HARTFORD METROPOLITAN DISTRICT (MDC) WET WEATHER EXPANSION PROJECT PHASE 1 – NEW 200 HEADWORKS FACILITIES

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NEWEA Conference

January 22, 2018

Presentation Agenda

- The Metropolitan District Overview
- Project Drivers and Goals
- Headworks Facility In-Depth
- Construction Time-Lapse
- Other Project Elements & Team Collaboration
- Questions

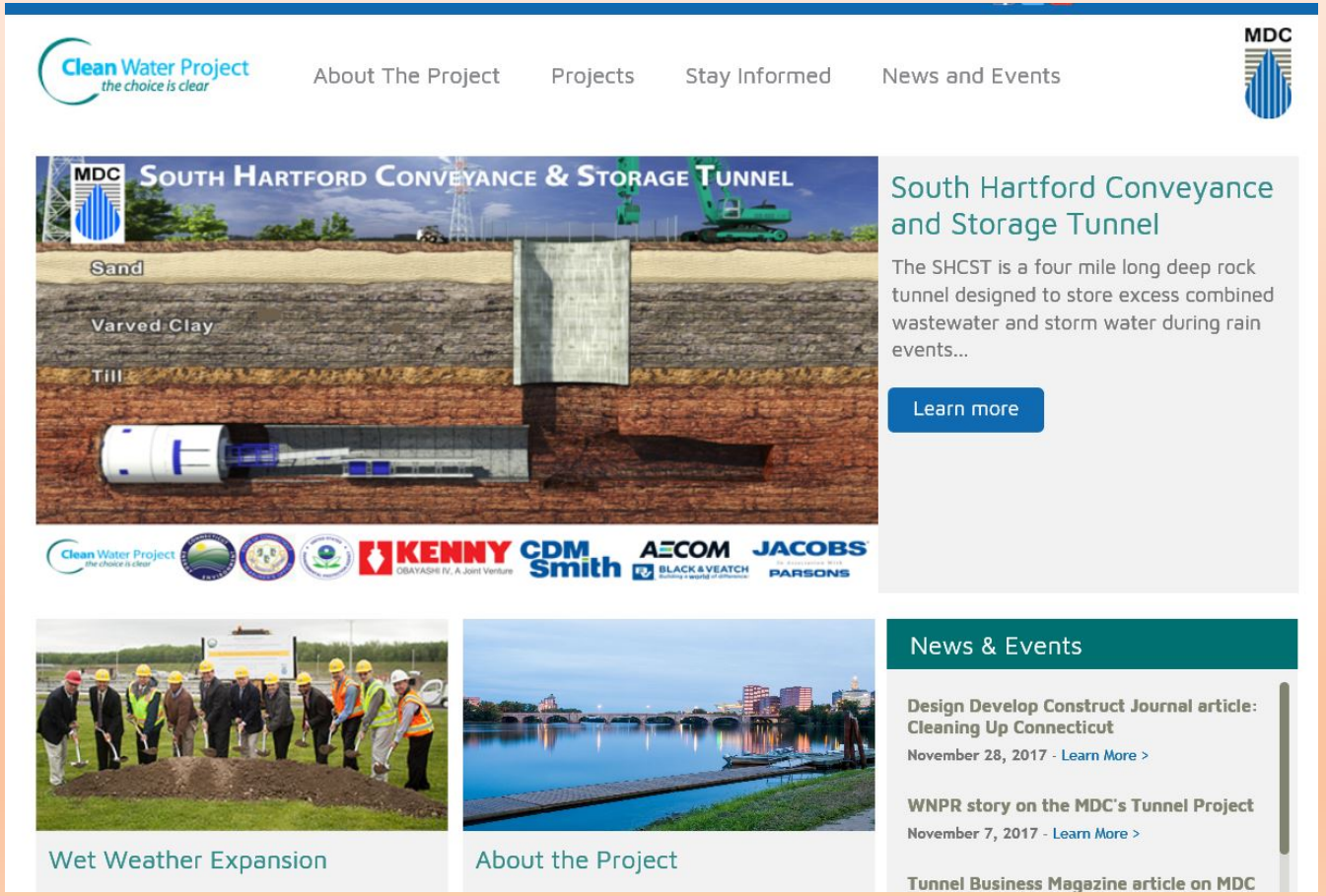
MDC Overview

- Established in 1929, first on CT River to provide sewage treatment
- Serve 8 Member Towns
  - Responsible for serving 400,000+ customers
- Full service utility
  - Water Supply, Water Treatment, Distribution Collection, Wastewater Treatment, All support services
- All WPC facilities operate continuously, 24hrs/day, 365 days/year

Project Driver – Clean Water Project

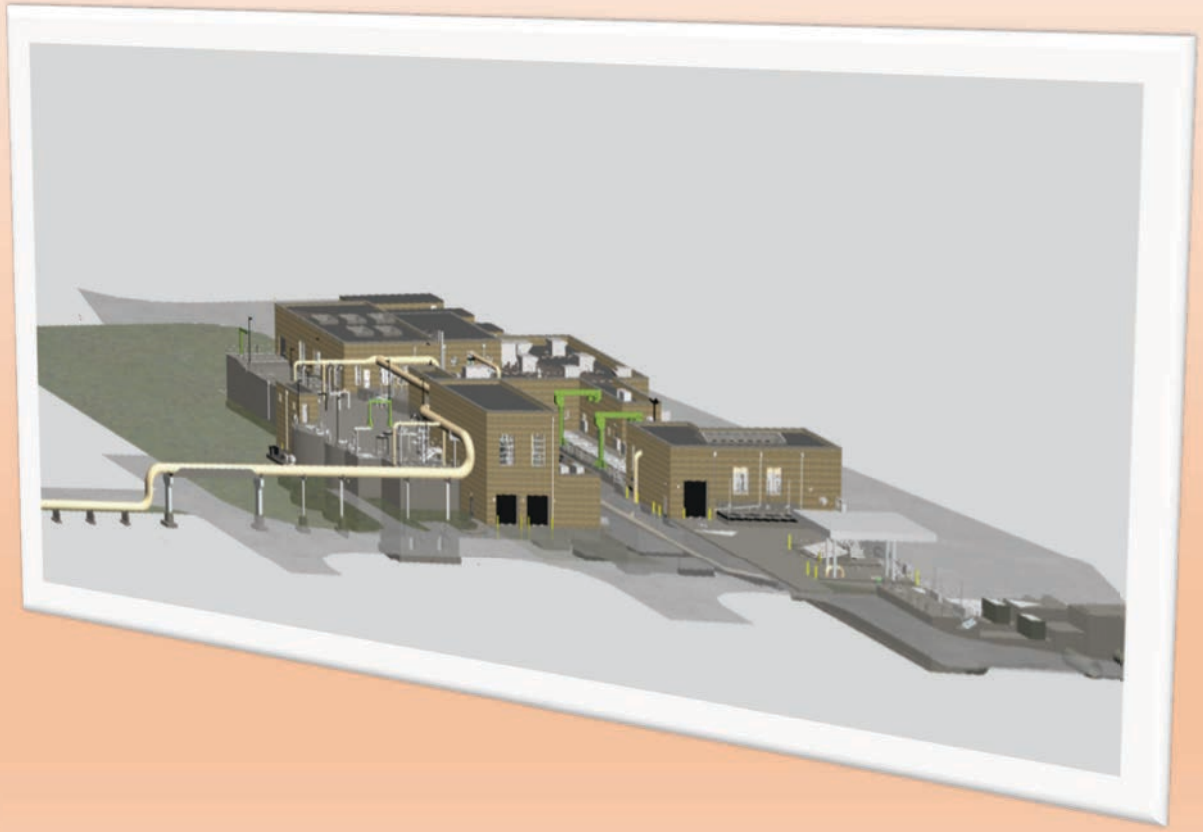
5 Components to the Solution:

1. Eliminate All Sanitary Sewer Overflows (SSOs)
   - Inflow and Infiltration (I/I)
2. Abatement of Combined Sewer Overflows (CSOs)
   - Sewer Separation
3. Storage Tunnels
   - Interceptor Pipes
4. Reduction of total nitrogen discharge from the waterwater treatment facilities
   - Treatment Plant Improvements
5.

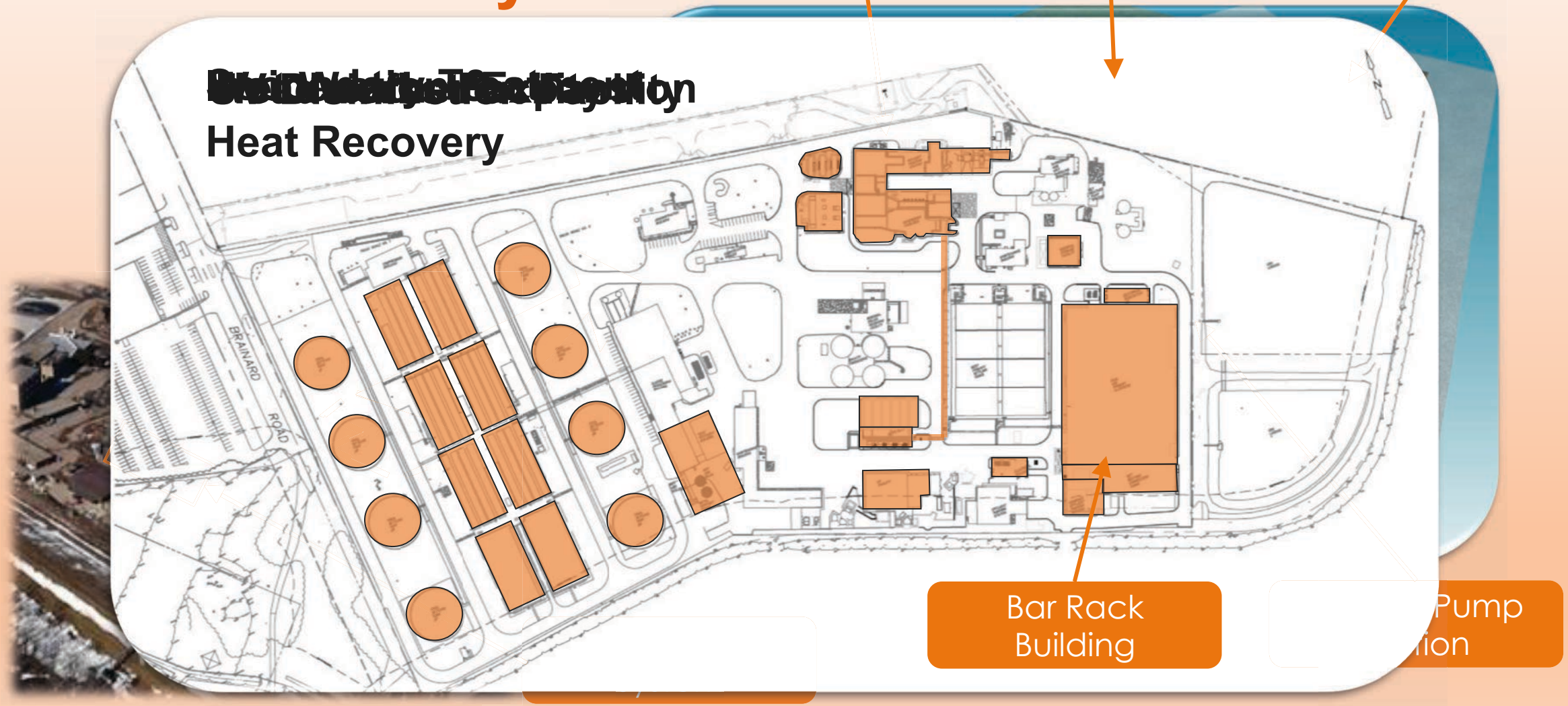


Goals of the Headworks Project

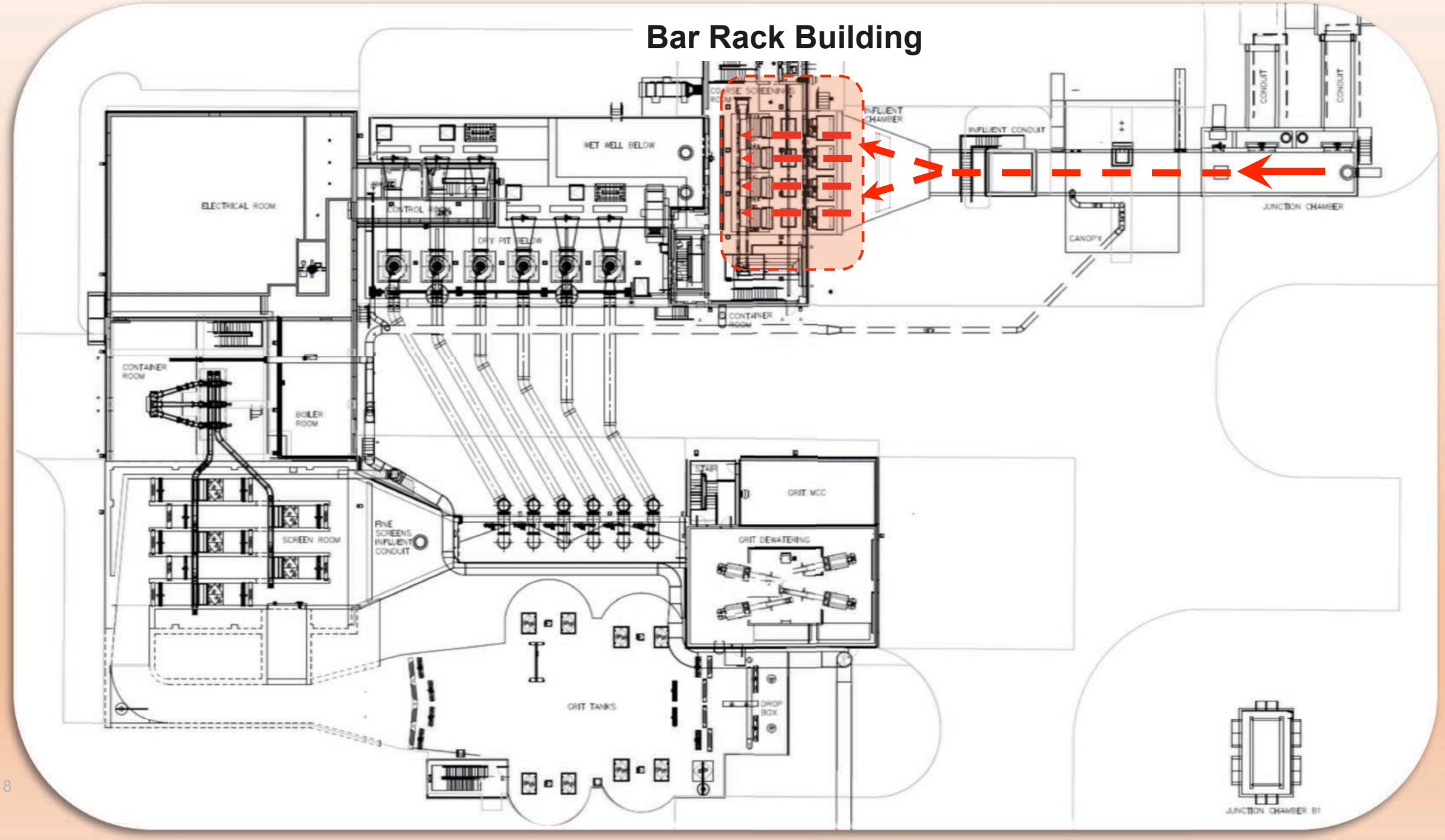
- Lower the hydraulic grade line (HGL) of collection system
  - Increasing hydraulic capacity to handle 200 MGD + plant recycles
  - Free discharge from existing interceptors
- Raise the HGL to the preliminary treatment facilities
  - Achieve preferred velocities downstream
  - Provide gravity flow through the rest of the facility
- Improve removal of screenings and grit material
- Odor control for Headworks Facility using a chemical free biological process



Heat Recovery WPCF Site Overview

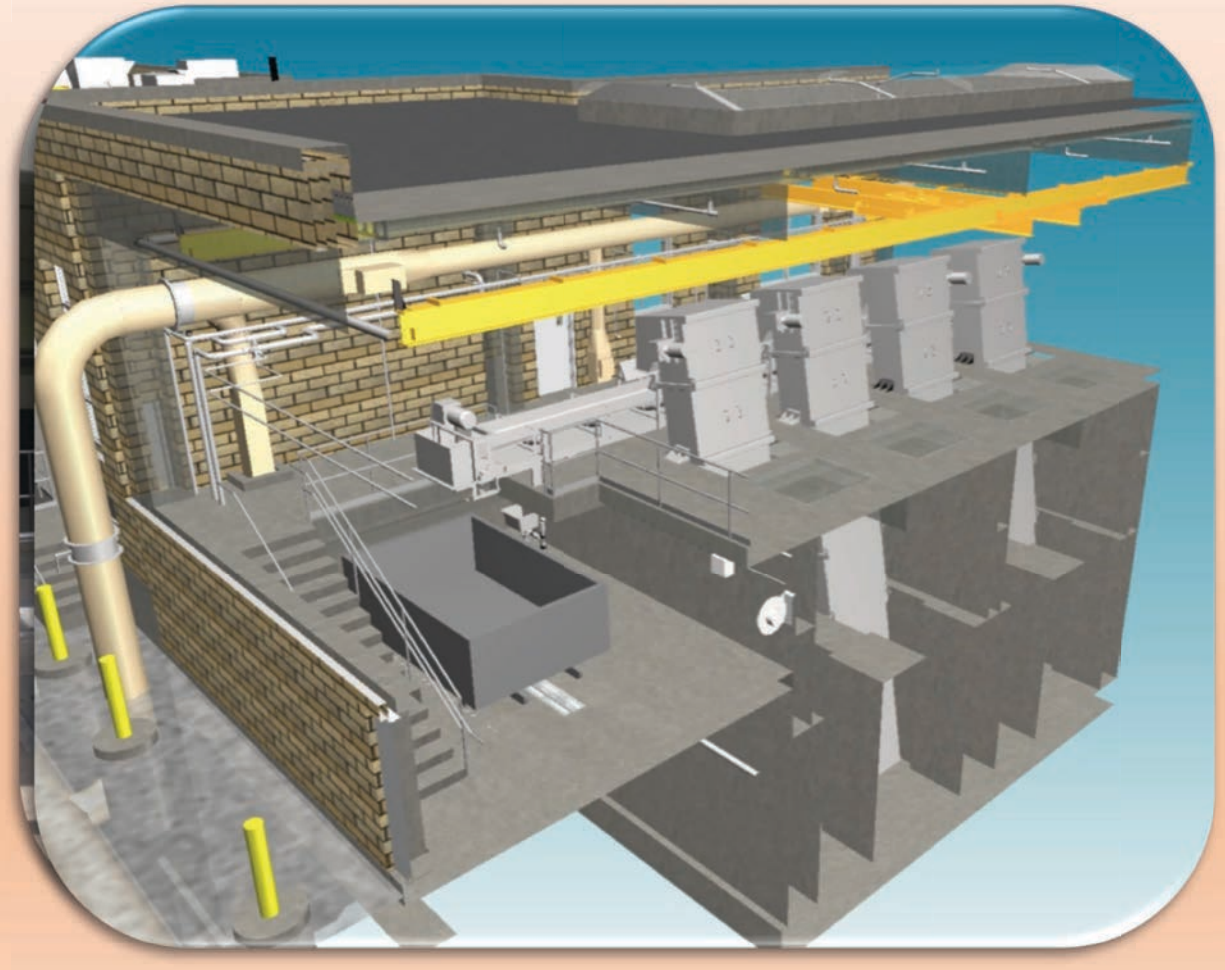


Process Flow Stream



Bar Rack Facility

- Rated for 200 MGD
  - Average 56 MGD
- Four new chain and rake type bar racks with 3-in bar spacing
- Protect the downstream influent pumps from large debris
- Configured to optimize flow distribution to the IPS wet wells.



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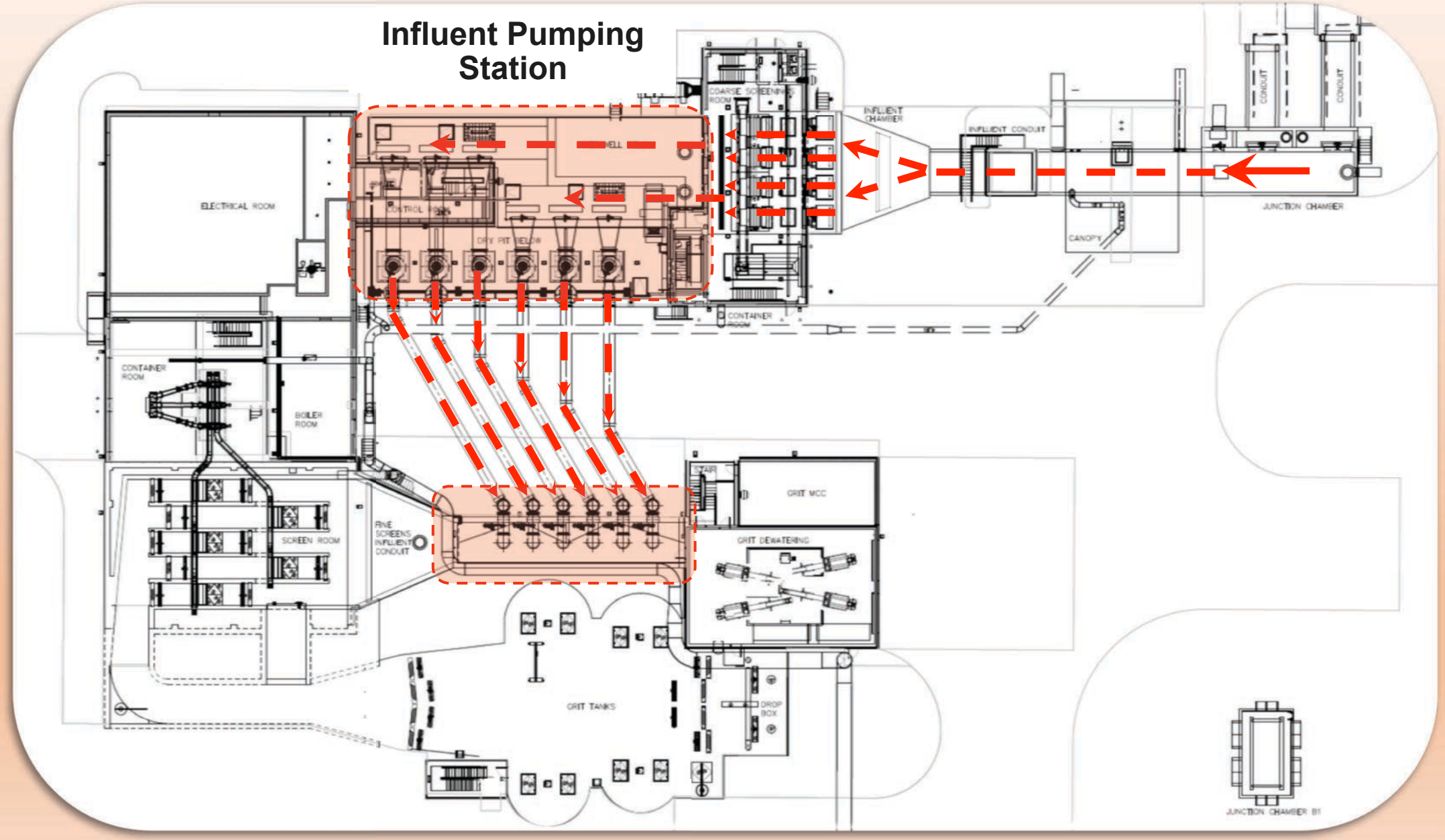
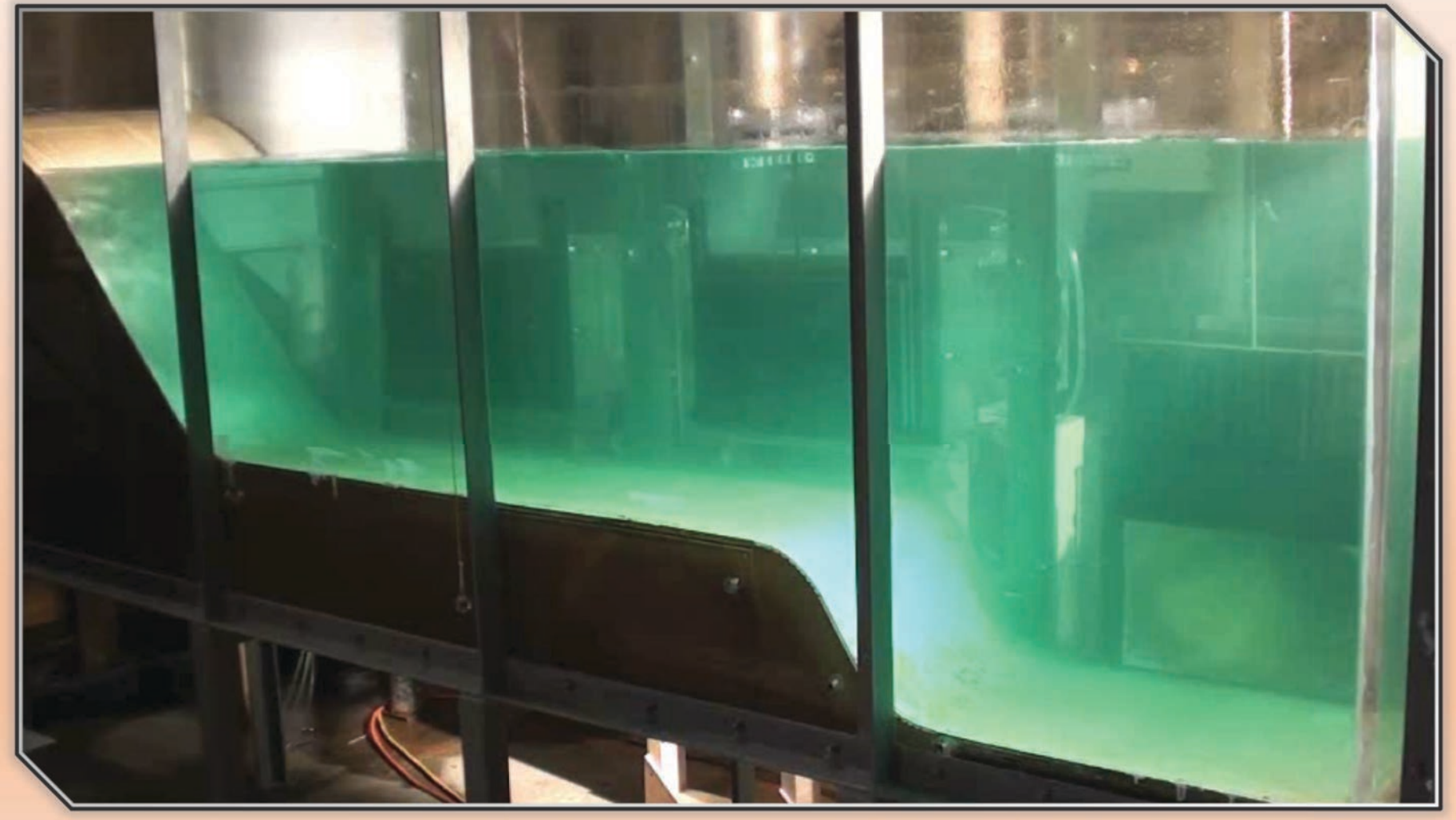


Hydraulic Modelling

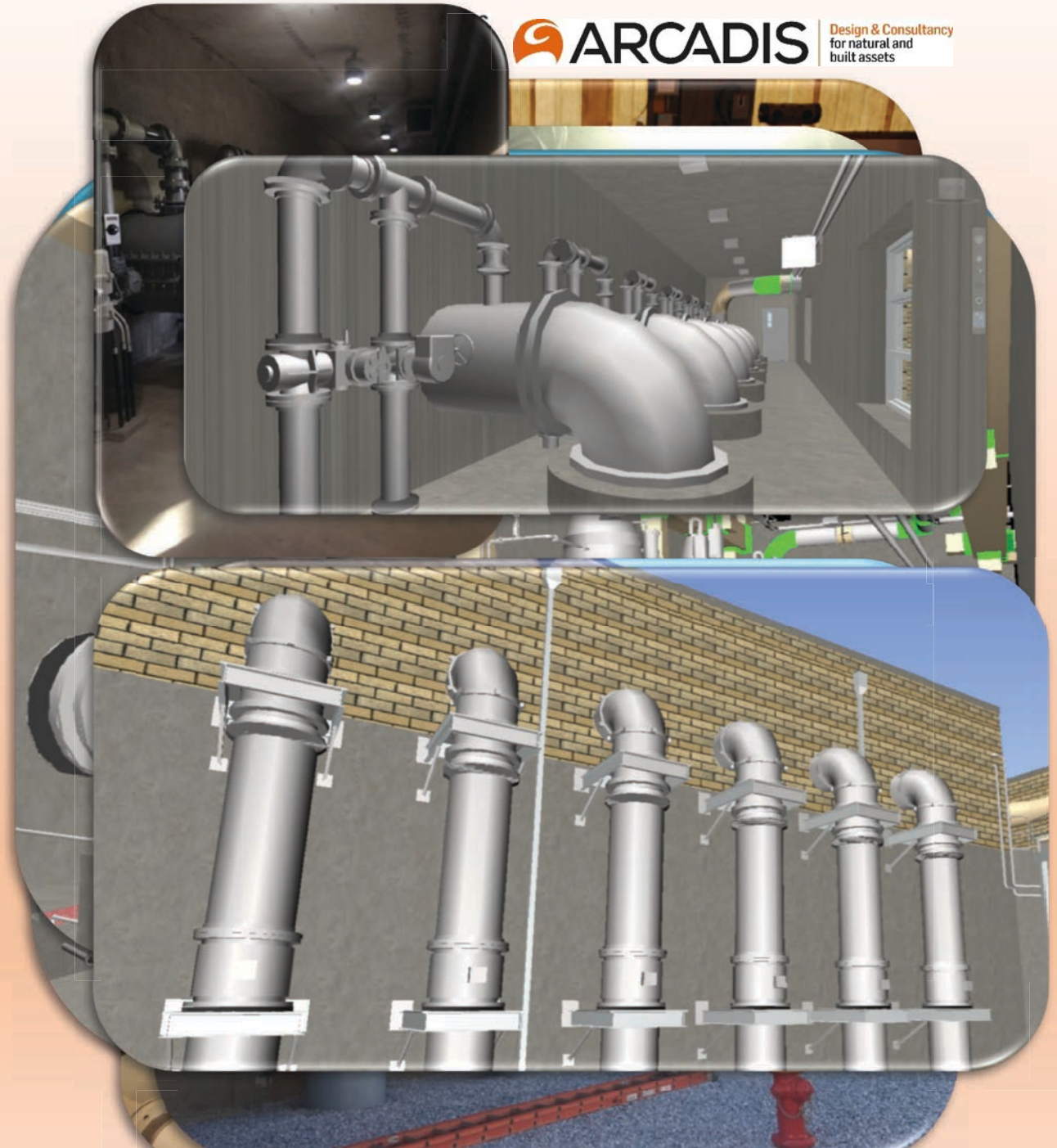
- Purpose: Evaluate the following hydraulic conditions:
  - Flow distribution to operating screen channels,
  - Flow patterns, free and subsurface vortex formation and swirl
  - Assure satisfactory performance, based on the Hydraulic Institute Standards, ANSI/HI 9.8-1998 (HIS) acceptance criteria.
  - Performance of the wet well under clean-out mode
- Simulated facility to a geometric scale ratio of 1:5.84
- Resulting Design Modifications:
  - Installation of bull nose pier in expansion between the influent conduit and screening channel entrances to distribute flow more uniformly amongst operating screening channels and vertical vanes to reduce swirl to acceptable levels.

ADLEN LAB 3D MODEL – SELF-CLEANING WET WELL



Influent Pump Station

- Physical Model Constructed
- Two Self-Cleaning Style Wet Wells
- Six Dry-Pit Submersible pumps, 42 MGD capacity each
- Level control to match incoming flow rate
- Siphon type discharge arrangement
- Magnetic flow meter on each pump discharge
- Discharge to common headbox



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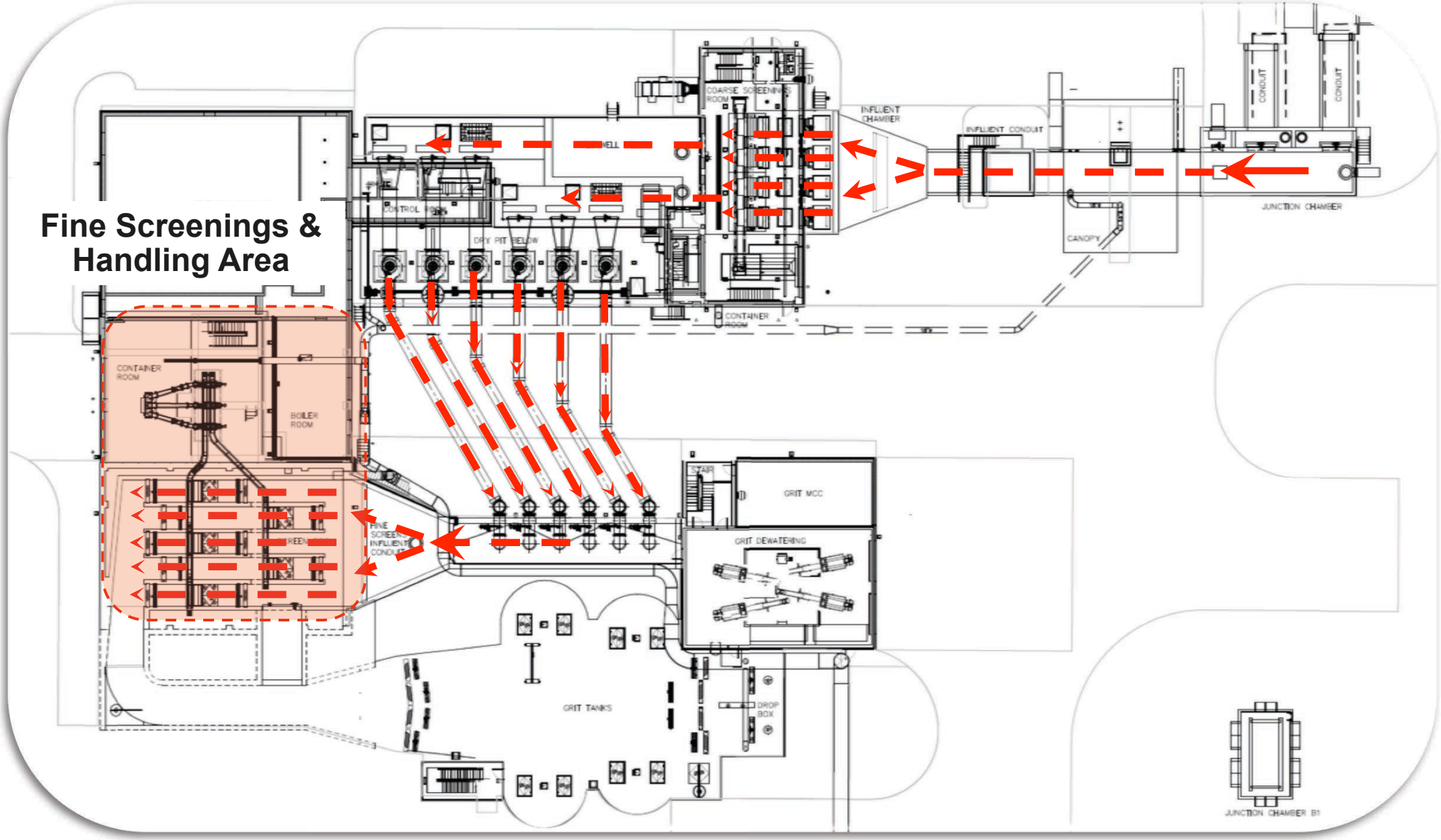
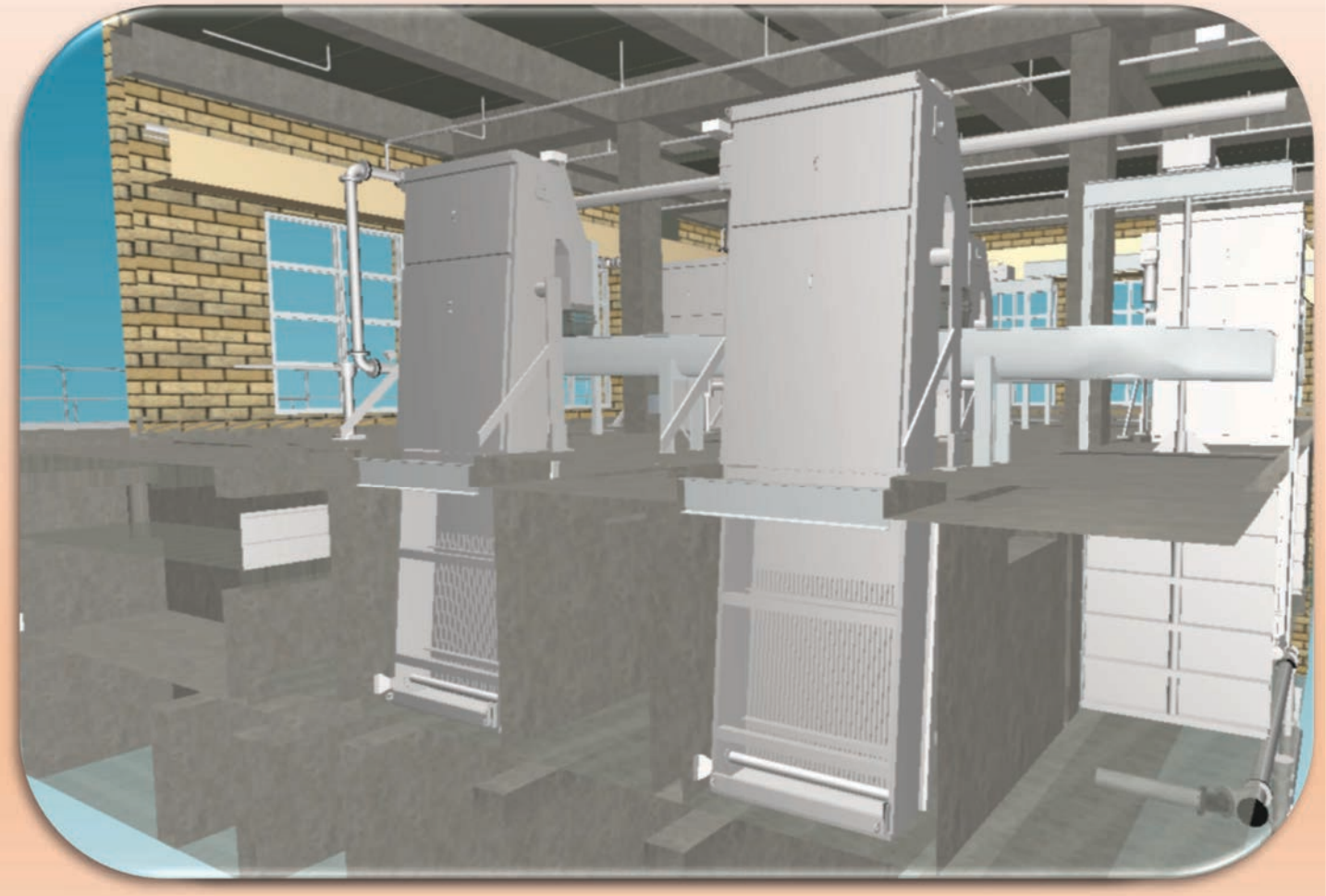


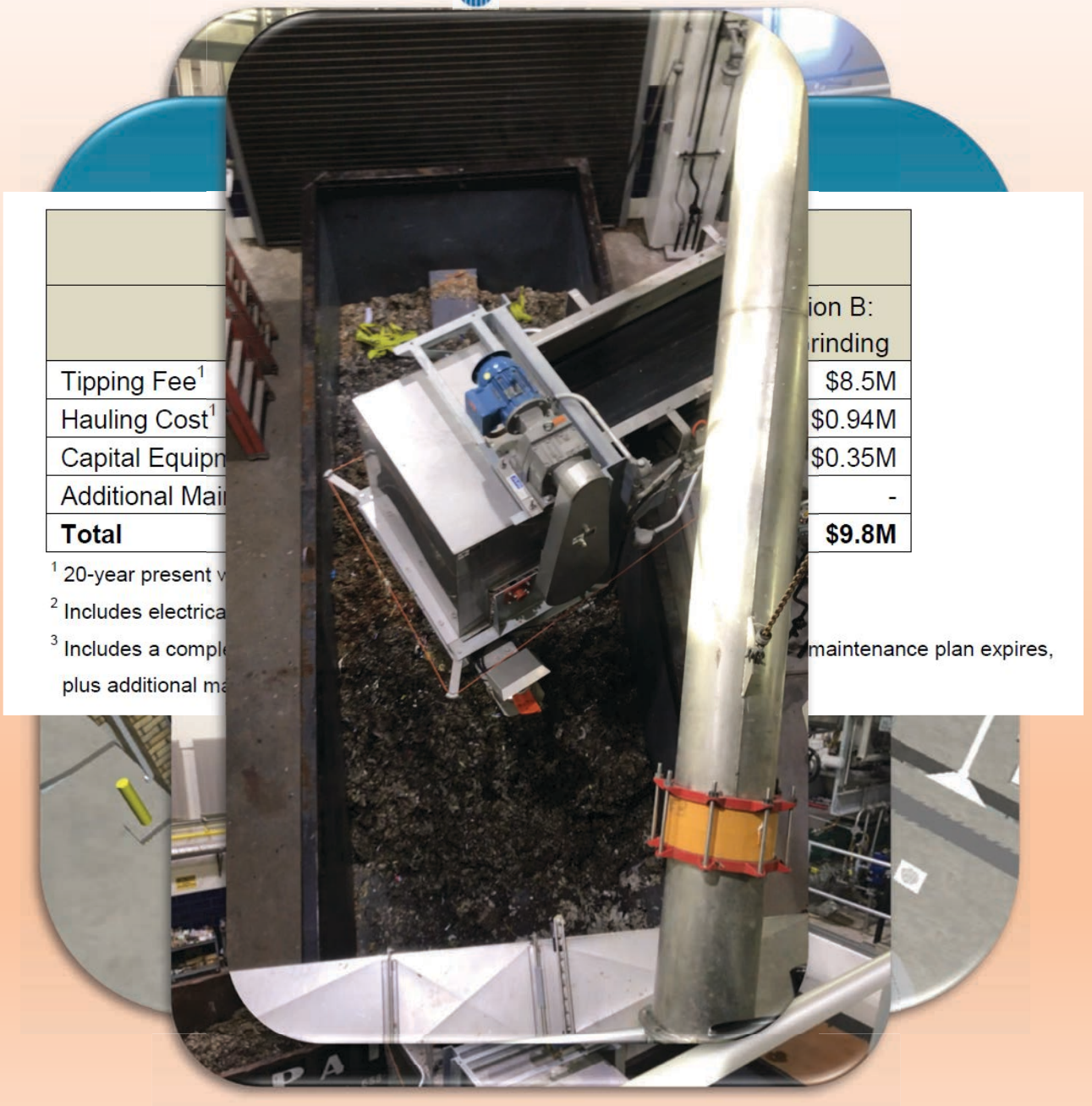
Fine Screens

- Five multiple rake bar screens with 1/4-in. openings
- 52.5 MGD capacity each
- Increase capture rate and reduce operational/maintenance issues in downstream process equipment.
- Screenings Sluicing Troughs used to transport



Screenings Handling

- 3 Grinder / Washer / Compactors and Pivoting Belt Conveyor
- Classification and Disposal Benefits
  - Municipal Solid Waste vs. Special Waste
  - CT DEEP Acceptable
  - $20/Ton Disposal Savings on increased material removal in the new headworks.
- Other Benefits:
  - Reduction in manpower to manage waste streams
  - Reduction in unit processes issues down stream of headworks



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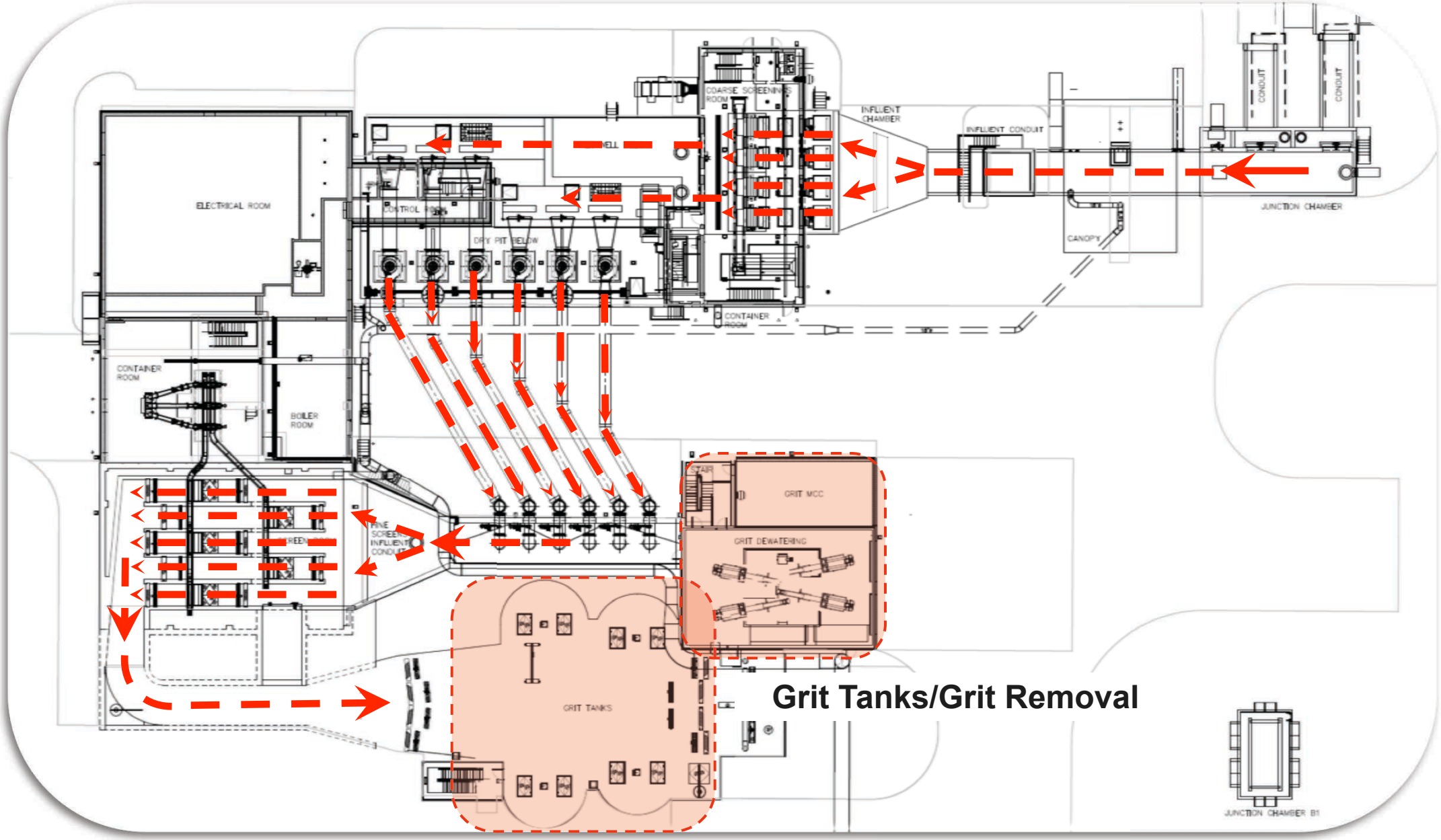
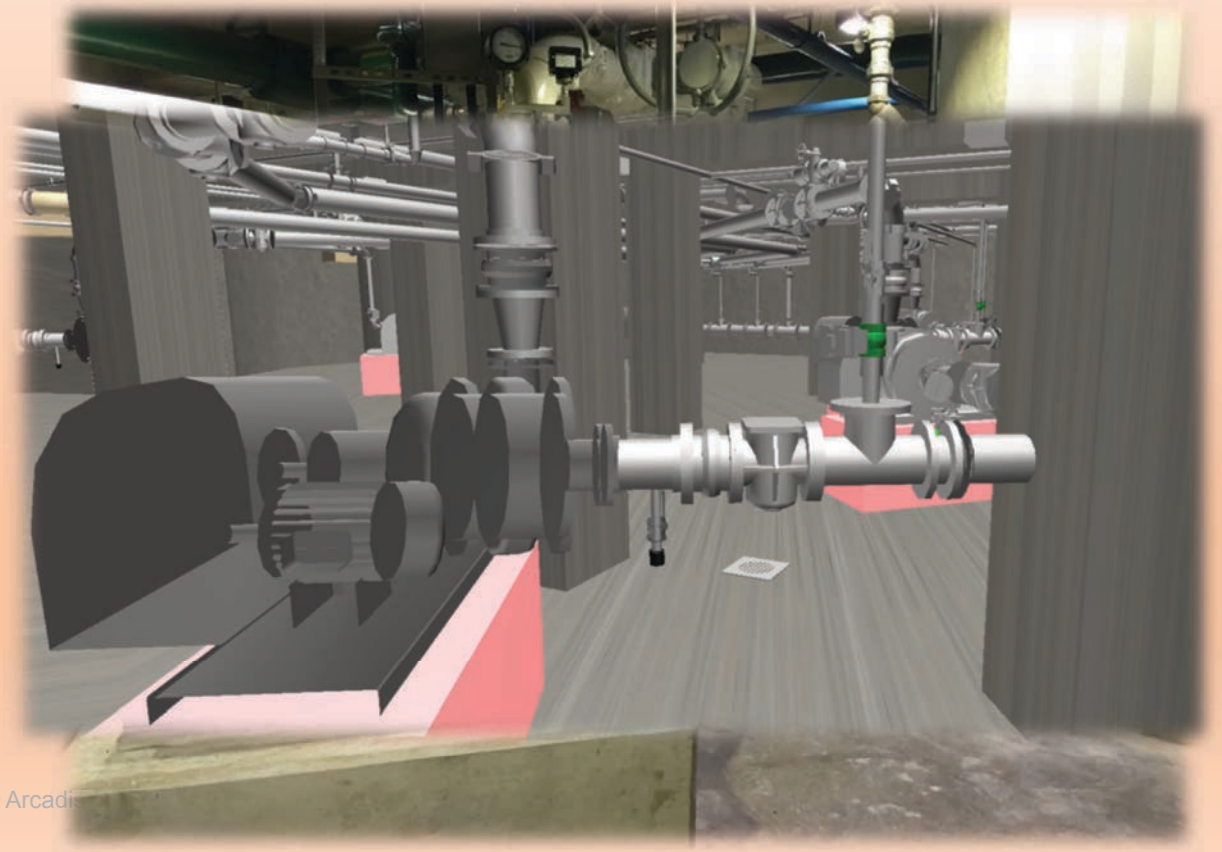


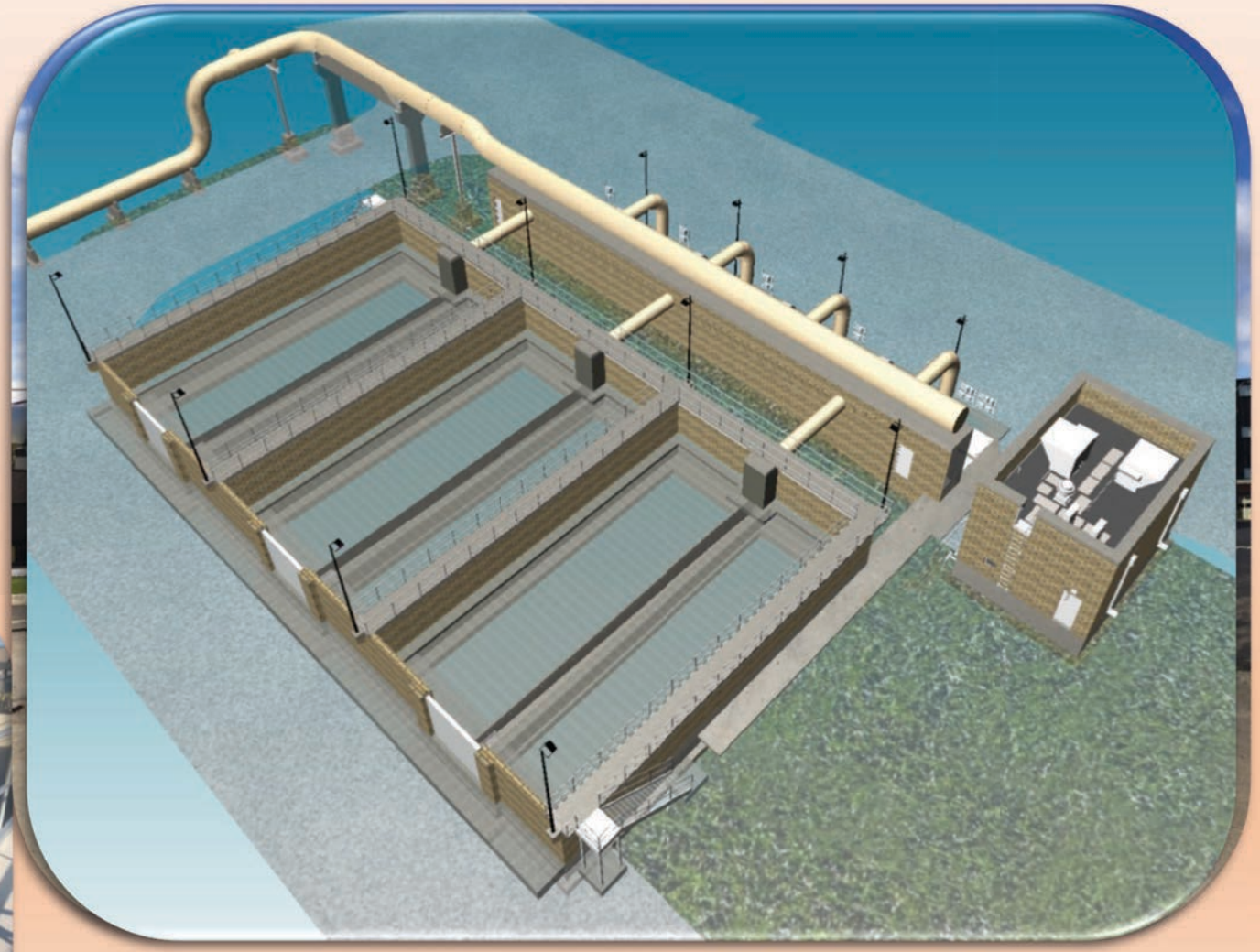
Grit Removal

- Four 24-foot-diameter centrifugal vortex type grit chambers, each rated for 70 MGD
- Each grit tank equipped with two 500 GPM centrifugal pumps
- Grit pumps automatically run on a timer to extract grit deposited in the vortex hoppers



Odor Control

- Biofilter System
  - 52,800 scfm
  - 3 cells
  - (17,600 scfm/cell)
  - 4 Fans & Humidification Chamber



Time Lapse – Mar 2014 to Nov 2016

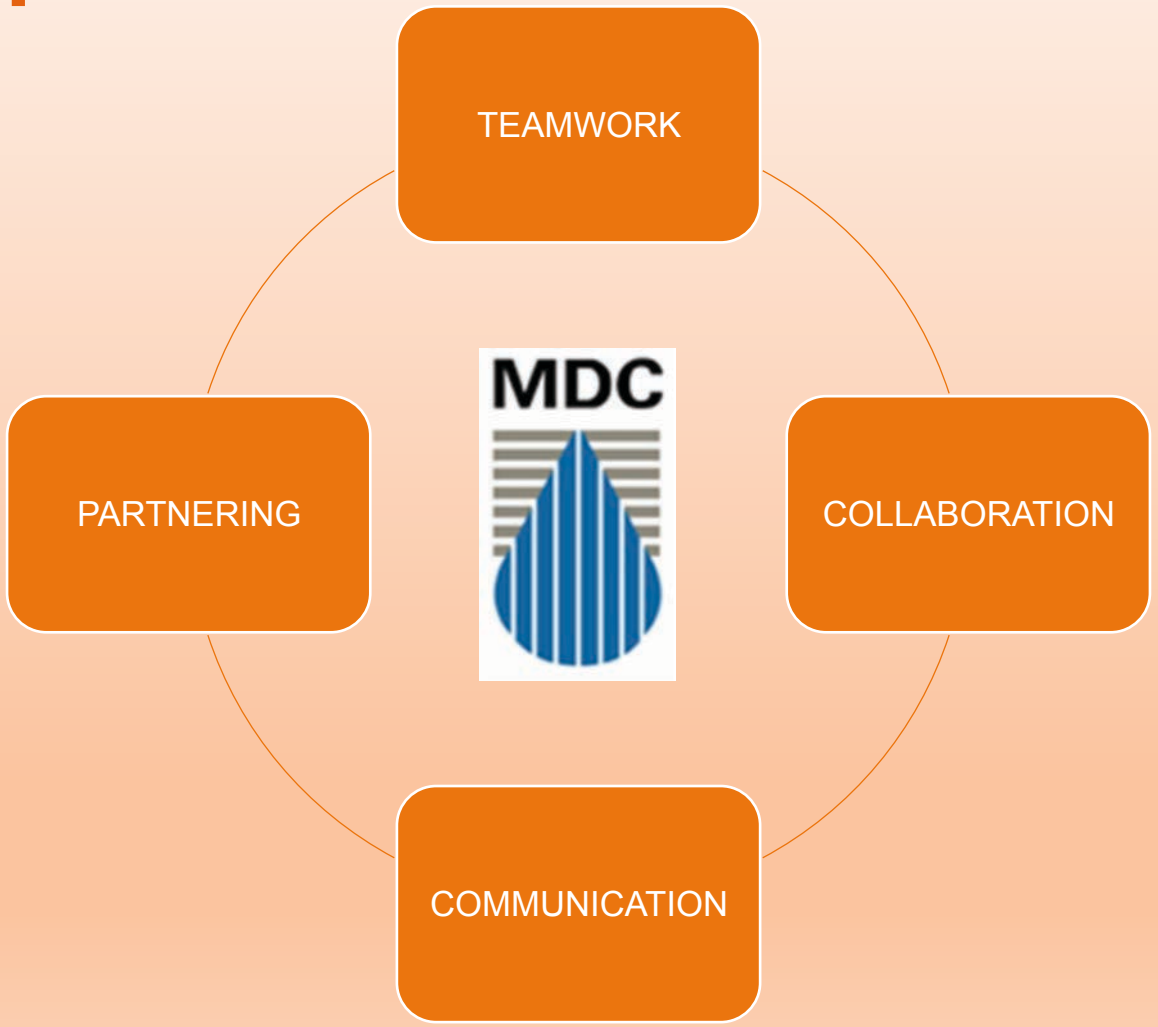
Other Project Elements - eOM & CMMS

- System O&M Manuals
- Normal/Routine Procedures (SOPs)
- Process Design Criteria
- Operator Log Entries
- Troubleshooting
- Training Documents
- Record Drawings
- Equipment Lists
- Control Descriptions

Tablet & Phone Accessible

Overall Team Collaboration

- Engineer Selection is key
- Collaboration all they way through
- Design Team integrated with MDC
- 3D model used to visualize the facility during design and construction phases
- Maintenance and Operational Staff participation at all review milestones
- SCADA Collaboration
- Start-up



ACKNOWLEDGEMENTS

Questions?