

CITY OF NAPLES
PURCHASING DIVISION
CITY HALL, 735 8TH STREET SOUTH
NAPLES, FLORIDA 34102
PH: 239-213-7100 FX: 239-213-7105

ADDENDUM NUMBER 3
ADDITIONAL INFORMATION

NOTIFICATION DATE: 10/22/13	BID TITLE: Public Works Pump Station Improvements	BID NUMBER: 049-13	BID OPENING DATE & TIME: NEW 11/01/2013 2:00PM
--	---	----------------------------------	--

**THE FOLLOWING INFORMATION IS HEREBY INCORPORATED INTO,
AND MADE AN OFFICIAL PART OF THE ABOVE REFERENCED BID.**

The following is additional information to Attachment A (inclusion of Section 444333 - Revised) for ADDENDUM 3 for the referenced solicitation.

IMPORTANT MESSAGE

PLEASE ACKNOWLEDGE RECEIPT OF THIS ADDENDUM ON THE BID COVER SHEET.

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials, installation, and testing of mechanically cleaned vertical bar screens. The bar screen supplier/manufacturer is also responsible for design and operation of the screens belt conveyor. Both bar screens, screenings belt conveyor, and control panel shall be furnished by a single supplier. The screenings belt conveyor is specified in Section 412123.

1.02 SUBMITTALS

- A. Submit shop drawings in accordance with the General Conditions, Section 013300, and the following.
- B. Submit dimensional drawings. Show relationship between the conveyor belts to which the screens will feed. Submit shop drawings for screens and associated conveyors together as a package.
- C. Submit manufacturer's catalog data and detail drawings showing all screen parts and described by material of construction, specification (such as AISI, ASTM, SAE, or CDA), and grade or type. Show linings and coatings. Identify each screen by tag number to which the catalog data and detail sheets pertain.
- D. Submit head loss calculations.
- E. Submit installation drawings. Show dimensions and locations of base plates and anchor bolts.
- F. Submit calculations for the design of the support legs, anchors, anchor bolts, and other structural elements.

1.03 MANUFACTURER'S SERVICES

Provide equipment manufacturer's services at the jobsite for the minimum labor days listed below, travel time excluded.

- A. Three labor days to check the installation and advise during start-up, testing, and adjustments of the equipment.
- B. One labor day to instruct the Owner's personnel in the operation and maintenance of the equipment.

PART 2 - MATERIALS

2.01 MANUFACTURER

Screens shall be John Meunier "Lock-Chain Cont-Flow" or Engineer approved equal.

2.02 BAR SCREEN DESCRIPTIONS

- A. The screening unit shall consist essentially of a bar rack, counter-current, back clean rake mechanism and chain drive, structural frame and shall be factory-assembled and tested prior to its delivery. Testing shall be Owner (and/or Owner's Representative) inspected at the manufacturing facility; airfare and accommodations shall be included in the bid. Ready for installation in its channel, it shall not require field assembly of any components such as chain drive, reducer, or gears, except where partial disassembly is required by transportation regulations or for protection of components.
- B. Each screen shall provide continuous removal of materials in the influent stream. The screening mechanism shall continuously carry material to the top of the device where it shall fall off or be removed from the screen onto a belt conveyor. Each screen shall be automatically self-cleaning by mechanical means without requiring any water to remove captured material from the screen surface.

2.03 BAR SCREEN STRUCTURE

- A. The bar screen structure shall consist of the structural frame, the housing, and the structure leveling bolts.
- B. Structural Frame: The vertical structural frame shall be fabricated of 1/4" thick minimum steel, forming a frame width of 29". It shall be bolted to a 5/8" thick base plate and a 3/8" thick head frame. The structural frame shall be designed to be of the monobloc and self-standing type.
- C. The side frames may also serve as guide rails for the carriage and rake guide wheels and the positive movement of the chains. All these guides shall be designed to positively push the rake entry through the bar rack. The frame shall be covered with steel material formed to strengthen the monobloc.
- D. The chain must be guided in a minimum 1/4" thick channel through at least 180 degrees of the turn made at the drive sprocket. The interior chain guide channel must extend on both above the screen frame by at least 2 inches to eliminate gap where chain can bind under sprocket.

- E. The chain guide must have a slanted entrance on the back side of the screen to ease the chain into the guide and depress any kinks before as the chain is entering the guide channel.
- F. The screen frame shall be recessed into the channel bottom. It shall also be firmly anchored to the channel sides and bottom.
- G. Housing: 18 gauge metal sheeting shall be used to cover the front and sides top sections (and the sides at the intermediate level). The rake and wiper guards shall be made of the same material. The housing shall be bolted to the screen.
- H. Leveling Bolts: All leveling bolts shall be supplied with the equipment and shall be of sufficient size to support the total screen weight.

2.04 BAR, RACK AND CLEANING MECHANISM

- A. The bar screen cleaning mechanism shall consist of the bar rack, the rake with rake arm, shafts and drive system, the wiper, if required, and the chute.
- B. Bar Rack: The free standing bar rack shall consist of equally spaced parallel 304 Stainless steel bars 1 inches wide by 4 inches deep, welded on a bottom support plate only. The bars shall rise vertically and extend ~~180-145~~ inches above the channel invert with clear openings of 1 inch between bars. The jam-proof "LAS" type bar rack shall be easily removable and shall be capable of withstanding a full differential. A bar guide shall be installed near the top end of the rack to support the bars. The bar guide shall be hinged and shall rotate away from the bar rack to allow the rake to travel past it. The bar rack shall sit on a 6 inch high spool.
- C. Rake Mechanism: The rake mechanism shall remove the screenings from the bar rack and raise them vertically out of the liquid up to the trash chute. Only the rake mechanism during the cleaning cycle shall be allowed to enter the water flow.

The rake teeth shall be fabricated from $\frac{3}{4}$ inch thick 304 stainless steel plates. The teeth shall be profiled in such a way to easily swing through the retained screenings; **and designed to allow the lifting of round objects up to 6-inches in diameter (coconuts) without falling off.** They shall also prevent the screenings from falling behind the bar rack. The rake shall provide a minimum shelf capacity of 8 inches. The teeth support steel plate of $\frac{3}{4}$ inch minimum thickness. It shall be bolted to the rake arm structural steel 4 inch x 4 inch x $\frac{1}{4}$ inch min. reinforced member.

The rake arms shall be attached by a shaft to the carriage driven by the electric gear motor and traveling up and down the screen at a speed of 18.8 feet/min. The adjustable rake movement shall be regulated by means of an adjustable shock absorber and counter weight system to minimize the wear and noise and extend the life of the unit.

The system shall be so designed that the rake shall not swing away from the bar rack during the cleaning action and free all encountered objects held by the bar rack. Positive protection against applied loads too large to be handled by the unit shall be provided in the control system. The rake mechanism shall be easily removable from the channel for inspection or servicing without any need to dewater the channel or remove the screen frame.

- D. Shafts: The guide wheels and rake arm shafts, made of stainless steel type 304 conforming to ASTM A-276, shall be bolted in place to allow easy removal. Shafting shall be straight and of sufficient size to operate without distortion.
- E. Drive System: The carriage drive shall be supported by two (2) flanged roller type conveyor chains (12,000 pounds breaking load each), each running inside lateral guides. The roller chains shall be kept in the guide rails by a steel spreader bar. This shall insure positive carriage movement in either direction. Each chain shall be driven by a sprocket mounted on a main drive shaft. This shaft shall be made of 416 stainless steel. The chain take up assembly shall be located on the carriage.

Two (2) self aligning roller bearings, assembled in split case housing shall support the main drive shaft on the top of the screen frame. Grease fittings shall be extended with 316SS lines and located at the operating floor level. For security purpose, a protective housing shall be located on the back of the screen frame to store the chain as the carriage comes up. It shall be fabricated with structural angles and 18 gauge sheet metal.

- F. Drive Unit: The carriage shall be driven by a stationary TEFC, 1 H.P., 1.0 S.F., class "B" insulation motor, 460 Volts, 3-Phase, 60 Hz power supply. The motor shall be per Specification Section 262650. The motor shall be equipped with a tropicalized brake system. The drive system shall also include a speed reducing gear of the combination Parallel-Helical/Helical-Bevel type 85% efficient. The gear motor shall include anti-friction bearings with high overhung load properties, and double lip high temperature oil seals riding on precision ground shafts. Gears shall be made of hardened and heat treated forged steel. The gear motor shall conform to AGMA II.
- G. Wiper: The wiper system shall be so designed to start the wiping action on a clean portion of the rake. The wiper shall push on the screenings while sitting on the rack and not on the screenings, to obtain a highly efficient transfer onto the chute. The hinged wiper frame work shall carry

a replaceable polyethylene and leather blade. The wiper blade shall terminate its cycle at least 1 1/2" away from the rake teeth.

- H. Chute: The chute fabricated of reinforced N° 11 GAUGE metal sheets shall be mounted so as to fall under the rake at a 55° angle, prior to the wiping action. The collected screenings shall discharge off the chute at an elevation of 48" above the operating floor. The rake teeth span a minimum of 4" over the discharge chute.

2.05 MATERIALS OF CONSTRUCTION

Concerning part other than the major drive components described before, the materials of construction shall be as follows:

Bar Rack	: 304L SS plates and bars
Rake	: 304L SS plates
Rake arm	: 304L SS structural tubing and plates
Wiper	: 304L SS angle, leather & polyethylene
Carriage	: 304L SS plates
Trash Chute	: 304L SS stainless steel sheet
<u>Structure:</u>	
Sides (left and right)	: 304L SS channels, angles and plates
Back	: 304L SS plates
Base	: 304L SS plates
Top	: 304L SS plates and angles
Chain housing frame	: 304 SS angles, bars and plates
<u>Housing:</u>	
Front (above chute)	: 304L SS sheets
Sides (upper level)	: 304L SS sheets (left & right)
Sides (lower level)	: 304L SS sheets (left & right)
Chain housing	: 304L SS sheets
Screws, bolts and anchors	: 304L SS
Shafts (wheels, rake arm)	: 304L SS
Wheels	: Pe Vo-Lon or equal
Conveyor chain	: 304 Stainless Steel
Sprockets	: 304 SS ASTM A240 or ASTM A276

All stainless steel plate, sheet, bars, and shapes shall conform to ASTM A240 or ASTM A276.

2.06 CONTROL PANEL AND CONTROLS

A. Control Panel and controls shall be in accordance with Section 409510. The Screen supplier shall furnish one local control panel complete with all hand switches and local indicators. The bar screen control panel shall also integrate screenings belt conveyor operation and control features. The control panel shall be able to receive or send at least seven input and out alarms to the RTU.

B. Limit Switches; The bar screen shall include the following frame mounted rake travel limit switches:

1. One NEMA 4X Top travel limit stop out of flow switch.
2. One NEMA 4X Bottom travel limit switch
3. One NEMA 4X Over-travel top limit switch.
4. The switches shall meet the applicable restrictions according to the environmental conditions of the installation.
5. All the above switches shall be pre-wired to a 304 SS NEMA 4X terminal junction box located on the side of the screen frame. The inter-connecting wires mounted on the frame shall be located in 304 SS electrical conduit.

C. The rake mechanism shall automatically initiate its cleaning cycle upon receipt of a start signal from the pump controller. The screenings belt conveyor shall also start when rake mechanism starts operation. The rake mechanism shall begin its downward travel after a pause of 3 seconds. During the descent, the rake arm shall be set backward in loaded position.

D. When the bottom switch is reached the motor shall stop. The motor direction shall then be reversed after another 3 second pause. The upward travel shall begin with the rake arm now in normal front position. During the upward travel, the rake shall pass the chute position. The chute shall tilt forward and fall back in the discharge position. Then, the wiper shall clean the rake from its load. At the top, the switch activation shall stop the motor thus ending the cycle. The rake mechanism and screenings belt conveyor stops when all pumps are stopped as signaled by the pump controller.

E. Reversing Memory Relay:

1. The printed board control circuit shall incorporate a 3 Amp (min) latching relay. It shall ensure the proper rake travel direction when

the mode selector is on "AUTO" or "MAN. TEST". The latch relay shall memorize the last travel direction prior to a power shutdown.

F. Thermal protection:

1. When the mode selector switch is on "AUTO" or on "MANUAL", this protection circuit shall cut the power off to the motor and to the control circuit of the motor starter should the following conditions occur:
 - (1) Overheat of the motor;
 - (2) Short circuiting;
 - (3) Single phasing.
2. An overload/over-travel indicating light shall be provided. The overload protection shall be sized according to the motor nameplate full load rating. This component shall be equipped with a manual reset and pad-lockable stop button.

G. Jamming protection:

1. A current metering system shall protect the mechanism against jamming. A continuous current reading (CMT) on all phases shall be monitored by an adjustable relay (CMR). The motor starting current being higher than the setting of the CMR, the jamming protection shall be put out of service by a time delay relay (TCM), for a predetermined adjustable motor start period, long enough to allow the current to fall below the CMR setting when it reaches its normal full load level.
2. Should this system be energized, the over-travel/overload light shall be activated. This system shall be reset manually by a push button.
3. When the bypass selector switch is used, the following items shall be ALL OUT OF SERVICE:
 - (1) jamming protection,
 - (2) over-travel switch,
 - (3) timers,
 - (4) control circuits,

4. Power shall be applied directly to the drive unit. Only the thermal overload and travel limit switches shall remain in service.
5. The bypass selector switch shall have a spring return to the AUTO position.

H. Over-travel Protection:

The screen shall be provided with an upper over-travel protection switch. When this switch is activated, the automatic control power shall be cut off and the motor shall stop. The over-travel/overload light shall be activated. This circuit shall be reset by a push button.

I. Control Panel

The following basic components shall be assembled in a NEMA 4X enclosure, pre-wired to identified terminal blocks. Panel hook up and installation shall be made on site by the contractor. The power supply shall be 460 Volts, 3-Phase, 60 Hz. The panel will be located in the electrical room.

1. Main breaker / fuse circuit switch sized for the application with front mounted operating handle and door interlock. 250 VA control transformer with secondary side breaker / fuse protection.
2. Reversing magnetic starter with thermal and magnetic overload protection.
3. Magnetic starter with thermal and magnetic overload protection, relays, timers, control circuitry for the conveyor belt.
4. Printed circuit board, relays and timers to operate the rake mechanism and stop it at the top of the unit after each cycle.
5. Timer: Interval timer shall causes the rake system to go through one complete cleaning cycle at pre-determined adjustable time intervals ranging from 8 to 180 minutes. This timer is only in service as long as the mode selector is in "AUTO".
6. Submersible Level Transmitter: Two submersible level transducers/transmitters shall be provided for each bar screen. One is to measure screen upstream water level. The second one is to measure water level downstream of the bar screen. The upstream and downstream water levels for each bar screen shall be sent to RTU via bar screen control panel. Submersible level transmitter shall be per Section 405020.

7. Excessive load and jamming protection device operating through a 3-phase amp monitor control circuit and over-travel limit protection. Rake upper limit over-travel protection circuit.
8. N.O. run and general alarm dry contacts. N.O. dry contact start signal for the compactor.
9. Door mounted MAINTENANCE BYPASS - OFF - AUTOMATIC/MAN. TEST selector switch and MAN. TEST button. The mode selector switch shall provide a cycle test position. When turned and held for a few seconds to the "MANUAL TEST" position, it shall produce a start signal, energizing the mechanism for one cleaning cycle only. This position of the selector shall be spring loaded, so that the selector can return to AUTO position after release.
10. Door mounted alarm relay RESET push button.
11. Door mounted FORWARD-OFF-REVERSE (jog) selector switch for manual bypass operation with spring loaded return to OFF position for maintenance purposes.
12. Status light: "SCREEN-UP", "SCREEN DOWN". Alarm light: OVERTRAVEL/OVERLOAD alarm.
13. Status light: "SCREENINGS BELT CONVEYOR-ON", "SCREENINGS BELT CONVEYOR OFF". Alarm light: GENERAL/MALFUCTION alarm
14. Lamp test: A common lamp test circuit with single push to test button shall be provided.
15. Elapsed Time Meter: This meter shall record the total time the drive unit has been in operation.
16. Ammeter: This single phase meter shall indicate the motor current drawn. It shall be provided with a range of 0 to 5 Amp.
17. Heater & Thermostat: The control panel shall include a 60 W space heater with thermostat to eliminate the formation of condensation, increase the life of the control components and ensure the best operating efficiency.
18. Provide upstream and downstream level inputs to RTU unit for monitoring.
19. Provide a door mounted Hand-Off-Auto selector switch for the conveyor belt. In the Auto position, the conveyor shall automatically start when a bar screen is called to run; provide a time delayed stop after bar screen stop. Provide "Running" and "Stop" door mounted lights. Provide a motor overload, over torque, and zero speed lights and reset button.

2.07 ANCHORAGE AND SUPPORTS

Design support legs, anchors, anchor bolts, and other structural elements per the following requirements:

- A. Design the anchorage system and lifting system per the Florida Building Code 2010:
 - 1. Ultimate Wind Velocity, mph: 180.
 - 2. Risk Category: III.
 - 3. Exposure Category: C
- B. An unreinforced concrete housekeeping pad above the reinforced concrete structural slab shall not be considered to have structural value in the design of the anchor bolts. Tension and shear values for drilled or epoxied anchor shall be FBC approved.
- C. Anchor Bolts – Provide Type 316 stainless steel anchor bolts, nuts, and washers; wedge anchor bolt shall be Kwik Bolt TZ or equal.

2.08 AUTOMATIC LUBRICATION SYSTEM

- A. Screen manufacturer shall provide ~~two-one~~ (21) centralized lubrication system ~~for all lubrication~~ for each vertical screen, ~~one to provide oil~~ for the chains ~~and one for the bearings~~. The lubrication system shall be manufactured by SKF Model KFGS or approved equal. The lubrication system shall include 316 SST flexible supply lines, nozzle, spray or brush applicators for chains, and 120VAC NEMA 4X stainless steel control panel. Screen manufacturer shall determine the pump capacity and number of application points.
- B. Provide dry contacts for a general fault alarm.
- C. Mount automatic lubrication system adjacent to screens with 304 SST unistrut.

2.09 MACHINERY LUBRICATION

- A. Grease and/or oil in contact with water shall be food grade lubrication and be NSF H1 registered.

2.10 SPARE PARTS

- B. Provide the following spare parts for each size or model of screen:

Quantity	Description
10	Complete chain links
2	Limit switches
2	Wiper blades
18 of each size	Snap rings (sizes 3/4 inch and smaller)
8 of each size	Snap rings (sizes larger than 63/64 inch)
2	Shaft bearings
2	Rake wheels
4	Carriage wheels
8	Guide bearings

- C. Pack the spare parts in a wooden box; label with the manufacturer's name and local representative's name, address, and telephone number; and attach list of materials contained therein.

2.11 FACTORY TESTING

- A. An Owner and Engineer witnessed shop testing of the actual screens at the manufacturer's plant shall be performed to determine acceptability of the screens and be included in the manufacturing cost. The screens shall be tested for: general operation of the bar cleaning mechanisms, operation of the excessive load and jamming protection device, complete control panel operation, with indicator lights, timers, selection switches, tester, and auto lubrication systems. Screens will also be evaluated for conformance to materials specifications and other requirements of the Contract Documents. Tests shall be conducted in accordance with the test codes of the ASME and the IEEE.
- B. The results of the shop tests shall be considered official and conclusive for the purpose of determining whether or not the equipment is in accordance with the performance requirements as specified.
- C. No such equipment shall be shipped to the work until the Owner notifies the Contractor in writing that the results of such tests are acceptable. When the Detailed Specifications required witnessed shop tests at the point of manufacture, or other approved facility, the only tests which will be accepted are those made in the presence of the Owner or his representative.
- D. The Contractor shall notify the Owner in writing forty-five consecutive calendar days in advance of the time when the equipment will be ready for witness shop tests or for required inspections. This notification shall

include the following information which will be subject to the approval of the Owner and Engineer:

1. A diagram of the proposed testing arrangement.
 2. A description of the proposed manufacturer's inspection and testing facilities and procedures.
 3. A list of all instruments and manufacturer proposes to use for the tests with initial and last calibration reports certified by an approved independent testing laboratory. (All instruments shall be of ranges suitable for the quantities to be measured.)
 4. Sample test data sheets.
 5. Sample calculations.
 6. Descriptive matter on the testing equipment which shall contain illustrative photographs, drawings, and such other matter as may be requested by the Owner and Engineer.
- E. Should the equipment or instrumentation not be ready, as per prior submitted approved data, the witness will return to the home office. The cost of the additional trip will be borne by the Contractor or manufacturer.
- F. Six copies of inspection and shop test data and interpreted results thereof accompanied by a certificate of authenticity sworn to, before a notary, by an officer of the manufacturing company shall be forwarded to the Owner for review and approval as required.
- G. The Contractor shall, for one representative of the Owner, be responsible for the costs of all transportation, lodging and miscellaneous travel expenses for each witness shop test or inspection required by the Contract Documents. These costs shall be included in his total bid price for the Contract. The Contractor shall make all travel, lodging and local transportation arrangements and pay such expenses directly, in advance. Contractor shall also reimburse City for the costs of all meals associated with the witness shop test, upon presentation of receipts for same.
- H. If a retest is required, the cost shall be borne by the Contractor.
- I. All equipment and material to be witness shop tested shall be identified with serial numbers and/or approved permanent type identification marks.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install per manufacturer's instructions.

3.02 PAINTING AND COATING

- A. Coat submerged metal and metal under the concrete deck per Section 099000, System No. 1. Do not coat stainless steel.
- B. Coat ferrous metal above the concrete deck per Section 099000, System No. 10. Apply prime coat at factory. Color finish coat shall be light gray.

3.03 SERVICE CONDITIONS

The design criteria for the screens shall be as follows:

Peak design flow (clear water):	21,000 gpm <u>36 MGD</u>
Head loss at peak design flow, 50% blinded (clear water):	9 inches
Channel width:	54 inches
Channel depth (invert to top of deck):	19'-10"*
Lift from invert to discharge point:	23'-5"*
Maximum downstream water depth:	14'-10"
Minimum downstream water depth:	8'- 4"
Screen opening:	1 inch
Bar height	180 <u>145</u> inches
Angle of screen inclination from horizontal:	Vertical
Motor type (per Section 262650):	4AEM
Motor horsepower (minimum):	1 H.P.
Motor Voltage	460, 3 phase
Liquid screened:	Stormwater

* Contractor shall confirm dimensions prior to ordering equipment.

3.04 FIELD TESTING

Operate each bar screen for 30 consecutive days and adjust the equipment. Assure that the automatic sequencing and control system interconnecting the screens, conveyors, and other equipment are functioning correctly. Each day, during this 30-day period, start the screen system and demonstrate that the system functions as designed. Assure that gear reducers operate without binding or sticking. Assure that components within the screens are aligned so that screen teeth are not damaged during operation.

3.05 LABELING AND MARKING

Provide a tag bearing the tag number for the unit. See Section 400775.

3.06 CONTRACT CLOSEOUT

Provide in accordance with Section 017000.

3.07 WARRANTY

The equipment shall be warranted for four (4) years commencing from date of substantial completion.

3.08 CERTIFICATION

- A. Provide a written certification from the equipment manufacturer that each pumping system has been properly installed according to the Contract Documents and the manufacturer's recommendations, and that the equipment is operating normally. Make all necessary corrections and adjustments including but not limited to parts, labor, or freight at no additional cost to the Owner.
- B. Screen manufacturers service technician shall verify that the vertical and horizontal alignment on the screen frame is within manufacturer's tolerance above and below the wet well floor of no more than 0.002" per foot. Alignment shall be verified using a plumb bob for vertical alignment check. Certificate of proper installation must be signed by the screen manufacturer before startup can occur.

END OF SECTION