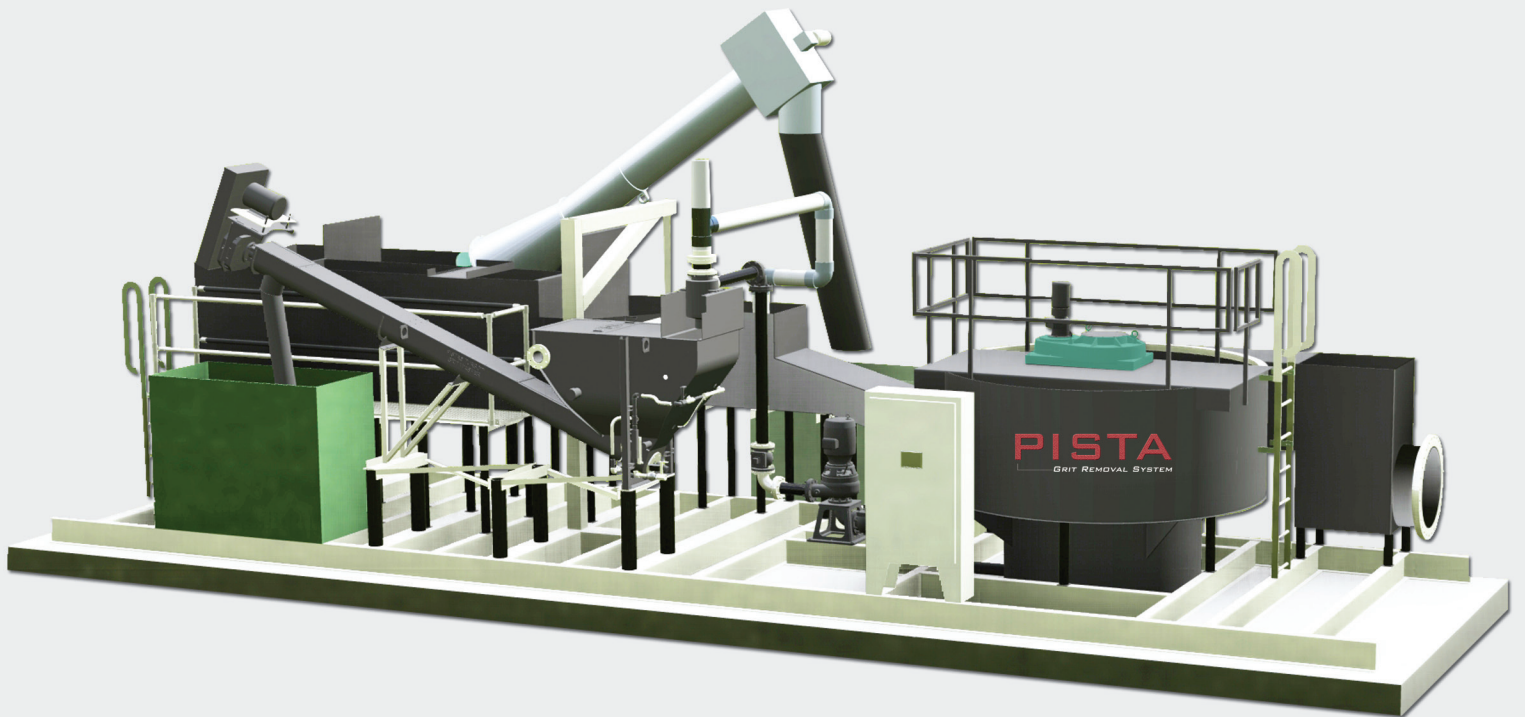


PISTA®WORKS™

PISTA® Grit Removal System



Smith & Loveless Inc.
Above All Others.™

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SPECIFICATION FOR PISTA® WORKS™ COMPLETE HEADWORKS SYSTEM

GENERAL

The contractor shall furnish and install _____ Model ____ PISTA® Works™ Complete Headworks System(s), in accordance with the drawings. Each unit shall be complete with the following equipment: Influent trough with slide gate, OBEX™ Spiral Fine Screening unit, manual bypass bar screen, PISTA® 360™ with V-FORCE BAFFLE™ Grit Chamber, grit handling system with PISTA® TURBO™ Grit Pump, PISTA® Grit Fluidizer, valves and piping, PISTA® TURBO™ Grit Washer with PISTA® Grit Concentrator(s), two access platforms with ladders and handrails, and a PLC-based control system with all auxiliary equipment, mounted on an epoxy coated steel skid, as specified herein and shown on the drawings.

The individual components of the PISTA® Works™ Complete Headworks System shall be as specified herein. The PISTA® Works™ manufacturer shall coordinate their sizing, placement and interconnection on the common base, so that the system operates smoothly as a single unit. A single control panel with PLC controller shall operate the PISTA® Works™. Disposal hoppers shall be provided by others.

The skid mounted system shall have a (____”) (____ mm) flanged inlet connection and a (____”) (____ mm) flanged outlet. Access ladders and walkways with handrails shall be provided as required for operation and maintenance access. Moving parts shall have appropriate safety guards as necessary.

CONDITION OF PERFORMANCE AND CAPACITY

The PISTA® Works™ shall be capable of effectively removing, washing and dewatering 95% of the grit solids, down to 140-mesh (105 microns) particle size, at flow rates up to a peak of (____ MGD) (____ CMD) from raw wastewater.

Before the bid, any alternate grit removal system manufacturer shall submit to the consulting engineer, performance test data showing through previous certified tests the stated grit removal efficiency of 95% down to 140-mesh (105 microns) in particle size. The stated performance must be proven in full scale field testing utilizing certified grit removal efficiency test procedures as performed by qualified, Factory payroll personnel who have at least one (1) year experience performing the test.

To maximize grit removal efficiency, the grit chamber hydraulics shall incorporate a toroidal flow path enhanced by a slow vortex. Grit chambers incorporating the gravity principle will not be acceptable due to the turbulence in the flow, which prevents gravity settling from being effective and due to the extra area needed for settling fine grit. Aerated grit chambers, including those incorporating conventional settling criteria, are also specifically unacceptable.

CONSTRUCTION

All equipment (less access equipment and skid) shall be pre-fabricated structural (304 stainless) (316 stainless) steel material with a 1/4” (6 mm) minimum thickness. The skid support assembly shall be pre-fabricated structural carbon steel material with all equipment factory-mounted and filled with concrete by the contractor in the field, as shown on the drawings. All welded steel structural members shall be joined by electric arc welding with fillets of adequate section for the joint involved. Where required for additional sectional strength or watertight integrity such welds shall be continuous. Inlet and outlet connections shall be as shown on the drawings.

OBEX™ SPIRAL FINE SCREENING UNIT

An automatic OBEX™ Spiral Fine Screen shall be mounted into the inlet trough as shown on the drawings. The mechanism shall consist of a combination of a fine screen, screenings removal auger and optional screenings press all into one. The OBEX™ Spiral Fine Screen shall consist of drilled metal trough with mesh of 6 mm opening. The OBEX™ Spiral Fine Screen shall be capable of passing a peak flow rate of (____ GPD) (____ CMD). The screenings remain on the auger, and the inside of the screen shall constantly be cleaned by brushes fixed on the outside diameter of the shaftless screw. The auger shall be a shaftless spiral and convey solids up towards the discharge. All components shall be of (304 stainless) (316 stainless) steel with the conveying screw manufactured of high tensile steel.

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MANUALLY CLEANED COARSE BAR SCREEN

A manually cleaned bar screen with a maximum bar spacing of 3/4" (20 mm) shall be provided as a backup screen to the automatic fine screen, as shown on the drawings. The screen shall be capable of passing a peak flow rate of (_____ GPM) (_____ LPS). Dimensions shall be as shown on the drawings.

PISTA® 360™ GRIT CHAMBER WITH V-FORCE BAFFLE™

The PISTA® 360™ Grit Chamber shall be equipped with a V-FORCE BAFFLE™, which is an integral flow control baffle in the inlet and outlet of the main chamber. The V-FORCE BAFFLE™ shall be designed to direct the inlet flow into the chamber in a manner ensuring the proper vortex flow and to prevent short-circuiting. The outlet shall have a baffle to direct the flow out of the unit, and to act as a "slice weir" to control the water level in the main chamber and in the inlet channel. No additional downstream flow control device shall be required to keep the velocity between 3.5 fps (1 m/s) at peak flow and 1.6 fps (0.5 m/s) at minimum flow with a 10:1 turn down. The baffles shall be constructed of (304 stainless) (316 stainless) steel.

The flow in the chamber shall travel a full 360° rotation through the inlet and outlet (clockwise) (counterclockwise), providing maximum travel for effective grit removal.

The contractor shall provide, in addition to the grit chamber mechanism, a pre-fabricated 1/4" (6 mm) minimum thickness structural (304 stainless) (316 stainless) steel chamber, baffles, bridges and integral channel transition pieces. Handrails shall be provided along both sides of the access bridge atop the chamber. A ladder shall provide access to the bridge from the skid.

MECHANICAL DRIVE

The PISTA® Grit Removal Unit shall have an axial flow propeller connected by a drive tube through gearing to a 3-phase, _____ cycle, _____ volt, totally enclosed helical gear motor. The minimum rated horsepower (kilowatt) of the motor shall be (_____ BHP) (_____ kW).

The drive tube shall be driven by a large, totally enclosed combination spur gear and turntable bearing. The maximum output speed of the drive shall be 21 RPM. Pinions and gears shall be high quality steel, machined and hardened for high strength and long wear. Propeller blades shall be tapered, with generously rounded leading edge, to reduce energy consumption and prevent foreign material from fouling the propeller.

A pinion mounted on the output shaft of the helical gear motor shall drive a large spur tooth bull gear enclosed in a heavy cast-iron case. The spur gear pinion shall be cut from heat-treated steel. The bull gear shall rotate with a minimum 21" (533 mm) diameter turntable bearing for durability and stability. The pinion and bull gear shall have a service factor of 5.0 or greater at normal operating speeds and loads.

All bearings of the drive unit, including the motor, shall have a minimum L-10 bearing life of 100,000 hours, except for the 21" (533 mm) diameter turntable bearing supporting the propeller assembly which shall have a minimum B-10 life of 20 years.

The bull gearbox shall be specifically designed for this service. It shall have an opening for the 10-3/4" (273 mm) diameter torque tube driving the propeller. The gearbox shall be sealed and the bottom opening shall have an air bell around the torque tube to prevent water from entering the gearbox in case of flooding. The top of the gearbox shall have a bolted flanged connection for the grit discharge pipe. Clarifier drives, which are modified to meet the higher propeller speed, specifically will not be acceptable. The drive motor shall have normal starting torque and low starting current. The motor shall not be overloaded beyond the nameplate rating under any normal conditions encountered.

PISTA® GRIT FLUIDIZER

The PISTA® Grit Collection System shall be equipped with PISTA® Grit Fluidizer vanes. The PISTA® Grit Fluidizer vanes shall be located within six inches (6") (150 mm) of the elevation of the pump suction inlet. The PISTA® Grit Fluidizer vanes shall be bolted to the propeller drive tube in a helical fashion so as to gently pump the grit upward and keep the grit fluidized at the inlet of the PISTA® TURBO™ Grit Pump.

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The PISTA® Grit Fluidizer vanes shall be fabricated of heavy (304 stainless) (316 stainless) steel plate. The PISTA® Grit Fluidizer vanes shall be bolted to the drive tube to facilitate easy removal of the drive tube.

The PISTA® Grit Fluidizer is a helical pump with PISTA® Grit Fluidizer vanes that continuously pumps the grit upward at the center of the grit collection chamber. This gentle pumping action prevents the grit from packing down around the pump suction pipe. If grit is left in the chamber too long it can pack together forcing the water from around the particles, and causing them to lock together where the pull of water created by the pump might not break it loose. The PISTA® Grit Fluidizer vanes keep the grit fluidized at the suction inlet so packing cannot occur.

GRIT STORAGE HOPPER

A grit storage hopper with a 60°-sloped bottom shall be provided. The effective storage volume shall be (___ cubic feet) (___ m³). The maximum diameter shall be (___'-___") (___ m). The minimum depth shall be (___'-___") (___ m). This is to allow for an adequate volume for grit pile expansion if backwashing is performed plus allow adequate storage to prevent excessive numbers of grit removal cycles and grit handling equipment wear. As an integral part of the equipment installation, the Manufacturer shall supply a floor plate to cover the storage hopper. The plate shall consist of two (2) sections with lifting slots to allow access to the storage area. Attaching this plate as part of the rotating assembly will not be allowed.

MODEL 250 PISTA® TURBO™ GRIT WASHER WITH TRI-CLEANSE TECHNOLOGY™ (INCLUDING A 250 GPM (15.8 LPS) CONCENTRATOR)

PISTA® GRIT CONCENTRATOR – 250 GPM (15.8 LPS)

The second stage PISTA® Grit Concentrator shall be provided as shown on the drawings for secondary treatment of organics and secondary grit dewatering. The PISTA® Grit Concentrator shall operate on the constant rate vortex principle. Design shall be such that a small volume of water and the grit will discharge at the bottom for final dewatering, washing and ultimate disposal of the grit.

The PISTA® Grit Concentrator shall be constructed of Ni-Hard, with a minimum thickness of 1-1/4" (32 mm) in high wear areas. Inlet and outlet connections shall be as shown on the drawings. The PISTA® Grit Concentrator shall be provided by the Manufacturer of the PISTA® TURBO™ Grit Washer and installed on the unit. The operating range shall be compatible with the total Grit Removal and Washing System as described herein.

PISTA® TURBO™ GRIT WASHER

The PISTA® TURBO™ Grit Washer shall be constructed of (304 stainless) (316 stainless) steel, including the screw. The inlet hopper receives the mixture of water and grit, and shall be equipped with an energy dissipation zone to prevent turbulence in the remaining portion of the hopper. The hopper shall have parallel plates located in the settling zone to improve retention of the fine grit. An overflow weir trough shall be provided to return the water to the system. The conveyor shall be freestanding with support legs to hold the conveyor at an angle of approximately 22°. The discharge shall be 8" (200 mm) diameter, plain-end pipe. The drive assembly shall be located at the discharge end.

The PISTA® TURBO™ Grit Washer shall have an open, 3/16" (5 mm) thick steel U-trough. The screw shall be 9" (230 mm) in diameter with mixer fluidizing vanes in the inlet hopper and shall have a continuous shaft design off the flight segment. The conveyor shall be 15' (4.6 m) in length, with overall dimensions as shown on the drawing. The hopper shall have a full-width outlet weir trough to minimize the carryover of the fine grit. The projected separator plate settling area shall be a minimum of 17.0 square feet (1.6 square meters).

The screw shall run on anti-friction bearings at the outlet end, and a bronze bushing at the inlet end. The inlet end shaft bushing shall be capable of being greased. The inlet end shall have two 2" (50 mm) drains. Clearance between the legs and the discharge outlet shall be as shown on the drawing.

The drive to the PISTA® TURBO™ Grit Washer shall be a belt-driven, shaft-mounted helical gear reducer. The motor shall be totally enclosed 3 HP (2.2 kW), ___ RPM, 3-phase, ___ cycle, ___ volt with a 1.0 Service Factor. The screw speed

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shall be 10 RPM. The drive shall be mounted on a plate at the discharge end and the plate shall be bolted to the flanges on the trough.

Belt guards and covers shall be provided and manufactured in accordance with ASME B15.1-1992 Safety Standard For Mechanical Power Transmission Apparatus. Each belt guard shall have a metal label riveted to the exterior face, reading “DANGER - LOCK OUT BEFORE SERVICING”, and another metal label riveted to the interior face, reading “WARNING – DO NOT OPERATE MACHINE WITHOUT GUARDS IN PLACE”.

A 1/8” (3 mm) thick expanded metal mesh cover, matching the material of construction of the PISTA® TURBO™ Grit Washer, shall be provided over the hopper and a portion of the trough opening, as shown on the drawings. A steel plate with a minimum thickness of 3/16” (5 mm) shall be provided over the lower portion of the trough opening as shown on the drawings.

STANDARD PISTA® TURBO™ GRIT WASHER ACCESSORIES

LUBRICATOR: The PISTA® TURBO™ Grit Washer shall be provided with a motor-driven, battery-operated automatic lubricator, which employs a microprocessor to deliver grease to a fixed displacement pump which produces pressures up to 900 psi at programmed intervals from a refillable reservoir to the bearing surface. The reservoir and base shall be constructed of premium nylon, to allow for visual inspection and monitoring of the grease supply. The lubricator shall have a thread size of 1/8” NPT, a grease storage capacity of 16.9 oz. (500 cc) and have a minimum size of 4 3/4” (121 mm) diameter x 8 3/4” (222 mm) tall. The operating temperature range shall be from 14°F (-10°C) to 131°F (55°C).

FLOWMETER: The flow rate of the wash water shall be controlled by a manual valve and measured by a flowmeter. The variable flowmeter shall be constructed with a tough machined acrylic meter body, highly polished to a clear finish with a direct reading permanent scale. The float and guide rod shall be constructed of 316 stainless steel. The F/NPT adapters shall be constructed with high grade Vitron O-Ring seals and aluminum stress ring thread supports. The flowmeter shall be capable of usage in direct sunlight.

ROTOMETER: The flow rate of the scouring air shall be controlled by a manual valve and measured by a rotometer. The low flow rotometer shall have body constructed of one piece welded 316 stainless steel with a clear, polycarbonate plastic tube shield and Borosilicate glass tube. The float shall be constructed of 316 stainless steel. The F/NPT adapters shall be constructed with high grade Buna-N O-Ring seals.

GRIT LEVEL SENSOR: A sonic level limit switch with direct contact probe shall send a signal to the controller to begin the grit discharge cycle, in response to the level of the grit in the grit hopper. This switch shall not be affected by external vibration. It shall actuate a dedicated DPDT DC relay in the PISTA® TURBO™ Grit Washer control panel. The electronic enclosure of the switch shall be NEMA 4X. The probe shall be constructed of 316 stainless steel with a 1 1/2” NPT mounting connection.

WATER LEVEL SENSOR: A sonic level limit switch with direct contact probe shall send a signal to the controller to signal, in response to the level of the water in the grit hopper after the discharge cycle. It shall actuate a dedicated DPDT DC relay in the PISTA® TURBO™ Grit Washer control panel. The electronic enclosure of the switch shall be NEMA 4. The probe shall be constructed of 316 stainless steel with a 1/2” NPT mounting connection.

FLUSH WATER REQUIREMENTS: 20 GPM (1.3 LPS) @ 60 psi. (3.94 BAR) Intermittent. To aid in organics separation. [NOTE TO DESIGNER: WATER SUPPLY MAY BE NON-POTABLE, HOWEVER NOT WASTEWATER. IF A POTABLE SUPPLY IS USED, A BACKFLOW PREVENTER SHOULD BE PROVIDED.]

AIR REQUIREMENTS: 5 SCFH (142 LPS) @ 70 psi. (4.6 BAR) Intermittent. To aid in organics separation.

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[DESIGNER SELECT ONE OF THE FOLLOWING]

[OPTION #1 – CHECK IF SELECTED]

The air required shall be provided by piping in from the main plant air supply, as shown on the drawings.

[OPTION #2 – CHECK IF SELECTED]

The air requirement shall be provided by an air compressor package, consisting of a 1/2 HP (0.4 kW) 3-phase, ____ cycle, ____ volt oil-less motor-compressor unit with intake filter/silencer and a 2 gallon (7.6 liters) air storage tank with pressure switch, regulator and associated piping mounted in a NEMA 4X enclosure with a rigidly mounted, thermostatically controlled 150-watt heater. The compressor shall have permanently lubricated bearings, stainless steel valves and lightweight aluminum construction. The air storage tank shall have a pressure gauge and safety relief valve.

ELECTRICAL CONTROLS

The electrical control equipment shall be mounted in a NEMA Type 4X steel enclosure with hinged access door. Thermal magnetic air circuit breakers shall be provided for branch disconnect service and short-circuit protection of all motor control and auxiliary circuits. Properly sized fuses shall be provided for the sensors, operator interface and control circuits.

Magnetic across-the-line starters with overload coils for each phase shall be provided for the Pump and drive motors used on the PISTA® Grit Removal Unit and PISTA® TURBO™ Grit Pump. A NEMA 1 rated, reversing, magnetic across-the-line starter with overload coils for each phase shall be provided for the PISTA® TURBO™ Grit Washer Drive Motor and the OBEX™ Spiral Fine Screen Drive Motor. Each single-phase auxiliary motor shall be equipped with an over-current protection device, in addition to the branch circuit breaker, or shall be impedance protected. All switches shall be labeled and a coded wiring diagram shall be provided.

A dedicated Programmable Logic Controller (PLC) controller with the appropriate programmed logic shall provide the necessary control functions to properly operate the OBEX™ Spiral Fine Screen, PISTA® Grit Removal System, including the PISTA® TURBO™ Grit Pump, and the PISTA® TURBO™ Grit Washer. The Programmable Logic Controller shall have a 20k-Hz high-speed counter and 6K-word non-volatile memory (4K-word maximum program and 2K-word maximum data). It shall have ____ inputs and ____ outputs, and be Ethernet enabled for external interfacing. A real-time clock module shall control scheduling of the timed operations for each component.

A NEMA 4X rated display unit (HMI) shall be mounted through the front of the panel to provide operator input to and visual output from the microprocessor controller. This interface shall be a minimum 5.7” (145 mm) diagonal graphic interface, DSTN 256-color Liquid Crystal Display with backlighting, and resistive-type touch screen with audible feedback on touch for data input and programming. The display shall have a “sleep” feature to prolong screen life. The HMI display screen shall be powered by 24v DC from a dedicated 650ma regulated power supply.

The 120v AC supply powering the 24v DC power supply unit and the PLC module shall be filtered to reduce transient spikes and noise going to the PLC and HMI. The filter shall be a single-phase active tracking filter, series connected, for high frequency noise and transient protection. It shall have a surge capacity of 45,000 amps, with transient protection in all modes (line to neutral, line to ground and neutral to ground). Transients shall typically be reduced to + or – 2.0 volts.

An aluminum hood to shade the HMI display from direct sunlight shall be mounted on the face of the control panel. The metal shade shall cover the entire display, shield the top and sides of the display, and shall be hinged to fold over the display and stow against the front of the panel.

OBEX™ SPIRAL FINE SCREEN: The OBEX™ Spiral Fine Screen solids discharge auger is operated based on the water level in the influent trough ahead of the screen. A Forward-Reverse-Off-Auto selector switch shall provide the operational control of the auger. In the Automatic position, the auger will start on a high water level detected by an ultra-sonic level sensor mounted in the influent trough. The auger will operate for a set amount of time (operator adjustable on the HMI), or until the water level has been lowered.

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PISTA® GRIT REMOVAL SYSTEM: The controls will allow operation of the propeller drive motor, and **PISTA® TURBO™** Grit Pump. An On-Off selector switch shall be provided to operate the propeller drive motor starter, which normally runs continuously. To control the operation of the **PISTA® TURBO™** Grit Pump, a manual Momentary-Off-Automatic selector switch shall be provided. In the Automatic position, control shall be by a time step included in the PLC logic. This time can be operator adjustable through the HMI. The manual selector switch will override the timer and initiate the pumping cycle.

PISTA® TURBO™ GRIT WASHER: The PLC control logic will operate the **PISTA® TURBO™** Grit Washer through its various cycles, including air infusion, grit wash water, spray water and organic drain solenoid valves, in proper sequence, taking input from the liquid and grit level detectors and the grit pump “run” signal. It shall provide the necessary output signals, interlock and timing functions, as programmed.

The grit washing sequence shall begin when the **PISTA® TURBO™** Grit Pump starts and begins delivering the recovered grit slurry to the **PISTA® TURBO™** Grit Washer or after a pre-programmed time interval from the completion of the last cycle. This shall initiate spray washing, multiple agitation cycles, air infusion and drain-refill cycles, all field adjustable for optimum organic particle removal.

The grit discharge sequence shall be initiated by a sonic grit level sensor mounted in the hopper which is actuated when the collected grit reaches a predetermined level in the main wash chamber. The discharge cycle shall include grit agitation, washing and ejection, and shall be field adjustable for maximum efficiency.

A Forward-Reverse-On-Off selector switch shall be provided to operate the **OBEX™** Spiral Fine Screen drive motor starter.

ACCESS PLATFORMS

Two (2) 3'-0" (0.9 m) wide access platforms shall be provided. One (1) platform shall span the entire width of the **PISTA®** Grit Chamber as shown on the drawings. This platform will provide access to the **PISTA®** drive and motor. One (1) platform shall provide access to the inlet trough, manual bar screen, slide gate, fine screen, **PISTA® TURBO™** Grit Washer drive and motor. The platforms shall be capable of supporting a live load of 150 lbs. per linear foot (223 kg/m), in addition to the dead load. Deflection shall not exceed 1/360 of the unsupported span. A 42" (1067 mm) high handrail and a midrail shall be provided for both sides of the platform. Openings shall be provided for transition to the platforms. Bar grating shall be aluminum and shall extend over the entire length of the screenings platform. Handrail and ladders shall be aluminum.

PISTA® TURBO™ GRIT PUMP

The **PISTA® TURBO™** Grit Pump shall be a 4" (100 mm) vertical, close-coupled type with curved 5-vane flow inducer completely out of the flow path between the pump inlet and discharge connection, so that the grit pumped is not required to pass through the impeller. All internal clearances shall provide for the passage of a 4" (100 mm) spherical solid to preclude clogging of the pump and suction line. The **PISTA® TURBO™** Grit Pump shall be vertical, for easy removal of the motor and impeller, to facilitate maintenance of the suction line by providing easy access to any potential blockage.

The **PISTA® TURBO™** Grit Pump shall be of Ni-Hard construction, with Ni-Hard impeller, and especially designed for the use of mechanical seals.

In order to minimize seal wear caused by lineal movement of the shaft, the shaft bearing nearest the pump impeller shall be locked in place so that end play is limited to the clearance within the bearing. To minimize seal wear resulting from shaft deflection caused by the radial thrust of the pump the shaft from the top of the impeller to the lower bearing supporting the impeller shall have a minimum diameter of 1-7/8" (48 mm). The dimension from the lower bearing to the top of the impeller hub shall not exceed 6" (150 mm).

The bottom bearing of the motor shall be locked in place and designed to handle all thrust loads and the necessary radial load. The upper bearing shall be free to move up and down and, thus, carry only radial load. This movement allows for thermal expansion of the shaft.

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The shaft shall be solid stainless steel through the mechanical seal to eliminate corrosion and abrasive rust particles. Removable shaft sleeves will not be acceptable if the shaft under the sleeve does not meet the specified 1-7/8" (48 mm) minimum diameter. Carbon steel shafts are not acceptable.

The impeller shall produce a turbine-like flow pattern within the casing, generating flow. To prevent grit from entering the seal area, all impellers less than full diameter shall be trimmed with the back shroud remaining full diameter so that a minimum clearance from shroud to casing is maintained. Both the end of the shaft and the bore of the impeller shall be tapered to permit easy removal of the impeller from the shaft.

The pump shall be arranged so that the complete rotating element can easily be removed from the casing without disconnecting the electrical wiring or disassembling the motor, impeller, backhead or seal.

The pump shall be supported by a heavy base with four (4) legs to provide maximum rigidity and balance. Anchor bolts are not included. For ease of maintenance, an isolation plug valve shall be installed on each side of the pump.

The pump shall be capable of delivering 250 GPM (15.8 LPS) against a total dynamic head of (__') (__ m). The maximum allowable speed shall be __ RPM. The minimum rated horsepower of the motor shall be (____BHP) (____ kW).

The motor shall be vertical, solid shaft, TEFC NEMA P-base, squirrel-cage induction-type, suitable for 3-phase, ____ cycle, __ volt electric current. It shall have Class F insulation, but the motor shall have Class B temperature limits. The motor shall have normal starting torque and low starting current, as specified for NEMA Design B characteristics. It shall have a 1.15 service factor.

The motor-pump shaft shall be centered, in relation to the motor base, within .005" (0.13mm). The shaft run-out shall be limited to .003" (0.08mm).

A bearing cap shall be provided to hold the bottom motor bearing in a fixed position. Bearing housings shall be provided with fittings for lubrication as well as purging old lubricant.

The motor shall be fitted with heavy lifting eyes or lugs, each capable of supporting the entire weight of the pump and motor.

FLUSH WATER RECOMMENDED: 25-125 GPM (1.6 – 7.9 LPS). Intermittent. To facilitate grit pumping and minimize pump clogging. [NOTE TO DESIGNER: WATER SUPPLY MAY BE NON-POTABLE, HOWEVER NOT WASTEWATER. IF A POTABLE SUPPLY IS USED, A BACKFLOW PREVENTER SHOULD BE PROVIDED.]

CLASSIFIED LOCATION

(OPTIONAL ITEM – CHECK IF SELECTED)

The installed location is classified as a Class 1, Division 1, Group D hazardous location. Therefore, all motors, motorized valves, solenoid valves, grit and water level sensors, electrical wiring and conduits shall be accordingly rated for this classification. The control panel shall be remotely mounted in an unclassified area, and rated appropriately for that location.

CONTROL TRANSFORMER

(OPTIONAL ITEM – CHECK IF SELECTED)

A properly sized insulating-type control transformer with fused primary and secondary shall be provided by the controls Manufacturer to supply power for controls and auxiliary devices necessary to semi-automatic operation. The control transformer shall have ____ Volt AC primary, 120-volt AC secondary, Class F insulation; with temperature rise not to exceed 115°C above a 40°C ambient.

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❑ COLD WEATHER PACKAGE (OPTIONAL ITEM – CHECK IF REQUIRED)

All flushing and spray water lines on the PISTA® TURBO™ Grit Washer shall be provided with thermostatically controlled electrical heat tracing and insulated for cold weather protection.

CORROSION PROTECTION

All structural carbon steel surfaces shall be Factory-blasted with steel grit to remove rust, mill scale, weld slag, etc. All weld spatter and surface roughness shall be removed by grinding. Surface preparation shall comply with SSPC-SP6 specifications. Following cleaning, a single heavy inert coating shall be applied to all surfaces. This coating shall be of VERSAPOX® epoxy resin especially formulated by Smith & Loveless for abrasion and corrosion resistance. The dry coating shall contain a minimum of 85% epoxy resin with the balance being pigments and thixotropic agents. The dry coating shall be a minimum of 6 mils (0.15 mm) thickness.

Stainless steel, aluminum and other corrosion-resistant surfaces shall not be coated. The welds on stainless steel plate and structural items shall be passivated at the factory prior to shipping of the unit. Carbon steel surfaces, not otherwise protected, shall be coated with a suitable non-hardening rust preventative compound. Auxiliary components, such as the grit pump, gear motor, etc., shall be furnished with a coating of VERSAPOX® epoxy resin especially formulated by Smith & Loveless for abrasion and corrosion resistance. The dry coating shall contain a minimum of 85% epoxy resin with the balance being pigments and thixotropic agents. The dry coating shall be a minimum of 6 mils (0.15 mm) thickness.

Final touch-up shall be the responsibility of the purchasing contractor, and shall be accomplished in the field. Touch-up shall be with VERSAPOX® epoxy resin as supplied by Smith & Loveless, Inc.

MANUFACTURING QUALITY

The specified Manufacturer markets, designs, fabricates and manufactures the grit chamber equipment at its own U. S. facility. The Manufacturer shall have on staff registered engineers, both in process and design. This would be for providing current capabilities in these areas as well as future capabilities after the equipment is installed and operating, for the best long term interest of the Owner.

INSTALLATION AND OPERATING INSTRUCTIONS

The purchasing contractor shall install the PISTA® Works™ Skid in accordance with the Installation Instructions in the manual provided by the Manufacturer. Installation by the contractor shall specifically include, but not be limited to the following:

1. All excavation, backfill and grading for site.
2. Construction of all necessary concrete foundations, pads, etc.
3. Furnishing and installing all influent and effluent pipes to and from the system.
4. Installing the OBEX™ Spiral Fine Screen into the influent trough, and connecting the electrical controls to the screen. The screen must ship separate from the skid.
5. Installation of the concrete grout between the skid support beams.
6. Furnishing and installing the electric power service, main disconnect and service wiring and conduit between the main disconnect and the PISTA® Works™ control panel.
7. Furnishing and installing all water supplies, faucets, hydrants and connections for the system.
8. Furnishing and installing air supply piping, regulators, and connections to the system.
9. Furnishing, installing and powering any lighting for the system.
10. Field touch-up painting as required. Touch-up paint to be furnished by the system Manufacturer.

MANUFACTURER'S INSURANCE

ALL EQUIPMENT MANUFACTURERS, either direct or subcontractors to the general or mechanical contractors, SHALL HAVE in effect at TIME OF BID, CONTRACT AWARD, CONTRACT PERFORMANCE, and WARRANTY TERM, PRODUCT AND COMPREHENSIVE LIABILITY INSURANCE, INCLUDING SUDDEN AND ACCIDENTAL POLLUTION COVERAGE, in the amount of FIVE MILLION DOLLARS (\$5,000,000) through an insurance company with a

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minimum rating of A+ (SUPERIOR) XV according to the BEST'S INSURANCE REPORTS. All policies must be written on an OCCURRENCE BASIS. Policies written on a CLAIMS MADE BASIS are not acceptable. The CERTIFICATE OF INSURANCE attesting to the specified coverage issued by the responsible carrier naming the ENGINEER OF RECORD and the OWNER as ADDITIONAL INSURED, must be presented to the named additional insured prior to contract award. A FAILURE TO COMPLY with this requirement BY THE BIDDER will require DISQUALIFICATION of the BID and CONTRACT AWARD.

STARTUP

The Manufacturer shall provide the services of a Factory-trained representative for a minimum period of 3 days on-site to assist with the initial startup, and to instruct the Owner's operating personnel in the operation and maintenance of the equipment.

WARRANTY

The Manufacturer of the equipment shall warrant for one (1) year from date of startup, not to exceed eighteen (18) months from date of shipment, that all equipment he provides will be free from defects in material and workmanship.

In the event a component fails to perform as specified, or is proven defective in service during the warranty period, the Manufacturer shall repair or replace, at his discretion, such defective part. The cost of labor and all other expenses resulting from replacement or replacement of parts is not included.

The repair or replacement of those items normally consumed in service such as seals, grease, light bulbs, etc., shall be considered as part of routine maintenance and upkeep.

It is not intended that the Manufacturer assume responsibility for contingent liabilities or consequential damages of any nature resulting from defects in design, material, workmanship or delays in delivery, replacement or otherwise.

MANUFACTURED EQUIPMENT

OPTION 1 (STANDARDIZATION) [DELETE THIS LINE FROM FINAL SPEC TEXT]

The specifications and drawings detail Smith & Loveless equipment and represent the minimum standard of quality for both equipment and materials of construction. The contractor shall prepare his bid on the basis of the particular equipment and materials specified for the purpose of determining the low bid.

The Owner has standardized on the named equipment in order to optimize their operation, maintenance, and safety programs, provide for interchangeability of costly equipment items, reduce stocking levels required for necessary spare parts and provide increased flexibility in the utilization of their facility. Equipment substitutions, since incompatible with the Owner's standardization program, will not be considered.

OPTION 2 (BASE BID WITH BID SUBMITTAL) [DELETE THIS LINE FROM FINAL SPEC]

The specifications and drawings detail Smith & Loveless equipment and represent the minimum standard of quality for both equipment and materials of construction. The contractor shall prepare his bid on the basis of this equipment for the purpose of determining the low bid without consideration of a possible substitute.

Substitution of other makes may be considered if the equipment proposed for substitution is superior or equal in quality and efficiency to the standards of quality named in the specifications and this is demonstrated to the satisfaction of the engineer.

Contractors wishing to offer a deduct for substitute equipment shall include the following submittal information with their proposal.

BID SUBMITTAL

The submittal for consideration of unnamed manufacturers shall be submitted at least 15 days prior to the bid opening, by a bidding Contractor (not an equipment manufacturer or sales representative). It shall include all necessary information for the proper determination of the acceptability of the proposed substitution, and shall not necessarily be limited to the following:

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- A. Complete description of the equipment, system, process, or function, including a list of system components and features, drawings, catalog information and cuts, Manufacturer's specifications, including materials description.
- B. Performance data and curves, and horsepower requirements.
- C. Outside utility requirements, such as water, power, air, etc.
- D. Functional description of any internal instrumentation and control supplied including list of parameters monitored, controlled, or alarmed.
- E. Addresses and phone numbers of nearest service centers and a listing of the Manufacturers or Manufacturer's representatives services available at these locations, including addresses and phone numbers of the nearest parts warehouses capable of providing full parts replacement and/or repair services.
- F. A list of five (5) installations in the state where similar equipment by the Manufacturer is currently in similar service; include contact name, telephone number, mailing address of the municipality or installation, engineer, Owner, and installation contractor; if five installations do not exist, the list shall include all that do exist, if any.
- G. Detailed information on site, architectural, structural, mechanical, plumbing, electrical, and control, and all other changes or modifications to the design and construction work necessary to adapt the equipment or systems to the arrangement shown and/or functions described on the drawings and in the technical specifications. This shall include plan view and section sketches illustrating any additional space requirements necessary to provide the minimum adequate clear space within and around the equipment for operation and maintenance, as shown on the drawings and specified.
- H. All differences between the specifications and the proposed substitute equipment shall be clearly stated in writing under a heading of "differences".
- I. Other specific submittal requirements listed in the detailed equipment and material specifications.

EVALUATION

Approval of the substitution to bid as an alternate shall in no way relieve the contractor from submitting the specified shop drawings for approval or complying fully with all provisions of the specifications and drawings.

If substituted equipment is accepted. The contractor shall, at his own expense, make any changes in the structures, piping, electrical, etc., necessary to accommodate the equipment. If engineering is required due to substitution of alternate equipment, the contractor shall pay for all engineering charges.

To receive final consideration, copies of the Manufacturers' quotations for the equipment may be required to document the savings to the satisfaction of the engineer. It is the intent that the Owner shall receive the full benefit of the savings in cost of equipment and the contractor's bid price shall be reduced by an amount equal to the savings. In all technical and other evaluations, the decision of the engineer is final.

TYPICAL BID FORM

[ADD TO BID FORM AS APPLICABLE TO ABOVE SELECTED OPTION]

OPTION 1

For reasons of standardization, bids shall be based on the named equipment. Alternate bids will not be allowed.

OPTION 2

Bids shall be based on the named equipment. Alternate/substitute equipment may be offered as a deduct, provided all conditions of the "manufactured equipment" section are met.

Alternate/Substitute Manufacturer _____.

Deduct \$ _____.

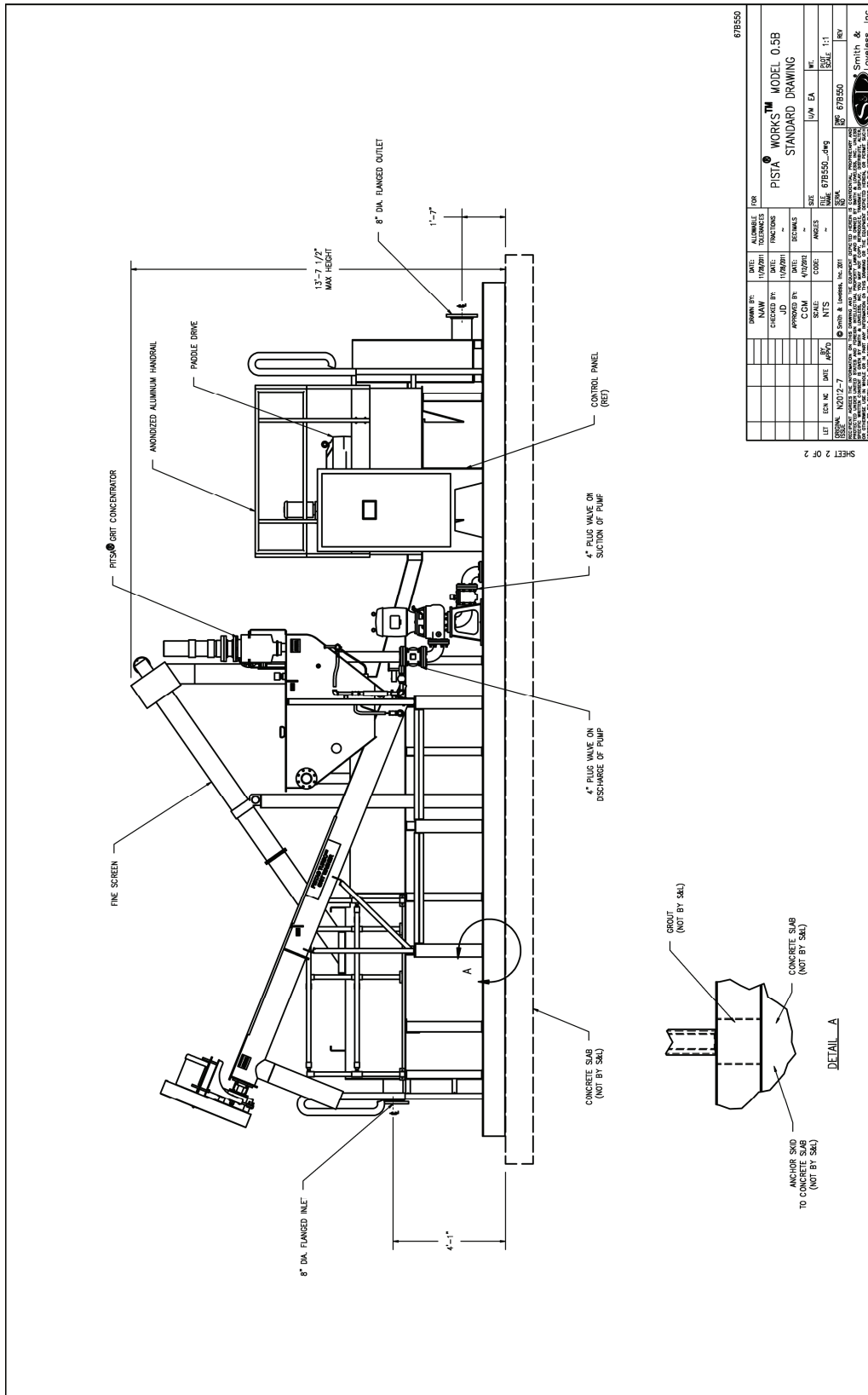
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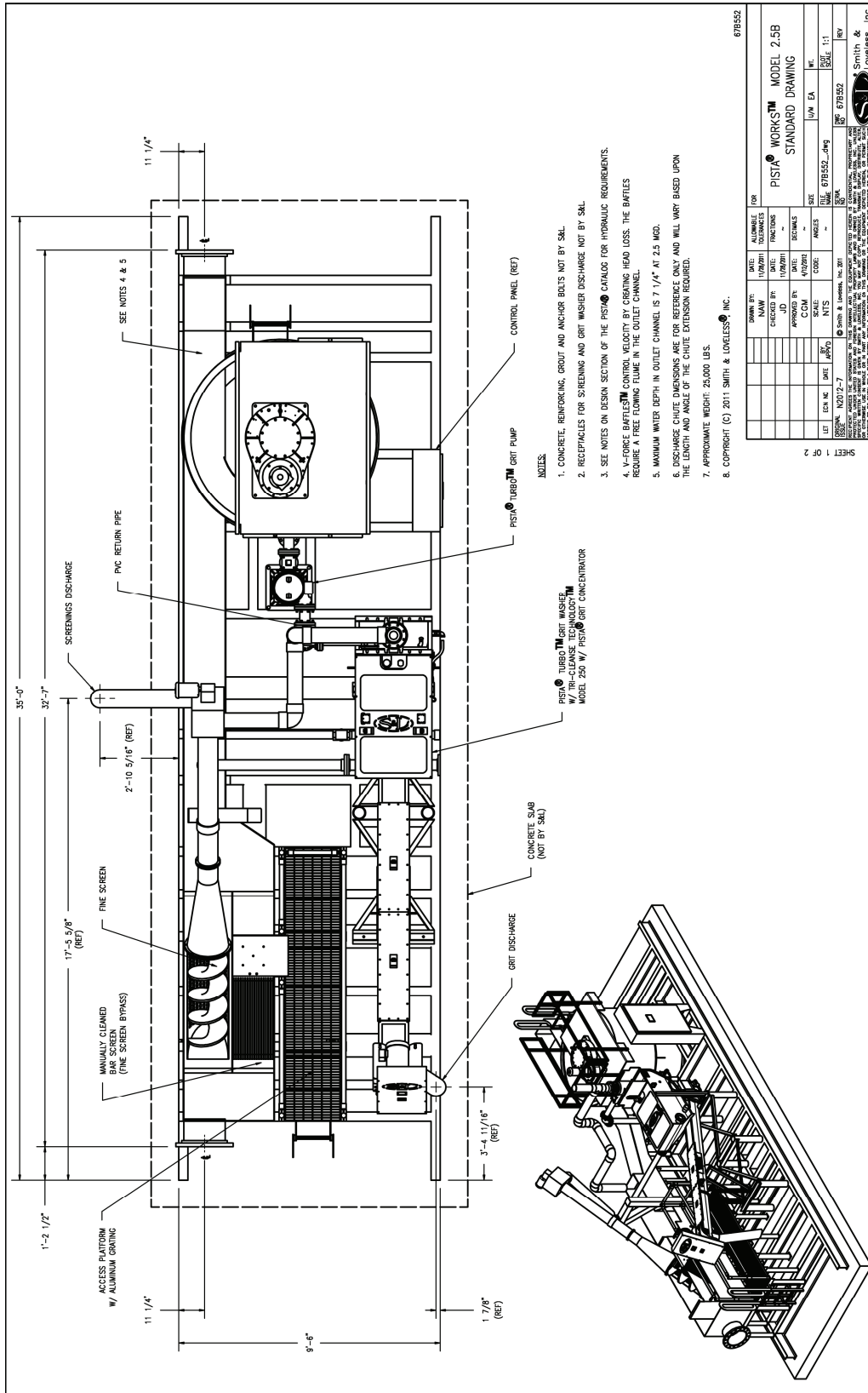
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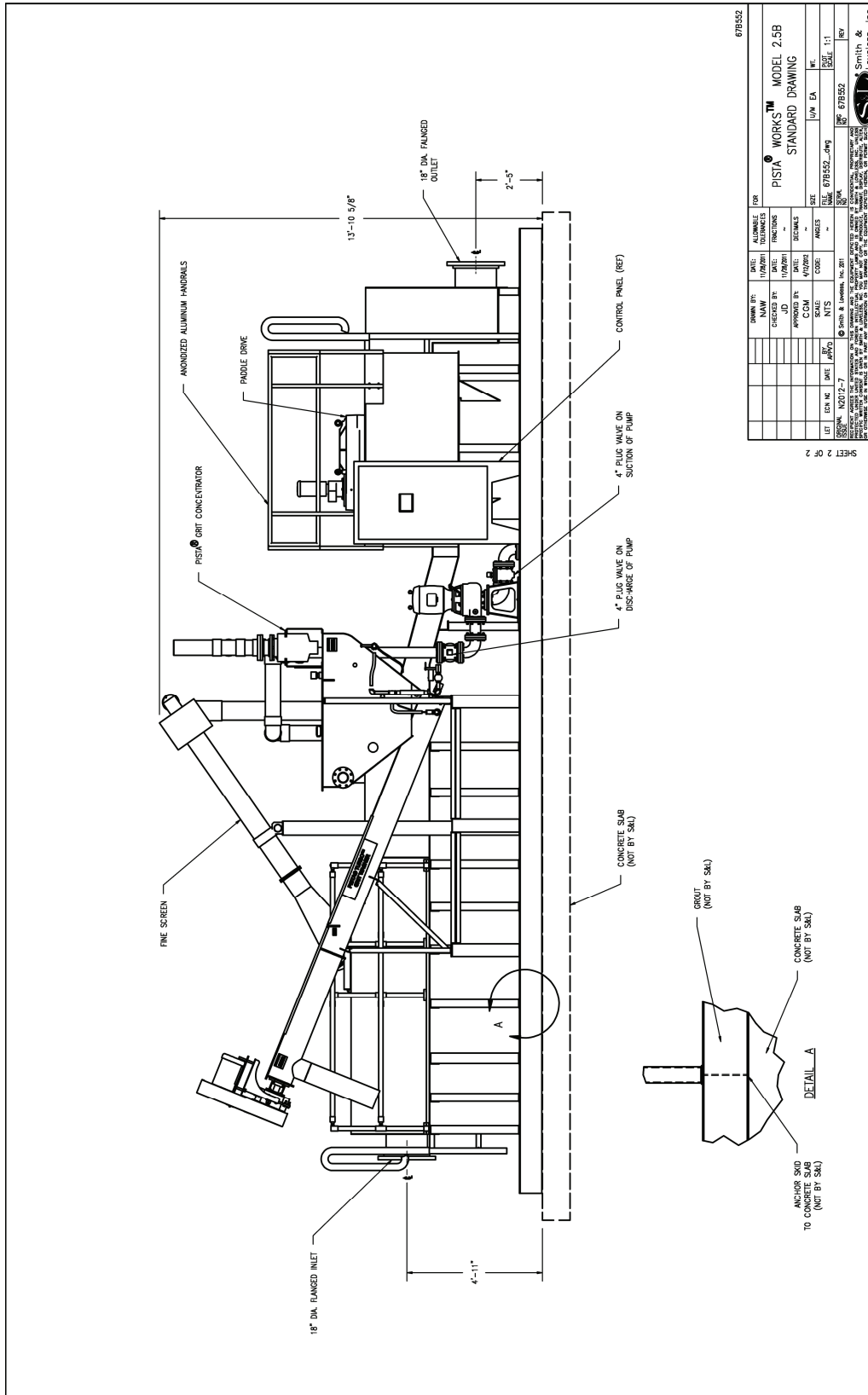
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