

# Developing a Beneficial Reuse Market for Class A Biosolids

A Case Study in the Challenges & Success with the Start up of the RCSD's New Biosolids Facility

NEWEA/NYWEA  
Spring  
Conference  
*June 7, 2016*



Resource  
Management, Inc.



**CDM**  
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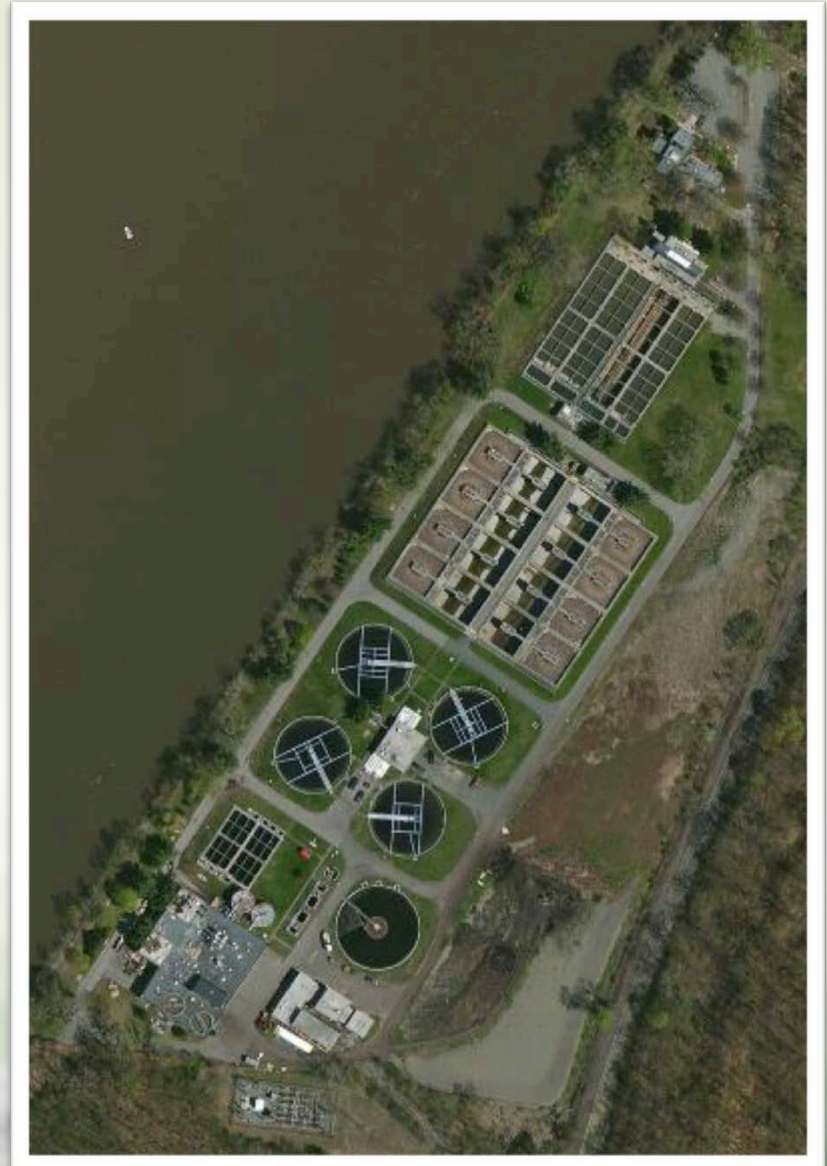
# Agenda

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- **RCSD WWTF Background**
- **Overview of Biosolids Alternatives Evaluation**
- **New Biosolids Facility**
- **Operational Challenges**
- **Marketing Study and RFP**
- **Product Quality**
- **Developing a Beneficial Reuse Market**
- **Operating a Beneficial Reuse Program**
- **Lessons Learned**
- **Questions**

# RCSD WWTF Background

- **Rensselaer County Sewer District No. 1**
  - Serves Troy, Rensselaer & surrounding communities
  - Operation began in 1976
  - ADF 24 mgd/Peak 63 mgd
  - Activated sludge process
    - Headworks
    - PST
    - Mechanical Aeration
    - Final Clarifiers
    - UV Disinfection



# RCSD WWTF Background

## Zimpro wet oxidation process w/ onsite monofill

- Generated Class B biosolids at ~50%
- Energy hog (~\$450k annually)
- Equipment nearing end of useful design life
- Odors & Sidestream process impacts were issues
- Monofill nearing capacity



# Biosolids Evaluation

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## **Biosolids evaluation was part of Energy Service Contract**

- New Zimpro**
- Lime Stabilization & landfilling**
- Pump liquid biosolids to ACSD North for disposal**
- Anaerobic digestion & dewatering**
  - Heat Drying Class A vs. landfilling Class B**

**Digestion, dewatering and drying selected**

# Biosolids Facility

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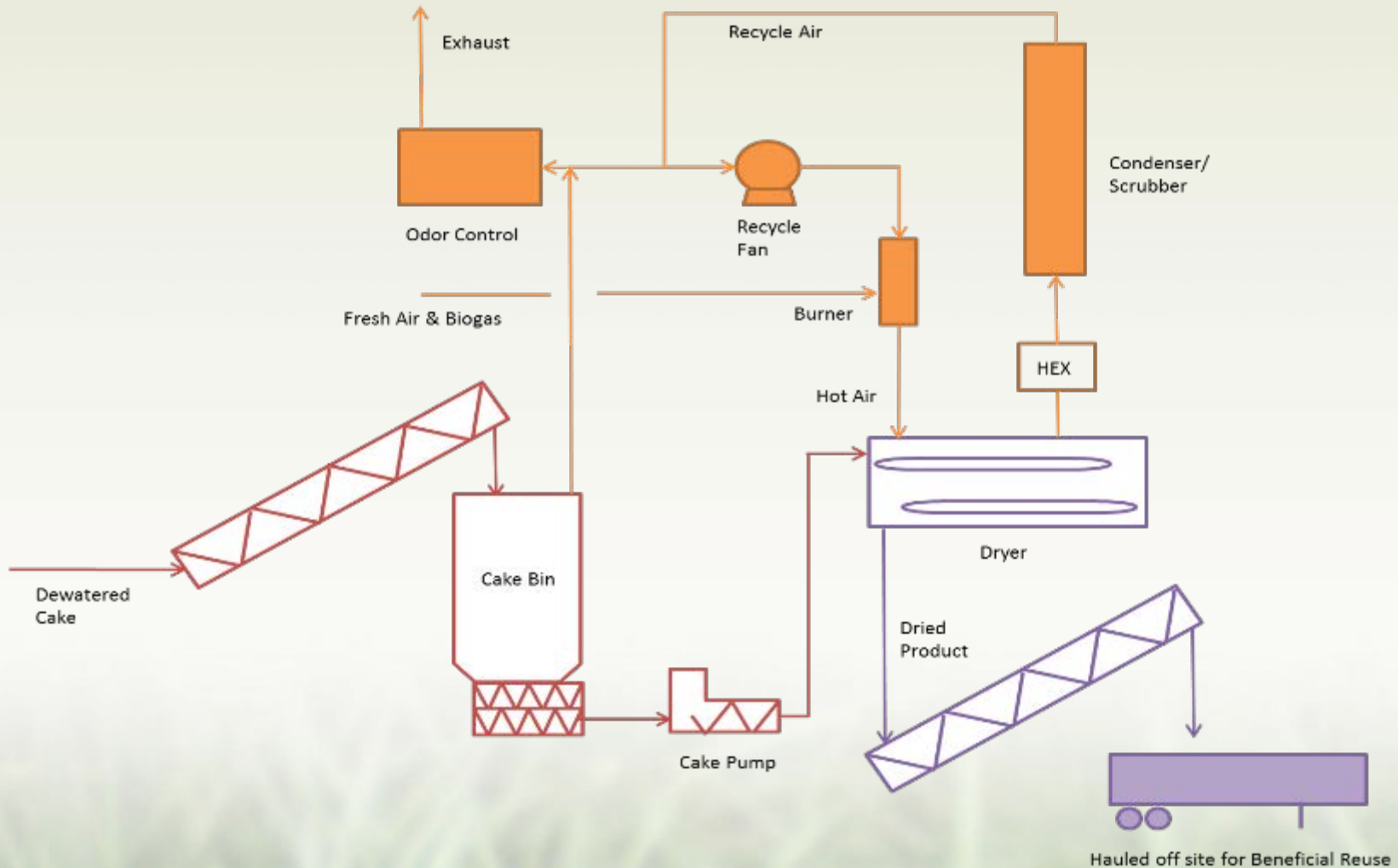
## ■ Phase 1

- Convert 2 Existing Oxidized Tanks into Blended Sludge Holding Tanks
- Convert 3 Existing Sludge Holding Tanks to Anaerobic Digesters
- Biogas Storage
- 2 New 2-meter 3 BDP BFPs

## ■ Phase 2

- Additional Anaerobic Digester
- Belt Dryer
- Dried Product Storage Facility (90 days of storage)

# Biosolids Facility – Dryer System



# Biosolids Facility - Dryer System



# Biosolids Facility

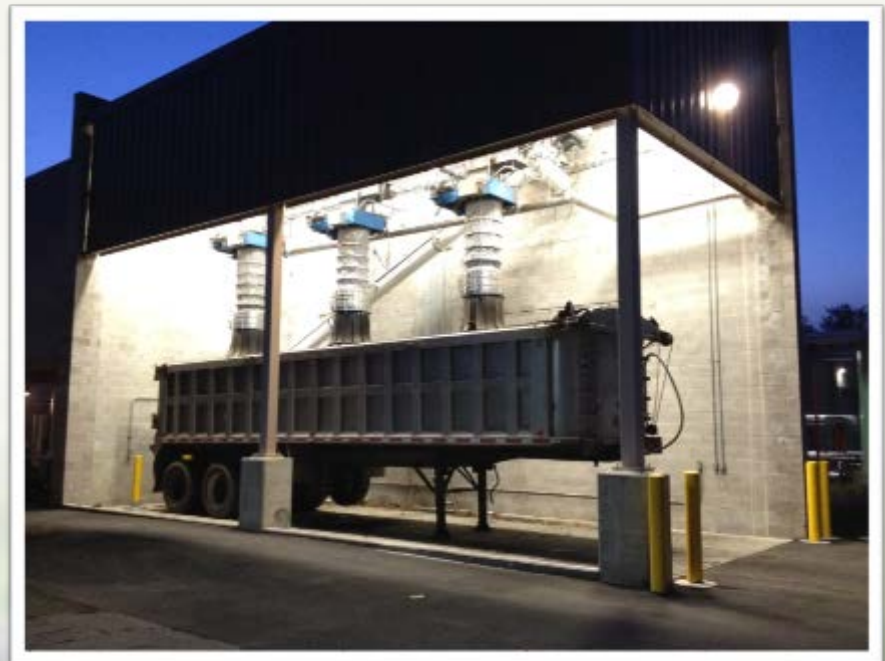
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## ■ Dryer System Design Criteria

- 3,300 lb water/hr Evaporation Capacity
- 82 wT/week @ 24 hr/day, 6 days/week operation
- 23 percent cake
- 1,140 lbs of dried product at maximum capacity
- 90+ percent dried product
- 1,450 BTU/lb water
- Meet NYS DEC 360 permit requirements

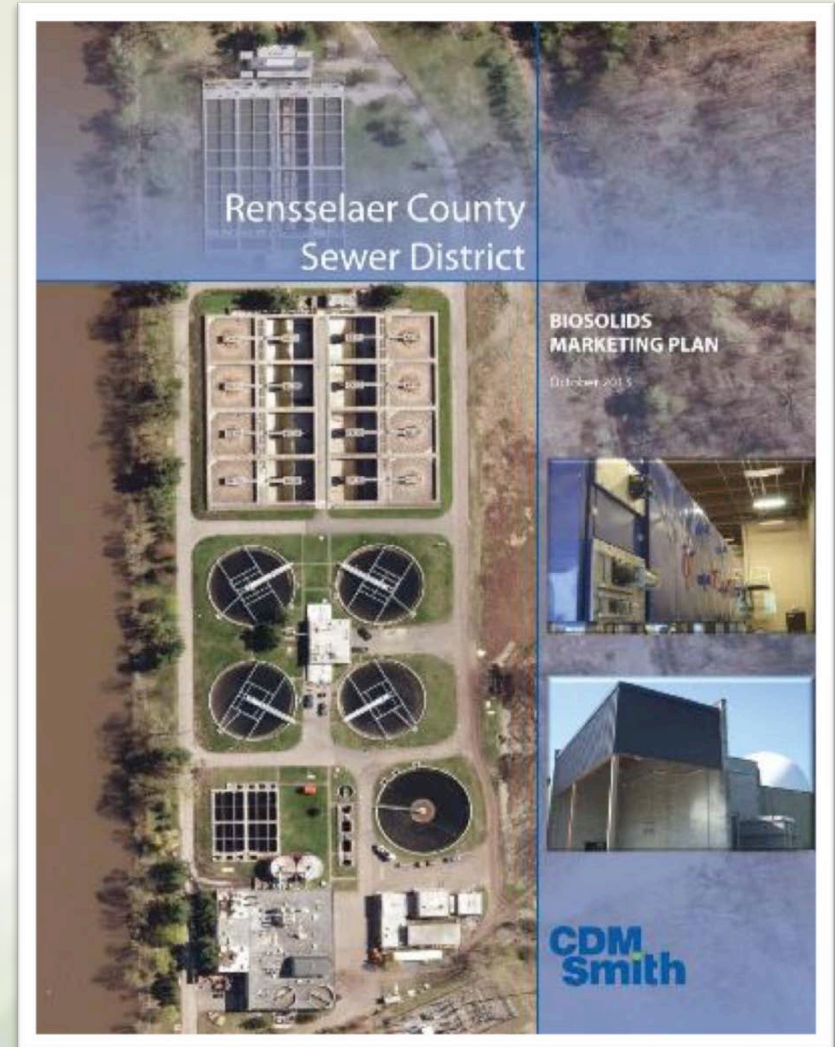
# Operational Challenges

- **Dewatered Cake Solids**
- **Debris**
- **Equipment Reliability**
- **Dried Product Characteristics**
  - **Design Value: 1,080 lbs/CY**
  - **Actual value: 525 lbs/CY**



# Marketing Study and RFP

- Analyzed cake samples
- Facilitated Ag. Gatekeepers Workshop
- Conducted Broker/Commercial User Interviews
- Estimated Potential Product Demand



# Marketing Study and RFP

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- **Proceeded with Broker/Commercial User**
- **RFP was issued in Spring of 2014 & selected in Summer of 2014**
  - **Resource Management, Inc. specializes in biosolids recycling**
  - **Revenue sharing component**
    - **Minimum guaranteed**
    - **Maximum of 50% revenue when certain price achieved**
  - **Contract includes costs for 3 different trailer loading options**
  - **Provides back-up for Class B**

# Product Quality

## ■ Dried Product Characteristics

### – Nutrient Characteristics

- TKN is ~3.9% Year 1 = 27 pounds nitrogen/ton

## ■ Dried Product Uses

- Fertilizer for agricultural use
- Disturbed soil reclamation
- Amendment for soil blends

## ■ Initial Benefits

- Slow release fertilizer – protects groundwater
- Able to be stored outdoors uncovered
- Soil tilth - increased organic matter
- No odors during storage or spreading



# Product Quality

Metals	2015 Average RCSD (mg/kg)	NY Pollutant Limits (Monthly Average Concentration mg/kg)	Federal 40 CFR Part 503	Rite Aid Central Vite™
Arsenic	10.03	41	41	
Cadmium	4.56	21	39	
Chromium	31.6	1000	1200	83
Copper	522	1500	1500	1276
Lead	85.3	300	300	
Mercury	1.12	10	17	
Molybdenum	7.68	40	18	102
Nickel	24.6	200	420	3.2
Selenium	7.45	100	36	12.8
Zinc	889	2500	2800	9573

# Developing a Market

## ■ Application Rates

*5.6 tons/acre = 20.4 cubic yards/acre*

*150 lbs N/acre plant available 1<sup>st</sup> year*

## ■ Current Product Value

- Market Value \$3.50/ton + Cost of Trucking
- Fertilizer Value \$53.44/ton + Cost of Trucking



# Operating a Beneficial Reuse Program

## ■ Overcoming Product Density Challenge

- Direct Loading – limited capacity due to size of bay
- Storage Building for live loading
- Loading Trailers – needed to build a ramp
- Went from 8 tons per load to 28 tons per load



# Operating a Beneficial Reuse Program

- Farmer interest growing
- Have not had product available consistently due to dryer being down
- Meeting crop needs requires more labor than commercial fertilizer
- Value is in slow release N and improving soil tilth
- Market is new but promising



# Operating a Beneficial Reuse Program

## ■ Revenue Sharing Model

- Demonstrate different cropping systems to drive demand/price
- Increase revenue share incrementally to a maximum of 50% of market price

## ■ Path Forward

- Goal to achieve standard price greater than \$26.00 per ton within the next 3 to 5 years

# Lessons Learned

- Transform attitude from “waste” to “product”.
- Quality Class A product has value in the market
- Flexible and creative solutions necessary
- Market expects consistent products and service
- Partnership is essential



# Questions?

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