

City of Orem Department of Public Works

Water Reclamation Facility



Question?

Can You Identify The Source Of
The Water In The Six Bottles On
The Table?

Hint: 2 Are Wastewater

Why Are We Here?



Orem WRF Sewer Service Area

- Orem
 - Area – 18.3 sq miles
 - Population – 94,459
- Lindon
 - Area – 8.57 sq miles
 - Population – 11,240
- Vineyard
 - Area – 0.25 sq miles
 - Population – 2,000



Collection System

- Servicing approximately 107,000 people
 - Residential
 - Commercial
 - Industrial
- 300 Miles of sewer pipe
 - Sizes 4" – 48"
- Gravity and Pump Flows
 - 7 Sewer Lift Stations

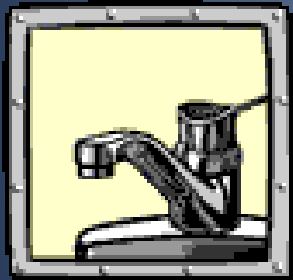


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What Are We In
The Basic Terms?



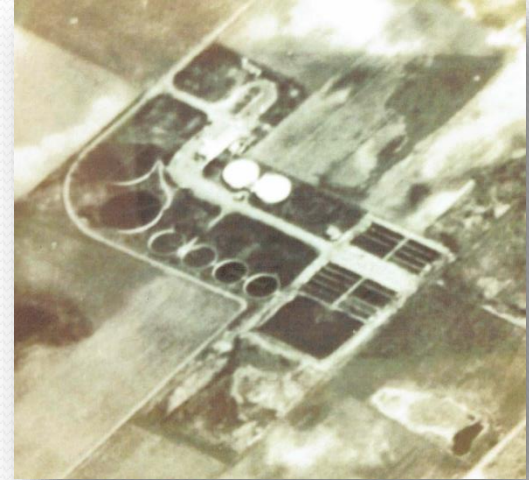
One "Big" Recycling Operation





Facility Background

- Original facility started operations in the late 50's. Upgraded in late 2011.
- One Water Reclamation Facility for all of Orem City
- Operated 24 hours a day 365 days per year
- Primary and Secondary Treatment
 - Secondary treatment process train is an Oxidation Ditch system.
- The facility operates under a Utah State issued UPDES permit



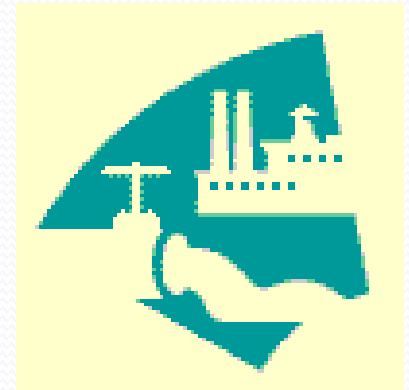
Facility Background

- Flows (water):

- Design Flow 13.5 mgd = 9,375 gpm
 - Average Daily Flow 8.5 mgd = 5,903 gpm
 - Peak Hour Flow 21.6 mgd = 15,000 gpm
- 1 mgd = 1,000,000 per day or 695 gallons per minute
695 gpm = 11.5 gallons per second

- Rated Loadings (pollution):

- BOD₅ 39,407 lbs/day
- TSS 39,407 lbs/day
- Ammonia 4,504 lbs/day



Just How Much Water Is It?



At 13.5 mgd,
how many 5
gallon
buckets a day
filled at
second?

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Liquid Stream Treatment



Headworks Building

- Propose – Removal of inorganic material from the raw wastewater stream.



Step Screen In Operation



Primary Treatment

Primary Clarification

- Propose – Removal of settleable solids, grease and oil from the wastewater.



Primary Clarifiers (4 total)

Secondary Treatment

Oxidation Ditch

- Three Ditches
 - 3.8 mg each
- Three Separate Zones:
 - Anerobic
 - Anoxic
 - Aerobic

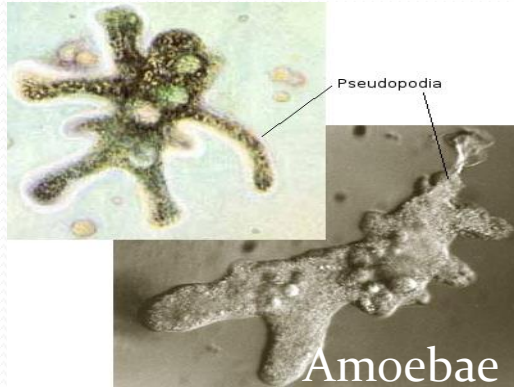


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So What Makes The
Ox-Ditch Work?



The “Bugs”



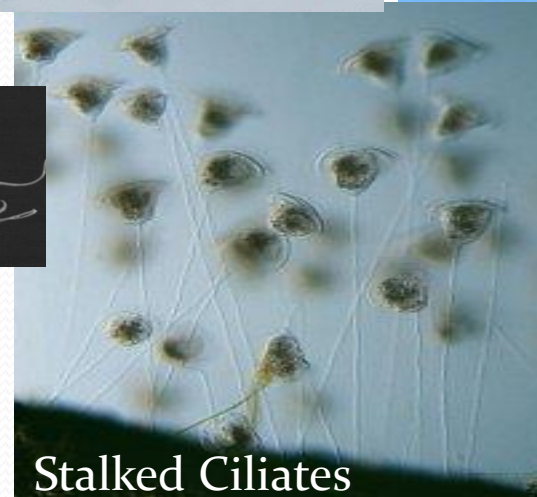
Flagellates



Water Bear



Free -Swimming Ciliates



Stalked Ciliates



Secondary Treatment

Aeration Blowers

- NexTurbo GTB-T20XY Series Integrally Geared Single Stage Blower
- 200 hp / 3,200 SCFM
- Provides air (oxygen) to the biological treatment process



Aeration Blowers (6 total)

Secondary Treatment

Secondary Clarification

- Settles out the biological floc
- Removes remaining grease and other buoyant matter
- The settled biological floc (Sludge) is then separated into Return Activated Sludge (RAS) and Waste activated Sludge (WAS).



Secondary Clarifiers (4 total)

Disinfection

UV Disinfection

- UV light provides rapid, effective inactivation of microorganisms through a physical process. When bacteria, viruses and protozoa are exposed to the germicidal wavelengths (200 and 300 nanometers) of UV light, they are rendered incapable of reproducing and infecting.



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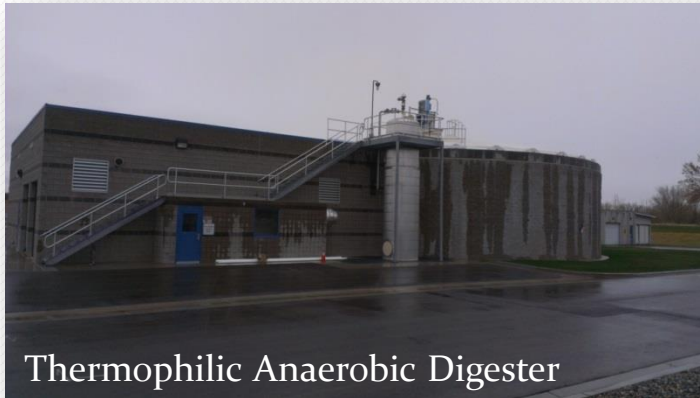
Solids Stream Treatment



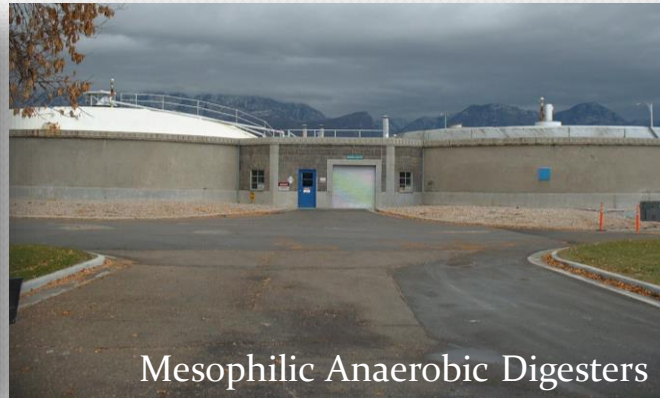
Solids Treatment

Two State Anaerobic Digestion

- A bacterial process in which sludge is digested through the absence of oxygen.
- Reduces the amount of organic matter and microorganisms in the sludge and creates a byproduct of biogas.



Thermophilic Anaerobic Digester



Mesophilic Anaerobic Digesters

Solids Treatment

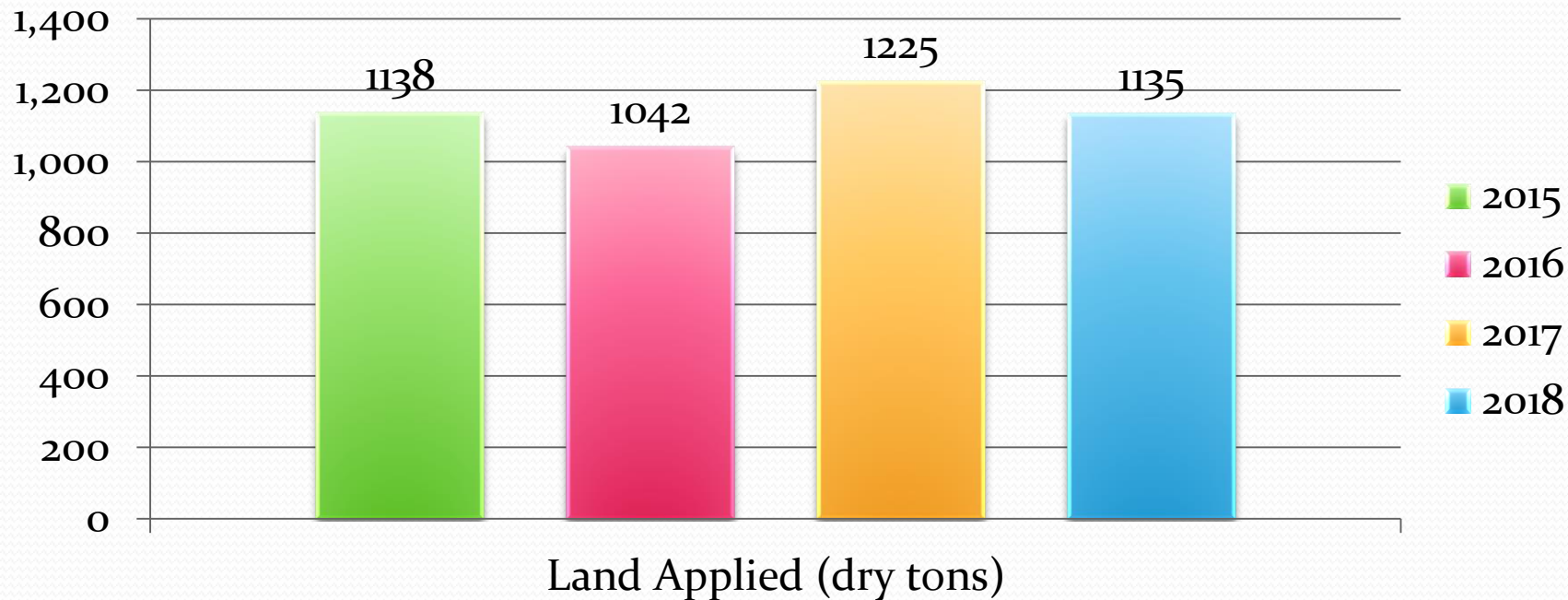
Sludge Dewatering Press (Belt Press)

- The belt press presses the sludge between two permeable belts to reduce the amount of water in the sludge prior to transfer and/or drying the sludge



Land Application

Bio-Solids



Where Does the Water Go?



Questions?

