

ADDENDUM NO. 1

To the Contract Provisions for:

CITY OF MOUNT VERNON **PROJECTS SS-2017-006**  
WWTP Screw Press Procurement Rebid

To the attention of all bidders for the above project:

Please find the following Addendum No. 1 for the above referenced project.

This addendum is to be considered as much a part of the Contract Document as if it were included in the body of the plans and specifications, and will be incorporated in and made a part of the contract when awarded and when formally executed.

Section 01 11 13

REPLACE:

Replace Specification Section 01 11 13 in its entirety with Specification Section 01 11 13 (attached).

Section 46 76 27

REPLACE:

Replace Specification Section 46 76 27 in its entirety with Specification Section 46 76 27 (attached).

Acknowledgement that this addendum has been received is required on the PROPOSAL SIGNATURE AND ADDENDA ACKNOWLEDGEMENT page 7.



Issued by: Kenny Packard, HDR

Date: May 31, 2017

**SECTION 01 11 13**  
**SUMMARY OF GOOD AND SPECIAL SERVICES**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Project Summary: This project involves the supply of one (1) new screw press system for the City of Mount Vernon Wastewater Treatment Plant.
- B. Related sections include but are not necessarily limited to:
  - 1. Special Provisions.
  - 2. Division 1 - General Requirements.
  - 3. Division 10 – Technical Special Provision.

**1.2 GOODS AND SPECIAL SERVICES COVERED BY CONTRACT**

- A. The Bid Form includes one (1) Bid Item for the project. The Goods and Special Services to be furnished include:
  - 1. Bid Item No. 1: Screw Press
    - a. All labor, equipment, materials, and appurtenances for furnishing the screw press and ancillary systems, including a flocculation tank and mixer, as specified in these Contract Documents.
    - b. The equipment shall be delivered to the Mount Vernon Wastewater Treatment Plant.
    - c. Special Services shall include, but are not limited to:
      - 1) Shop Drawings.
      - 2) Operations and Maintenance Manuals
      - 3) Manufacturer’s Field Services such as all the necessary startup, testing, and training of Buyer’s operations and maintenance personnel as quality control and quality assurance of the delivered equipment.
    - d. Conduct performance testing of equipment to show compliance with performance requirements.
    - e. The completion of all the furnishing of Goods and Special Services shall be on or before the dates or within the number of calendar days indicated in the Agreement.
  - 2. Bid Item No. 2: Maintenance Contract
    - a. Maintenance Contract for ten (10) year period after successful startup of equipment.
      - 1) Maintenance contract shall cover all materials, labor and equipment to perform all scheduled and unscheduled maintenance for the screw press in accordance with Final Operations and Maintenance Manual with the following exception.
        - a) Buyer shall perform all routine greasing and oil changes required as part of the maintenance schedule.
        - b) Electrical system components will be covered by the standard warranty from the manufacturer of each individual component.

**1.3 MAINTENANCE CONTRACT OPERATING PROVISION**

- A. Buyer will operate Seller’s equipment pursuant to the requirements of the current edition of the Seller’s standard Operations and Maintenance Manual in print as of May 2017. Standard manual shall be supplied by the apparent low Bidder within 10 days of bid opening. There will be no modifications, deletions, additions, or exceptions to the basis of maintenance contract requirements.
- B. Damage caused by vandalism, neglect, acts of God, or abuse will not be covered by the maintenance contract.

- C. Buyer will operate the unit a maximum of 15,600 hours per five-year period and no more than the hourly maximum capacity stated in Sludge Characteristics and PERFORMANCE AND DESIGN REQUIREMENTS herein.
- D. Buyer currently records daily totals of feed from the sludge storage tank and daily polymer flow. These records can be made available to Seller on a monthly basis.
- E. Buyer will make progress payments for the maintenance contract at the end of each maintenance contract year in equal payments over the life of the maintenance contract.

**1.4 WORK BY OTHERS**

- A. Buyer or Buyer's Installation Contractor will install the screw press and ancillary systems purchased on this contract.

**1.5 FABRICATION SCHEDULE**

- A. Within ten (10) days of Notice to Proceed, the Seller shall submit their fabrication schedule to meet the scheduled sequence, milestones, and limitations. The schedule shall be a bar chart showing, as a minimum, the schedule for the following activities:
  - 1. Fabrication of equipment.
  - 2. Equipment delivery.
  - 3. Final Shop Drawings.

**1.6 OTHERS WORKING AT PROJECT SITE**

- A. The Seller shall coordinate the delivery of the equipment and appurtenances with the Buyer.

**1.7 SUBSTANTIAL COMPLETION**

- A. For the purposes of establishing when the Project is substantially complete and suitable for its intended purpose, the following functional components and work elements shall be completed:
  - 1. Final shop drawings submitted and approved.
  - 2. Goods delivered to the site.
  - 3. Final operations and maintenance manuals submitted and approved.
  - 4. Manufacturer's Field Services are complete.
  - 5. Satisfactory completion of performance testing.

**1.8 REGULATORY REQUIREMENTS**

- A. Comply with all Federal, State, and local laws, regulations, codes, and ordinance applicable to furnishing the Goods and Special Services.
- B. References in the Contract Documents to local codes shall mean City of Mount Vernon, WA.
- C. Other standards and codes that apply to furnishing the Goods and Special Services are designated in the Specifications.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

**SECTION 46 76 27**  
**SCREW PRESS SYSTEM**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Scope: Furnish all the equipment necessary for the operation of one screw press:
1. The screw press will be used to dewater primary and waste activated sludge.
  2. Screw press to be specifically designed to maximize solids content of dewatered sludge.
- B. Provide one screw press complete with:
1. Drive motors and gear reducers.
  2. Engineered support system with proper anchorages.
  3. Flocculation tank and mixer.
  4. Electrical and local control panels with measuring and control devices.
  5. Special tools and accessories.
  6. Spare parts.
  7. Sellers field services.
  8. Performance guarantee.
  9. Any other features/equipment required to make a complete system.
- C. Related Sections include but are not necessarily limited to:
1. Special Provisions.
  2. Division 1 - General Requirements.
  3. Division 10 – Technical Special Provision.

**1.2 QUALITY ASSURANCE**

- A. Requirements of regulatory agencies and reference standards:
1. Comply with all local and federal regulations.
    - a. Standard Methods for Examination of Water and Wastewater
    - b. EPA Sampling Procedures and Protocols for the National Sewage Sludge Survey
    - c. EPA POTW Sludge Sampling and Analysis Guidance Documents.
  2. Comply with all necessary local and federal codes including:
    - a. American Gear Manufacturers Association.
    - b. American Institute Steel Construction.
    - c. American Iron and Steel Institute.
    - d. American National Standards Institute.
    - e. American Society of Mechanical Engineers.
    - f. American Society for Testing and Materials.
    - g. American Welding Society.
    - h. Institute of Electrical and Electronics Engineers.
    - i. Instrument Society of America.
    - j. National Electrical Code.
    - k. National Electrical Manufacturers Association.
    - l. Steel Structure Painting Council.
    - m. Underwriter's Laboratories.
    - n. Uniform Building Code
    - o. Standard Methods

**1.3 QUALIFICATIONS**

- A. Screw press support system shall be designed and Shop Drawings prepared and sealed by a Registered Professional Engineer in the state of Washington.

## 1.4 SUBMITTALS

### A. Shop Drawings:

1. See Section 01 61 03- Equipment Basic Requirements for the required content of the shop drawings.

### B. Engineered Submittals:

1. Equipment supplier shall design and stamp the screw press support system. The design shall include supporting structural calculations and fabrication drawings, both of which are to be prepared and sealed by professional engineer registered in the State of Washington.

### C. Performance Guarantee Statement:

1. On seller's letterhead.
  - a. Signed by officer of company.
  - b. State ability to meet specified operating parameters for maximum polymer dose, minimum cake solids, and pressate recovery as listed herein.
  - c. Performance Guarantee Statement shall be established on the basis of a 60 gpm sludge feed rate.
  - d. Maximum polymer dose shall based on the Owner's existing polymer.

### D. Detailed Bill of Shipped Materials:

1. Complete list of all materials shipped to the Wastewater Treatment Plant.

### E. Operation and Maintenance Manuals:

1. See Section 01 61 03- Equipment Basic Requirements for:
  - a. The content of Operation and Maintenance Manuals.
2. Equipment shall not be started until a manufacturer Operation and Maintenance manual has been submitted and approved.

### F. Submittal Milestones:

1. Submittals shall be provided according to the following schedule:
  - a. Performance Guarantee Statement: Submit at time of bid.
  - b. Shop Drawings, including electronic AutoCAD files: Submit within 30 days after Notice to Proceed.
    - 1) Owner review period shall be 10 working days.
  - c. Engineered Submittals: Submit within 30 days after Notice to Proceed.
    - 1) Owner review period shall be 10 working days.
  - d. Detailed Bill of Shipped Materials:
    - 1) Submit on date of shipment.
  - e. Draft Operations and Maintenance Manual: Submit within 10 days after bid opening.
  - f. Final Operations and Maintenance Manual:
    - 1) Final approval in electronic format (PDF) must be obtained 45 days prior to equipment start-up.
    - 2) Provide paper copies and thumb drives of approved final Operation and Maintenance Manuals in electronic format (PDF), a minimum of 30 days prior to equipment start-up.

## 1.5 PROJECT CONDITIONS

### A. The screw press and supporting equipment shall be:

1. Class B Operation:
  - a. Furnished equipment shall be capable of dewatering biosolids from anaerobically digested primary and waste activated sludge (WAS).
  - b. The flocculation and dewatering systems shall be capable of working in tandem to providing a minimum output capacity of 560 dry tons of solids per year per and produce a minimum cake dry weight solids concentration as stated below.
    - 1) The system shall operate on average 50 hours per week.
2. Figures 1-2 provide the location and size constraints for the new screw press.

### B. Ambient Conditions

1. Average High Temperature: 74 Degrees F
2. Maximum High Temperature: 93 Degrees F
3. Maximum Relative Humidity: 100%
4. Elevation: 20 ± FT, MSL

C. Other sludge characteristics:

1. In April of 2017 the Buyer contracted with a third party laboratory to complete a Dewatering Study. This Study characterized the Buyer's sludge and quantified the free water stored in the sludge. A copy of this report has been included in Appendix 1 to this specification.

**1.6 PAYMENT**

A. BUYER shall make progress payments on account of the Contract Price on the basis of SELLER's applications for Payment as recommended by ENGINEER, as provided below and in the General Conditions:

<u>Event</u>	<u>Percentage of Payment at each Event</u>
1. Approval of Shop Drawings	10
2. Delivery of Goods	50
3. Delivery of Final O&M Manuals	5
4. Satisfactory completion of Performance Testing	30
5. Satisfactory completion of Personnel Training	5

**1.7 WARRANTY**

A. Equipment Warranty.

1. See Section 01 11 13 Article 1.2.A.2.

**1.8 BASIS FOR DESIGN FOR CLASS B BIOSOLIDS PRODUCTION**

<b>Parameter</b>	<b>Value</b>	<b>Units</b>
Number of Screw Press Units	1	Quantity
Dry Tons per Year	560	Bone Dry Standard Tons/yr
Average Gallons per Day	24,000 <sup>1</sup>	gpd
Average Inlet Consistency Percent Total Solids (dry weight basis)	2.3% to 2.6%	% TS
Raw Sludge Volatile Solids	78 to 82%	%VS
Average Raw Sludge Percent Primary Sludge	±39%	
Average Raw Sludge Percent WAS	±61%	
Raw Sludge pH	±7.3	
Raw Sludge Temperature	±65	Degrees Fahrenheit
Average Screw Press Operating Flow	60	gpm
Maximum Screw Press Hydraulic Capacity	75	gpm

Parameter	Value	Units
Minimum Screw Press Outlet Consistency Percent Total Solids (at average flow of 60 gpm)	18.5%	% TS
Minimum Screw Press Recovery Efficiency (at average flow of 60 gpm)	95%	As calculated in 3.6E
Maximum Screw Press Polymer Dosage (at average flow of 60 gpm)	40	lbs active/ton dry weight solids

<sup>1</sup> This value is the average daily sludge production of the treatment plant.

## PART 2 - PRODUCTS

### 2.1 ACCEPTABLE SELLERS

A. Acceptable Manufacturers are defined as Manufacturers capable of meeting the requirements set forth in these contract documents.

### 2.2 MANUFACTURED UNITS

A. Products:

Item	Description
<b>Screw Press</b>	
Number of Units	1
Description of Biosolids (Feed)	Anaerobically Digested Municipal Primary and Waste Activated Sludge (WAS).
Materials of Construction	304 stainless steel (L Grade or full submersion passivation per ASTM 380 for welded components)
Screw design	304 stainless steel, Teflon coated.
Screens	304 Stainless Steel, wedge wire, perforated type or similar.
Motor	Horsepower as required, 1800 rpm, National Electrical manufacturers Association (NEMA) B, 480 VAC, 3 Phase (PH, 60 Hertz (Hz), Suitable for variable speed operation with Pulse-width Modulation (PWM) constant torque inverter.
Discharge Height for Dewatered Cake	As shown in Figures 1 and 2.
Other	1 set standard tools for screw press. 2 sets of brushes with mounting hardware (clips) - (brushes are wear parts). 2 bearing assemblies for shaft. 2 solenoid valves 110V, Cl.1/ Div.2 for spray bar washing system. 20 nozzles for spray bar washing system.
<b>Flocculation Tank Mixer</b>	
Number	1

Item	Description
Description	Flocculation Tank and mixer system shall be designed to operate in tandem with the screw press for the range of operating conditions described. Flocculation Tank shall have a hinged cover for accessibility.
Mixer	Removable.
Pipe Size and Connection	6" Flanged.

### 2.3 CONTROLS AND INSTRUMENTATION

A. The control system shall be furnished by the seller of the screw press and shall be fully automatic including the following controls:

1. Screw Press Control Panels:
  - a. Quantity: 1.
2. Automatic control for the pneumatic pressure cone.

B. Screw Press Control Panels:

1. Provide one Screw Press Control Panel:
  - a. Stainless steel enclosure with NEMA 4X rating:
    - 1) Continuous seam welded.
    - 2) Single front door with continuous hinge, neoprene gasket.
    - 3) Mechanism designed for securing enclosure with padlock.
    - 4) Mounted on a support frame, pedestal mounting.
    - 5) Condensation protection shall be provided with a space heater.
    - 6) Air conditioner attached to panel exterior. Size as required based on ambient room conditions to prevent overheating of the enclosure components.
  - b. Incoming power: 480 VAC, 3-phase.
  - c. Main circuit breaker with external disconnect handle, pad-lockable.
  - d. Surge arrester.
  - e. Control power transformer with line and load fuses.
  - f. Variable Frequency Controller (VFD):
    - 1) Screw press main drive.
  - g. Ethernet switch.
  - h. Programmable Logic Controller (PLC):
    - 1) Acceptable manufacturers:
      - a) Allen-Bradley, CompactLogix.
      - b) Or equal.
    - 2) Design and fabrication:
      - a) On-board Ethernet.
      - b) PLC Programming by Screw Press manufacturer.
  - i. Operator Interface Unit (OIU):
    - 1) Acceptable manufacturers:
      - a) Allen-Bradley PanelView 600.
      - b) Or equal.
    - 2) Design and fabrication:
      - a) Color, touch screen.
      - b) Display size: 6 IN diagonal, minimum.
      - c) Ethernet communications to PLC.
      - d) OIU Programming by Screw Press manufacturer.
  - j. Operator controls and indicators (pilot devices) located on panel exterior:
    - 1) Control power ON light, white lens.
    - 2) Dewatering system in operation, green lens.
    - 3) System Disturbance light, amber lens.
    - 4) Emergency Stop pushbutton with mushroom-head.
    - 5) System reset pushbutton.



- 6) Alarm silence pushbutton.
- 7) HAND/OFF/AUTO selector switch for spray wash.
- k. Pilot device requirements:
  - 1) Heavy-duty type.
  - 2) Oiltight, NEMA 4X rating.
  - 3) Mounting hole: 30.5 mm.
  - 4) Knob type operators.
  - 5) Push-to-test pilot lights, lens color as indicated.
  - 6) Legend plates:
    - a) Laminated, phenolic plastic with white field and black letters.
    - b) 2 IN x 2 IN.
- l. Running time meter, NEMA 4X rated:
  - 1) Screw Press.
  - 2) Sludge Pump.
- m. Alarm horn.
- n. Alarm beacon.
- o. Laminated plastic nametags shall be provided for the name of the control panel and all disconnects, switches, lights, and meters.
- p. Plant Control System interface requirements:
  - 1) Each discrete interface point shall be in the form of a dry, relay contact wired to terminal blocks.
  - 2) The following is a list of interface points required between the Screw Press Control Panels and the Plant Control System.
    - a) Discrete Signals:
      - (1) E-Stop activated.
      - (2) System in Auto.
      - (3) Dewatering mode.
      - (4) System Disturbance.
      - (5) Common Alarm.
      - (6) Screw Press running.
      - (7) Screw Press fault.
      - (8) Sludge Pump running.
      - (9) Sludge Pump fault.
      - (10) Polymer System running.
      - (11) Low Polymer flow.
      - (12) Low Water pressure.
    - b) Analog Signals:
      - (1) Screw Press VFD speed feedback signal.
      - (2) Sludge Pump VFD speed feedback signal.
      - (3) Sludge Flow signal.
      - (4) Polymer Speed feedback signal.
  - 3) Controls from Plant Control System:
    - a) Discrete Signals:
      - (1) System Enable
    - b) Analog Signals: None.
- q. Control interface requirements to the Sludge Feed Pump VFD:
  - 1) VFD in Auto mode (discrete input, dry contact).
  - 2) VFD Running (discrete input, dry contact).
  - 3) VFD Fault (discrete input, dry contact).
  - 4) VFD Run command (discrete output, dry contact).
  - 5) VFD Speed command signal (analog, 4-20ma DC).
  - 6) VFD Speed feedback signal (analog, 4-20ma DC).
- r. Spare terminals (control and power voltage) shall be provided to accommodate for remote control operation and to interface with other equipment components such as the polymer dosing system, thin sludge pumps etc.

- s. All internal wiring shall be neat and color coded. Each wire shall be labeled at both ends with a heat-shrinkable wire label. All incoming wires shall terminate into a box clamp type terminal block. All control wires shall be 14 Ga. Type TEW, tinned copper, rated for 105 DegC.
- t. A schematic diagram (showing wire color) shall be permanently fastened to the inside of the enclosure. An Installation and Service Manual shall also be included with each control panel.
- u. Apply corrosion inhibitors inside the panel after fabrication and prior to shipment to the jobsite. Inhibitor shall consist of agents that vaporize and then condenses on all internal surfaces of the enclosure.
- v. Panel shall be factory wired and tested.
- w. The control panel shall be U.L. listed as an assembly.

## **2.4 PAINTING**

### **A. Painting:**

- 1. Shop clean and prime coat all iron and steel surfaces, except stainless steel, motors and gear reducers with standard manufacturer coatings suitable for corrosive environment.

## **PART 3 - EXECUTION**

### **3.1 SHIPPING**

A. The screw presses are to be shipped to the site with the following components unassembled from the main equipment:

- 1. Gearbox and motor
- 2. Screw and basket
- 3. Support legs
- 4. Flocculation Tank
- 5. Flocculation Tank Mixer

### **3.2 MEETINGS**

A. Seller's Representative shall attend the preconstruction meeting.

### **3.3 INSTALLATION**

A. Dewatering system to be installed by the Contractor in accordance with the seller's approved written instruction.

- 1. The screw press are to be moved into the existing building with the following components unassembled from the main equipment:
  - a. Gearbox and motor
  - b. Screw and basket
  - c. Support legs
  - d. Flocculation Tank
  - e. Flocculation Tank Mixer
- 2. The Contractor will reassemble the screw press inside the building. The Seller shall have a representative onsite to provide oversight and guidance to the Contractor's staff during reassembly and to observe that the screw press has been properly reassembled.

B. The following field service shall be provided to support installation and performance testing.

- 1. Seller's Representative to inspect, check, and adjust equipment as required and verify that equipment has been installed in accordance with the seller's written instruction immediately prior to Performance Testing.
- 2. Seller to be present when equipment is placed in operation.
- 3. Seller to revisit the Project Site as often as required to correct problems related to Seller's product performance or quality, at no cost to Buyer, until equipment installation and operation are acceptable to the Buyer.
- 4. Seller to include in the Contract Price a minimum of four (4) separate trips to the Project Site

- a. To provide oversight to Contractor while contractor is reassembling screw press.
- b. To inspect the installation after Contractor has given written notice the unit is completely installed and all control and power wiring is complete.
- c. To start the system and place system in operation
- d. To conduct performance testing.

### **3.4 SCHEDULE OF FIELD SERVICE BY SELLER**

- A. Maximum of three 8-hour days on-site for oversight of reassembly after Contractor has given Seller a minimum of 2 weeks prior written notice that Contractor will be ready for reassembly.
- B. Maximum of three 8-hour days to inspect installation for conformity to the Seller's written installation instructions including piping connections, anchorage, power and control wiring connections after Contractor has given Seller a minimum of 2 weeks prior written notice that Contractor is ready for installation inspection.
- C. Startup of system after Buyer/Contractor has given Seller a minimum of 2 weeks written notice that system is ready for startup and all punch list items from installation inspection have been satisfactorily completed.
- D. Performance testing may start at any time after startup once Seller certifies in writing to Buyer that the equipment is installed correctly, is ready for testing and after the required training has been completed.
  - 1. It is desired to have the performance testing take place in the March to April time period; however, if the Construction Contractor has not completed the installation and all the checks have not been completed, the performance test can be completed after April or before March.
    - a. Upon satisfactory completion of the performance test, Seller will be due the percentage of payment as schedule in the payment article.
    - b. If the test is not conducted in the month of April, the Seller shall inform its Bonding Company that the Buyer requires the performance bond to remain in effect until the results of the Buyer's performance test in the month of April.
      - 1) Seller will have the opportunity to observe, assist, and split samples of Buyer's performance test.
      - 2) Should the performance test results obtained by Buyer in his testing during the month of April not meet the performance guarantees, Seller will be allowed to retest at his expense, make corrections or reimburse Buyer pursuant to the provisions of the contract.
    - c. Upon successful completion of performance test in April, Buyer will issue a notice of Final Completion and release of Seller's Performance Bond.

### **3.5 PREOPERATING CHECKS**

- A. Per seller's installation checklist:
  - 1. Performed by factory authorized representative.
  - 2. Supervise unloading and storage of units.
  - 3. Inspect installation and make mechanical check of screw press system.
  - 4. Seller to submit Installation Inspection Report for completed installation:
    - a. Report to be submitted within five calendar days of the inspection.
    - b. Report to include list of all deficiencies and recommended corrective actions.
  - 5. After correcting all deficiencies, whether by Construction Contractor or Seller to:
    - a. Certify in writing that screw press system properly installed and adjusted.
    - b. Ready for start-up and mechanical testing.
  - 6. Seller to submit qualifications of factory representative to Engineer for approval.

### **3.6 FIELD TESTING AND ADJUSTING**

- A. It is required that start-up and testing of screw press be started as soon as possible after installation.

- B. After installation and after all components operable.
- C. Submit unit to complete normal start, normal stop, and emergency stop cycles.
- D. Submit screw press to an 8-hr minimum running test:
  - 1. At beginning and end of test, and at one-hour intervals between, check:
    - a. All thermometers.
    - b. Pressure gauges.
    - c. Flow indicators.
    - d. All safety devices.
    - e. Differential speed control.
    - f. Bearing temperatures.
    - g. Belt tension.
    - h. All instruments and controls.
  - 2. Check no load amperage of motor.
  - 3. Tests run by seller's authorized representative with assistance from Seller.
  - 4. All readings to be recorded and submitted to Engineer in written form.
- E. Correct all malfunctions and retest as directed by Engineer, until equipment is operating properly:
  - 1. Each retest shall be for the specified eight-hour period.
  - 2. Supplier/Seller to certify in writing that screw press is ready for performance testing.

### 3.7 PERFORMANCE TESTING

- A. After operational testing and adjusting described above is completed.
- B. Submit each screw press to a performance test to:
  - 1. Performance tests shall commence following the screw press installation complete and ready for startup.
  - 2. Demonstrate each screw press can perform as guaranteed in the Performance Guarantee Statement.
  - 3. Run a minimum of two (2) tests
  - 4. Tests will be made in five (5)-hour runs.
  - 5. Days between tests will vary from 3-4 days due to Buyer's solids production.
  - 6. Tests to be witnessed by Engineer.
  - 7. Tests to be scheduled by Engineer in conjunction with Buyer and Seller.
  - 8. After the two performance tests have been completed, the Buyer will continue to operate the screw presses for 30 days based on the final set points to verify long term performance.
    - a. Buyer will continue to collect samples 3-4 times a week during the extended performance operation to confirm that the equipment continues to meet the guaranteed performance.
    - b. Buyer will split the samples collected for analysis with the Seller at the request of the Seller, however the Seller shall pay for all analysis of the Seller's samples.
    - c. Seller shall be available to the Buyer on call in the event that technical assistance is required from the Seller.
- C. Collect samples at the following locations:
  - 1. Solids discharge.
  - 2. Pressate discharge.
  - 3. Screw press feed pipe.
  - 4. Samples collected at start and end of each test run and at 45 minute max intervals in between. Sample volume shall be at least 500 ml for each sample taken at the three sample points at each sample time.
  - 5. Each days samples will be combined for a composite sample for testing.
  - 6. Each days composite will be split with the Buyer.
  - 7. Test results will be averaged over the test period.
- D. Suitably label and split samples and deliver promptly Buyer's split sample for his analysis.

E. Seller shall have the following tests performed by an independent EPA accredited laboratory to determine solids concentration and suspended solid recovery. Testing shall conform to standards referenced in Part 1 of these specifications. Laboratory shall also collect samples:

1. Screw press solids: Total solids.
2. Pressate: Suspended solids.
3. Screw press feed: Suspended solids and volatile solids.
4. Computation to determine solids recovery efficiency to be determined from following formula:

$$\% \text{ recovery} = \frac{C(F-E)}{F(C-E)} \times 100$$

Where C = % solids (total solids)  
 F = % feed solids (suspended solids)  
 E = % pressate solids (suspended solids)  
 All values expressed as a decimal

F. Buyer will order and inventory performance polymer. Record polymer usage by weight during each performance run.

1. Determine polymer concentrations from Buyer's weight record.
2. Compute lbs polymer per dry ton solids.

G. If performance fails to meet the specifications:

1. Seller will be allowed to make corrections and one retest.
2. All adjustments and retests to be made within 90 days of first test at Seller's cost.
3. Seller will be allowed one retest for the full scale performance tests. If after the second test the equipment does not meet the required performance, the Seller will reimburse the Buyer a lump sum, payable in a cashier's check to the City of Mount Vernon, Washington, in the amount as determined by the following formula:

H. Reimbursement will be calculated as follows with the significant figures as indicated.

Where:

C =	Guaranteed % pressate recovery	(95%)
c =	Performance test % pressate recovery	(Expressed as XX.X)
S =	Guaranteed % solids cake	(18.5%)
s =	Performance test % solids cake	(Expressed as XX.X)
P =	Guaranteed maximum pounds of polymer/dry ton	(40 lbs/dry ton)
p =	Performance test pounds of polymer required per dry ton.	(Expressed as XX.X)
Q =	Dry tons of solids per year	560
\$P =	Cost per pound of polymer	\$1.70
\$S =	Cost to haul each % of additional water each year	\$ 9,500
\$C =	Cost to process each additional % of pressate each year	\$ 3,800
R =	Present Worth Factor at 4% for 20 years	13.59

Polymer Cost	(p-P) * \$P * Q	if less than Zero, enter zero	\$ _____
Pressate Quality	(C-c) * \$C	if less than Zero, enter zero	\$ _____
Cake Quality	(S-s) * \$S	if less than Zero, enter zero	\$ _____
		Total Yearly Cost (TYC)	\$ _____
Reimbursement will equal	TYC * R	=	\$ _____

I. After successful completion of acceptance tests, screw press seller shall prepare written report:

1. Summarize details of tests.
2. Provide test results.
3. Compare test results with acceptance criteria.
4. Present data in tabular and graphical form.

### 3.8 FIELD QUALITY CONTROL

#### A. General:

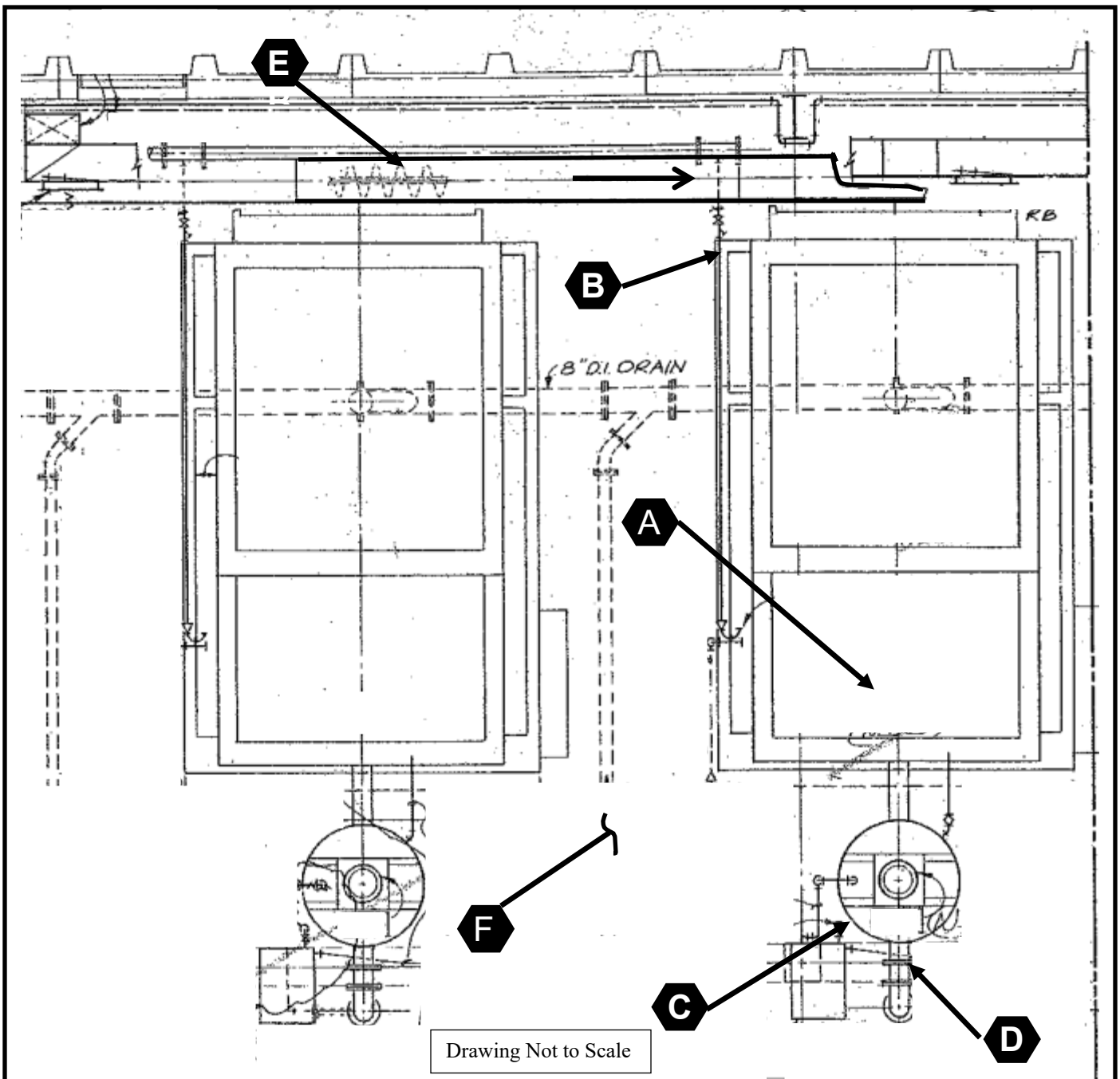
1. Seller to prepare a log showing each equipment item that includes a listing of what shall be accomplished during Equipment Startup. A completed log along with a certificate indicating that startup and training is complete shall be submitted to the Buyer through the Engineer for review. Upon successful completion of operator startup and training, Buyer will endorse certificate, attesting to the successful completion of the startup and training.
2. Provide sellers field services.
3. Qualified factory representative to supervise:
  - a. Start-up screw press.
  - b. Instruction of Buyer's personnel in operation and maintenance of screw press.
4. These services in addition to all other specified services.
5. Provide at least 2 days of training and all related expenses.
6. Two additional follow-up Inspections and training as requested by Buyer with 14 days advance notice to Seller during the one-year warranty period.
7. Provide per diem salary and expenses for additional or fewer days of training.

#### B. Training

1. Training to be scheduled through the construction Contractor and Engineer.
2. Training sessions to be in classroom and on-site.
3. To occur after completion of installation, testing and start-up of all installed equipment.
4. Training for operations personnel to be separate from maintenance personnel.
5. Training session times to be defined by Buyer.
  - a. To coincide with shift schedules.
  - b. To be in maximum 7-hour intervals.
  - c. Acceptable times for training are Tuesday through Thursday, 7am – 3pm PST, except holidays.
6. Seller to submit course outline at least two weeks before training starts.
7. Seller to submit examples of class materials for operations and maintenance staff separately.
8. Seller to discuss the following topics for operations training;
  - a. Theory of operation.
  - b. Start-up procedures.
  - c. Shutdown procedures.
  - d. Troubleshooting.
  - e. Selection of proper polymer types and dosages.
  - f. Operating adjustments for performance optimization.
  - g. Emergency procedures.
  - h. Recordkeeping.
  - i. Instrumentation and controls.
  - j. Other deemed important by the Seller.
9. Discuss the following topics for maintenance training:
  - a. Preventative maintenance.
  - b. Maintenance procedures.
  - c. Other deemed important by the Seller.
10. Training sessions by Seller may be videotaped by Buyer.
11. Seller to include in his bid costs for all presentation materials and handouts for up to ten (10) participants.
12. All costs for training and start-up to be included in the contract Price.

### END OF SECTION

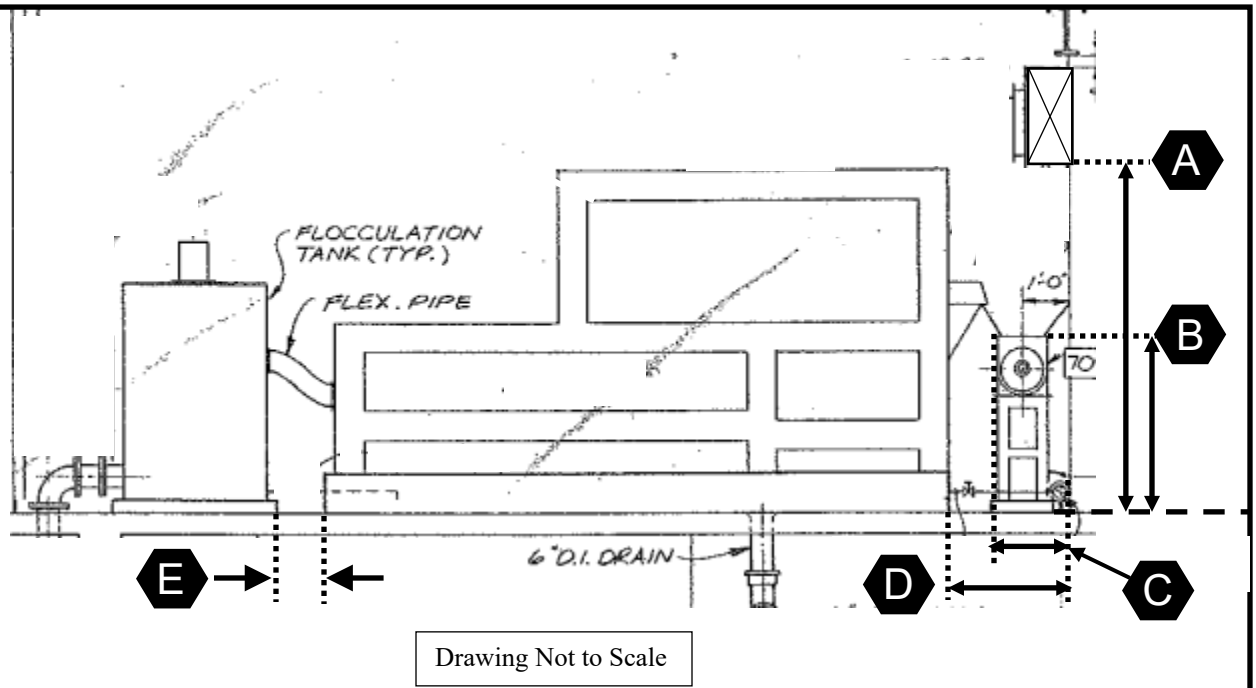
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Drawing Not to Scale

A	Existing south belt filter press and flocculation tank to be replaced with screw press and flocculation tank.
B	Existing belt filter press base is 14'-4" long by 9'-10" wide by 1'-6" deep. Modifications to equipment base permitted to facilitate equipment installation.
C	Existing flocculation tank base is 3'-10" by 3'-10" by 1'-6" tall. Modifications to equipment base permitted to facilitate equipment installation.
D	Existing 6" diameter sludge feed pipe centerline approximately 27" above finished floor elevation.
E	Existing screw conveyor.
F	The area beneath the existing belt filter press and flocculation tank and approximately 5 feet beyond their foot print in all directions are routinely wet.





A	Bottom of duct 9'-4" above finished floor elevation.
B	Top of existing discharge conveyor 4'-0" above finished floor elevation.
C	Distance from existing wall to edge of existing conveyor is approximately 3'-2".
D	Distance from existing wall to equipment base is approximately 3'-6".
E	Distance between existing flocculation tank base and existing belt filter press base is approximately 1'-0".