Facilities Renovations at the Ann Arbor Wastewater Treatment Plant

June 2018
Facilities Renovations at the Ann Arbor Wastewater Treatment Plant

- Services City of Ann Arbor and portions of Ann Arbor, Pittsfield and Scio Townships
- Design capacity - 29.5 MGD
- Average daily flow - 18.5 MGD
- Maximum hydraulic flow - 48 MGD
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- Modified activated sludge process (A/A/O)
- Tertiary treatment facility (sand filtration)
- Ultra-violet light disinfection
- Gravity belt thickening of RAS
- Land application of lime stabilized Class B biosolids
- Centrifuge dewatering and landfill (winter)
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Plant History

• First construction started in 1936
• Upgrades and improvements from 1940’s – 1960’s
• Major expansion from 1977 – 1983
• Upgrades and improvements from 1988 – 2000
• Biosolids improvements project from 2009 – 2012
• Facilities Renovations Project from 2012 - 2018
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1936 Construction Equipment

Excavating for Aeration Tanks Aug. 19, 1936
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Plant Historical Layout - Preconstruction

Newer East Plant – 20 mgd 1977

Old West Plant – 9.5 mgd 1936 – 1964
FRP Major Features – East and West Plants

Replacement of West Plant

- Two new treatment passes including primary clarifiers, aeration tanks and secondary clarifiers
- A/A/O modified activated sludge process
- New energy efficient blowers

Improvements to East Plant

- Modify aeration tanks to incorporate A/A/O process
- Rehabilitation of clarifier drive mechanisms and arms
- New energy efficient blowers
FRP Major Features – Plant-wide Infrastructure Rehabilitation

- Flow splitter modifications and improvements
- New electrical distribution system
- New stand-by electrical generators
- New Administration Building
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Site Limitations

- Railroad Track
- Access Road
- Huron River
- Fleming Creek
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FRP Regulatory History

- Preliminary Site Plan: 8/6/09 – 3/1/10
- FEMA Conditional Letter of Map Revision: 11/18/09 – 8/8/10
- Stormwater Management Plan 11/18/09 – 9/8/10
- Natural Features Impact Statement 11/18/09 – 12/6/10
- Final Site Plan: 8/18/10 – 12/6/10
- MDEQ Construction Permit: 5/23/11 – 10/7/11
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Preconstruction Aerial Photograph
Agenda

- Site Health and Safety Program
- What it means to build the project before construction
  - Design approach: include detailed construction requirements into the design documents
- Site challenges
- Construction elements made part of design requirements
  - Upfront work
  - Protection of existing structures
  - Electrical sequencing
  - Project sequencing
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SAFETY: The Project Team’s Number 1 Priority
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Building the Project Before Construction
Building the Project Before Construction

- Limited site access and one-lane bridge present traffic issues to plant staff and construction traffic may present load limitations.
- North perimeter bound by railroad and high power lines must be protected during demolition and excavation of digester tanks.
- Limited lay down and staging areas present challenge to contractor logistics and coordination.
- FEMA required berm improvements to protect the WWTP from flooding.
- West, south, and east perimeter bound by the Huron River and Flushing Creek presents site dewatering challenges during demolition and excavation of below-grade facilities.
- Critical buried site utilities must be relocated and/or protected during demolition and construction of west plant.
- Maintenance of plant traffic during construction is required for plant access to operational facilities.
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West Plant
Building the Project Before Construction

General Design / Construction requirements

• Construct west plant from south to north

• Make sure reasons for design requirements are identified in the contract documents to be able to address contractor’s proposals

• Give the contractors the reasons why
Floodplain Improvements

Previous FEMA floodplain map
Building the Project Before Construction

Up-Front Work

• Depressurize Artesian conditions and excavate from south to north

• Install geotechnical instrumentation

• Start demolition

• Don’t build anything
Building the Project Before Construction

Partial demolition of existing tanks left in place for earth retention and protection of existing structures
Building the project before construction

Contractor suggested alternative to temporarily leave existing structures in place to serve as earth retention
Building the project before construction

Replacement of the Electrical Distribution

- Design temporary Electrical Distribution
- Relocate existing electrical to the headworks to keep the plant operational
- Sequentially replace the existing electrical system
- Design and build a new Central electrical building
- Don’t lose power at any time
Construction sequence alternatives submitted by Walsh to improve schedule and reduce cost savings. A result of understanding the design intent.

Open up more of the site at one time by showing construction in one area do not influence construction in another.

Proposed or-equals technically and costs wise equal

Building the project ahead of the schedule proactive approach
Lessons Learned and Results

- Excellent Safety as a result of the safety program initiated by Walsh Construction
- Collaborative effort between the City of Ann Arbor, Arcadis and Walsh Construction from design through construction is the best way to take on any project.
- Maintenance of Plant Operations throughout the entire five year construction period
- Design and construction flexibility resulted in schedule savings shared by the Owner and Contractor.
- No major contractor claims on the project
- Project on time and budget
Award Winning Project!

MICHIGAN SECTION
American Society of Civil Engineers
2017
Outstanding Civil Engineering Achievement Award
Ann Arbor Wastewater Treatment Plant Facilities Renovations
Owner
City of Ann Arbor
Engineer
Arcadis of Michigan, LLC

In recognition of valuable service to the Society and to the Civil Engineering Profession

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