

ADDENDUM NO. ELEVEN (11)

Project: Harold D. Thompson Regional Water Reclamation Facility
Phase 1 – 2.5 MGD

Date of Addendum: December 14, 2012

Owner: Lower Fountain Metropolitan Sewage Disposal District

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THE FOLLOWING REVISIONS AND CLARIFICATIONS ARE HEREBY MADE TO THE BIDDING AND CONTRACT DOCUMENTS FOR THIS PROJECT:

PART I – GENERAL

1.01 SCOPE

- A. This Addendum forms a part of the Contract Documents and modifies the Project Manual and Drawings as described below.
- B. This Addendum consists of sixteen (16) pages including attachments.

1.02 ACKNOWLEDGMENT

- A. Acknowledge receipt of this Addendum by return electronic mail correspondence.

PART II - PROJECT MANUAL

2.01 BIDDING REQUIREMENTS – This Addendum No. Eleven (11) makes no changes to the Bidding Requirements

2.02 TECHNICAL SPECIFICATIONS

A. SECTION 11315 – PROGRESSIVE CAVITY PUMPS

- 1. **ADD** new Paragraphs 1.1.A.1.d., e. and f. to read as follows:
 - d. "BPP-1 and BPP-2 for sludge feed pumping to dewatering equipment
 - e. BPP-1 and BPP-2 installed in the Biosolids Handling Complex
 - f. BPP-1 and BPP-2 suitable for variable speed operation with electronic variable frequency drive equipment"
- 2. **ADD** new Paragraph 1.5.C. to read as follows:
 - C. "Belt Press Feed Pumps: BPP-1 and BPP-2
 - 1. Pumped fluid
 - a. Aerobically digested sludge from digested sludge day tank to biosolids dewatering equipment
 - b. Altitude: 5411 feet above sea level
 - c. Solids concentration: 0.1% to 3%
 - d. Temperature range: 5°C to 23°C"

3. **ADD** new Paragraph 2.1.D. to read as follows:
 - D. "Belt Press Feed Pumps: BPP-1 and BPP-2
 1. Number of units: 2
 2. Maximum pump operating speed at 60 Hz (design full speed): 500 rpm
 - a. Rated capacity: 174 gpm
 - b. Total head at rated capacity: 7.7 psi
 3. Minimum pump operating speed at reduced speed: 150 rpm
 - a. Rated capacity: 83 gpm
 - b. Total head at rated capacity: 5.4 psi
 4. Maximum motor operating speed: 1,800 rpm, nominal
 5. Maximum brake horsepower (bhp) required at input shaft for any point in operating range: 6.0
 6. Maximum motor nameplate rating: 7.5 hp
 7. Minimum diameter of test sphere: 0.6 inch
 8. Maximum NPSH required at any point in operating range: 19.0 feet"
4. **ADD** new Paragraph 2.2.C. to read as follows:
 - C. "Belt Press Feed Pumps: BPP-1 and BPP-2
 1. Same as for scum pumps SCP-1 and SCP-2"
5. **ADD** new Paragraph 2.3.H.3.d.2)c) to read as follows:
 - c) "Belt press feed pumps BPP-1 and BPP-2 to run at operator-selected VFD speed setpoint. Pumps to stop in response to SCADA system signal and remote shutdown signal"
6. **ADD** new Paragraph 2.3.H.8.a.3) to read as follows:
 - 3) "VFD for pumps BPP-1 and BPP-2"
7. **ADD** new Paragraph 2.3.H.8.f. to read as follows:
 - f. "For BPP-1 and BPP-2 control panels, include provisions for the following communications to the SCADA system or other remote devices
 1. Input contact for shutdown signal from remote location
 2. Output contact for Run status
 3. Output contact for Fault indication
 4. Output contact for Pump In Auto status
 5. Analog signal out for motor current draw indication"

B. SECTION 11316 – SUBMERSIBLE PUMPS

1. **ADD** new Paragraph 1.1.A.3. to read as follows:
 3. "Furnish and install two (2) removable nonclog submersible pumping units at the filtrate return pump station, FRP-1 and FRP-2
 - a. Located in the Biosolids Handling Complex dedicated wet well"
2. **REVISE** Paragraph 1.4.A. to read as follows:
 - A. "Aeration Basin Drain Pumps"

3. **ADD** new Paragraph 1.4.B. to read as follows:
 - A. "Filtrate Return Pumps FRP-1 and FRP-2
 1. Pumped liquid
 - a. Filtrate and wash water collected from thickening and dewatering equipment and floor drains throughout the Biosolids Handling Complex
 - b. Altitude: 5,403 feet above sea level"
4. **REVISE** Paragraph 2.1.B. to read as follows:
 - B. "Aeration Basin Drain Pumps"
5. **ADD** new Paragraph 2.1.C. to read as follows:
 - C. "Filtrate Return Pumps FRP-1 and FRP-2
 1. Number of units: 2
 2. Rated total head: 15.4 feet
 3. Capacity at rated head: 312 gpm
 4. Minimum shutoff head: 31.0 feet
 5. Maximum shutoff head: 50.0 feet
 6. Normal operating head range: 12.8 to 22.7 feet
 7. Maximum capacity at high end of operating head range: 150 gpm
 8. Maximum capacity at low end of operating head range: 400 gpm
 9. Minimum nominal pump operating speed: 1,200 rpm
 10. Maximum bhp required for any point in the operating head range: 3.0
 11. Minimum pump efficiency: 45%
 12. Minimum size of pump discharge: 3 inches
 13. Minimum sphere size pump is capable of passing: 2.5 inches"
6. **REVISE** Paragraph 2.3.F.1. to read as follows:
 1. "Provide for mounting in control panel"
7. **ADD** new Paragraph 2.5 to read as follows:
 - 2.5 "CONTROLS FOR FILTRATE RETURN PUMP STATION
 - A. Provide one control panel for the pump station
 - B. Pumps FRP-1 and FRP-2 shall be operated and controlled through the pump station control panel
 1. Future pump FRP-3 shall be operated and controlled through separate control panel
 - C. Control panel to be wall-mounted next to filtrate return wet well in the Biosolids Handling Complex
 - D. Provide one of the following types of level control devices for installation in filtrate return wet well to control pump operations
 1. Float switches
 2. Digital switches
 3. Level transducer
 - E. Control Panel
 1. Number required: 1
 2. Enclosure rating: NEMA 4X
 3. Control panel component rating: NEMA 4X
 4. Completely prewired and factory tested prior to shipment
 5. Main disconnect switch capable of being locked in the Off position
 6. Accept input power of 480 VAC, 3-phase, 60 hertz

7. Include all logic devices, programmable relays, timers and appurtenances for proper equipment operation
8. Physical size of panel shall be held to the absolute minimum required
9. Include the following minimum electrical devices
 - a. FVNR motor starter and motor overload protection for each pump
 - b. Transformer for 120 VAC control system power
 - c. Main circuit breaker
10. Include the following minimum pilot and control devices
 - a. Control power On/Off selector switch
 - b. Pump control Hand/Off/Auto selector switch for each pump
 - 1) When in Hand, equipment to operate continuously
 - 2) When in Auto, equipment to operate as follows
 - a) Filtrate return pumps FRP-1 and FRP-2 to start and stop automatically in response to level control device in filtrate return wet well
 - b) Pumps to operate in a lead/lag fashion
 - c) Lead/lag designation to switch automatically upon the lead pump stop
 - c. Automatic lead/lag alternator device
 - d. System reset pushbutton
 - e. Control power on indicating light: White
 - f. Run indicating light: Green, one for each pump
 - g. Fault indicating light: Red, one for each of the following
 - 1) Motor overload, one for each pump
 - 2) Motor seal fail, one for each pump
 - 3) Wet well high level alarm
 - 4) Wet well low level alarm
 - h. Hour or run time meter, one for each pump
 - i. Run output contact, one for each pump
 - j. Pump In Auto output contact, one for each pump
 - k. General fault output contact to SCADA system, energized by any and all faults or alarm conditions, other than wet well high level
 - l. Fault output contact to SCADA system dedicated to wet well high level
 - m. Input contact for equipment shutdown signal from SCADA system
 - n. Analog output for motor current draw indication in SCADA system
11. Provide circuitry and devices to shut down the equipment upon the following
 - a. Motor overload/fault (affected motor only)
 - b. Pump seal failure (affected pump only)
 - c. Wet well low level alarm
12. Clearly label all front panel mounted items and devices on the outside front of the panel
13. Clearly label all wires and terminal points inside the control panel
14. All power and control wiring shall be 600 Volt insulated copper and sized for the required load, 14 AWG minimum
15. All circuit breakers shall be thermal magnetic molded case units
16. All selector switches, pushbuttons and pilot lights shall be heavy-duty, water/oil tight, corrosion resistant units rated for NEMA 4X service
17. All terminal blocks shall be pressure connector type with marking strips and covers suitable for copper connectors sized for the application
18. All control relays shall be industrial plug-in type rated for the appropriate application load"

C. SECTION 14550 – BELT CONVEYORS

1. **ADD** new Specification Section 14550-Belt Conveyors as attached to this Addendum No. Eleven (11).

D. SECTION 14555 – SHAFTLESS SCREW CONVEYORS

1. **ADD** new Paragraph 1.1.A.1.b. to read as follows:

- b. "Conveyor SCV-1: Receive dewatered biosolids cake from dewatered cake belt conveyor and convey it to multiple discharge points over the dewatered cake container"

2. **ADD** new Paragraph 1.4.B.1.d.4)a) to read as follows

- a) "Design for bolted connections of conveyor SCV-1 supports to supplemental building support members. Provide bolted connection details for coordination with building manufacturer, including sizes, dimensions and bolting templates"

3. **ADD** new Paragraph 1.5.B. to read as follows:

B. "Conveyor SCV-1

1. Application

- a. Accept dewatered biosolids cake from dewatered cake belt conveyor
 - b. Distribute dewatered biosolids cake through multiple discharge points to the dewatered cake container in the outdoor, open bay of the Biosolids Handling Complex

2. Installation conditions

- a. Install in outdoor, open bay of the Biosolids Handling Complex suspended from supplemental building supports over the dewatered cake container
 - b. Provide equipment supports connected to and suspended from supplemental building supports
 - 1) Conveyor manufacturer shall design and provide the equipment supports
 - 2) Building manufacturer shall design and provide the supplemental building supports
 - 3) Conveyor manufacturer shall design bolted connections between equipment supports and supplemental building supports
 - 4) Four (4) equipment supports required
 - 5) Provide all bracing and stiffeners in equipment supports to properly secure unit during motor starts and stops and during continuous operation
 - 6) Horizontal distance between equipment support centerlines: 9'-0"
 - 7) Midpoint of conveyor trough approximately centered horizontally between middle equipment supports
 - 8) Bottom elevation of supplemental building supports: Varies, refer to Drawings
 - 9) Minimum bottom flange width of supplemental building supports: 8 inches
 - c. Environment: Outdoor, unheated location exposed to weather and the elements; roof sheeting without wall enclosure on 3 sides
 - d. Site elevation: 5426 feet above mean seal level
 - e. Physical characteristics
 - 1) Dewatered biosolids container slab elevation: 5411.00
 - 2) Top of conveyor trough elevation: 5427.50

ADDN#11-5

- 3) Minimum elevation of conveyor and gate components: 5425.00
- 4) Minimum length of conveyor trough: 29'-6"
- 5) Number of discharge chutes: 4
 - a) Size
 - (1) Width equal to at least full width of conveyor trough
 - (2) Length in direction of travel shall provide a minimum of 1.5 spiral flight pitch rotations exposed in the opening, 16 inches minimum
 - b) Manual slide gates
 - (1) Required on three discharge chutes
 - (2) No gate required on discharge chute closest to the drive end
 - (3) Refer to Drawings for rope and pulley system requirements
- f. Orientation
 - 1) Receive dewatered biosolids cake discharge near east end of conveyor trough between first and second openings
 - 2) Dewatered cake belt conveyor discharge location per dimensions and elevations given on the Drawings
 - 3) Drive end is located at east end of conveyor trough to facilitate ease of access for maintenance activities
3. All equipment, components and devices in the outdoor, open bay of the Biosolids Handling Complex shall be rated for outdoor installation exposed to weather and the elements"

4. **ADD** new Paragraph 2.1.B. to read as follows:

B. "Conveyor SCV-1

1. Conveyor shall be designed and manufactured to handle dewatered biosolids cake received from the dewatered cake belt conveyor and distribute it into the dewatered cake container without spillage, jamming or clogging
2. Conveyors shall be designed to handle continuous or intermittent loading of dewatered biosolids cake
 - a. Dewatered biosolids cake is aerobically digested sludge dewatered by typical belt filter press dewatering equipment
 - b. Dewatered biosolids cake solids content: 10% to 20% solids by dry weight
 - c. Dewatered biosolids cake density: 60 to 65 pounds per cubic foot
3. Capacity
 - a. Design loading: 313 cubic feet per hour
 - b. Maximum trough filling at design loading: 30%
4. Maximum rotative speed of conveyor flight: 20 rpm
 - a. Unless availability of reducer ratios require adjustment
 - b. Unless manufacturer's calculations require faster speeds to meet design loading requirements
5. Total conveying capacity of the conveyor shall not be less than 2 times the design loading of 313 cubic feet per hour
6. Torque capacity of the drive unit shall be sufficient to start the conveyor with 100% trough loading
7. Torsional rating of flight shall exceed torque rating of drive motor at 150% of motor nameplate horsepower
8. Spring effect of the spiral shall not exceed 0.08 inches per foot of length at design load conditions
9. Submit calculations
10. At 100% trough loading and operating, the stress in the auger shall not exceed 30% of the shear strength rating in the extreme outer fibers of the spiral
11. Submit calculations"

5. **ADD** new Paragraph 2.3.B.6.b. to read as follows:
 - b. "Conveyor SCV-1
 - 1) Trough covers to abut inlet chute on each side
 - 2) Maximum cover panel length: 5'-0" "

6. **ADD** new Paragraph 2.3.B.7.b. to read as follows:
 - b. "Conveyor SCV-1
 - 1) Provide inlet chute and chute extension with flanged and gasketed connection
 - 2) Inlet chute width equal to at least the full width of conveyor trough
 - 3) Inlet chute length: 2'-6" minimum
 - 4) Refer to Drawings"

7. **ADD** new Paragraph 2.3.C.5.b. to read as follows:
 - 1) "Conveyor SCV-1: 5 hp, maximum"

8. **ADD** new Paragraph 2.3.C.13. to read as follows:
 13. "Motor and associated drive equipment for Conveyor SCV-1 shall allow for reversing spiral flight rotation so dewatered biosolids cake can be conveyed in either direction along the conveyor trough"

9. **ADD** new Paragraph 2.3.D.4.b. to read as follows:
 - b. "Refer to previous paragraphs of this section for particular requirements of Conveyor SCV-1"

10. **ADD** new Paragraph 2.3.E.3.b. to read as follows:
 - c. "Provide rope and pulley system on Conveyor SCV-1 discharge gates for operation of gate slide, refer to Drawings"

11. **ADD** new Paragraph 2.6.B. to read as follows:
 - B. "Conveyor SCV-1
 1. Provide one control panel for the shaftless screw distribution conveyor
 2. Shaftless screw conveyor shall be operated through its own control panel
 3. Control panel to be wall-mounted in the outdoor, open bay of the Biosolids Handling Complex
 4. Provide a local emergency stop pull chord system as specified at the shaftless screw conveyor utilizing equipment and enclosures rated for outdoor installation, exposed to weather and the elements
 5. Control panel
 - a. Number required: 1
 - b. Panel tag designation: LCP SCV-1
 - c. Enclosure rating: NEMA 4X
 - d. Control panel component rating: NEMA 4X
 - e. Completely prewired and factory tested prior to shipment
 - f. Main disconnect switch capable of being locked in the Off position
 - g. Accept input power of 480 VAC, 3-phase, 60 hertz
 - h. Include all logic devices, programmable relays, timers and appurtenances for proper equipment operation
 - i. Include the follow minimum electrical devices
 - 1) FVR motor starter and motor overload protection

- 2) Transformer for 120 VAC control system power
- 3) Main circuit breaker
- j. Include the following minimum pilot and control devices
 - 1) Forward/Off/Reverse selector switch for drive motor
 - 2) Emergency stop pushbutton
 - 3) System reset pushbutton
 - 4) Run indicating light: Green
 - 5) Motor overload fault indicating light: Red
 - 6) Zero speed fault indicating light: Red
 - 7) Overtorque fault indicating light: Red
 - 8) Hour meter/run time meter
 - a) Nonresettable
 - 9) Run output contact to SCADA system
 - 10) General fault output contact to SCADA system
 - 11) Input contact for equipment shutdown signal from SCADA system
 - 12) Analog signal out for motor current draw indication in SCADA system
- k. Provide circuitry and devices to shut down the equipment upon the following conditions
 - 1) Motor overload/fault
 - 2) Control panel emergency stop pushbutton activation
 - 3) Local emergency stop pull cord activation
 - 4) Receipt of SCADA system shutdown signal
 - 5) Zero speed condition
 - 6) Overtorque condition
- l. General fault indicator light and output contact to SCADA system shall be energized under any and all fault conditions including, but not limited to, the following
 - 1) Motor overload/fault
 - 2) Zero speed fault
 - 3) Overtorque fault
 - 4) Emergency stop pushbutton activation
 - 5) Emergency stop pull cord system
- m. Clearly label all front panel mounted items and devices on the outside front of the panel
- n. Clearly label all wires and terminal points inside the control panel
- o. All power and control wiring shall be 600 Volt insulated copper and sized for the required load, 14 AWG minimum
- p. All circuit breakers shall be thermal magnetic molded case units
- q. All selector switches, pushbuttons and pilot lights shall be heavy-duty, water/oil tight, corrosion resistant units rated for NEMA 4X service
- r. All terminal blocks shall be pressure connector type with marking strips and covers suitable for copper connectors sized for the application
- s. All control relays shall be industrial plug-in type rated for the appropriate application load"

PART III – DRAWINGS: This Addendum No. Eleven (11) makes no changes to the Drawings.

THIS ADDENDUM IS HEREBY MADE A PART OF THE BIDDING AND CONTRACT DOCUMENTS FOR THIS PROJECT AND IS BINDING AS IF PRINTED AND BOUND THEREIN. ALL BIDDERS SHALL ACKNOWLEDGE RECEIPT OF THIS ADDENDUM IN THE APPROPRIATE LOCATION ON THE BID FORM.

END OF ADDENDUM NO. ELEVEN (11)

ADDN#11-8

SECTION 14550
BELT CONVEYORS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Scope

1. Furnish and install belt conveyor BCV-1 for use in conveying dewatered biosolids cake from the discharge of the belt filter press to the shaftless screw distribution conveyor

B. Additional Requirements Specified Elsewhere

1. Section 01010: Summary of Work
2. Section 01340: Shop Drawings, Product Data and Samples
3. Section 01400: Quality Control
4. Section 01600: Materials and Equipment
5. Section 01730: Operating and Maintenance Data

C. Related Requirements Specified Elsewhere

1. Section 05120: Structural Steel
2. Section 05500: Metal Fabrications
3. Section 05501: Anchor Bolts and Drilled-In Anchors
4. Section 13300: Utility Control System
5. Section 14555: Shaftless Screw Conveyors
6. Division 16: Electrical

1.2 QUALITY ASSURANCE

A. Manufacturer's Qualifications

1. All equipment supplied by a single manufacturer
 - a. Equipment to be the standard product of the manufacturer with specified optional equipment and components
 - b. Minimum of 5 years experience in the design and manufacture of wastewater biosolids related conveying equipment including belt conveyors
 - c. Provide list of installations where belt conveyors are in operation when requested
2. Design basis
 - a. Pathwinder by Serpentix Conveyor Corporation, Westminster, CO
 - b. Equivalent products of other manufacturers may be accepted subject to compliance with design, function, materials and performance of the specified items

1.3 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

- A. American Gear Manufacturers Association (AGMA)
- B. Anti-Friction Bearing Manufacturers Association (AFBMA)
- C. Conveyor Equipment Manufacturers Association (CEMA)
- D. American Iron and Steel Institute (AISI)
- E. National Electrical Code (NEC)

1.4 SUBMITTALS

- A. In accordance with Section 01340
- B. Manufacturer's Specifications and Illustrations
 - 1. Sufficient data to verify compliance with these specifications and to illustrate construction and assembly of products
 - a. Conveyors
 - 1) Manufacturer
 - 2) Type, model and size
 - 3) Design speed
 - 4) Bearing type and life calculations
 - 5) Horizontal and vertical loadings for structural supports
 - 6) Dimensions
 - 7) Weight
 - b. Motors
 - 1) Manufacturer
 - 2) Type and model including class
 - 3) Rated size (hp)
 - 4) Temperature rating and service factor
 - 5) Rating for maximum number of starts per hour
 - 6) Design rotative speed
 - 7) Voltage, phase and frequency
 - 8) Dimensions
 - 9) Weight
 - c. Drive
 - 1) Manufacturer
 - 2) Type and model
 - 3) Input and output speeds
 - 4) Gear ratios
 - 5) Service factor (24 hour continuous service)
 - 2. General
 - a. Materials
 - b. Parts
 - c. Devices
 - d. Accessories
 - e. Dimensions
 - f. Electrical and control wiring diagrams

- g. Monitoring and control systems and devices
- h. Written description of system controls
- i. Panel layout drawings
- j. Data on shop painting

C. Shop Drawings

- 1. Fabrication
- 2. Assembly
- 3. Installation
- 4. Anchor bolt setting template
- 5. Foundation and structural support components

D. Certification of Compliance

- 1. Manufacturer's affidavit of compliance certifying
 - a. All equipment and materials comply with these specifications with any exceptions noted
 - b. Equipment has been properly installed and is operating within specification tolerances
 - c. All tests have been performed with satisfactory results

E. Operating and Maintenance Manuals in accordance with Section 01730

1.5 JOB CONDITIONS

A. Application

- 1. Convey dewatered biosolids cake from belt filter press cake discharge to shaftless screw distribution conveyor at the Biosolids Handling Complex

B. Installation Conditions

- 1. Receiving end of conveyor located under belt filter press discharge inside the building
- 2. Discharge end of conveyor located over shaftless screw distribution conveyor in outdoor open bay of building, which includes roof sheeting without enclosed walls on three sides
- 3. Conveyor will pass through exterior wall of Biosolids Handling Complex
- 4. Operating floor of Biosolids Handling Complex
 - a. At location indicated on Drawings
 - b. Install conveyor below belt filter press cake discharge
 - c. Provide skirt boards as indicated on the Drawings and specified herein
 - d. Equipment component orientation to allow access to critical maintenance and equipment items, and as indicated on the Drawings
- 5. Environment
 - a. Discharge end: Outdoor, unheated, exposed to weather and the elements
 - b. Receiving end: Interior, heated location
- 6. Site elevation: 5,430 feet above sea level
- 7. Physical characteristics
 - a. Nominal finish floor elevation: 5,411.00

- b. Maximum elevation of belt under belt filter press cake discharge: 5,414.17

PART 2 – PRODUCTS

2.1 PERFORMANCE AND DESIGN REQUIREMENTS

- A. Design Basis: Serpentix Pathwinder Conveyor
- B. Conveyor to be designed and manufactured to handle continuous or intermittent loading of dewatered biosolids cake
 1. Cake solids content: 10% to 20% solids by dry weight
 2. Cake density: 60 to 65 pounds per cubic foot (wet weight of cake)
- C. Cake material loading rate design capacity: 10.2 tons per hour (based on wet weight of cake)
- D. Maximum belt travel speed: 22 fpm

2.2 FABRICATION AND MANUFACTURE

A. Conveyor Belt

1. Belt width: 26 inches
2. Modular belt pan sections
 - a. Moldable plastic rubber
 - b. Nominal 1½-inch high convolutions permanently molded into each section
 - c. Fasten belt pan sections every 8 inches to create watertight conveying surface. Belt pan connections to be supported by nylon attachment and two plastic guide/wear blocks bolted to drive chain to permit continuous vertical, horizontal and helical turns
 - d. Convolutions to flatten out as belt goes over the drive station to allow for continuous belt cleaning
 - e. Reinforced with non-metallic stiffeners molded into each section to achieve 20° trough cross-section

B. Drive Chain

1. Case-hardened alloy steel chain
2. Minimum breaking strength: 35,000 pounds
3. Closed link chain with alternating horizontal and vertical links to allow for movement in two or more directions with guide blocks bolted bilaterally to each vertical chain link
4. Belt pan attachments and guide blocks to be shipped assembled on the chain

C. Frame, Tracks and Supports

1. Structural I-beam frame for conveyor system
 - a. Fabricated from ½" minimum thickness ASTM A36 structural steel
2. Top and bottom flanges of I-beam to have UHMWPE track, with bilaterally positioned angles to contain the guide blocks

3. Conveyor supports to be fabricated from structural steel conforming to ASTM A36
4. Containment angles fabricated from UHMWPE
5. Containment angles and guide blocks to stabilize belt pan surface in the event of unbalanced material loading
6. All shop welding to conform to American Welding Society standards
7. Refer to Section 09900 for painting requirements
 - a. All structural steel components to be hot dipped galvanized to ASTM 123-892 specifications

D. Drive Unit

1. Drive station to be fully factory-assembled
2. Motor
 - a. 5 hp maximum
 - b. 460 VAC, 3 phase, 60 HZ
 - c. TEFC
 - d. Energy-efficient design
3. Drive unit to include UHMW polyethylene sprocket, gear reducer, V-belt, sheaves and steel sprockets to achieve proper belt speed for loads indicated
4. A single chain drive between the reducer and steel sprocket shaft to be provided for power and speed reduction
5. Belt drive sheaves to be interchangeable for speed control
 - a. Directly coupled drive motor-gear reducer combinations are not acceptable
6. Provide mechanical ratcheting clutch mechanism in drive design to prevent or mitigate damage to drive components
7. Provide overtorque protection to disengage clutch in the event of overloading or jamming
8. The torque setting for the overtorque condition to be adjustable and preset at the factory

E. Chain Tensioning Station

1. Tensioning station to be fully factory-assembled
2. UHMW polyethylene chain sprocket
3. Constant pressure, spring-loaded chain tensioner
4. Spring tensioner adjustable by a single ratchet

F. Skirt Boards

1. Provide at locations indicated on the Drawings
2. Fabricate and install to not cause a blockage of biosolids cake passing on conveyor or otherwise hinder or dislodge biosolids cake from conveyor surface
3. Fabricate and install to not interfere with belt filter press equipment
4. Fabricate from 3/8-inch thick HDPE or stainless steel
5. Secure to conveyor frame with stainless steel brackets and hardware

G. Drip Pans

1. Fabricate from stainless steel sheet
2. 18 gauge minimum
3. Secure to conveyor frame with stainless steel support brackets and hardware
4. Slope to drain as indicated on the Drawings

H. Wall Seal

1. To be provided where conveyor passes through exterior wall
2. Fabricated from neoprene or other flexible elastomer sheet and stainless steel plates for securing to exterior side of wall opening
3. Designed to minimize air flow through wall opening
 - a. Contour and shape elastomer sheet as close as possible to conveyor silhouette without disrupting or dislodging cake traveling on belt
 - b. Elastomer provided in two mirror image pieces to be installed around conveyor silhouette

I. Accessories

1. All hardware, nuts, bolts and washers to be 304 stainless steel
2. Provide a zero speed alarm and a NEMA 7 safety stop switch and safety pull cords with high visibility orange protective coating on each side of conveyor
3. Provide pre-tensioned belt scraping mechanism with replaceable rubber blade and UHMWPE backing plate to continuously remove material from the conveying surface at the conveyor discharge

J. Spare Parts

1. Provide Owner with complete set of spare parts as recommended by the manufacturer, to include at a minimum
 - a. 5 belt pans with hardware
 - b. 10 guide blocks
 - c. 1 master link guide block assembly
 - d. 5 chain attachments
 - e. 2 rubber scraper blades

K. Controls

1. Provide one control panel for the dewatered cake belt conveyor
2. Conveyor shall be operated through its own control panel
3. Control panel to be wall-mounted in the outdoor, open bay of the Biosolids Handling Complex
4. Provide a local emergency stop pull chord system as specified at the conveyor utilizing equipment and enclosures rated for outdoor installation, exposed to weather and the elements
5. Control panel
 - a. Number required: 1
 - b. Panel tag designation: LCP BCV-1
 - c. Enclosure rating: NEMA 4X
 - d. Control panel component rating: NEMA 4X

- e. Completely prewired and factory tested prior to shipment
- f. Main disconnect switch capable of being locked in the Off position
- g. Accept input power of 480 VAC, 3-phase, 60 hertz
- h. Include all logic devices, programmable relays, timers and appurtenances for proper equipment operation
- i. Include the follow minimum electrical devices
 - 1) FVNR motor starter and motor overload protection
 - 2) Transformer for 120 VAC control system power
 - 3) Main circuit breaker
- j. Include the following minimum pilot and control devices
 - 1) Hand/Off/Auto selector switch for drive motor
 - a) When in Hand, equipment to operate continuously
 - b) When in Auto, equipment to operate as follows
 - (1) When a run signal is received from any belt filter press, this will initiate conveyor operation
 - (2) When all belt filter press run signals terminate, an adjustable Off delay timer will be energized as conveyor continues to run. When the timer times out, the conveyor will be de-energized and the system will reset
 - 2) Emergency stop pushbutton
 - 3) System reset pushbutton
 - 4) Run indicating light: Green
 - 5) Motor overload fault indicating light: Red
 - 6) Zero speed fault indicating light: Red
 - 7) Overtorque fault indicating light: Red
 - 8) Hour meter/run time meter
 - a) Nonresettable
 - 9) Solid state Off delay timer adjustable from 1 – 30 minutes
 - 10) Run output contact to SCADA system
 - 11) Run output contact to belt filter press control panel
 - 12) Conveyor In Auto output contact to SCADA System
 - 13) General fault output contact to SCADA system
 - 14) Two input contacts for belt filter press run signals
 - a) One contact is for future belt filter press, jumper as required
 - 15) Input contact for equipment shutdown signal from SCADA system
 - 16) Analog signal out for motor current draw indication in SCADA system
- k. Provide circuitry and devices to shut down the equipment upon the following conditions
 - 1) Motor overload/fault
 - 2) Control panel emergency stop pushbutton activation
 - 3) Local emergency stop pull cord activation
 - 4) Receipt of SCADA system shutdown signal
 - 5) Zero speed condition
 - 6) Overtorque condition
 - 7) Termination of all belt filter press run signals
- l. General fault indicator light and output contact to SCADA system shall be energized under any and all fault conditions including, but not limited to, the following
 - 1) Motor overload/fault
 - 2) Zero speed fault
 - 3) Overtorque fault

- 4) Emergency stop pushbutton activation
- 5) Emergency stop pull cord system
- m. Clearly label all front panel mounted items and devices on the outside front of the panel
- n. Clearly label all wires and terminal points inside the control panel
- o. All power and control wiring shall be 600 Volt insulated copper and sized for the required load, 14 AWG minimum
- p. All circuit breakers shall be thermal magnetic molded case units
- q. All selector switches, pushbuttons and pilot lights shall be heavy-duty, water/oil tight, corrosion resistant units rated for NEMA 4X service
- r. All terminal blocks shall be pressure connector type with marking strips and covers suitable for copper connectors sized for the application
- s. All control relays shall be industrial plug-in type rated for the appropriate application load"

PART 3 – EXECUTION

3.1 FACTORY TEST

- A. Each conveyor to be factory tested to ensure satisfactory operation

3.2 INSTALLATION

- A. Conveyor to be installed in accordance with the manufacturer's installation instructions and in compliance with all OSHA, local, state and federal codes and regulations
- B. Provide minor adjustments to accommodate related equipment

3.3 FIELD QUALITY CONTROL

- A. Manufacturer to provide the services of a factory-trained representative to check installation and to start up conveyor
 - 1. Factory representative to have complete knowledge of proper installation, operation and maintenance of equipment supplied
 - 2. Representative to inspect the final installation and supervisor the startup test of the equipment
 - 3. Provide operator training to the Owner's staff
- B. Provide telephone support to Owner up to a maximum of 10 hours for operation adjustment and troubleshooting during the warranty period
 - 1. No limit on support to Owner on issues subject to contract warranty

END OF SECTION