



Wastewater Treatment Plant Headworks Screening System Replacement Project

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes: Removing an existing Wastewater Treatment Plant Headworks Screening System and installing a new Screening System. Requirements for furnishing one (1) fine screen with perforated filter panels, (1) screw wash press and associated controls. Equipment shall be supplied and installed as specified herein by the equipment manufacturer in compliance with all local, state and federal codes and regulations. Both the fine screen and screw wash press shall be by the same manufacturer.
- B. Each fine screen shall be furnished with perforated filter panels, drive chain, sprockets and bearings, automatic self-adjusting cleaning mechanism, screenings deflection and discharge system, spray water system, drive motors, gear reducers, anchor bolts, controls and all accessories and appurtenances specified or otherwise required for a complete and properly operating installation.
- C. Each screenings wash press will consist of a flange mounted gearmotor, spiral with separate thrust bearing, wash water spray system, stainless steel trough, wash zone, press zone, discharge piping, electrical controls, and all other appurtenances required for a complete and properly operating installation.

1.02 MANUFACTURER

- A. The Perforated Filter Screen and Screw Wash Press shall meet the performance and material requirements of this specification.

1.03 REFERENCES

- A. Equipment shall, as applicable, meet the requirements of the following industry standards:
 - 1. AISI (American Iron and Steel Institute)
 - 2. ANSI (American National Standards Institute)
 - 3. ABMA (American Bearing Manufacturers Association)
 - 4. AGMA (American Gear Manufacturers Association)
 - 5. NEMA (National Electrical Manufacturer's Association)



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6. NFPA (National Fire Protection Association)
7. ASTM (American Society for Testing and Materials)
8. WSC (American Welding Society Code)
9. ASME (American Society of Mechanical Engineers)
10. NEC (National Electrical Code)
11. UL (Underwriters Laboratory Standards)

1.04 EXPERIENCE

- A. In order to establish a quality standard for the manufacture and production of the equipment, all manufacturers shall meet the requirements listed in this section.
- B. Manufacturer shall have a minimum of ten years of experience in producing substantially similar equipment and shall be able to show evidence of at least fifty (50) installations in satisfactory operation for at least five years. Documentation of at least ten (10) installations having been installed for a minimum of five (5) years shall be provided.
- C. The minimum acceptable standards for the equipment shall conform to the project contract documents as outlined in the respective sections of the specifications and drawings.

1.05 SUBMITTALS

- A. The Manufacturer shall furnish the electronic submittals (and a final printed version if required) within 6 - 8 weeks of receipt of the order to verify compliance with the specification. The submittals shall include:
 1. Certified general arrangement drawings showing all important details including materials of construction, dimensions, loads on supporting structures, and anchor bolt locations.
 2. A list of all deviations from any and all drawings and/or specifications.
 3. Descriptive literature, bulletins and/or catalogs of the equipment.
 4. Complete data on motors and gear reducers.
 5. Wiring diagrams and electrical schematics for all control equipment to be furnished.
 6. Describe the screen cleaning mechanism and how it maintains consistent cleaning efficiency.
 7. Describe method of checking and adjusting drive tension.
 8. Provide details of the area at the bottom of the screen to show how the screen will pick up large objects off the channel floor.
 9. Provide details of the bottom of the screen that shows the method employed to prevent buildup of grit and small stones beneath the screen and to prevent wear on the screen elements.



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10. Provide independent certified test data confirming screenings capture rate ("SCR") value with perforated panels of the same size as specified herewith. Testing shall confirm the percentage of all material captured by the screen as documented by the National Screen Evaluation Facility at Chester-le-Street in England by ThompsonRPM Ltd. and Northumbrian Water. The documented report of the test which shows the result of SCR must be provided with submittals.
11. Provide installation plan including but not limited to; removal and laydown of existing headworks screen, removal of existing screening wash press, disconnect and removal of existing controls/instrumentation, offloading new filter screen and screenings wash press, installation of new equipment and controls, safety procedures and crane used.

1.06 PROPOSAL EVALUATION CRITERIA

- A. Proposals will be evaluated and ranked by the Board of Supervisors on the basis of the following criteria and approximate relative weights:
 1. Proposed price, including all equipment, installation, and startup costs: 40%
 2. Demonstrated compliance with NSEF/ThompsonRPM Screenings Capture Ratio (SCR) certification at the specified perforation size: 20%
 3. Manufacturer qualifications, installation experience, and references for substantially similar installations: 20%
 4. Warranty terms offered beyond the specified minimums: 10%
 5. Proposed delivery and installation schedule: 10%
- B. The District reserves the right to request written clarifications, conduct oral presentations, or request Best and Final Offers (BAFOs) from one or more proposers prior to award. Award will be made to the proposer whose proposal the Board of Supervisors determines to be most advantageous to the District, price and other factors considered.

1.07 BID PROTEST RIGHTS

- A. Any person who is adversely affected by the District's decision or intended decision to award a contract shall file with the District a written notice of protest within seventy-two (72) hours after posting of the notice of the District's decision or intended decision, and shall file a formal written protest within seven (7) days after the date of filing the notice of protest. The formal written protest shall state with particularity the facts and law upon which the protest is based. Failure to timely file a notice of protest or failure to timely file a formal written protest shall constitute a waiver of all further proceedings.
- B. Upon receipt of a timely filed notice of protest, the District shall stop the award process until the subject of the protest is resolved, unless the District determines in writing that immediate action is required to protect the public health, safety, or welfare.



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1.08 WARRANTY

- A. All equipment shall be covered against manufacturing defects in materials and workmanship during normal use and service for a period of one (1) year from date of start up as long as periodic maintenance procedures are followed and performed. Items specifically not covered by the warranty are consumable wear parts as identified in the O&M manual.
- B. The screens shall be unconditionally guaranteed to meet or exceed design criteria detailed in Part 2 of this specification.
- C. The lower guide assembly with incorporated bearing and automatic cleaning mechanism adjustment shall be guaranteed for five (5) years.

1.09 INSURANCE AND BONDING REQUIREMENTS

- A. Prior to execution of any contract pursuant to this RFP, the selected proposer shall furnish certificates of insurance evidencing the following minimum coverages, naming the St. Lucie West Services District as an additional insured on all liability policies:
 - 1. Commercial General Liability: \$1,000,000 per occurrence / \$2,000,000 general aggregate
 - 2. Automobile Liability: \$1,000,000 combined single limit per occurrence
 - 3. Workers' Compensation: Florida statutory limits
 - 4. Employers' Liability: \$500,000 per occurrence
- B. All insurance policies shall be issued by insurers licensed to do business in the State of Florida with an A.M. Best rating of no less than A-/VII. Certificates shall be filed with the District Manager before work commences and shall provide for thirty (30) days' advance written notice to the District of cancellation or material change.

The selected proposer shall also furnish a Performance Bond and a Labor and Materials Payment Bond, each equal to one hundred percent (100%) of the contract price, executed by a surety licensed in Florida and listed on U.S. Treasury Circular 570, in a form acceptable to District Counsel.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. The following manufacturers are named to establish a standard of quality necessary for the Project:
 - 1. Manufacturers meeting all requirements of this specification are invited to submit proposals.
 - 2. All manufacturers must submit a copy of this specification section with checkmarks along with their bid for owner review and approval.



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2.02 QUALITY ASSURANCE

- A. Equipment manufacturer shall be ISO 9001 certified.
- B. The Perforated Filter Screen and Screw Wash Press will be fully assembled and run to confirm fit and function of the screen. A certificate of the shop run test shall be supplied with the shipping documents.
- C. The Perforated Filter Screen and Screw Wash Press will be shipped to the site fully assembled, if possible, and dependent upon the height of the screen and wash press. Some ancillary components may be removed to prevent damage during shipment.
- D. Shop Surface Preparation/Coating: All screen weldments shall be cleaned and passivated using a full dip passivation process to remove weld spatter, slag and discoloration. Bearings, electrical devices, drive and wiper chains and sprockets, motor and gear reducer shall be provided with the manufacturer's standard coating system. Screen weldments not full dipped passivated, using spray on cleaning solutions, passivating welds only or bead blasting shall not be allowed.
- E. Definitions
 - 1. Screen Height: The height between the operating floor and the top of the perforated plate screens.
 - 2. Discharge Height: The height between the operating floor and the screenings discharge.
 - 3. Head Loss: Total difference in elevation of the water level upstream of the upstream screening elements and downstream of the downstream return elements.
 - 4. Percent Blinded: Percentage of submerged area of partially blinded perforations relative to total area of non-blinded perforations.
 - 5. Maximum Differential Head: Maximum difference in elevation of the water level upstream and downstream of the upstream screening elements that the screen will experience during emergency conditions (i.e. screen fully plugged).
 - 6. Screenings Capture Rate (SCR) / Efficiency: Percentage of all material captured by the screen as documented by the National Screen Evaluation Facility at Chester-le-Street in England by ThompsonRPM Ltd. and Northumbrian Water. The documented report of the test which shows the result of screenings capture rate (SCR) must be provided with submittals.



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7. Screen Angle: Angle of screen frame incline from horizontal plane parallel with mounting floor.

2.03 PERFORMANCE REQUIREMENTS

A. Perforated Filter Screens

1. Solids shall collect on a continuous belt of perforated filter panels, elevating solids to the discharge point. The filter panels shall be cleaned by means of an automatic self-adjusting cleaning mechanism.
2. The perforated filter panels shall be driven by drive sprockets secured to the main drive shaft.
3. Perforated plate screens shall be designed in accordance with the following performance and configuration requirements:

Conditions	Unit
Number of screens	One (1)
Influent Type	Municipal Wastewater
Peak flow per screen (MGD)	5.0
Downstream Liquid Level at Peak Flow (in)	10.8
Headloss at Peak Flow at 30% Blinding (in)	12.5
Screen Panel Perforation Diameter (mm)	6
Channel Width (in)	36
Channel Depth (in)	67.2
Screen Inclination	75 degrees
Screenings discharge height from top of channel (ft)	4.0
Minimum Screenings Capture Ratio (SCR)	85% or better

4. The minimum screening capture rate for 6 mm perforation must be 85% or better. This result must be confirmed by the National Screen Evaluation Facility at Chester-le-Street in England by ThompsonRPM and Northumbrian Water. The documented report of the test which shows the result of SCR must be provided with submittals.

B. Screw Wash Press

Conditions	Unit
Number of Wash Presses	One (1)
Influent Type	Municipal Screenings



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	Wet screenings with an approximate dry weight of not less than 8 - 10% solids.
Inlet Solids Capacity (CFH)	70
Inlet Length	700 mm (27.6 inches)
Volume Reduction	60 – 85% or better
Weight Reduction	60 – 85% or better
Discharged Material Dry Solids	>40% or better
Washed Screenings Fecal Reduction	90% or better (<20 mg/g BOD5)

2.04 UTILITY REQUIREMENTS/ENVIRONMENTAL CONDITIONS

Perforated Filter Screen - Requirements/Locations	Unit
Spray water flow and pressure:	26 gpm at 45 psi
Power Supply (V/P/Hz)	480/3/60
Screen Installation Location (indoor/outdoor)	Outdoor
Screen NFPA Classification Requirement	Non-hazardous
Control Panel Location (indoor/outdoor)	Outdoor
Control Panel NFPA Classification Requirement	Non-Hazardous

Screw Wash Press - Requirements/Locations	Unit
Spray Wash Water	11 gpm @ 20-40 psi
Motor HP	3.0
Power Supply (V/P/Hz)	480/3/60
Wash Press Installation Location (indoor/outdoor)	Outdoor
Wash Press NFPA Classification Requirement	Non-hazardous
Control Panel Location (indoor/outdoor)	Outdoor
Control Panel NFPA Classification Requirement	Non-hazardous

2.05 PERFORATED SCREEN DESIGN REQUIREMENTS

A. Materials of Construction

1. All moving wetted parts, all wetted parts on which moving parts ride, all filter belt components under guiding, bearing, or driving loads shall be 316 stainless steel, wear resistant heat treated, high tensile, wear resistant steel, or UHMW-PE as noted below:
2. The frame shall be minimum 4 mm thick type 316 stainless steel.
3. The discharge chute, and all covers shall be type 316 stainless steel.
4. The screen and brush drive shafts shall be type 316 stainless steel.



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5. The rotating deflector shall be from type 316 stainless steel.
6. The lower sprocket stub shafts shall be from type 316 stainless steel.
7. The upper and lower sprockets shall be type 316 stainless steel with only the wear area hardened.
8. The screening elements shall be type 316 stainless steel.
9. The special designed heavy duty drive links will be from type 316 stainless steel.
10. The side and bottom seals shall be replaceable contoured UHMW-PE with 316 stainless steel fasteners.
11. The bottom seal between the lower end of the screen frame and the width of the filter panels shall be from Buna-N rubber.
12. The screening element support rails shall be 316 stainless steel with UHMW-PE wear surface or equivalent.
13. Spray bars from shall be 316 stainless steel.
14. All fasteners shall be 316 stainless steel.
15. All other appurtenances shall be of manufacturer's standard coated material.

B. General

1. The perforated filter screen shall be designed to provide maximum solids filtration and thus maximize capture of debris and minimize rate of head loss increase through the screen. The maximum perforated opening shall be 6 mm. The screen shall be capable of intermittent operation by means of differential head measurement.
2. The screen shall be mounted by fastening to the top of the channel. The screen mounting system shall be constructed of 316 stainless steel and complete as required to function in accordance with the specification. Routine service, repair or replacement of damaged parts, shall be possible with the screen in the channel.
3. Unit(s) shall be designed so that maintenance of the drive mechanism can be accomplished at operating floor level. Screen elements shall be capable of removal at the operating level without taking the screens out of the channel or affecting the continuous or intermittent rotation of the screen.
4. The screen shall be factory assembled and tested prior to delivery and shall be delivered to the site fully assembled (other than the motor/reducer unit, discharge chute, and support legs). It shall be capable of being set in place and field erected by the contractor with minimal field assembly.



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5. The influent screening system shall include a perforated plate screen and a washer/compactor system. The perforated plate screen shall be a self-contained screening system used to capture and transport wastewater debris to the washer/compactor system.
6. Influent screening system shall be designed for continuous and intermittent operation.
7. All components shall be amply proportioned for all stresses that may occur during manufacturing, transportation, erection, and operation.
8. The shafted screw type screenings wash press shall be a complete assembly consisting of an inlet hopper between the filter screen and wash press. The shafted screw wash press shall be designed to receive and wash screenings, then reduce the volume and water content by means of a pressing zone. The unit's washing and compacting performance will be as documented in Paragraph 2.03. After the compacting and dewatering process, the screenings shall be conveyed through the discharge transportation tube to the dumpster.
9. Screenings washers that use impellers and/or grinders to tear and shred fibrous screenings at the inlet to the compactor and therefore increase the amount of inert material returned to the plant shall not be allowed.
10. Refer to and comply with the performance requirements list in Paragraph 2.03.
11. The screw wash press shall be designed and built to withstand maximum possible forces exerted. All structural and functional parts shall be sized to prevent deflections or vibrations that may impair the screw wash press operations. All components of the screw wash press shall be made of type 316 stainless steel except the shaft screw which shall be from high strength steel with Hardox™ 400 flights throughout. Bearings, electrical devices, sprockets, motor and gear reducer shall be of the manufacturer's standard materials.
12. Shop Surface Preparation/Coating: All weldments shall be cleaned and passivated using a full dip passivation process to remove weld spatter, slag and discoloration. Bearings, electrical devices, drive and wiper chains and sprockets, motor and gear reducer shall be provided with the manufacturer's standard coating system. Screen weldments not fully dipped passivated, using spray on cleaning solutions, passivating welds only or bead blasting shall not be allowed.



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13. The screw wash press shall discharge dewatered screenings capable of passing the EPA Paint Filter Test as described in method 9095 of the EPA publication SW-486

C. Perforated Filter Screen

1. Screening elements shall be a minimum of 1/8" (nominal) thick type 316 stainless steel. Drive chain links shall be supported on UHMW-PE guides on both the upstream and downstream sides of the screen. The screen design shall include a means of lifting spherical and large size solids (stones, bottles, rag clumps, etc.) from the bottom of the channel.
2. A submerged stainless steel plate shall be provided at the base of the screen. The base of the screen shall be fitted with sealing components along the full length of the filter panel to prevent ingress of stones and grit and to prevent solids bypass.
3. Upper sprockets shall be type 316 stainless steel. Upper sprockets shall be designed to allow removal without having to remove the drive shaft.
4. Lower revolving guide assemblies shall incorporate bearings suitable for the application, sealed against the environment, with grease lubrication accessible at operating floor level.
5. To prevent deflection, filter elements shall have a minimum thickness of 1/8" (nominal) and shall be constructed of stainless steel, designed to ensure structural integrity and smooth operation.
6. The screening elements shall be engineered to permit cleaning with optimum efficiency by the automatic adjusting cleaning mechanism.
7. The cleaning mechanism shall be self-adjusting and shall automatically compensate for wear during use, with no manual adjustment required. The automatic adjustment shall maintain consistent cleaning efficiency at a minimum SCR of 85% or better across the entire filter panel surface.
8. The screening elements shall be sealed against the frame to prevent bypass. Maximum gaps between screen panels and side frame shall not exceed 1 mm. Side sealing components shall be of stainless steel or equivalent wear-resistant material.
9. A rotating deflector of type 316 stainless steel shall be provided, auxiliary driven from the screen drive unit, to seal the gap between the filter panels and discharge chute and to direct solids into the wash press inlet hopper. The deflector shall prevent bypassing of solids into the downstream channel.

D. Filter Screen Panels



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1. The screen filtration belt shall be provided with perforated filter elements which limit the maximum opening in any direction to the perforated opening size specified in the performance table. This restricted opening profile shall prevent long thin materials from passing through the openings.
2. Cleaning devices that cause trash to be pushed or dropped into the interior of the filtration belt shall not be permitted.
3. The individual screening elements shall be designed so as not to exert stresses on one another. Elements shall not overlap in a manner that would create spaces in which material may collect.
4. Due to the risk of high differential levels on the screen, in the event of a power failure, excess solids load condition, mechanical breakdown etc. the screen shall be designed to withstand a maximum differential head of 5.0 ft. measured from the upstream water level to the downstream water level.
5. The horizontal space between each adjoining screen panels will not exceed 1mm +/- 10% at any point between any adjacent panels.
6. To control the buildup of biological slimes, an internal spray water wash system shall be provided, manufactured from stainless steel with non-plugging spray nozzles suitable for use with treated effluent water. The spray system shall deliver approximately 9 gpm per ft. width of screen panel at a pressure of 40–45 psi or better. A connection shall be located on the screen frame above the operating floor level and the water supply connection shall include an inline strainer, manual ball valve, and solenoid valve.

E. Chain and Sprockets

1. The filter panel drive chains shall be equal in pitch to the upper and lower drive sprockets.
2. The drive chain shall be a heavy-duty design supported outside the frame by UHMW-PE, a hardwearing, high lubricity synthetic material. Minimum chain breaking load shall be 20,232 lbf (90 kN) or greater.
3. Each screen shall be provided with two identical drive sprockets matching the drive chain. The sprockets shall be mounted on a drive shaft with grease-able bearings mounted on the external side of the frame.
4. Chain drive shaft bearings shall be grease lubricated and mounted to a stainless steel plate. Chain tension adjustment shall be provided.
5. Chain guides shall be secured to the screen frame for the full height of travel. A guide track shall also be located at the bottom of screen to allow the chain to travel from a downward to an upward direction. The chain guides shall accurately guide the chain and filter panels.



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F. Screen Drive Mechanism

1. Motor: 1.5 HP 1760 rpm TEFC geardrive inverter duty motor suitable for 460/3/60 electrical supply.
2. Gear Reducer:
 - a. Suitable gear reducer type.
 - b. Anti-friction bearings.
 - c. AGMA I rating.
3. All drive components shall be designed to operate the screen continuously under a calculated load resulting from the differential water level between the upstream and downstream sides of the screen.
4. Minimum filter panel speed shall be 10 fpm.

G. Brush Drive Mechanism

1. Motor: 2.0 HP 1760 rpm TEFC geared motor suitable for 460/3/60 electrical supply.
2. Gear Reducer:
 - a. Suitable gear reducer type.
 - b. Anti-friction bearings.
 - c. AGMA I rating.

H. Rotating Deflector Drive Mechanism: Auxiliary driven from Screen drive.

I. Discharge Chute/Hood:

1. A discharge chute/hood shall be provided that fully encloses the discharge section of the screen. The discharge chute/hood shall be designed to allow complete access to the screen cleaning mechanism.
2. Discharge chute shall be from type 304 stainless steel.
3. Each screen discharge chute/hood shall direct screenings directly to the compactor or other device. Outlet shall extend down to the inlet of the compactor and shall be designed to match the screenings compactor inlet hopper with no water leaking or screenings dropping to the floor.

J. Frame Enclosures / Covers



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1. The screen shall be provided with easily removable, sufficiently stiffened covers made of type 316 stainless steel with edges on all sides.
2. Covers shall be provided on the upstream and downstream portion of the screen above the operating floor.
3. Covers shall be secured in place using stainless steel fastening hardware.

K. VFD SCREEN TRAVEL

1. Screen Travel Speed:
 - a. Each screen shall have a travel speed that will quickly remove debris from the channel, and quickly return clean screen panels into the channel for further debris removal:
 - b. High travel speeds are critical for efficient debris removal as well as to limit the head loss across the screen since the percent blinding increases in direct proportion to the time the panel is exposed to the wastewater flow in the channel.
 - c. Screens shall have a VFD drive capable of continuously operating at Peak Flow throughput up to a maximum screen travel speed of 23 feet per minute (FPM).

2.06 SCREW WASHER PRESS DESIGN REQUIREMENTS

A. General

1. The shafted screw type screenings wash press shall be a complete assembly consisting of an inlet hopper between the filter screen and wash press. The shafted screw wash press shall be designed to receive and wash screenings, then reduce the volume and water content by means of a pressing zone. The unit's washing and compacting performance will be as documented in Paragraph 2.03. After the compacting and dewatering process, the screenings shall be conveyed through the discharge transportation tube to the dumpster.
2. Screenings washers that use impellers and/or grinders to tear and shred fibrous screenings at the inlet to the compactor and therefore increase the amount of inert material returned to the plant shall not be allowed.
3. Refer to and comply with the performance requirements list in Paragraph 2.03.



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4. The screw wash press shall be designed and built to withstand maximum possible forces exerted. All structural and functional parts shall be sized to prevent deflections or vibrations that may impair the screw wash press operations. All components of the screw wash press shall be made of type 316 stainless steel except the shaft screw which shall be from high strength steel with Hardox™ 400 flights throughout. Bearings, electrical devices, sprockets, motor and gear reducer shall be of the manufacturer's standard materials.
5. Shop Surface Preparation/Coating: All weldments shall be cleaned and passivated using a full dip passivation process to remove weld spatter, slag and discoloration. Bearings, electrical devices, drive and wiper chains and sprockets, motor and gear reducer shall be provided with the manufacturer's standard coating system. Screen weldments not full dipped passivated, using spray on cleaning solutions, passivating welds only or bead blasting shall not be allowed.
6. The screw wash press shall discharge dewatered screenings capable of passing the EPA Paint Filter Test as described in method 9095 of the EPA publication SW-486.

B. Screw Housing

1. The screw housing shall be constructed from type 316 stainless steel of sufficient thickness to support all required loads.
2. The interior of the screw housing shall incorporate anti-rotation wear bars fabricated from Hardox® 400 special high strength alloy steel with minimum Brinell Hardness of 400.
3. The bottom of the housing shall be provided with perforated drainage sections with maximum 6 mm diameter perforations.
4. An inlet area length as specified in Paragraph 2.03, will receive incoming materials. A hopper constructed from type 316 stainless steel shall be provided by the manufacturer to direct solids to the inlet area of the screenings washer.

C. Shafted Screw

1. The screw shall be constructed of high strength low alloy carbon steel with Hardox® 400 flights (minimum 400 Brinell), prime coated for protection during shipment. Screw OD shall be 200 mm (7.9 inches) with minimum 12



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mm (0.47 inch) thick flights. The final flight shall be of increased thickness for enhanced wear life.

2. A replaceable nylon brush reinforced with a stainless steel backer shall be attached to the screw flights in the drainage area with stainless steel clips and hardware. To reduce wear on the brush the design shall be such that the screw shall not be allowed to rest in the press housing. The screw shall be fully supported and cantilevered off the thrust bearing.

D. Thrust Bearing

1. An independent thrust bearing housing shall be flanged mounted to the drive and flanged mounted to the press body. The independent thrust bearing assembly shall be protected from the environment and located in a separately sealed area located inside the press body. The flange portion of the thrust bearing shall have a grease fitting centrally located for ease of maintenance.
2. The thrust bearing shall fully support the screw and handle the load created during compaction and reversal of the screw. The thrust bearing shall utilize a heavy-duty roller bearing complete with double lip grease seals and O-rings. The mounting flange shall have a seal mounted to seal the housing against the press body.

E. Drain Pan

1. A drain pan shall be mounted to the bottom of the screw housing along the full length of the housing. The pan shall be sloped to the drain and it shall be provided with a flushing water connection. Drain connection shall be minimum 4 inch plain ended pipe. Flush connection shall be minimum 1 inch NPT connection.
2. The pan shall be secured in place with hardware and allow for easy removal. Drain pan shall be constructed of minimum 14-gauge 316 stainless steel.

F. Wash Water Manifold

1. The screenings washer shall be provided with a minimum of two (2) separate connections for injecting wash water into the screenings.
2. Wash water spray nozzles shall be capable of utilizing the screened plant effluent without clogging or fouling.



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3. The wash zone shall include a spray wash system to wash organic residue from the screenings, with a minimum of two (2) wash water injection points. The system shall deliver a minimum of 11 gpm at 20–40 psi or better. The spray connection shall be 1 inch NPT.

G. Inlet Hopper

1. The inlet hopper shall be designed to accept discharge screenings from the filter screen discharge chute. The hopper shall directly interface with the filter screen discharge with no solids or water bypass.
2. The inlet hopper shall be fabricated from minimum 12-gauge type 316 stainless steel.

H. Discharge Pipe

1. The discharge pipe shall be flanged and mounted to the press body.
2. The discharge pipe shall be designed to transport the washed, dewatered, and compacted screenings to the discharge point without plugging.
3. The diameter of the discharge pipe shall increase in size to ease the transportation of the screenings.
4. For increased washing and compaction performance, the discharge pipe shall include a manually controlled back pressure device. The device and access components shall be constructed of type 316 stainless steel.
5. The discharge pipe elbow shall be fabricated from minimum 11-gauge type 316 stainless steel.
6. The discharge piping following the elbow shall be fabricated from minimum 12-gauge type 316 stainless steel.

I. Drive Assembly

1. The gear reducer shall be flanged and mounted directly to the thrust bearing housing and the compactor frame, and shall be designed in accordance with AGMA recommendations for Class I service based on the horsepower required to operate the wash press. The gear reducer shall be bolted directly to the unit's frame.
2. The motor shall be TEFC, 3.0 HP, 460 Volt, 3 phase, 60 Hz. The motor shall be NEMA design code B and be direct coupled to the reducer.



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3. Chain drives, belt drives, and hydraulic drives will not be accepted.

2.07 ELECTRICAL CONTROLS AND DEVICES

- A. Filter Screen Control Panel: 480 volt primary control panel shall be provided with a type 304, stainless steel, NEMA 4X enclosure. Panel shall be suitable for wall mounting with the following electrical components to provide proper operation of the equipment.
 1. Main disconnect with through door interlock handle.
 2. Step down control transformer.
 3. Branch circuit protection.
 4. Screen drive motor VFD.
 5. Brush motor starter (IEC) with overloads.
 6. Emergency stop pushbutton.
 7. Hand-Off-Auto selector switches for screen and brush drive.
 8. Fast-Off-Slow switch for each screen drive motor.
 9. Open – Close – Auto switch for screen wash water solenoid valve.
 10. Hour meter for each motor.
 11. Control power on, run and fault indicating lights.
 12. Alarm reset pushbutton.
 13. Programmable relay to control screen control logic functions.
 14. Run and alarm auxiliary contacts for use by the customer.
 15. UL label.
- B. In addition to the drive motor, the manufacturer shall furnish all electrical items specifically called for in this specification section. The contractor shall supply all other electrical items, and interconnecting wiring of proper size, including all conduit and supports required to place the equipment into service.
 1. The following components will be included in the associated screen panel to provide proper operation of the screw wash press equipment:
 - a. Branch circuit protection.
 - b. Compactor motor starter (IEC) with overloads.
 - c. Hand-Off-Auto selector switches for the screw drive, and screenings spray wash water.



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- d. Motor load monitor for overload and over torque protection.
 - e. Hour meter for motor.
 - f. Run and fault indicating lights.
 - g. Run and alarm auxiliary contacts for use by the customer.
- C. Local Emergency Stop Pushbutton: A local emergency stop pushbutton station will be provided in a NEMA 4X enclosure for field mounting at the screen unit.
- D. Motor Cut-out Switch: One (1) interlock switch shall be provided, suitable for the area classification and mounted to the discharge chute/hood access cover.
- E. Solenoid Valve: Two (2) solenoid valves shall be provided to control flow to the spray wash assembly of the screen and screenings washer. The 316SST valve shall be 120 Volt, single phase, 60 Hz with a NEMA 4X housing.
- F. Ultrasonic Differential Level Controller and Sensors – One (1) ultrasonic differential level controller with one (1) upstream sensor and one (1) downstream sensor for screen start. The controller shall have a minimum of 5 internal relays. Each sensor shall have a range of 1–20 ft and be supplied with a minimum 33 ft integral cable and shall be suitable for installation in a Class I Division 1, Group D hazardous area, with stainless steel mounting bracket.

2.08 OPERATION, MONITORING, AND CONTROL – FILTER SCREEN

- A. Screen and Brush Hand Operation: In HAND position the operator shall be able to run the screen or brush assembly by selecting the respective HOA selector switch. Turning the screen selector switch to Off will stop the unit. Screen drive motor is interlocked with the brush motor. Brush motor must be on if the screen is in operation.
- B. Screen Automatic Operation: When the Screen and Brush are in AUTO position the screen shall be controlled by the water level sensors. Screen operation shall be started when the water level sensors monitor a certain water level difference, when the sensor senses high upstream water level, high differential, or when a certain time has passed since the last operation of the screen. When the upstream water level reaches its high level setting or when the high differential setpoint is reached, the Screen will run in high speed. When both the high level and high differential drop below their setpoints, the screen will decrease to low speed after the high speed off delay timer has expired. Screen operation shall be stopped with an adjustable delay time after the water difference is below a certain value and after the sensor reads the correct water level, or after a certain run time has expired (if operation was started by timer).



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- C. Wash water solenoid valve Operation: In HAND position the wash water solenoid valve will open. In the CLOSE position the wash water solenoid valve will close.
- D. Wash Water Automatic Operation. The wash water solenoid valve will open and close via a repeat cycle timer whenever the screen is in operation.
- E. Fault Conditions:
 - 1. Excessive motor power will trip the starter overload relays, immediately stop the drive or brush motor, and illuminate the alarm indicating light. This fault must be reset by depressing the associated motor starter overload reset internal to the control panel.
 - 2. Momentary drive high torque will trip the screen motor load monitor, immediately stopping the screen drive motor, and illuminate the alarm indicating light. Pushing the reset push button will reset this fault.

2.09 OPERATION, MONITORING, AND CONTROL – SCREW WASH PRESS

- A. Sequence of Operation
 - 1. HAND OPERATION: When HAND mode is selected, the spiral will run continuously. When spray wash HAND mode is selected, the spray wash will run continuously.
 - 2. INTERMITTENT AUTOMATIC OPERATION: The control panel will be equipped to control the wash cycle and screw movement. The wash cycle and the screw movement will be controlled independently through the use of timers and counters. The drive motor and spray wash will be controlled automatically when the selector switches are placed in the Auto position.
 - a. The press motor starts after an adjustable accumulated run time from the interlocked feeding equipment.
 - b. The wash water solenoid is open whenever the screw is in operation.
 - c. The washing solenoid closes and the press motor runs for an adjustable length of time, typically set at 30 seconds, to dewater and discharge the screenings.
 - 3. EMERGENCY STOP: The unit can be deactivated at any time by pressing either the control panel mounted or unit mounted Emergency Stop push buttons.
 - 4. FAULT CONDITIONS: Motor overload, high motor torque, or high motor current conditions will stop the motor and illuminate the fault light.



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2.10 ANCHORAGE AND FASTENERS

- A. Anchor Bolts: All anchor bolts shall be a minimum of 1/2 inch diameter and made of type 316 stainless steel. The equipment supplier shall furnish all anchor bolts, nuts, and washers required for the equipment.
- B. Fasteners: All fasteners shall be type 316 stainless steel. The equipment supplier shall furnish all fasteners required for the assembly of the equipment.

2.11 SPARE PARTS

Manufacturer shall recommend any additional spare parts deemed necessary based on experience with the screen in similar applications.

PART 3 - EXECUTION

3.01 PREPARATION

- A. The mounting points of the channel shall be level and parallel and of proper size.
- B. Manufacturer, as the installing contractor, shall verify all dimensions in the field to ensure compliance of equipment dimensions with the drawings.

3.02 INSTALLATION

The installation is the responsibility of the Manufacturer. Complete installation procedures and scheduling are included in the O&M manual shipped with the unit.

3.03 START UP/TRAINING/FIELD QUALITY CONTROL

The initial start-up of equipment will be performed by an authorized Manufacturer's representative. The Manufacturer's authorized representative will verify the proper operation and installation and provide training to the equipment operators and maintenance staff.

3.04 ADJUSTING AND CLEANING

Information on minor periodic adjustments and cleaning is contained in the Operating and Maintenance Manual.

--End of Section---