



# The Future of Solid Waste Think Outside the Box

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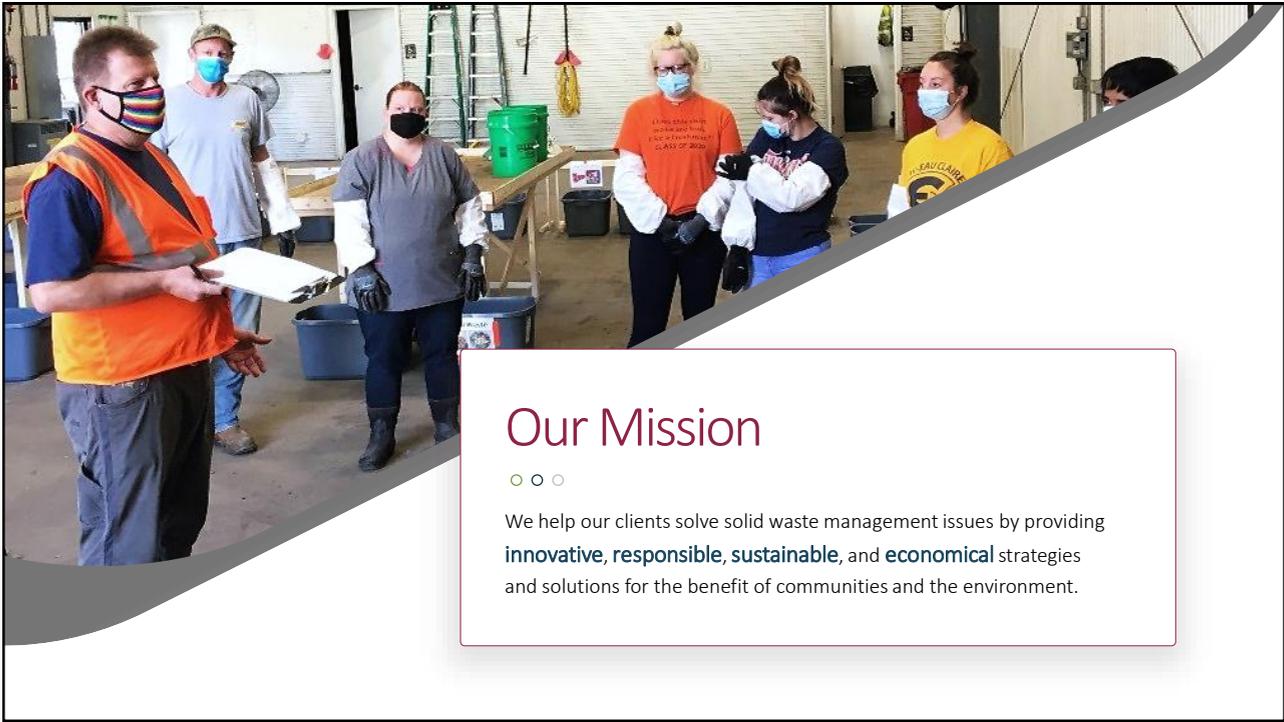
1

## Today's Agenda



- Introduction to GBB
- Daily Operations
- Challenges
- Collection
- Transportation
- Processing
- Disposal
- Planning
- Q&A

2



## Our Mission

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We help our clients solve solid waste management issues by providing **innovative, responsible, sustainable,** and **economical** strategies and solutions for the benefit of communities and the environment.

3

## Our Comprehensive Services

<b>Solid Waste Management Planning</b>	<b>Technical Evaluation &amp; Planning</b>	<b>Business &amp; Financial Planning</b>
<b>Curbside Collection &amp; Route Optimization</b>	<b>System Administration &amp; Receivership</b>	<b>Sustainability, Circular Economy &amp; Disaster Debris Planning</b>
<b>Expert Witness</b>		



4

# Daily Operations

**Functions:**

- Collection
- Transportation
- Processing
- Disposal

**Waste Streams:**

- Municipal Solid Waste (MSW)
- Construction & Demolition (C&D)
- Batteries, Oil, Paint, Anti-freeze, Electronics (BOPAE)
- Household Hazardous Waste
- Organics/Food Waste
- Tires

5

# Challenges

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graph TD
    C[Challenges] --- I[Lack of infrastructure]
    C --- HR[Lack of human resources]
    C --- B[Insufficient budget for solid waste management]
    C --- T[Limitation of technology]
    C --- P[Lack of participation in waste segregation at source due to low awareness]
    C --- F[Low waste collection fee]
    C --- IP[Institution and policy for solid waste management]
  
```

6

# Challenges

- What to do when the nearest landfill reaches capacity?
- When should we change what we are doing, because we know changes are coming?
- How to increase diversion from landfills?
- Who do we depend on when we can't manage using our own resources?
- Where do we get money to support operations?

7

# Collection

## Dual Purpose Collection Trucks



8

# Collection

## Reduce Volume



9

# Transportation

## Transportation by Rail



10

# Transportation

## Waste by Rail



11

# Processing

## Sort Line Robotics



12

Processing

### Electric Equipment



13

Processing

### eWaste



14

Processing

Glass



15

Processing

Tires



16



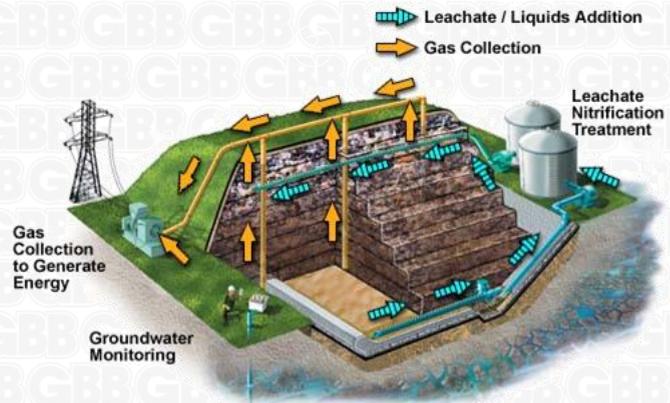
# Disposal



17

# Disposal

## Anaerobic Bioreactor Leachate Treatment



18

## Municipal Solid Waste (MSW)

### Peel Back the Layers of Waste



Waste Streams:

- Municipal Solid Waste (MSW)
- Construction & Demolition (C&D)
- Batteries, Oil, Paint, Anti-freeze, Electronics (BOPAE)
- Household Hazardous Waste
- Organics/Food Waste

19

## Municipal Solid Waste (MSW)

What materials make up the MSW (waste characterization) in your community?

Are there any materials that can be separated from MSW that have outlets for recycling?

Are there commodities that are in high demand that you can separate from your MSW?

Is there a manufacturer in your area that might need some materials that you can separate from your waste stream? If yes, what condition does the material need to be in to satisfy the needs of the manufacturer?

20

# Construction & Demolition (C&D)

Are you mixing C&D materials with MSW?

Is there a positive economic way to separate C&D materials from MSW? If yes, is there an outlet for clean wood waste, gypsum drywall, concrete, shingles, etc...?

Will a concrete plant take demolition concrete to pulverize back into a material they can then mix into new batches of concrete in place of gravel?

Could shingles be pulverized and mixed into asphalt?

Clean wood waste – mulch, or feedstock for a pyrolysis system to make biochar?

Gypsum Drywall – processed to become soil amendment, pulverized to be used in manufacture of new drywall.

21

# Construction & Demolition (C&D)



22

## Batteries, Oil, Paint, Anti-Freeze & Electronics (BOPAE)

- Oil/Anti-Freeze**
  - Pump and Haul
  - Containment for Collection Tank
- Paint**
  - Oil Dry
- Electronics**
  - City eWaste
- Batteries**
  - Lithium Ion
  - Electric vehicles

23

## Household Hazardous Waste (HHW)

Do you have a plan?

24

# Organics Food Waste



25

# Planning



26

# Planning

- Data Collection
- Information Gathering
- Community Input
- Budget Forecasting
- Software
- Advancing Technologies
- Fleet Features

Tell Your Story...

27

# Disaster Debris Planning



The top photograph shows a paved road that has been completely washed away by a turbulent river, leaving a deep gap in the road surface. The surrounding area is a steep, wooded hillside. The bottom photograph shows a line of pack animals, likely mules or horses, standing in a line on a dirt path, each carrying a large pack on its back, illustrating a traditional method of transport in disaster-prone areas.

28

# Thank You!



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*“This industry has a greater effect on us, our children and our grandchildren than any other. It has always been my goal to ensure we find ways to efficiently and economically leave it in a much better position than it is today.”*