



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

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Presentation Agenda

- 1 The Metropolitan District Overview
- 2 Project Drivers and Goals
- 3 Headworks Facility In-Depth
- 4 Construction Time-Lapse
- 5 Other Project Elements & Team Collaboration
- 6 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)
 2. Inflow and Infiltration (I/I)
 3. Abatement of Combined Sewer Overflows (CSOs)
 4. Sewer Separation
 5. Storage Tunnels
 - Reduction of total nitrogen discharge from the wastewater treatment plants
 - Interceptor Pipes
 - Treatment Plant Improvements

The screenshot shows the website for the Clean Water Project. The main header includes the project logo and navigation links: 'About The Project', 'Projects', 'Stay Informed', and 'News and Events'. The central focus is a large graphic titled 'SOUTH HARTFORD CONVEYANCE & STORAGE TUNNEL' which illustrates a cross-section of the ground with layers of Sand, Varved Clay, and Till. A large tunnel is shown being installed through these layers. Below this graphic are logos for partner organizations: Clean Water Project, U.S. EPA, KENNY CDM Smith, AECOM, BLACK & VEATCH, JACOBS, and PARSONS. At the bottom of the page, there are two image-based sections: 'Wet Weather Expansion' showing a group of people at a construction site, and 'About the Project' showing a scenic view of a river and city buildings. On the right side, there is a detailed article titled 'South Hartford Conveyance and Storage Tunnel' with a 'Learn more' button, and a 'News & Events' section listing recent articles from 'Design Develop Construct Journal' and 'WNPR'.

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





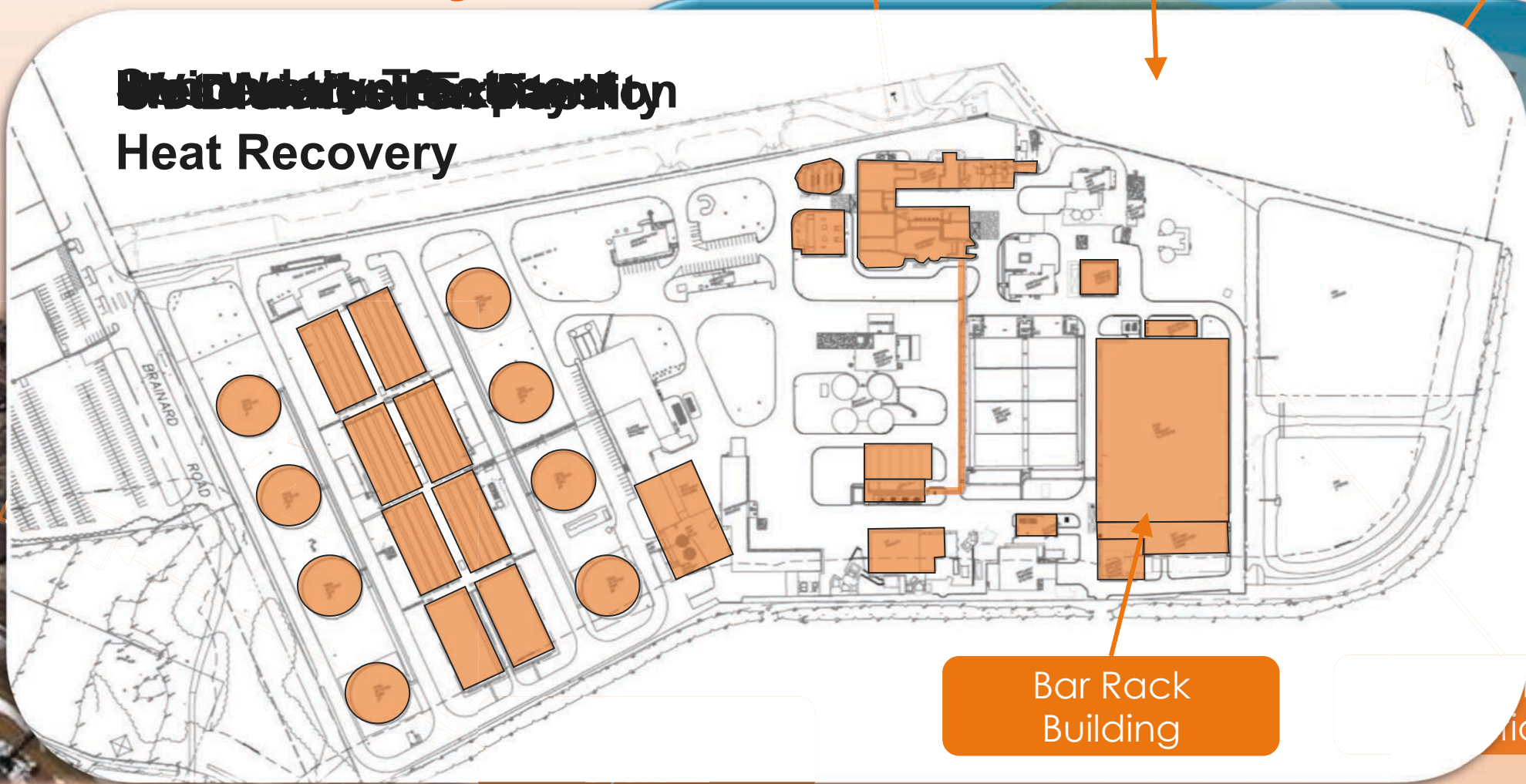
Headworks Efficiency Overview

Grit Tanks

Fine Screens

Emergency Generators

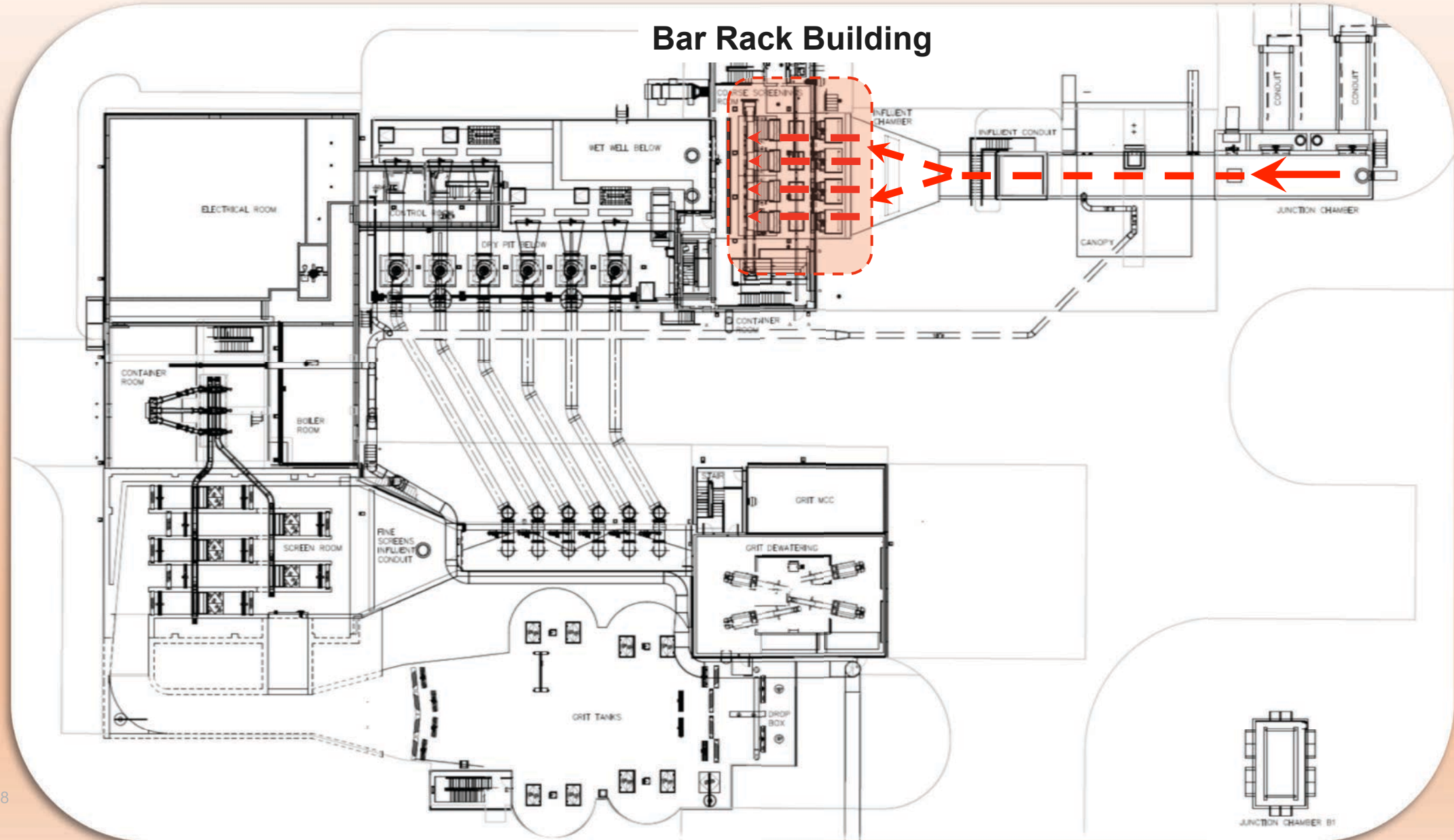
Heat Recovery



Bar Rack Building

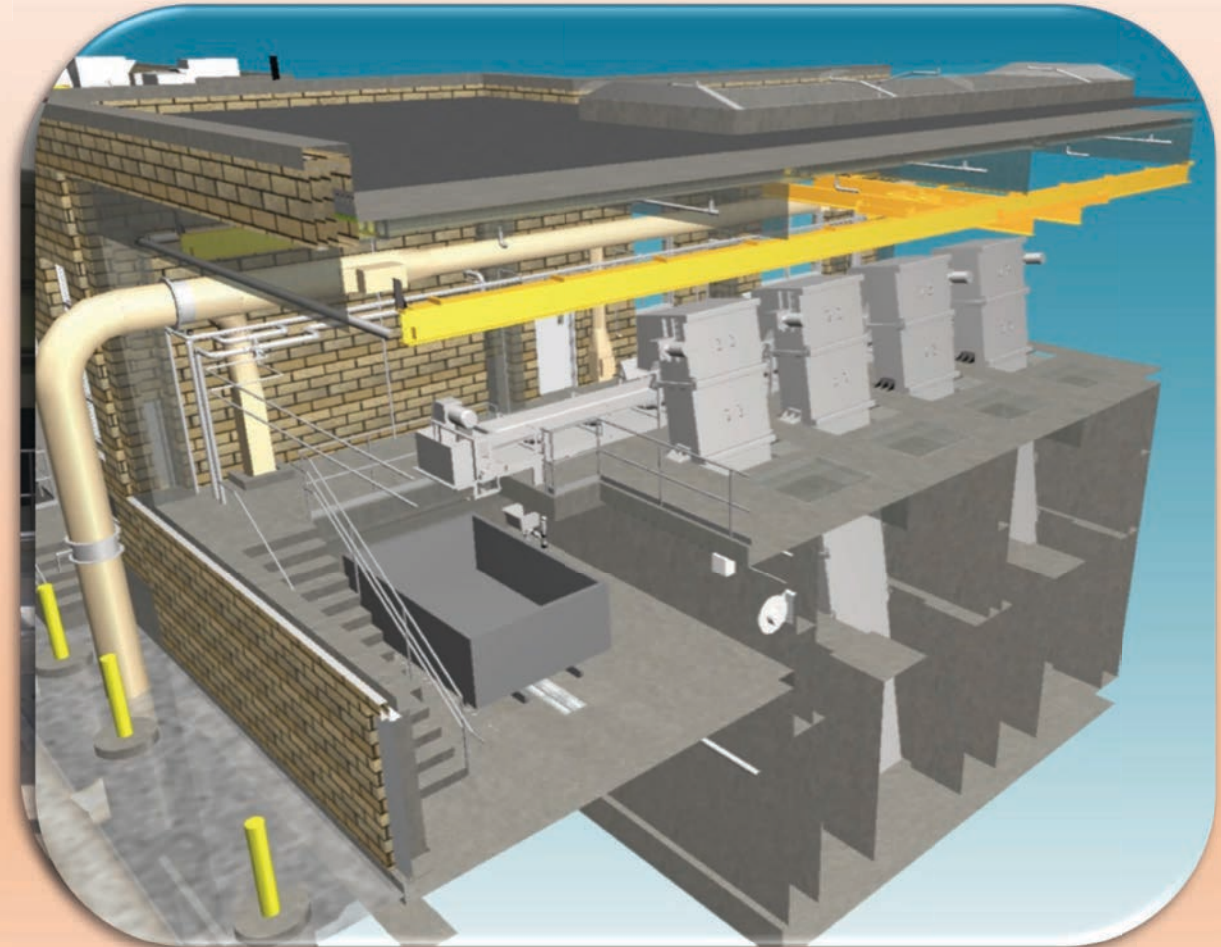
Pump Station

Process Flow Stream

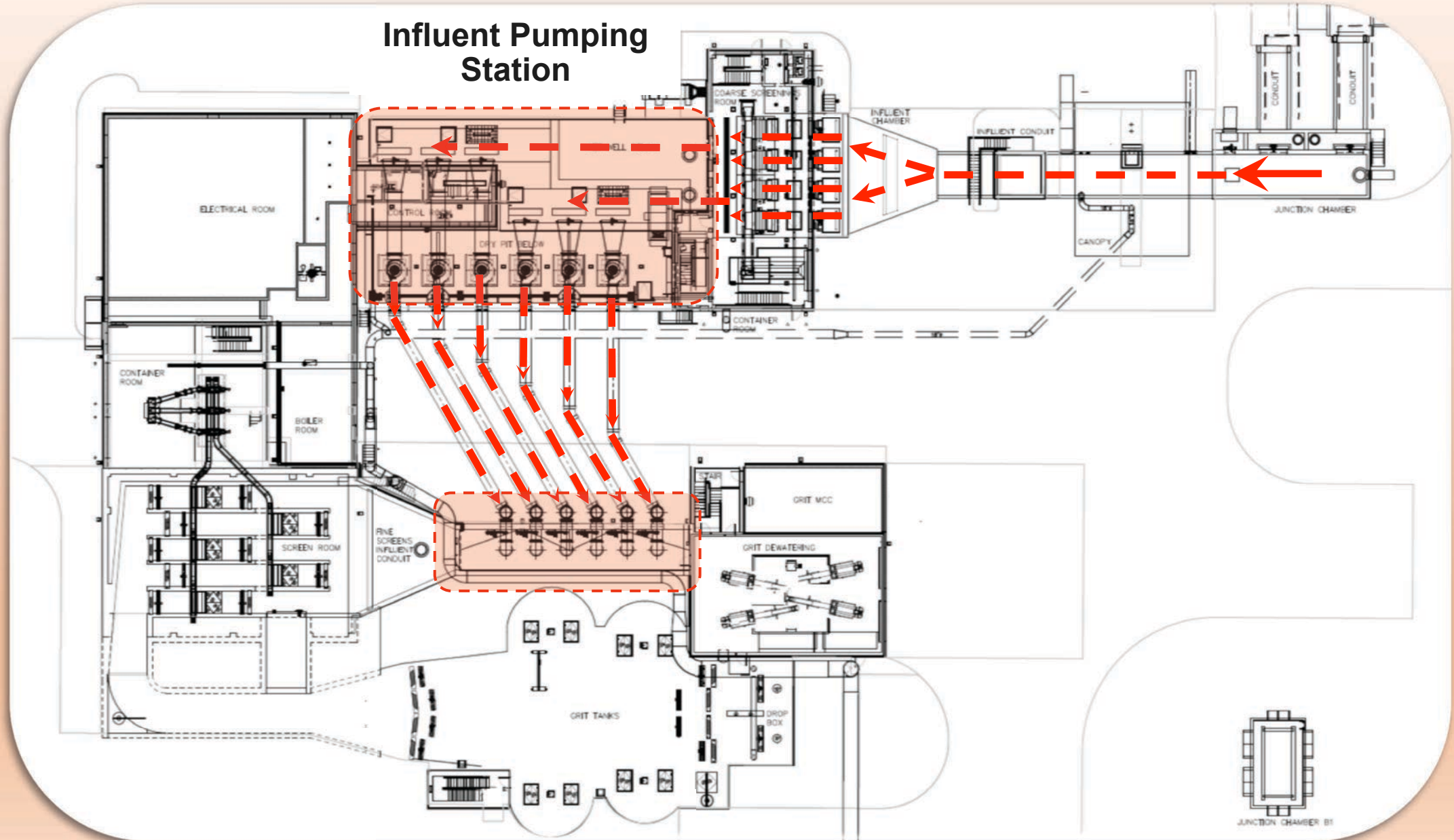


Bar Rack Facility

- 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.



Process Flow Stream

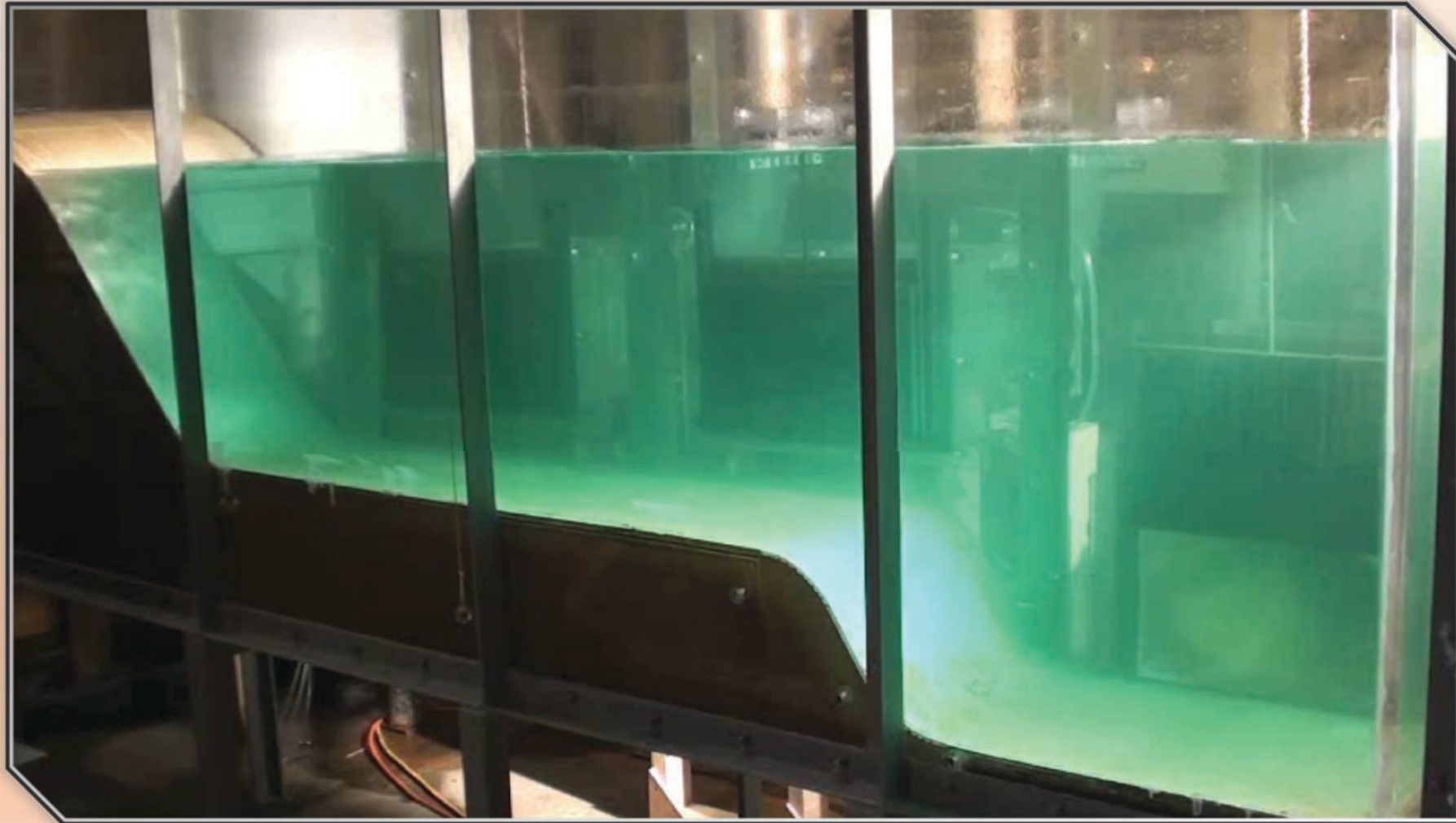


Hydraulic Modelling

- 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.

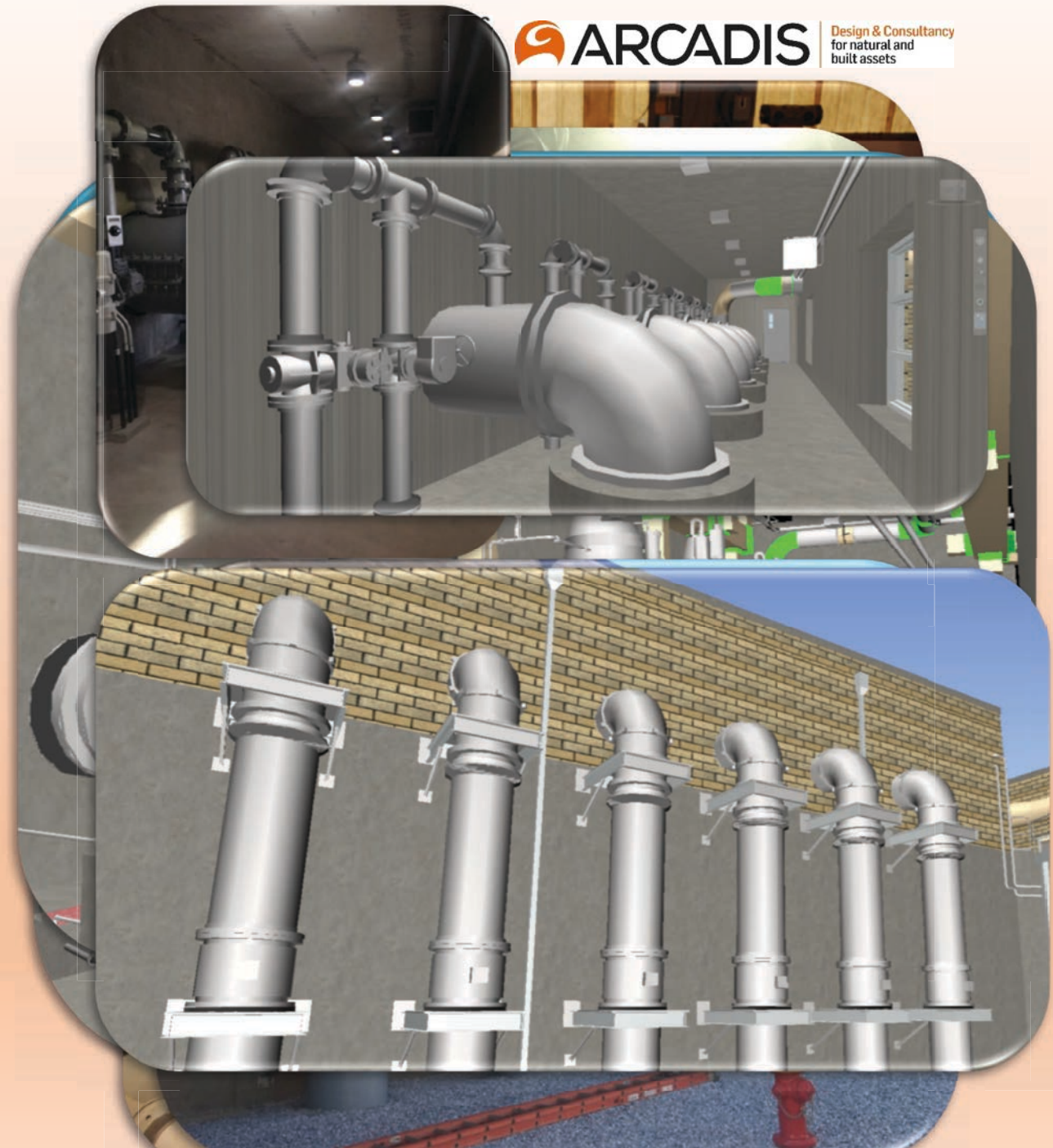


ADLEN LAB 3D MODEL – SELF-CLEANING WET WELL

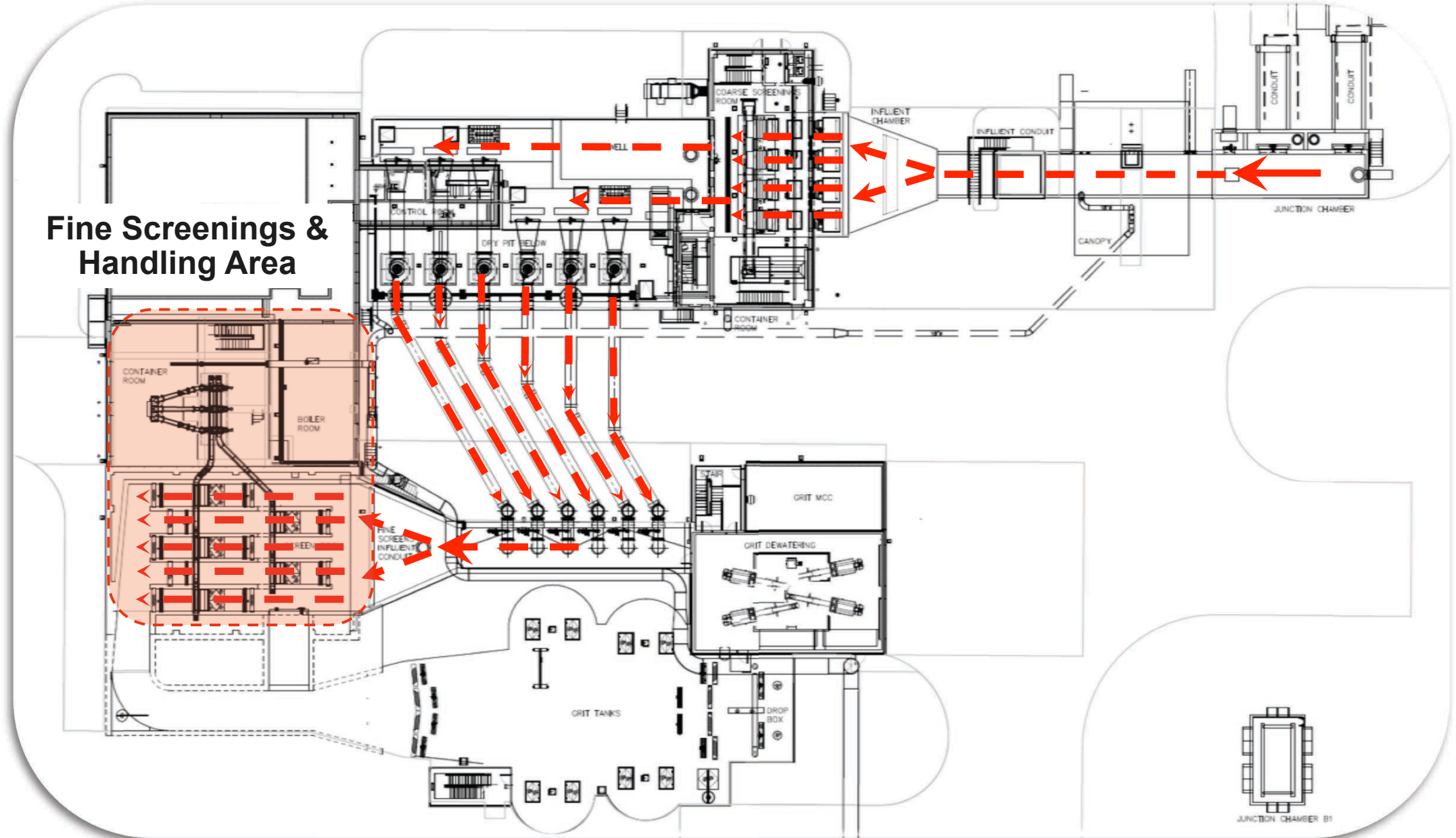


Influent Pump Station

- 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

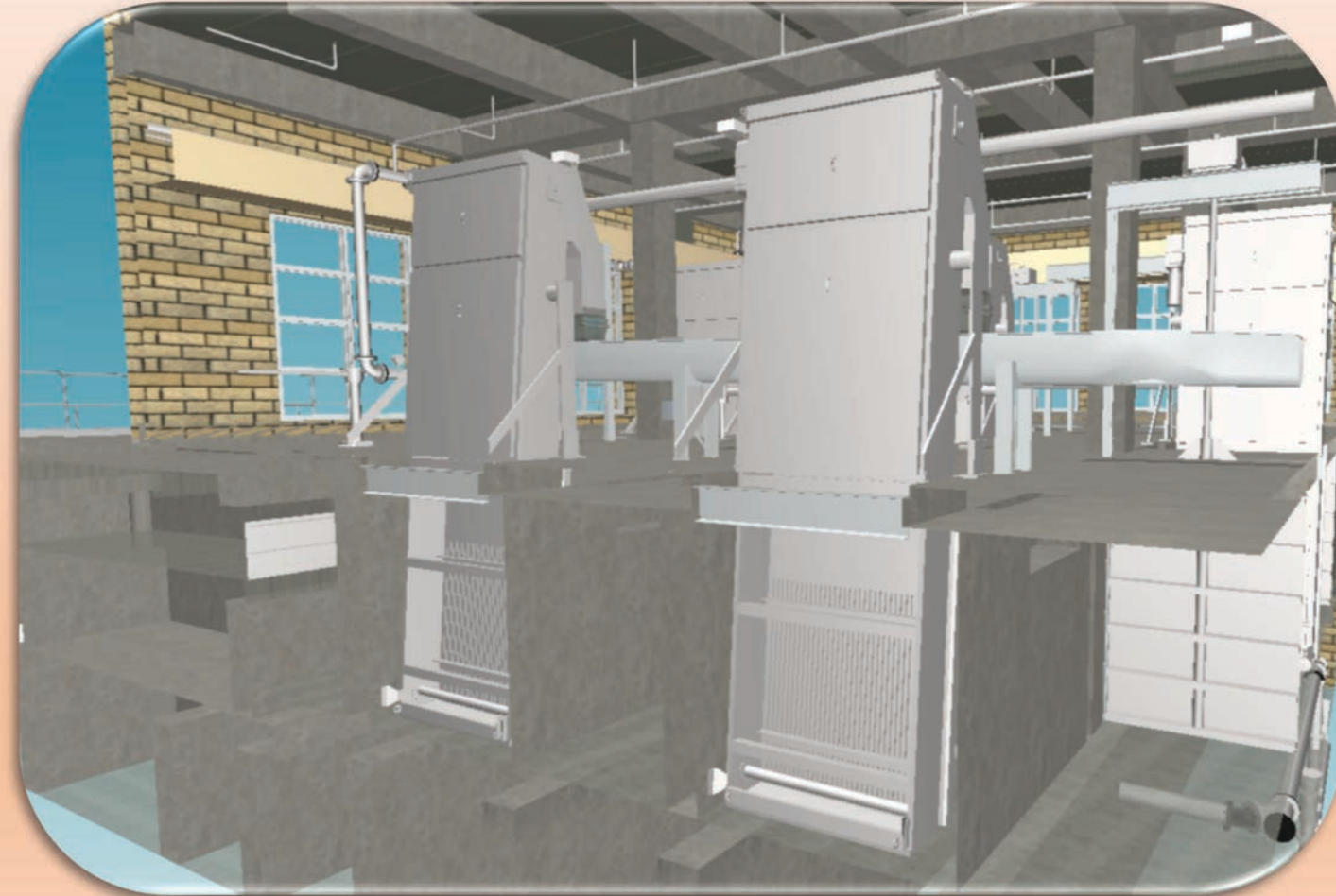


Process Flow Stream



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

	ion B: grinding
Tipping Fee ¹	\$8.5M
Hauling Cost ¹	\$0.94M
Capital Equipm	\$0.35M
Additional Mai	-
Total	\$9.8M

¹ 20-year present v

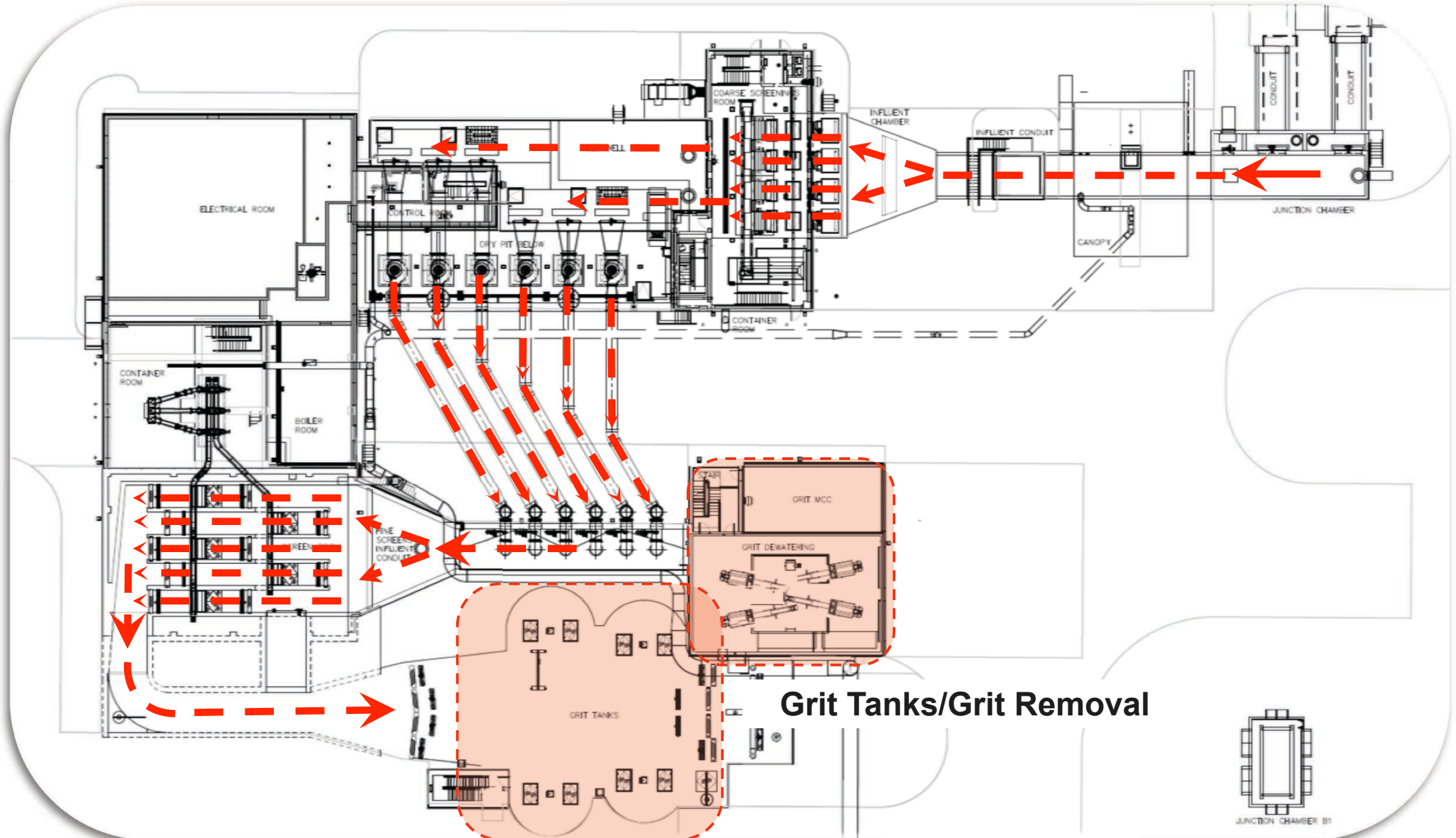
² Includes electrical

³ Includes a comple
plus additional ma

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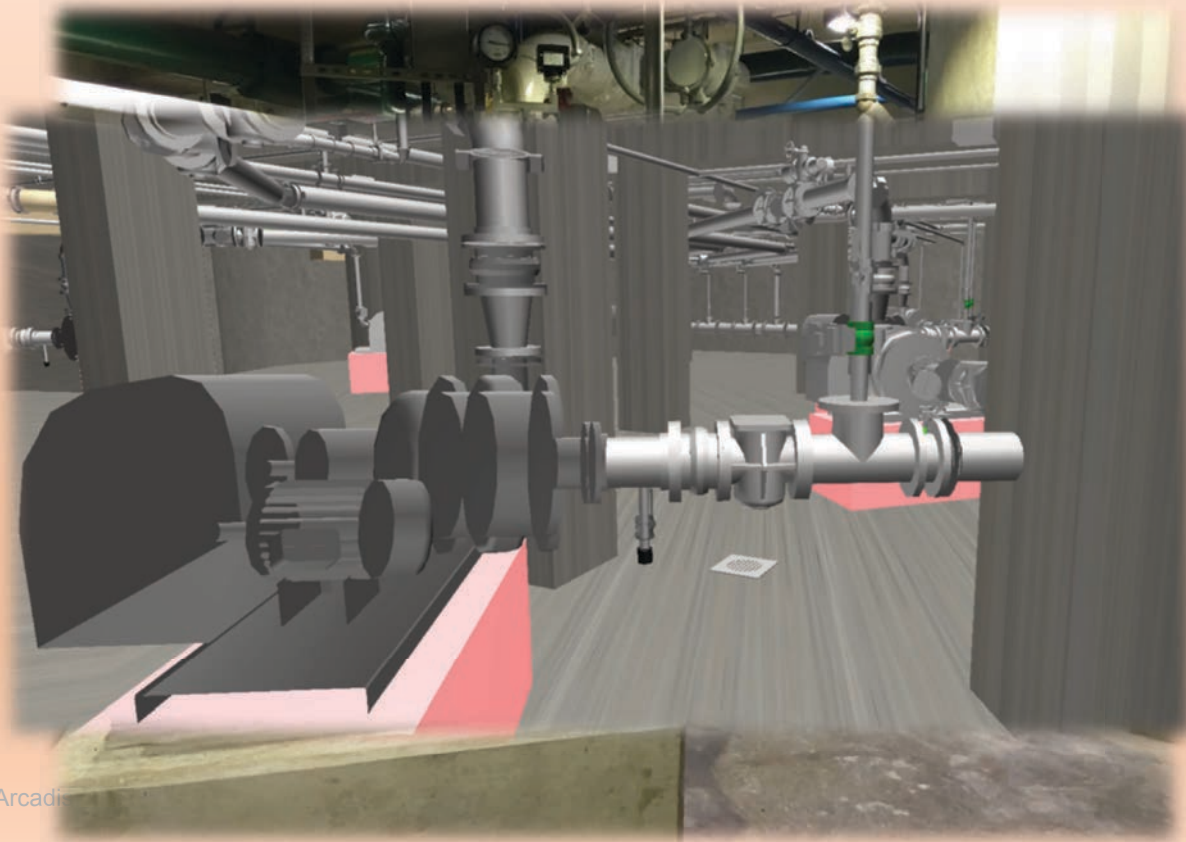


Process Flow Stream



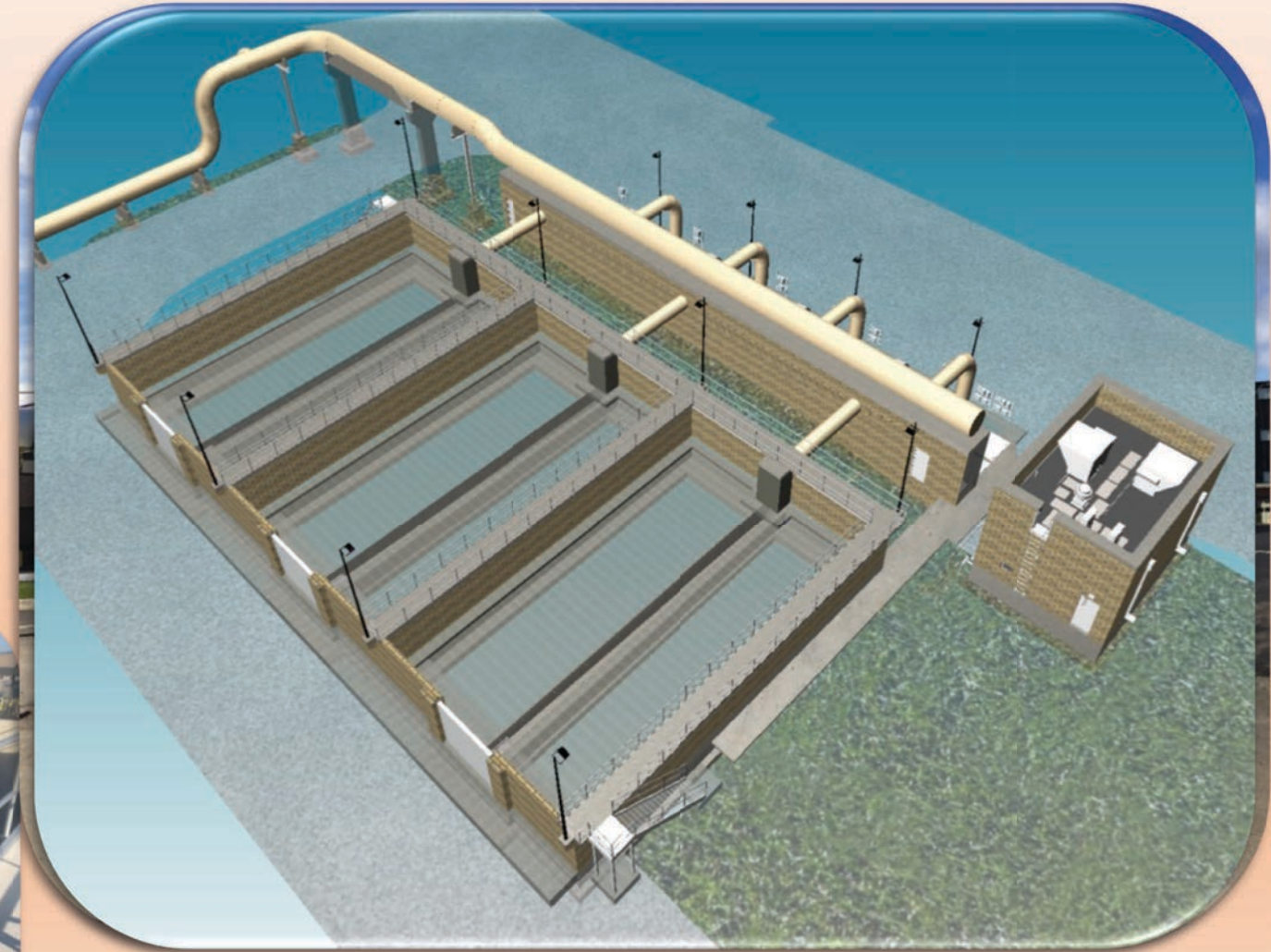
Grit Removal

- 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

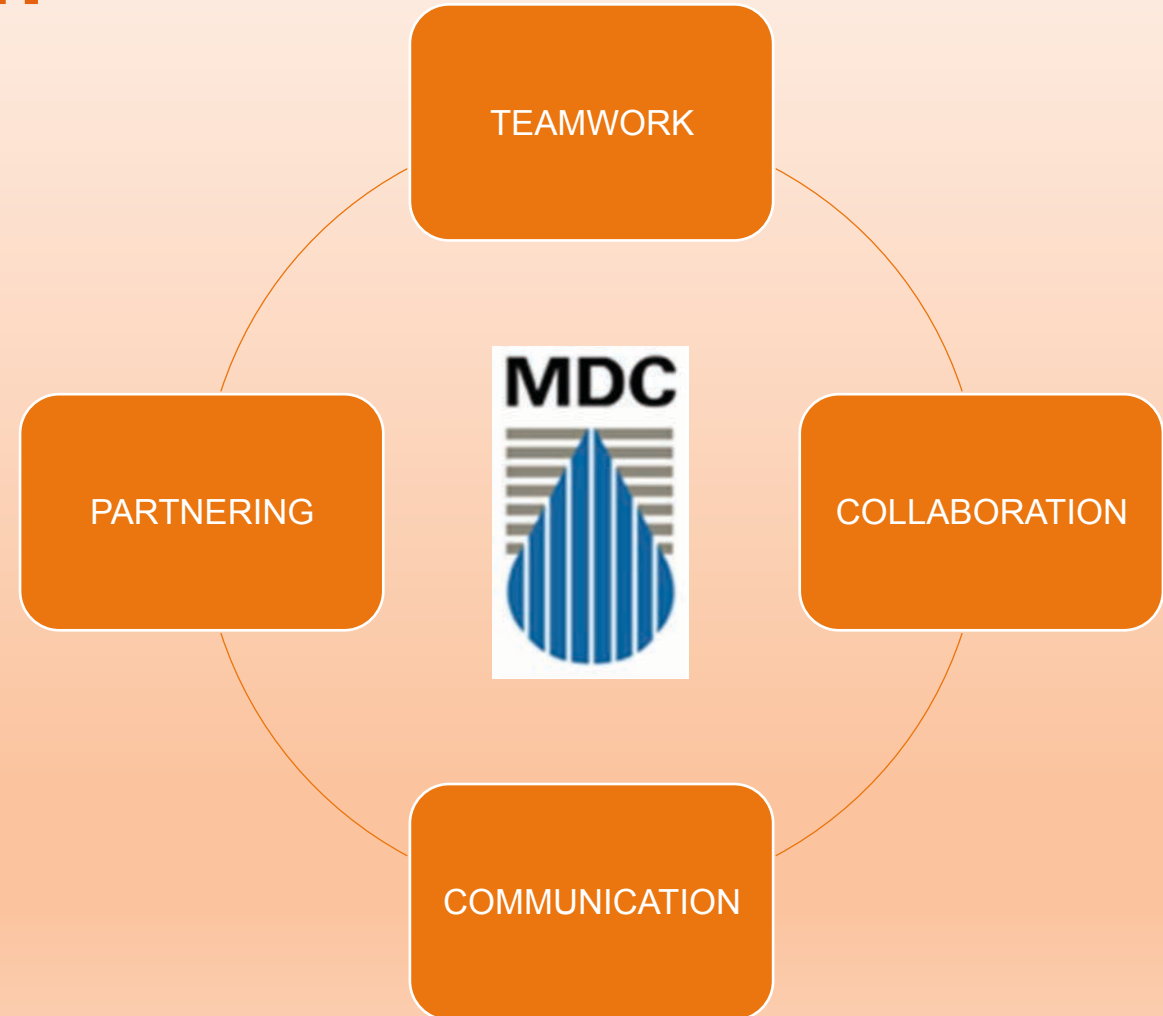
- System O&M Manuals
- Normal/Routine Procedures (SOPs)
- Process Design Criteria
- Operator Log Entries
- Troubleshooting
- Training Documents
- Record Drawings
- Equipment Lists
- Control Descriptions

Tablet & Phone Accessible



Overall Team Collaboration

- Engineer Selection is key
- Collaboration all the 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?

