

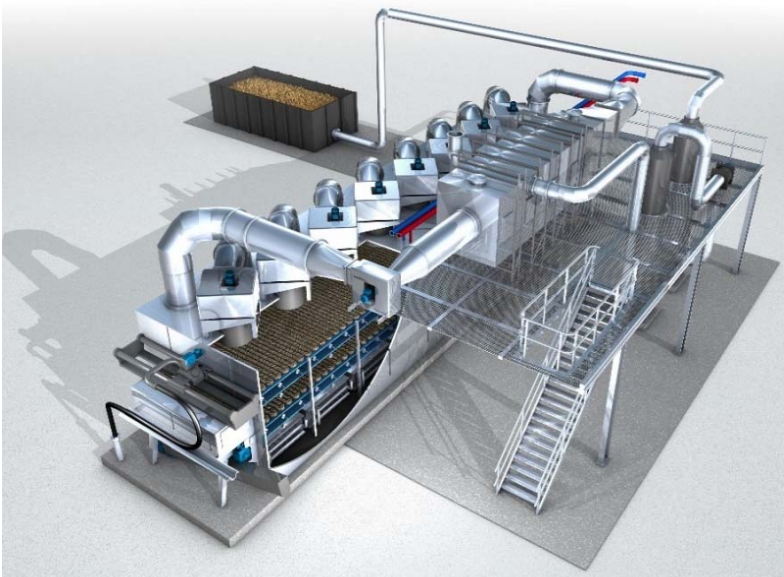
# Budgetary Proposal

Project Name:  
Fort Bragg, CA

Equipment Type:  
BT 8      221°F  
                 105°C

Proposal Date:  
9/15/2020

Proposal Number:  
461135



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# Belt Dryer Design Summary

Fort Bragg, CA

September 15, 2020

## Sludge Characteristics:

Upstream Process:	Activated Sludge with Secondary Clarifier
Digestion Process:	Aerobic Digester
Sludge Type:	Waste Activated Sludge
Sludge VSS:	≤ 70%
Sludge Protein Content:	≤ 30%
Sludge Feed Density:	55 lb/cuft
Dried Sludge Density:	25 lb/cuft

## Project Design Parameters:

Sludge Feed Rate:	1,084 dry ton/yr	(986 dry tonne/yr)
Inlet Cake Concentration:	20%	
Calculated Hydraulic Loading Rate (per unit):	5,421 wet ton/yr	(4,928 wet tonne/yr)

## Equipment Recommendation:

Recommended unit model:	Huber Dryer BT 8
Recommended unit quantity:	1

## Air Flow Design:

Fresh Air System

## Project Design Calculations:

Sludge Feed Rate to the Dryer:	1,738 wet lb/hr
Estimated Dry Cake Solids Out:	92%
Annual Water Evaporation Requirement:	4,243 ton water/year (3,857 tonne water/year)
Assumed Annual Operation Time:	6,240 hr/year (24 hr/day, 5 days/wk, 52 wks/yr)
Hourly Water Evaporation Requirement:	0.68 ton water/hr (0.62 tonne water/hr)
	1,360 lb water/hr (617 kg water/hr)
Solids Loading Rate Out:	1,178 wet ton/year (1,071 wet tonne/year)

## Equipment Design Parameters:

Thermal Heat Source:	Hot Water Boiler (Propane)
Estimated Heat Supply Temperature:	221°F (105°C)

## Equipment Requirements:

Estimated Heat Demand (at the dryer):	1,300 Btu/lb water evaporated 1.77 MMBTU/hr
Estimated Electrical Demand:	.03 kWh/lb water evaporated
Estimated Exhaust Air Flow:	10000 m3/hr 5900 CFM

## Notes and Assumptions

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1. Equipment specification and drawings are available upon request.
2. If there are site-specific hydraulic constraints that must be applied, please consult the manufacturer's representative to ensure compatibility with the proposed system.
3. Huber Technology warrants all components of the system against faulty workmanship and materials for a period of 12 months from date of start-up or 18 months after shipment, whichever occurs first.
4. Budget estimate is based on Huber Technology's standard Terms & Conditions and is quoted in US dollars unless otherwise stated.
5. Equipment recommendations are based on information provided to Huber Technology. Subsequent information which differs from what has been provided may alter the equipment recommendation.
6. Pricing is based on Huber's standard control panel arrangement.
7. The offer is based on normal, homogenous municipal sludge with a minimum organic content of 45% and a maximum organic content of 70%. Sludge with organic content around 70% is assumed to have less than 45% protein value.
8. Feed sludge must be free of any foreign matter to the greatest extent possible. Maximum particle size allowed is 8 mm (spherical diameter). A Huber Strainpress is recommended between the digester or sludge storage tank and the dewatering operation to provide this screening and to extend the operational life of the dryer's extruder.
9. Feed sludge must be free of any pollutants which could be hazardous, toxic, radioactive, corrosive, flammable, or explosive.
10. Dewatered cake feed characteristics have been assumed based on the information provided to Huber. Please notify Huber if the cake conditions will differ from those described in this proposal.
11. Annual solids loading is based on 200,000 gal/wk at 2.5% feed solids to dewatering process with 100% capture rate.

# Equipment Summary

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## Dryer System:

One (1) Huber BT 8 Dryer, including (each):

- One (1) Belts
  - Temperature Resistant Plastic
  - Upper Belt Drive
    - Max 5HP, 460VAC, 3ph motor, VFD
  - Lower Belt Drive
    - Max 1HP, 460VAC, 3ph motor, VFD
  - Belt Washing System for each belt with a common booster pump
    - Two (2) 0.5HP, 460VAC, 3ph motors for belt wash drive
    - 5HP, 460VAC, 3ph motor for booster pump
- Support Frame
  - Internal Frame: 316L Stainless Steel
  - Head Pieces: 316L Stainless Steel
  - Interior Panels: 316L Stainless Steel
  - Exterior Panels: Painted Steel
- Extruder System
  - Traction Drive System
    - Max 1.5HP, 460VAC, 3ph motor, VFD
  - Cutter Knife System
    - Max 7.5HP, 460VAC, 3ph motor, VFD
  - 316L Stainless Steel Construction
  - Feed Hose - 6" (connects at the end of the dryer, reference drawings)
- Heat Exchangers:
  - Eight (8) Main Heat Exchangers
    - Combination 316 Stainless Steel Construction, AIMg
    - Each with a modulated valve 120VAC
  - One (1) Preheat Heat Exchanger
    - Combination of Galvanized Steel, Copper and AIMg
  - Two (2) Heat Recovery Heat Exchangers with recirculation pump
    - Combination of 316 Stainless Steel, Galvanized Steel, Copper and AIMg
    - 1HP, 460VAC, 3ph motor
- Fans:
  - Four (4) Process Fans:
    - 316 Stainless Steel Materials
    - Drive Motors
    - 10HP, 460VAC, 3ph Drive Motor
  - Exhaust Fan:

- 316 Stainless Steel Casing Material
- 50HP, 460VAC, 3ph Drive Motor
- Outlet Conveyor:
  - 316 Stainless Steel Material
  - Shafted Screw
  - Carries Sludge to end of the dryer (reference drawings)
  - 2HP, 460VAC, 3ph motor
- Instrumentation (Huber Standard\*):
  - Inlet Moisture sensor
  - Discharge Moisture Sensor
  - Discharge Sludge Temperature Sensor
  - Two (2) transfer chamber level sensors
  - Three (3) Extruder Proximity Sensors
  - Extruder Pressure sensor
  - Extruder Camera
  - Two (2) Belt Wash proximity sensors
  - Two(2) Belt Motion Sensors
  - Two(2) Belt Proximity Sensors
  - One (1) access door safety switch
  - Five (5) Pressure sensors for each module
  - Two (2) Temperature and Moisture Sensors for fresh and exhaust air
  - One (1) Flow meter for heating water
  - One (1) Calorimeter for heating water
  - One (1) pressure sensor for heating water
  - Two (2) Temperature sensors - supply and return of heating water
  - Two (2) Temperature sensors - supply and return of heat recovery water
  - Eight (8) Temperature sensors - after each main heat exchanger
  - Eight (8) Flow control valves -one (1) for each main heat exchanger

\* - Instrumentation subject to change based on updated controls design of Huber Technology, Inc

#### Ancillary Equipment

- Control Panel with Allen Bradley PLC and HMI
- Heat Recovery and Cleaning Pump

#### Freight and Startup:

- Standard Huber Recommended Start-up Services
- Freight to jobsite.

**Total Price:        \$    3,800,000        (per unit)**

## Items Not Supplied by Huber

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### Items not included in the above offering:

- Piping between all supplied equipment
  - Pipes between boiler system and dryer
  - Pipes between boiler system and preheat heat exchanger
  - Pipes for water supply to belt cleaning system
  - Pipes for heat recovery system
  - Pipes for scrubber process water (if Required)
  - Pipes for sludge feed between Sludge Feed Pump and Dryer Extruder Hose
- Wiring between all supplied equipment
- Installation
- Building structures
- Site Preparation
- Required maintenance platforms and cranes
- Ductwork and insulation supplying fresh air to the dryer
- Ductwork and insulation for exhaust air to the odor control (if required)
- Boiler system fresh air duct and exhaust stack (if required)
- Gas Cleaning System for Digester Gas (if required)