

INSTRUCTIONS TO BIDDERS AND SPECIFICATIONS

CITY OF FOREST
120 South Davis Street
P. O. Box 298
Forest, Mississippi 39074

RE: One New filter screen

BID DUE DATE: 1:30 pm Monday September 29th 2014

WRITTEN SEALED BIDS: To Be Filed Before Above Time at the Office of the City Clerk at 120 South Davis Street, P. O. Box 298, Forest, Mississippi 39074

INSTRUCTIONS TO BIDDERS

- 1 The City of Forest will Award the bid to the lowest, best and most responsive and responsible bidder at the next scheduled board meeting and **reserves the right to reject any and all bids.**
- 2 All bids must be sealed and the outside envelope clearly marked in the following manners:
- 3 Any exceptions to the above specifications must be listed in the bidders bid, with justification. Failure to do so will disqualify the bid.
- 4 All bids must state delivery time, failure to meet specified delivery time will result in penalties of \$200 per day (which will be a factor used in determining the lowest and best bid), and bid price must include delivery and installation to the CITY OF FOREST.
- 5 All bids must state warranty, which will be a factor used in determining the lowest and best bid.

Bid: MECHANICAL BAR/FILTER SCREEN.

Otherwise the bid will not be considered.

SPECIFICATIONS FOR NEW MECHANICAL BAR/FILTER SCREEN

These are the minimum specifications for the following equipment. All bids must be equal in performance and quality to the following specifications, which are not intended to exclude any manufacturer. Any reference to manufacturer's make or series of equipment stated in the following specifications is intended only to establish an acceptable standard and is not intended to limit the bidding.

TECHNICAL SPECIFICATIONS

FOR

MECHANICAL BAR/FILTER SCREEN

FOREST, MS

1.0 GENERAL

- 1.1 There will be furnished one (1) mechanical bar/filter screen unit, consisting of a frame assembly, filter belt/screen assembly, drive assembly, rotating brush assembly, and controls. Manufacturer must have experience manufacturing plastic element type screens, with at least 100 U. S. operating installations that have been running for at least 10 years. Installation list must be submitted with the bid.
- 1.2 The automatic bar/filter screen will be designed to positively clean and remove debris up to 3 inches in diameter from the influent stream by means of high impact plastic filter elements designed to retain and elevate debris to the discharge point of the unit where the rotating brush assembly cleans the elements.
- 1.3 The unit shall be suitable for installation and operation in a channel measuring 2 feet wide and 3.6 feet deep. The angle of inclination shall be 75 degrees from horizontal. The opening from which the unit discharges screenings from its enclosure shall be at least 4.4 feet above the operating floor elevation at which the screen is supported. This is the available clearance for the container/compactor to collect the debris. The total discharge height of the screen, as measured from its base to the screenings discharge point, shall be 8 feet.
- 1.4 **PERFORMANCE.** The screen shall be capable of passing a maximum peak flow of 2 MGD based on a nominal unit width of 2 feet, with a downstream water level of 1 foot. The head loss at the maximum flow of clean water shall not exceed 12 inches. The calculated head loss is based on the assumption of a clean screen, clean water, and steady state flow conditions.

- 1.5 The screen shall be capable of presenting a clean filtration surface to the influent stream at all times during continuous operation. It shall be capable of intermittent operation in order to form a mat of material to provide maximum trash removal. Additionally, in order to maximize the capture of paper, rags, and other flexible debris, which tends to drape over and adhere to the filtration surfaces, the screen shall have 0.693 square feet of contact surface area per square foot of wetted filtration belt frontal surface.
- 1.6 The unit shall be capable of handling 0.722 cubic yards per hour of trash in order to ensure that the maximum amount captured by the screen can be transported out of the channel and into the waiting receptacle.

2.0 CONSTRUCTION AND MATERIALS

2.1 FRAME ASSEMBLY

- 2.1.1 The frame of the unit, which is stationary, shall be constructed from type 304 stainless steel with a thickness of 3/16 inch. It supports and locates all of the operating components. The unit shall rest at the bottom of the channel, and be anchored at the operating floor elevation. No mechanical mounting or fastening of the unit frame is required to the sidewalls or bottom of the channel.
- 2.1.2 The "A" frame unit shall be supported at the operating floor elevation by support legs constructed from type 304 stainless steel. The legs shall be designed to allow the unit to pivot the screen out of the channel without dewatering (e.g. for bypass purposes). Routine service of the unit is possible with the screen in the channel.
- 2.1.3 Guide rails shall be mounted to each side on the inside surface of the frame to direct the filter belt during its ascension out of the channel. The guide rails shall be 1/2 inch thick and will be constructed from type 304 stainless steel.
- 2.1.4 At the top of the screen, circular chain guides shall gently direct the filter belt from its ascending path out of the channel towards the drive sprockets. These circular guides shall be constructed from type 304 stainless steel and shall be welded to a type 304 stainless steel shaft. In order to reduce the wear on both the chain and chain guides, the shaft shall be secured to bearings on each side of the frame and free to rotate.
- 2.1.5 Chain guides shall also be provided to direct the filter belt from the drive sprockets to the descending path into the channel. These

fixed rails shall be constructed of type 304 stainless steel and shall be 5/8 inch thick.

- 2.1.6 Lower return guides shall be provided at the base of the screen to direct the filter belt during its 180-degree turn from the descending to ascending paths. The lower guide rails shall be constructed from 1/2-inch thick type 304 stainless steel and shall be fixed in place as low as possible in the frame to optimize the submerged screen area. No submerged bearing or rotating guides are used that will require routine maintenance or that may become fouled by trash and debris.
- 2.1.7 Neoprene rubber seals with type 304 stainless steel backing plates shall be mounted along the upstream edges of the frame to seal the outer edge of the frame against the channel wall, and the area between the frame and filter belt side plates.
- 2.1.8 The bottom of the unit shall be sealed with two rows of nylon brushes, which allow the elements to pass through, but prevents trash from passing beneath the filter elements, ensuring capture of all solids and trash by the filter belt.
- 2.1.9 All shaft bearings are mounted externally to the side frame for ease of access and maintenance.
- 2.1.10 The front and rear portions of the screen above the channel shall be equipped with covers to protect operators from contact with moving parts and minimize misting and dripping. All enclosures shall be removable. There shall be a hinged section for access to the screen and rotating brush assembly for periodic maintenance. The covers shall be fabricated from 14 gauge type 304 stainless steel.

2.2 FILTER BELT/SCREEN ASSEMBLY

- 2.2.1 The screen shall provide dual filtration of all materials in order to minimize compaction of captured debris and minimize the head loss through the screen. This shall be accomplished by recessing the horizontal fine filtration opening in the face of the screen. The coarse horizontal openings formed by the upper or forward shank/arm of the elements shall be 14 millimeters and shall be the first opening the flow stream contacts as it passes through the screen. The lower or recessed shank/arm of the elements shall create a two dimensional grid which limits the maximum vertical opening to 25 millimeters and the fine horizontal opening of 6 millimeters. The elements are arranged in a staggered fashion to form an endless belt and to create a range of motion that allows the recessed shank/arm of one row of elements to pass through the plane of the forward arm of the next row of elements it meshes with. Each filter element shall be a single molded component with a rake integral to its shape. The filter belt shall form a row of

these rakes spaced every 4 inches, capable of lifting material of up to 3 inches in diameter out of the channel. The elements are secured to two separate filter shafts that pass through individual bosses in the elements.

- 2.2.2 The side plates (or end plates) are mounted next to the outermost elements of each filter row, and overlap to form a continuous moving sidewall for the filter belt. This moving wall prevents captured trash and debris from spilling over the sides of the filter belt. The side plates shall be constructed from a high strength phenolic resin.
- 2.2.3 The tension of the moving screen/filter belt assembly shall be completely supported by a stainless steel link chain. The chain must connect the filter shaft ends on both sides of the belt assembly so that the elements are free of tension, and support no weight of the assembly. The chain shall be of closed link design with 2 link sidebars, chain rollers and pins per link. The chain assembly shall have a minimum cross sectional area of 0.144 square inches at the weakest point of any individual link sidebar.
- 2.2.4 Chains shall be supplied with hollow pin construction that allows for the removal and replacement of the filter shafts, side plates and filter elements without releasing the chain tension. The unit is designed to allow this function to take place at the operating floor elevation with the screen in the channel. Chain rollers shall have a diameter of 1-3/4 inches.
- 2.2.5 All chain components shall be corrosion resistant stainless steel. Sidebars shall be type 304 stainless steel. Pins, bushings and rollers shall be type 410 stainless steel. 400 series components shall be heat treated to a minimum hardness of 39 on the Rockwell C Scale.
- 2.2.6 The filter shafts shall have a maximum diameter of 3/4 inch and be spaced on 4-inch centers in the direction of travel of the filter belt. The shafts shall be constructed from type 304 stainless steel.

2.3 DRIVE ASSEMBLY

- 2.3.1 The drive assembly consists of a gear reducer, motor, drive shaft, and eccentric bearing. The drive mechanism shall be protected from the trash stream to ensure that the screen runs smoothly without jamming. The driving force is transmitted to clean, trash free components to avoid mis-tracking or binding, which could render the screen inoperable, requiring manual cleaning and realignment.
- 2.3.2 The gear reducer is of hollow shaft design by Sumitomo, mounted directly to the unit external to the side frame and connected directly to the drive shaft with a keyless tapered bushing. The reducer shall be designed in accordance with AGMA

recommendations for Class II service based on the required horsepower for operation of the machine.

- 2.3.3 The motor shall be a squirrel cage induction motor, TEFC, 230/460 volt, 3-phase, 60 Hz, 1800 RPM by Baldor. The motor Horsepower shall be 1/2. Motor shall be acceptable for use in a Class 1, Division 2 environment in accordance with paragraph 501-8(b) of the National Electrical Code.
- 2.3.4 Overload protection shall be provided by an electrical overload device that senses motor current draw (SSAC Current Monitor or equal)
- 2.3.5 The filter belt drive shaft is located in the head of the unit and is supported at each end by the hollow shaft reducer and eccentric bearing. The drive shaft sprockets that engage the filter belt chain rollers and transmit motion to the filter belt assembly are welded to the drive shaft. The drive shaft and sprockets shall be constructed from type 304 stainless steel.

2.4 ROTATING BRUSH ASSEMBLY

- 2.4.1 The filter belt assembly is cleaned by the interaction of the filter elements and the rotating brush assembly without requiring any water or other mechanical devices capable of jamming (i.e. doctor blade) to remove the captured material.
- 2.4.2 The rotating brush assembly is supported by bearings on each side of the machine mounted externally to the machine frame. The brush is chain driven by the filter belt drive shaft.
- 2.4.3 The brush is comprised of two separate components, the brush shaft, and the brush core. The shaft is made of type 304 stainless steel. The brush core is made of UHMW, with tufted nylon bristles. The core is split into two halves that are fastened with stainless steel hardware to the brush shaft. This allows the brush to be easily removed from the machine simply by removing the hardware, and separating the core pieces from the shaft. To install a new brush, the two new core pieces are placed over the shaft, and the hardware is inserted through the factory holes and tightened.
- 2.4.4 The brush shall be orientated in a paddlewheel design with rows of bristles located at 90,180, 270, and 360 degrees.

2.5 DISCHARGE CHUTE

- 2.5.1 A discharge chute shall be provided integral to the machine, constructed from 14 gauge type 304 stainless steel and designed to direct the screenings to the collection equipment below.
- 2.5.2 The chute shall have a 1/4-inch thick flange that shall allow it to be connected to ancillary washing, compacting, and collection

equipment. Owner will provide a discharge chute extension to feed the dumpster. The existing chute will be reused.

2.6 LUBRICATION

2.6.1 Lubrication lines shall be extended from each bearing housing to a central point located on the respective side of the machine, accessible from the operating floor for ease of maintenance.

2.7 FASTENERS

2.7.1 All fasteners shall be type 18-8 stainless steel.

2.8 SURFACE FINISH

2.8.1 **SURFACE TREATMENT OF STAINLESS STEEL COMPONENTS** All frame and structural members will be mechanically cleaned using Dupont Starblast. Sheet metal components such as covers or the discharge chute will be furnished with a 2B finish.

2.8.2 All other appurtenances including roller chain, brush sprockets, bearing housings, motor, reducer, etc. shall be supplied with the manufacturer's standard finish.

3.0 **ELECTRICAL DEVICES AND CONTROLS**

3.1 ELECTRICAL DEVICES: Interconnecting conduit and wiring will be the responsibility of the installing contractor. In addition to the drive motor, the following electrical devices will be furnished with each unit:

3.1.1 **FLOAT SWITCH.** A mercury type float switch of chemical resistant polypropylene construction will be provided with a 316 SST pipe mounting bracket, float mounting clamp and expansion anchors. The mounting bracket requires a suitable length of 1" nominal pipe to suspend the float in the channel, to be supplied by others. The float will have a 20-foot long integral cable.

3.1.2 **EMERGENCY STOP LOCAL PUSH BUTTON STATION.** A NEMA 4X polycarbonate emergency stop push button station will be mounted to the frame of the unit with a 1/2 inch NPT conduit connection.

3.2 CONTROLS: The following controls will be provided:

3.2.1 A 480 Volt primary U.L. listed and labeled control panel in a NEMA 4X 304 SST enclosure suitable for wall mounting. It will contain the following logic devices for proper operation of the equipment:

1. Programmable relay to perform necessary logic functions and

- monitor equipment mounted electrical devices.
- 2. Emergency Stop push button.
- 3. Hand-Off-Auto selector switch for screen operation.
- 4. Control power and run indicating lights.
- 5. Motor current monitor and hour meter.
- 6. Fault indicating light and system reset pushbutton.
- 7. Run and fault auxiliary output contacts for customer use.

3.2.2 A step-down control transformer, motor starter and fused disconnect will be provided.

3.3 SEQUENCE OF OPERATION

3.3.1 HAND OPERATION. When the Hand mode is selected, the screen will run continuously. Placing the selector switch in the Off position will stop the screen.

3.3.2 AUTOMATIC OPERATION. When the Auto mode is selected, the unit will run via the water level sensor, repeat cycle timer, or thermostat. After the water level has lowered, the unit will continue to run for the length of time set on the off delay timer, typically set at 30 seconds.

3.3.3 EMERGENCY STOP. The unit can be deactivated at any time by pressing either the control panel or unit mounted Emergency Stop push buttons.

3.3.4 FAULT CONDITIONS. Motor overload or high motor current will stop the drive motor and illuminate the fault light.

4.0 ANCHOR BOLTS

4.1 The manufacturer will supply type 304 stainless steel 3/4"-10 UNC threaded rods for use with the HILTI HY-150MAX Adhesive Anchoring system. Adhesive to be provided by others.

5.0 FACTORY SERVICE

5.1 The manufacturer will provide a qualified service representative following installation for one (1) trip for one (1) day for inspection of installation, equipment startup and operator training.

6.0 FACTORY ASSEMBLY, TESTING, AND INSPECTION

6.1 The screen shall be factory assembled and tested prior to being shipped. The Engineer and/or Owner may, at their option and own expense, witness the factory test. The equipment will be shipped completely assembled other than the motor/reducer, discharge chute and support legs. It shall be capable of being set in place and field erected by the contractor with a minimum of field assembly.

7.0 INSTALLATION, OPERATION AND MAINTENANCE MANUAL

- 7.1 In addition to the normal Installation, Operation, and Maintenance manuals required by the contract, a spare manual will be shipped with the unit in order to allow for proper operation of the equipment prior to the release of all final Installation, Operation, and Maintenance manuals.

8.0 INSTALLATION, OPERATION AND MAINTENANCE MANUAL

- 8.1 In addition to the normal Installation, Operation, and Maintenance manuals required by the contract, a spare manual will be shipped with the unit in order to allow for proper operation of the equipment prior to the release of all final Installation, Operation, and Maintenance manuals.

9.0 INSTALLATION OF ALL EQUIPMENT WILL BE BY THE SUCCESSFUL LOW BIDDER, ALL NECESSARY FIELD MEASUREMENTS MUST BE MADE BY BIDDERS

10.0 REMOVAL AND DISPOSAL OF ALL EXISTING OLD FILTER SCREEN EQUIPMENT WILL BE BY THE SUCCESSFUL LOW BIDDER.

11.0 WARRANTY

10.1 MIINIMUM OF ONE YEAR WARRANY

SUPPLIER BID FORM

NAME OF BIDDER _____

ADDRESS OF BIDDER _____

PHONE NUMBER _____

MODEL OF UNIT BID _____

SELLING PRICE OF NEW UNIT \$ _____

WARRANTY DOCUMENTS (ENCLOSE COPY) _____

DELIVERY DATE _____

EXCEPTIONS AND JUSTIFICATION TO SPECIFICATIONS _____

REPRESENTATIVE SIGNATURE: _____

DATE: _____