.

G. The compacted screenings will be pushed through the compaction zone and pass through an elbow into an outlet chute. The outlet chute will provide for screening expansion and will elevate the dewatered screenings to discharge by gravity into a waste receptacle (by others).

H. Each Washing Compactor will have a minimum 1.5 hp, inverter duty reversing electric motor suitable for a 460/3/60 supply and rated for a Class 1 Div. 2 environment. As a minimum, the motor will be TEFC with an IP55 enclosure rating and will conform to NEMA MG-1 requirements.

2.4 THE VORTEX GRIT TRAP

A. General

1. The internal mechanism of the Grit Trap will consist of a helical gear motor, a drive head, a drive tube and a rotating impeller.

2. The grit chamber shall be a concrete structure provided by the contractor that must have inlet and outlet channels as shown on the drawings. The grit chamber shall be a stainless steel structure provided by the manufacturer as shown on the drawings.

B. The Drive Head Assembly

1. The drive head will be a composite unit consisting of a heavy duty steel base and cover. The base section will support a nominal 20 inch turntable bearing that has a minimum B-10 life of 20 years. The Contractor will be responsible for correctly mounting the drive head on the bridge.

2. The support bridge will consist of galvanized support beams that will span the grit chamber to provide a 36" wide walk way and support the drive head and rotating mechanism. The contractor will supply flooring and hand rails as per the drawings.

3. The drive tube will be rotated at a nominal 15 RPM by a heavy duty spur tooth bull gear wheel securely bolted to the turntable bearing. This bull gear wheel will be driven by a steel drive pinion mounted on the output shaft of the helical gear motor. The helical gear motor will be supported by a cover that will have an access port to allow the contractor to check that the gear wheel and pinion are centered correctly. The pinion and the bull gear will have a service factor of 5.0 or greater at standard operating speeds.

4. The helical gear motor will be directly shaft mounted to the bull gear wheel. Each drive head will have a single 3/4 hp, continuous duty electric motor suitable for a 460/3/60 supply and rated for a Class 1 Div.2 environment. As a minimum, the motor will be TEFC with an IP55 enclosure rating and will conform to NEMA MG-1 requirements.

5. The whole drive head assembly will be suitable for continuous operation.

C. The Rotating Mechanism

1. The drive tube will be 10.75 inch diameter pipe that will run down the center of the grit chamber. The drive tube will pass through an opening in bull gear wheel and terminate inside the drive head as an open pipe.

2. The impeller will be attached to the drive tube by means of a two piece collar. The impeller shall have four equally spaced blades fixed to a base plate. As the impeller rotates each blade will pass within 6 inches from the top of the collection hopper. The impeller blades will be set at 5 to 20 degrees to the vertical. The profile of the impeller blades will be designed to maximize grit capture and eject floating solids out of the chamber. The impeller will rotate at a nominal 15 RPM in the direction to the waste water flow.

3. The rotating mechanism will be manufactured from stainless steel.

2.5 THE GRIT PUMP – TOP MOUNTED

A. General

1. The grit pump shall be supplied on a factory built fabricated steel base suitable for mounting as shown on the contract drawings.

B. The Internal Suction Pipe for Top Mounted Grit Pump

1. The grit pump suction arrangement will consist of a 4-inch diameter suction pipe and a parallel 1.5-inch fluidizing pipe that will run down the inside of the drive tube to within 4 inches off the bottom of the grit collection hopper floor. Both pipes will terminate immediately above the drive head. The manufacturer will supply a 1.5 inch solenoid valve and two manual PVC isolation valves that the Contractor will install at a convenient place in the fluidizing pipe above the drive head. The Contractor will bring and connect an air or water supply to the 1.5 inch pipe that will provide agitation of the grit before each pumping cycle.

2. The grit pump suction assembly will be manufactured from stainless steel.

3. The contractor will connect the fluidizing pipe to a water supply that will deliver a minimum pressure of 40 psig at the suction point. This will provide a blast of water that will agitate the grit prior to each pumping cycle.

4. The manufacturer will control the solenoid valve and hence the fluidizing cycle through the control panel specified in 2.5.

5. The Contractor will supply the pipe to the flanged connection of the center mounted 4 inch suction pipe that terminates above the drive head to the inlet of the grit pump.

6. The Contractor shall provide the 4 inch pipe from the outlet of the grit pump to the dewatering screw classifier.

7. The grit pump shall be designed to handle the passage of a 3-inch spherical solid.

C. Grit Pump Design

1. The foot supported pump casing will be designed to retain sufficient liquid for automatic re-priming between pumping cycles. It will allow a horizontal centerline suction and vertical discharge arrangement and incorporate a fill port with safety lock bar and Teflon gasket. A drain hole will be provided for connection to the drain kit. The kit shall contain 10' length of reinforced plastic hose with a female quick connect fitting at one end, and factory installed drain fittings in each pump. Fittings include a stainless steel pipe nipple, stainless steel bushing, stainless steel ball valve and aluminum male quick connect fitting.

2. A separate capped threaded port will be provided if a casing heater is required. If required thermostat control will be provided the main control panel.

3. The cover plate will be supplied with a removable wear liner. It will be sealed to the pump casing by two Buna-N O-rings. The cover plate also has a pressure relief valve to open at 75 PSI fitted with a handle pusher bolt capability.

4. The two vane impeller will be a semi open, non clog design that has integral pump-out vanes on the back shroud. The impeller will be threaded on to the pump shaft and secured with a lock screw.

5. The shaft bearings will be anti-friction ball or tapered roller type that will withstand loads associated with normal operation. A mechanical cartridge seal will seal the pump shaft against leakage. This seal will be double floating to prevent misalignment that might arise from to vibration, deflection or general movement.

6. Separate oil filled cavities, vented to the atmosphere will be provided for the shaft seal and bearings. The cavities will be cooled by the pumped liquid. The bearing and seal cavities will have an oil level sight gauge and fill plug with vent. The oil will be prevented from leaking by a three lip seal arrangement.

D. Grit Pump Drive Motor

1. The motor will 5 hp continuous duty electric motor suitable for a 460/3/60 supply and rated for a Class 1 Div.2 environment. As a minimum, the motor will be TEFC with an IP55 enclosure rating and will conform to NEMA MG-1 requirements.

2. The V-belt transmission will transfer the power from the motor to the pump. The V-belt will have two belts and safety factor of 1.5. The drive transmission will be supplied with removable guards with openings less than ½ an inch.

E. Grit Pump Construction

1. The materials of construction will be as follows:
2. Casing – Gray Iron No. 30
3. Suction flap – molded neoprene with steel reinforcement.
4. Cover plate – Iron 30 with replaceable wear plate
5. Impeller – Cast ADI (Austempered Ductile Iron) with minimum Brinell hardness of 400.
6. Pump shaft – Alloy steel No. 4150
7. Shaft sleeve – Alloy steel No. 4130
8. Mechanical seal mating faces – Tungsten Titanium Carbide
9. Replaceable seal plate.

2.6 THE STAINLESS STEEL GRIT CHAMBER

1. The grit chamber will consist of a 84 inch diameter upper chamber and a 40 inch diameter lower storage hopper. These will be welded together on site by the contractor. The chamber will be fully braced to handle a full load of water.

2. The grit chamber will have a flanged inlet and outlet connection that will interface with the incoming and out going channels or pipes.

3. The manufacturer will supply a 36” wide galvanized steel support bridge that will be span the upper chamber that is adequately sized to support the centrally mounted drive head, drive tube and impeller without further support off the side walls or bottom of the tank. The contractor shall supply the flooring and hand railing as shown on the drawings.

4. The grit tank will include a 4 inch connection to receive the grit suction pipe and a 1.5 inch connection for the water/air supply to fluidize the grit.

5. The grit chamber will have a fully braced support leg structure made from 4 inch x 4 inch stainless steel tube that will be suitable for mounting to a flat concrete pad.

6. The grit chamber tank will be manufactured from T304 stainless steel.

2.7 THE GRIT CLASSIFIER SYSTEM

A. The Grit Cyclone

1. The grit pump will pump the grit mixture directly to a flanged inlet connection situated on the side of the cyclone through a 4 inch delivery pipe, supplied by the contractor. The cyclone will be mounted on a support placed over the inlet hopper of the Grit Classifier.

2. The cyclone will be capable of receiving and processing pumped flow up to a maximum of 250 GPM. The excess water will be separated and returned to the main flow via a vortex finder and through a 6 inch flanged outlet connection situated on the top of the cyclone inlet head. The contractor will supply and install the return pipe with siphon break. The remaining concentrated grit mixture will be removed and directed via the cone and apex into Grit Classifiers inlet hopper. The apex will have a fixed neoprene rubber liner and include quick release toggle clamps.

3. The cyclone will work on the constant centrifugal principle and have no moving parts. Pressure must be maintained above 5 psi.

4. The cyclone casing will be fabricated from carbon steel plate sections. All sections shall be constructed with replaceable neoprene rubber liners.

5. The inlet adapter will include a 1.25" pressure gauge connection and the manufacturer shall supply a pressure gauge assembly complete with protective diaphragm, 0-30 PSI dial

6. Cyclones must be painted to FLSmidth Krebs EN-SPEC-4-3041

B. The Grit Classifier

1. The partially de-watered grit mixture will fall by gravity from the underside of the cyclone into the main body of the Grit Classifier. The main body is comprised of an inlet hopper and a screw trough that will be manufactured from stainless steel plate.

2. The inlet hopper will have sloping side walls and a minimum pool area of $6ft^2$. The design will guarantee retention of 95% of 100-micron grit particles (silica sand with specific gravity of 2.65) at the maximum inflow without added internal baffle plates.

3. The grit particles will settle on the bottom of the inlet hopper. The excess liquid will spill over an internal weir within the inlet hopper and be returned to the sewage flow. The manufacturer will terminate with a flanged 4 inch pipe connection within 12 inches of the main body of the Grit Classifier.

4. The retained grit particles will be elevated from the inlet hopper by a rotating screw that runs the full length of the Grit Classifier. The full pitch screw will be installed at a nominal 16 degree angle to the horizontal.

5. The screw assembly will move the grit particles from the submerged inlet hopper to the "drying zone" section of the screw trough. The length of the "drying zone" must be no less than 2 feet to ensure adequate de-watering. The dry grit will discharge from an outlet at the end of the screw trough and be directed into the dumpster (supplied by others).

6. The screw assembly will be supported within the main body by a top and bottom bearing arrangement specially designed to avoid premature wear by abrasive grit particles. The bearing arrangement must support the entire length of the screw and maintain a 1/2 inch nominal clearance between the screw flights and the full length of the Grit Classifier main body. This will allow a permanent grit layer to accumulate and act as a natural wear liner protection.

7. The bottom bearing shall be mounted externally to the main body of the classifier. A 2" full port drain and flush valve will be mounted below the bottom drive shaft bearing on the main body of the classifier.

8. The bottom drive shaft bearing shall be mounted to the main body of the classifier and will consist of a (4) bolt flanged housing that is accessed externally to the hopper.

9. The entire Screw Classifier will be provided complete with the support legs suitable for mounting directly to the concrete floor.

10. The manufacturer shall provide lightweight minimum 16 gauge stainless steel covers that are easily removed for maintenance and totally enclose the Grit Classifier.

11. The manufacturer shall provide an ESTOP for mounting in an easily accessible location on the side of the collection hopper.

12. The motor shall be 1/2 hp continuous duty electric motor suitable for a 460/3/60 supply and rated for a Class 1 Div.2 environment. As a minimum, the motor will be TEFC with an IP55 enclosure rating and will conform to NEMA MG-1 requirements.

2.8 SCREEN TANK

A. The manufacturer shall design and supply a stainless steel tank that will house the screen and washing compactor

B. The tank will be manufactured from minimum 14 gauge stainless steel with minimum 10 gauge exterior bracing as required to limit distortion.

C. The tank inlet connection will have a 12 inch pipe diameter flange and positioned to allow for gravity unloading.

D. The tank outlet connection will have a 16 inch diameter pipe flange.

E. If ultrasonic level sensors are supplied with controls, sealed stainless steel mounts will be integrated into tank covers to position sensor minimum 10 inches above top of tank. One mount will be provided for each sensor supplied and in operation

2.9 FREEZE PROTECTION

A. Each equipment item specified in this Section shall be outfitted with a freeze protection package consisting of heat trace and 2 inches of stainless steel jacketed fiberglass insulation that is designed to automatically start based on ambient temperatures.

B. The freeze protection package is specifically designed for highly corrosive and wet treatment plant environments.

C. The heat will be provided via Class 1 Div. 2 energy efficient, self-regulating, low temperature copper cable with a wearable jacket suitable for a single phase 120V power supply.

D. Power is supplied via NEMA 4X junction boxes specifically designed for heat trace systems.

E. Insulation will be a minimum 2" thick and fully enclosed with minimum 18 gauge thick stainless steel covers as needed. The covers must allow unhindered access for inspection and maintenance without requiring removal or electrical disconnection of the freeze protection package.

F. The equipment manufacturer will supply a ground fault interrupt breaker to be installed in the control panel and a NEMA 4X thermostat to be mounted by the contractor in the vicinity of the equipment.

G. The equipment manufacturer will provide a step down transformer that delivers single phase 120V power supply installed inside or adjacent to the control panel.

2.10 SPARE PARTS - The manufacturer will supply the following spare parts, per screen supplied, with the equipment:

A. Ten (10) hook links and elements spacers
B. Two (2) grid axles
C. Two (2) guide links
D. One (1) brush for the screw

2.11 ACCESSORIES - The manufacturer will supply the following accessories, with the equipment:

A. Three (3) 1" NEMA 4X brass body solenoid valve
B. One (1) 1.5" wash water strainer
C. One (1) wash water pressure gauge
D. One (1) 1" manual isolation valve
E. One (1) 1" full port valve

2.12 ELECTRICAL CONTROLS AND ANCILLARY COMPONENTS

A. General Information - The manufacturer will supply one UL listed main control panel and two local control stations that shall automatically control the equipment offered in this section. These control panels shall connect to the point I/O network as shown and as described on Drawing E-601 of the contract documents.

B. The Main Control Panel – 4X stainless steel enclosure for outdoor installation – Each control panel shall consist of the following components for each screening system:

1 - Enclosure, NEMA 4X, 304 Stainless Steel, Wall mounted
1 - Main Fused Disconnect / door handle
5 - Motor Starter Branch Circuit Protection
4 - Motor starter, Non-Reversing, w/ overload [Trap, Pump, Classifier, Screen]
1 - Motor starter, Reversing, w/ overload [Compactor]
3 - Current Monitor [Classifier, Screen, Compactor]
1 - Surge Protection, 120VAC
1 - Control power transformer, 480-120VAC
5 - Hour Meters
1 - 24Hr Time Clock
1 - Programmable Logic Controller, Allen-Bradley

1 - Lot, Push buttons, NEMA 4X
1 - Lot, Pilot lights, NEMA 4X, Transformer Type
1 - Lot, Selector Switches, NEMA 4X
1 - Lot, Control relays, socket type
1 - Lot, Terminal blocks
1 - Lot, Remote contacts

C. Ancillary Control Components -

1. Ultrasonic level transducer
   a. NEMA 4X enclosure with viewing window
   b. Milltronics Hydro-Ranger 200 controller with real-time 4-20mA output

2. Local Control Station (2 total) – NEMA 4X - Each local station shall consist of the following components:
   a. NEMA 4X stainless steel 4-hole enclosure for screen and compactor
   b. Hand/Off/Auto switch each for screen and compactor motors
   c. Forward/Off/Reverse switch for compactor
   d. Emergency stop
   e. Separate NEMA 4X LCS e-stop for grit classifier

Part 3 SURFACE PREPARATION AND PAINTING

A. The majority of stainless steel materials, flanges and piping shall be pickled by means of a four tank system that is in accordance with ASTMs A380. This process is for quality control, removal of heat affected discoloration, surface treatment for corrosive environments and to provide a uniform finish to the stainless steel surfaces. Stainless steel components must be fully submerged in the tanks for complete coverage. Electro-chemical wanding is acceptable on weld finishes that cannot be submerged due to size. Sandblasting, pickling pastes and abrasive cleaners will not be accepted as forms of metal finishing. The drive and grid components do not require pickling.

Tank 1 – Detergent bath for the removal of soils, greases, oils and dirt
Tank 2 – Rinsing process to remove detergent and residual soils
Tank 3 – Two part acid solution for the removal of tightly adhere oxide films
Tank 4 – Final rinse process to remove all residual acid

B. All ferrous surfaces (except stainless steel) shall be coated with a pre-primer, primer, and an exterior top coating, or fusion bonded polyester coating suitable for humid/wet environments for superior corrosion protection.

C. Motor(s) and gearbox(s) shall be surface prepared to withstand humid/wet environments for superior corrosion protection.

Part 4 EXECUTION

4.1 WARRANTY - The Manufacturer of the equipment supplied under this specification shall provide a warranty in accordance with SECTION 016000. The Manufacturer shall guarantee that the equipment furnished is suitable for the purpose intended and free from defects in design, materials and workmanship. In the event that the equipment fails to perform as specified the Manufacturer shall, at his option, promptly repair, modify or replace the defective equipment.

4.2 FACTORY TESTING

A. The screening system and all components shall be factory assembled and tested for a minimum of 24 hours prior to shipment. The equipment shall be shipped fully assembled and shall be capable of being set in place and field erected by the Contractor with minimal field assembly.

B. During the factory test period the screening system shall be adjusted as required assuring proper operation on completion of the field installation. The Manufacturer shall supply a certification of the completion of the factory testing of the assembled screening system and appurtenances and shall certify as to the equipment being in satisfactory operating condition at time of shipment. The Engineer and/or Owner may, at their own option and expense, witness the factory test.

4.3 DELIVERY AND STORAGE

A. The screening system shall be appropriately crated and delivered to protect against damage during shipment.

B. An authorized representative of the Contractor shall inspect the screens on delivery to the jobsite and shall report any damage or missing components to the Manufacturer.

4.4 INSTALLATION - The installation of the equipment shall be as indicated on the drawings and in strict accordance with the Manufacturer's instructions and recommendations.

4.5 FIELD TESTS, ADJUSTMENTS AND COMMISSIONING

A. The equipment shall be shipped completely factory assembled. Contractor shall verify all access dimensions, channel dimensions, and any interior building dimensions to ensure equipment may be installed as a factory assembled units.

B. After completion of the installation, the equipment shall be inspected and certified by an authorized representative of the Manufacturer as being in compliance with the Manufacturer's recommendations and requirements. At such time as the Manufacturer has deemed the installation to be acceptable, the Manufacturer's authorized service representative shall make any required adjustments and shall start the equipment to assure proper operation.

C. The Manufacturer's authorized representative shall provide instruction to the plant personnel as to the operation and maintenance of the equipment including commissioning, shut down, on-line operations, lubrication and preventative maintenance.

D. The Contractor shall include in his bid, the cost of the above referenced authorized service representative for a minimum of one (1) trip totaling two (2) eight hour days onsite to complete the certifications and training described in this specification section.

END OF SECTION