Sustainable Solution to Street Sand

Dover, NH Catch Basin and Wet Well Cleanings Facilities

January 2023

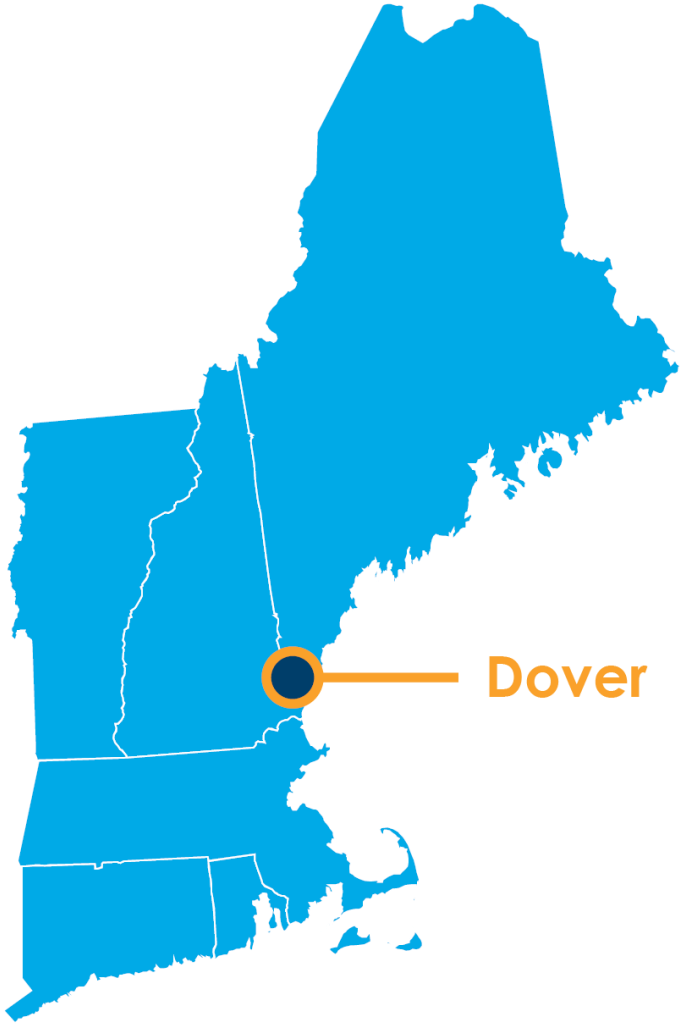
Jeff Mercer, PE; Wright-Pierce

WRIGHT-PIERCE
Engineering a Better Environment

Presentation Overview

Dover Introduction
Wet Well Cleanings Facility
Catch Basin Cleanings Facility
Results & Conclusions

City of Dover



- Oldest Permanent Settlement in NH
- Industrialization early 1800's
- Current Population: 33,000
- 29 square miles
- MS4 and partial combined sewer Community

WRIGHT-PIERCE
Engineering a Better Environment

WWTF Overview

WET WELL CLEANINGS FACILITY

Wastewater Infrastructure

- 113 miles sewer
- 23 pump stations

Wet Well Treatment Facility

Wet Well Cleanings Facility Design Basis	
Waste Type	Grease, Grit, Fats, Oils, Floatables, Organic Solids, WWTF Scum Tank Cleanings
Solids Content	3-10%
Trucking	Vactor Truck
Average Volume	10-15 cubic yards per load, several times per year

- **Pump Station Wet Wells cleaned via vactor trucks**
- **Emptied at WWTF into roll-offs**

Old System

- Earthen ramp
- No roll-of pad
- No washdown

Wet Well Treatment Facility

Two 25'x90 ramps

Two roll-offs

- More user friendly
- Rugged roll-off pad and plates
- Under cover allows material to drain, saves disposal $
- Hose station + Hydrant

CATCH BASIN and STREET SWEEPINGS FACILITY

WRIGHT-PIERCE
Engineering a Better Environment

Background

- 4,000 catch basins and over 70 miles of pipe
- MS4 - no catch basin can be more than 50% full
- City cleans catch basins every two years
  - Rotating between north and south side of city every year
- 1,600 tons of road sand used each year
- Street Sweeping in spring and fall
- Disposed at City's dredge cell – (closing!)

Sustainable Approach Needed to Manage Solid Waste Generated

Facility Goals

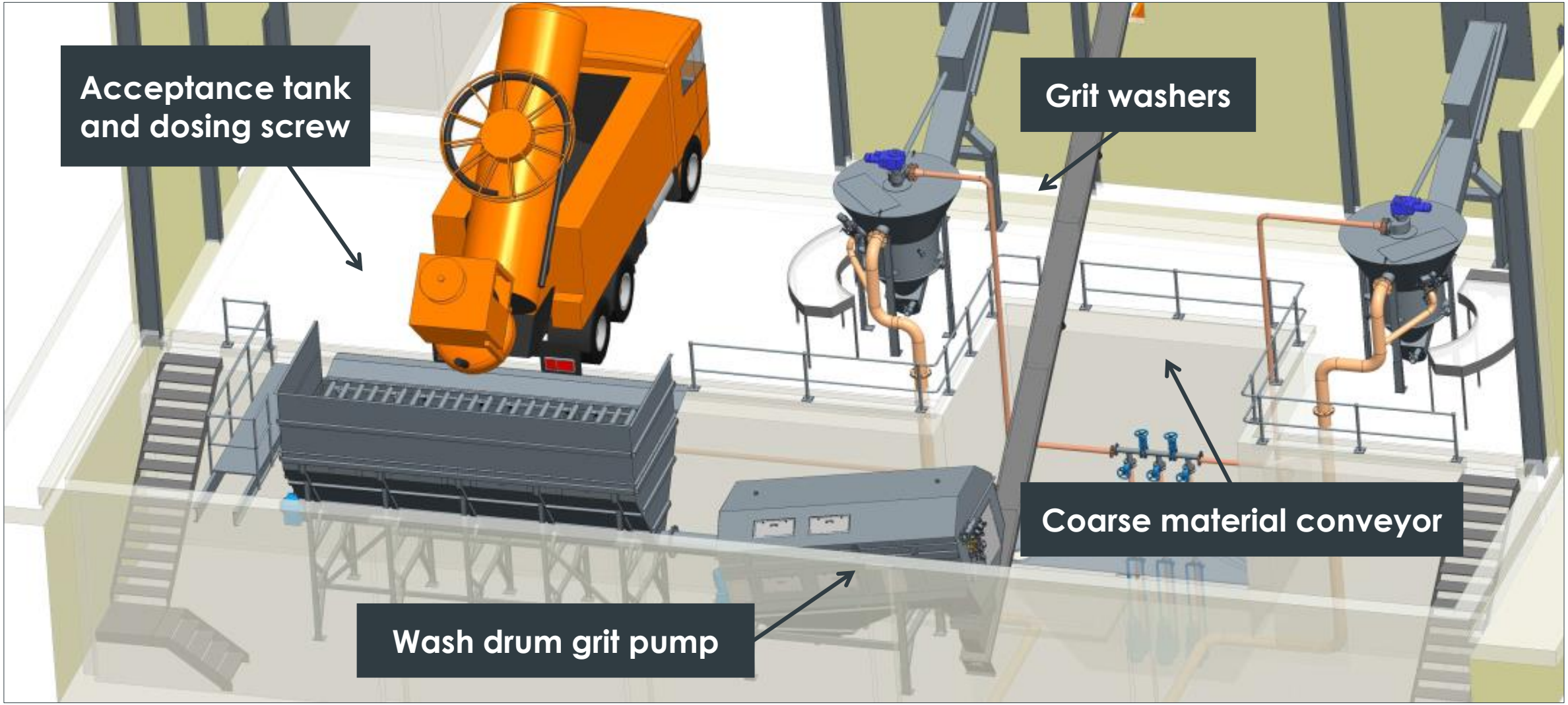
- Waste removed as part of MS4 protects watershed, but must be properly disposed as a solid waste
- Next step for environmental sustainability is to limit landfilled material
  - Recycle = Less to landfill and less demand for raw materials

- Huber Technology has a package system that rinses and separates solid materials
  - Soil washing shown to be effective at removing contaminants
- 150 worldwide installs (mostly Europe)
  - None in U.S. (Until now)

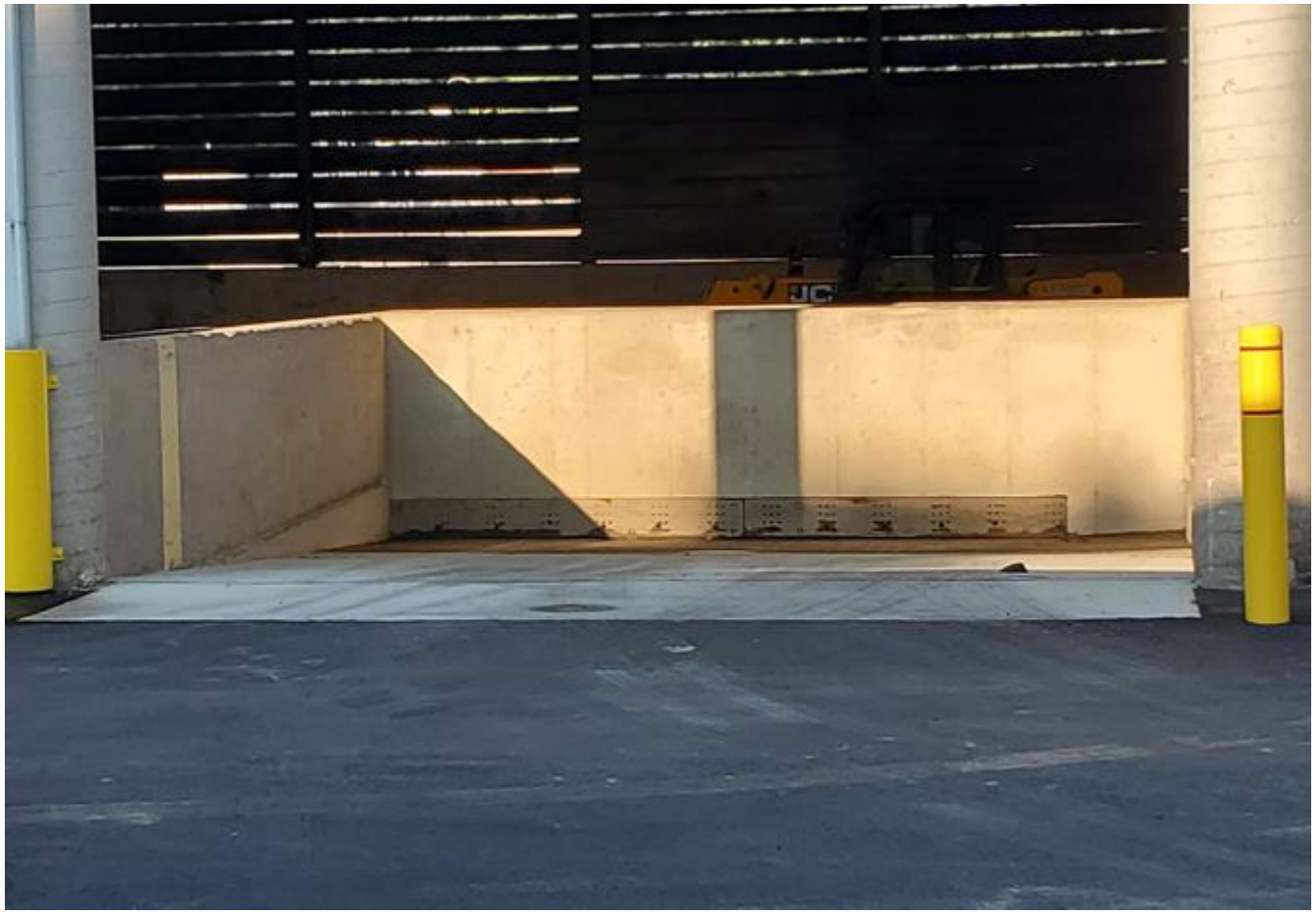
Design

Dover Facility Design Parameters	
Waste Type	Catch Basin Cleanings, Street Sweepings
Solids Content	10-40+%
Trucking	Vactor Truck
Average Volume per Unload	4 - 5 cubic yards
Equipment Processing Rate	7-10 cubic yards per day

Example Grit Facility



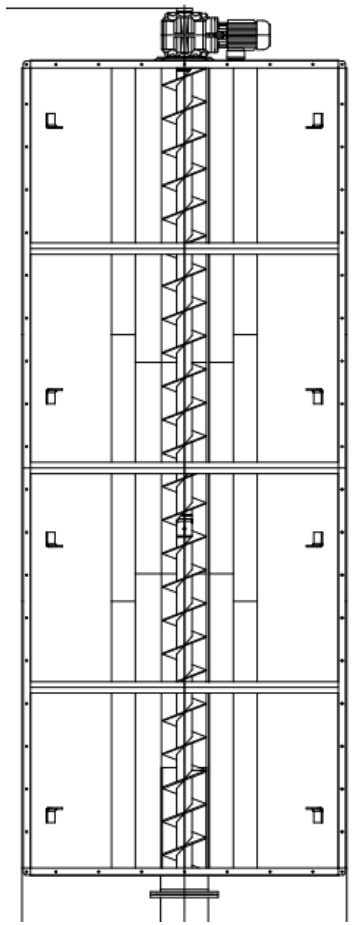
Components



Storage/Decanting Area

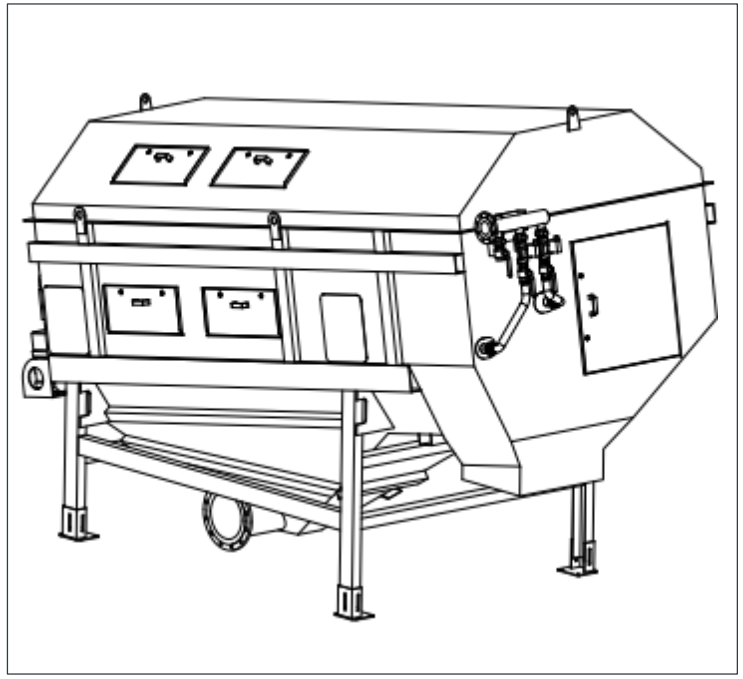
- Sloped Concrete Bay
- Push Wall with Drainage Ports

Acceptance Tank & Dosing Screw



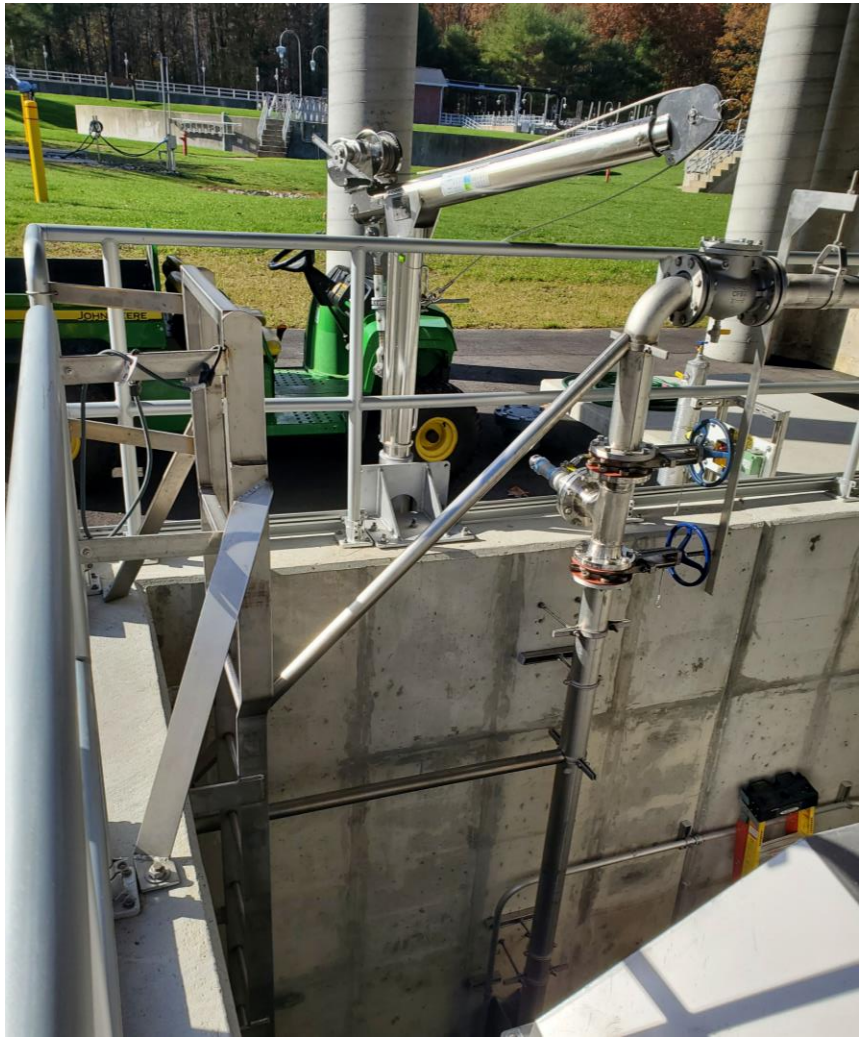
Acceptance Tank & Dosing Screw

Wash Drum



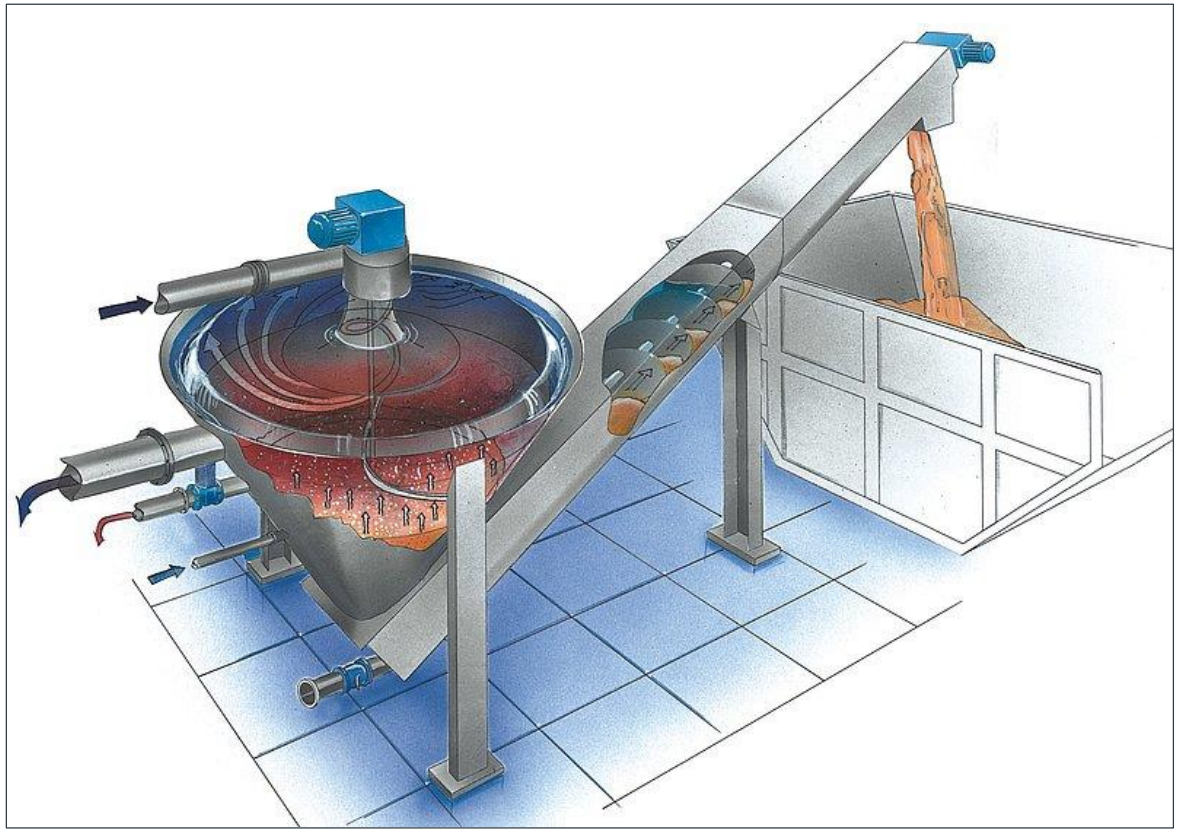
- Rotating fine screen
  - 3/8” perforations
- Two spray bars for rinsing
  - ~240 gpm plant effluent

Grit Pump



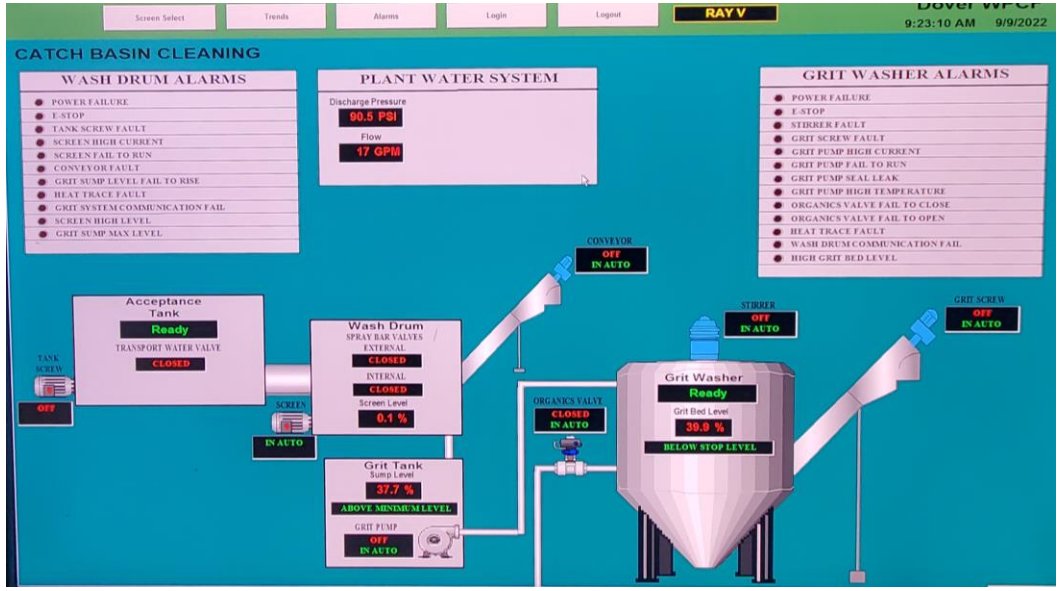
- Submersible, recessed impeller
- Many flush connections
- Fine-tune pump speed to keep grit fluidized
- High solids content-
  - Oversized motor
  - Robust pipe supports

Grit Washer



Rear Overview

Instrumentation and Control



- Two control panels for automation
- Instrumentation for monitoring
- Local controls

Results – Pre-Processing

Results – Coarse Material Separation

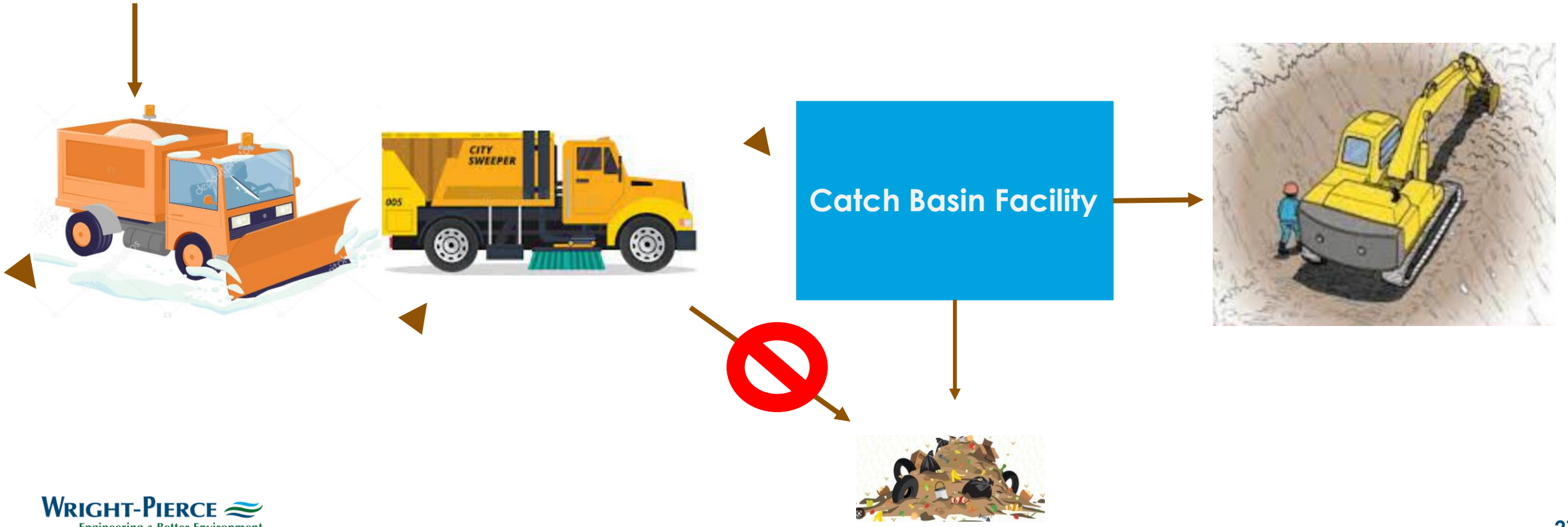
Results – Fine Material Separation

Economics

- Total Project Cost: $3.4 million (2020)
- Catch Basin Facility: ~$2 million
- Payback: Potential Break-even
  - Unknown long-term solid waste disposal costs
  - Assumes major equipment rebuild in Year 10, could be longer or shorter
  - No outside waste received (Yet – potential income source)
- Coarse material combined with wet well container for disposal
- Separated sand intended to be used for City projects

Conclusions

- Difficult to put a value on environmental benefits
- Overall reduction in watershed nitrogen loading
- Part of City's efforts for a circular economy:



Next Steps

- City wants this to be a case study for sustainable MS4 compliance
- First - Determine regulatory options for facility
  - Currently discussing with NHDES, including options for reuse of material
  - Conduct lab testing as required for any waivers needed
    - limited reuse vs. remediated >>City infrastructure projects
- Later - Explore options for accepting other communities' waste

End Game: Synchronize watershed, wastewater, and solid waste program goals for environmental protection and sustainability

Acknowledgements

Ray Vermette
Facility Supervisor

John Storer
Director of Community Services

Gretchen Young
Environmental Projects Manager

Ryan Campbell, RPR

Thank you for attending

Contact Information

JEFF MERCER

Jeff.mercer@wright-pierce.com

WRIGHT-PIERCE
Engineering a Better Environment