

Installation of Screw Press for Solids Dewatering Westerly WWTF

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Agenda

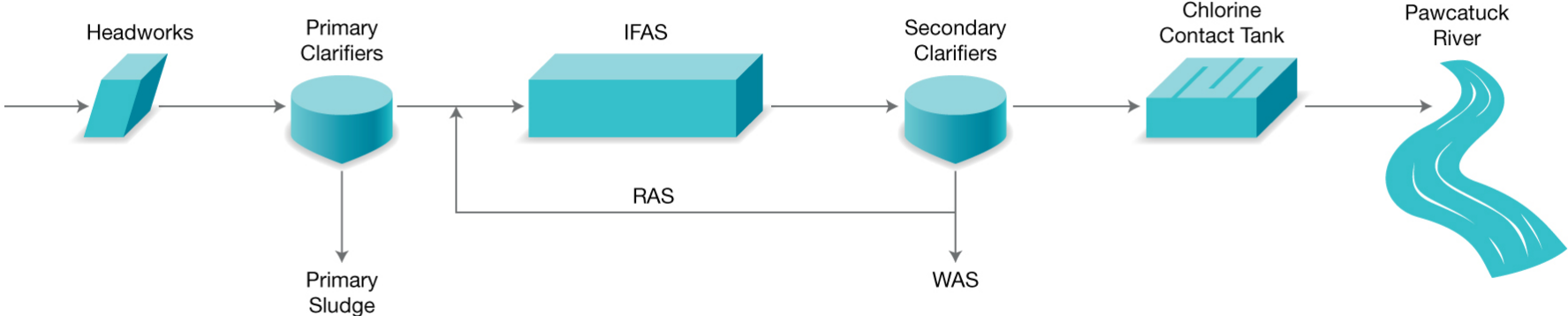
1. Overview of Solids Processing
2. Evaluation of Alternatives
3. Design and Construction
4. Results

Westerly WWTF

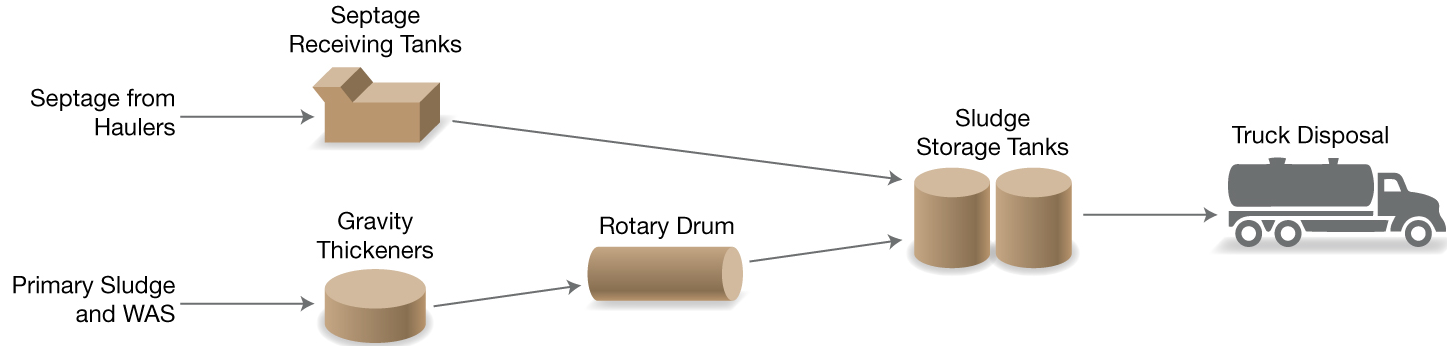
- 16,500 customers
- 3.3 MGD
- 7,650 gpd septage



Westerly WWTF



Westerly WWTF



Westerly WWTF Solids Processing

- Dispose liquid sludge ~1.5 solids
- 3-4 Trucks per day

| Parameter | Units | Average | Max Month | Peak |
|--|-------|---------|-----------|--------|
| Septage | lbs/d | 319 | 565 | |
| Septage (0.5% solids) | gpd | 7,647 | 13,540 | |
| Blended Sludge (WAS + Primary) | lbs/d | 4,073 | | 10,721 |
| Blended Sludge (1.5% solids) | gpd | 29,412 | | 76,571 |
| Net Biosolids Production | lbs/d | 4,392 | | 11,040 |
| Net Biosolids Production (1.3% solids) | gpd | 37,059 | | 87,238 |

Solids Upgrade Evaluation

- Objectives
 - Reduce Disposal Cost
 - Reduce Truck Traffic
 - Reduce Operator Time
- Considerations
 - Centrifuge
 - BFP
 - Screw Press

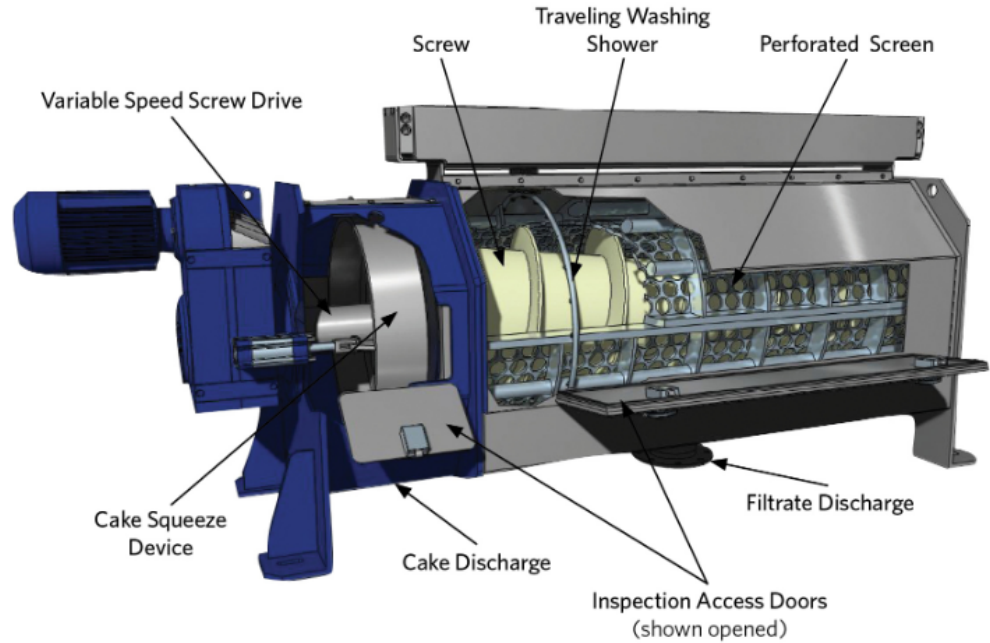
Solids Upgrade Evaluation

- Decided on Screw Press
 - Dilute Feed
 - Full Automated
 - Low Maintenance (no redundancy)
 - Company Experience

Solids Upgrade Evaluation

- Screw Press Overview

- Courtesy of Ishigaki USA LTD (http://isl_detail/screw-press/)



Solids Upgrade Evaluation

- Pilot Test
 - July 2017 – Ishigaki USA LTD
 - Demonstrate
 - Polymer dose
 - Hydraulic loading
 - Screw speed
 - Cake %solids



Solids Upgrade Evaluation

- Pilot Test

- Results

- Fed 1.5% solids blend of
Primary:WAS:Septage (approximate
58:38:5 mass concentration)
 - Averaged 24.6% solids (up to over 30%)
 - Polymer dose 34 lbs active/dry ton
 - Solids capture 93.2% to 96.8%



Solids Upgrade Evaluation

- Copper
 - NPDES Effluent Total Copper 23 ug/L
 - Consistently meet with existing process
 - Average 52.4 ug/L Total Copper influent
 - Average 9.7 ug/L Total Copper effluent
 - 82% Removal
 - Dose Ferrous Chloride headworks

Solids Upgrade Evaluation

- Copper

- Why is this a concern with Upgrade?

- High copper concentrations in septage
 - 5.8 mg/L

- Prior to upgrade septage did not enter liquid stream

- After upgrade filtrate from blended sludge (plant and septage) would enter liquid stream

Solids Upgrade Evaluation

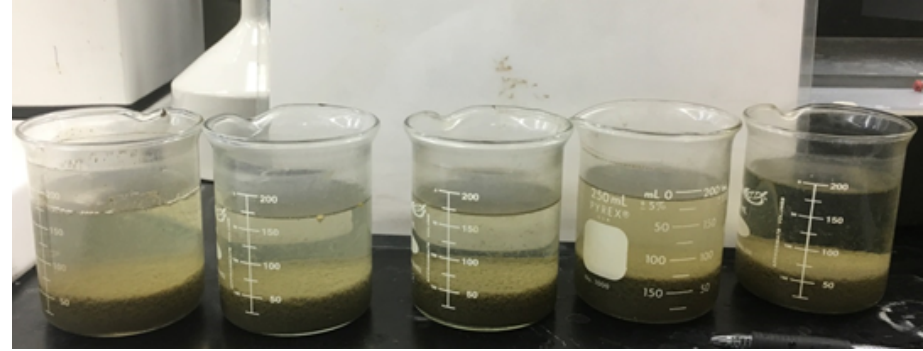
- Copper
 - Mass Balance
 - Worst Case – All copper from septage enters filtrate
 - Assume existing removal rate – 34.9 ug/L Total Copper Effluent

Solids Upgrade Evaluation

- Copper

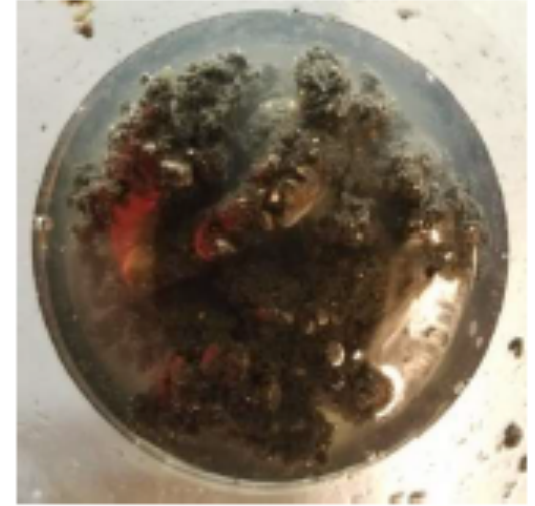
- Mass Balance

- Bench-scale with polymer formulated for removal of heavy metals
 - 80% removal in sludge
 - Assume existing removal rate – 12.8 ug/L Total Copper Effluent
 - Required two part system (coagulant + flocculant)



Solids Upgrade Evaluation

- Copper
 - Mass Balance
 - Pilot test with polymer selected for dewatering
 - Jar testing prior to pilot test by Ishigaki
 - 97% removal
 - Assume existing removal rate – 10.3 ug/L Total Copper Effluent



Design and Construction

- Location
 - Selected abandoned septage facility
 - Centrally located
 - Connected to odor control
 - Located above existing sludge storage tanks



Design and Construction

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Design and Construction

- Design Features of Note
 - Plunger Pumps
 - Consistent feed to Screw Press
 - Suction Lift
 - Plant experience
 - Large throughput
 - Challenge
 - Flow Meter
 - Took average readings in SCADA



Design and Construction

- Design Features of Note
 - Levelling Cover
 - Odor control
 - Evenly fills bin
 - Challenge
 - Bin too full
 - Optimized level instrument to reduce fill



Design and Construction

- Design Features of Note
 - Polymer Fill
 - Loading area outside polymer room



Design and Construction

- Design Features of Note
 - Screw Press Pad
 - Sawcut existing floor
 - Poured new pad
 - Trench drain
 - Filtrate Drain
 - Overhead clearance



Design and Construction

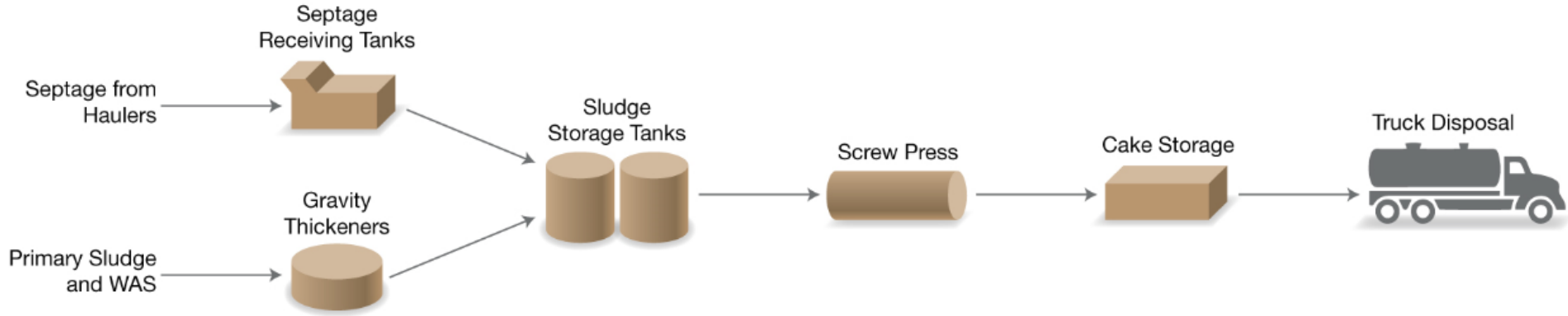
- Design Features of Note
 - Piping
 - Flexibility
 - Draw from either tank
 - Transfer from one tank to the other
 - Pump to truck or screw press



Design and Construction

- Pre-purchase
 - Pre-purchased major items to improve schedule
 - Grinder
 - Pumps
 - Screw Press
 - Levelling Cover
- Construction
 - NTP May 2018
 - Goal Producing Cake by August
 - Began Producing Cake in October 2018

Results



Results

- Copper

| Copper concentrations pre- and post-commissioning | | |
|---|--------------------------------------|--------------------------------------|
| Parameter | Influent Copper Concentration (µg/L) | Effluent Copper Concentration (µg/L) |
| Pre-commissioning | 52.4 | 9.7 |
| During Commissioning | 66.0 | 10.2 |
| Post-commissioning | 57.2 | 10.3 |

Results

- Screw Press Performance
 - Average Cake Concentration – 25% solids
 - Polymer usage – 16 to 24 lbs active/dry ton
 - Polymer consumption 100 to 150 gallons per week
 - Disposal cost dropped from \$40,849/month prior to upgrade to \$21,810/month after upgrade
 - Averaging two to three trucks per week

Questions