

IDOT Pump Station 38
US Route 41 @ Deerpath Road
Lake Forest, Illinois

Challenging Design
Challenging Coordination

IASFM Concurrent Session 1B
March 12, 2024

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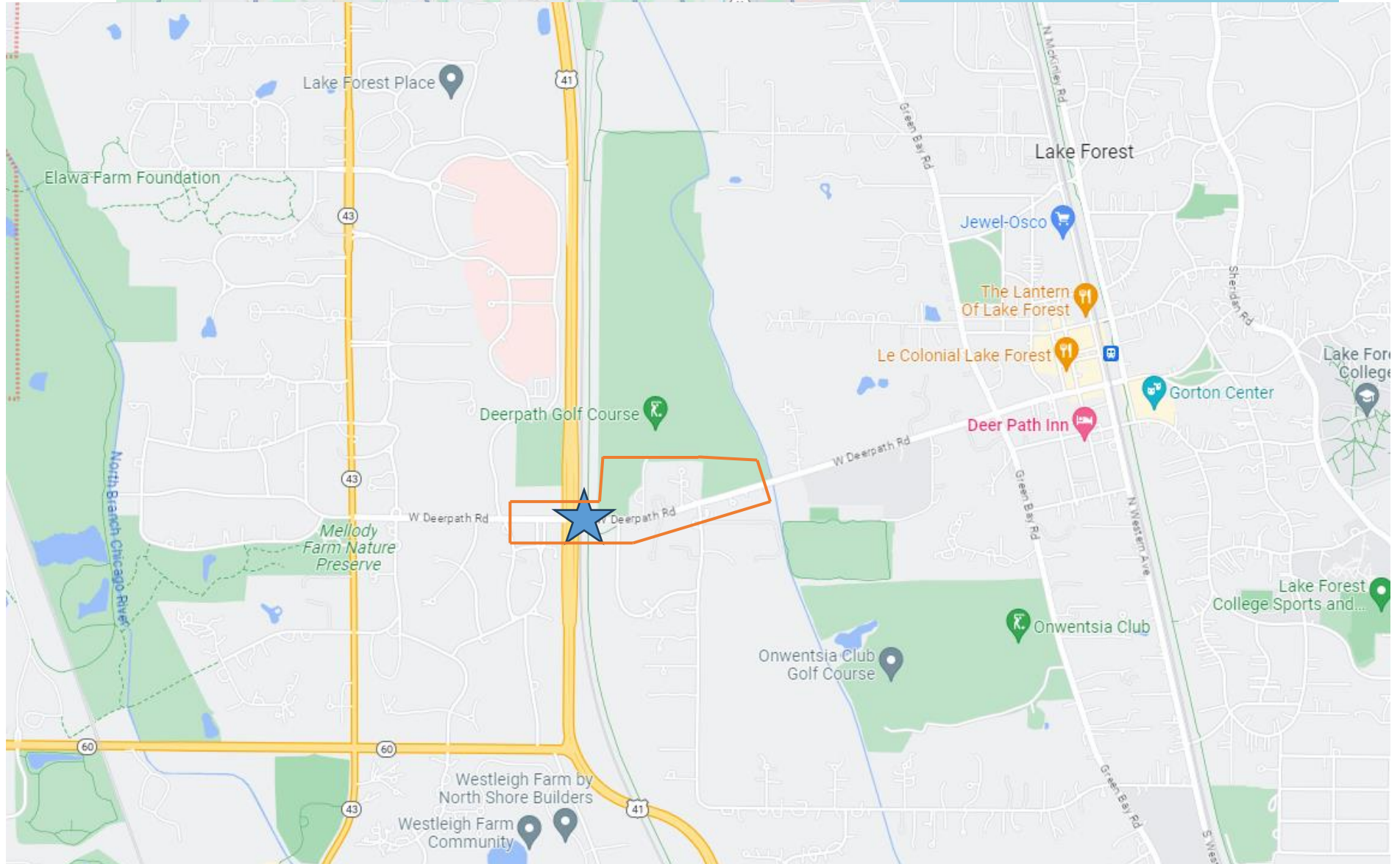


Project Overview

- IDOT Phase I completed in December of 2016
- IDOT Phase II completed in September of 2020
- Project Low Bid \$12,127,335 (construction)
- Construction commenced in Fall 2021
- Substantial Completion in Fall 2022
- Final Project Completion, Commissioning and Transfer of Pump Station end of 2023 due to supply chain constraints.

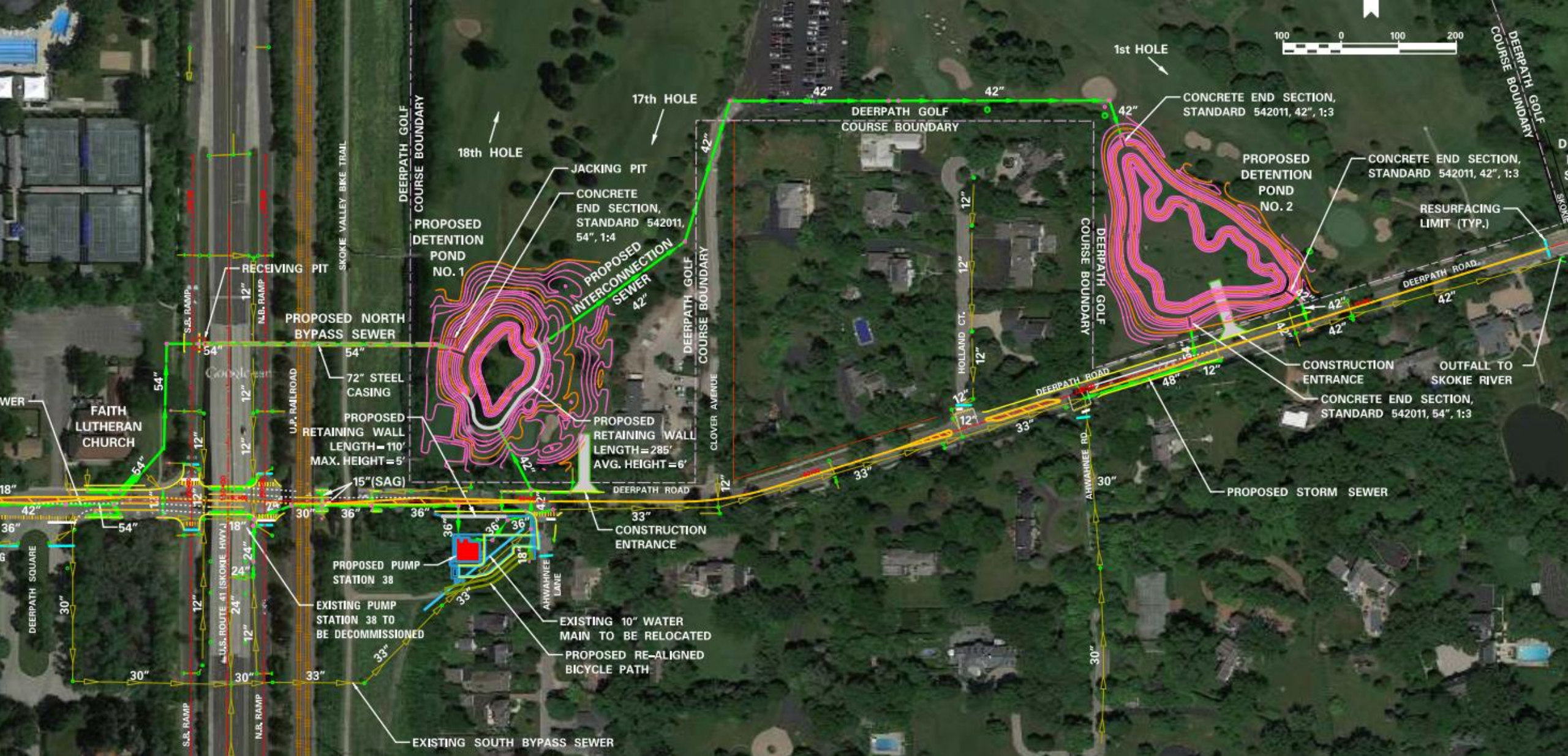


Project Location



Member of WSP

Project Overview





Project Overview



Project Purpose

Improve the existing drainage system at the US 41 and Deerpath Road interchange and prevent road closures and delays caused by flooding

- Multiple documented instances of flooding on Deerpath Road at US 41 and the UPRR viaduct
- Road closures for extended periods of time
- Deerpath Road is the main access road to downtown Lake Forest from the west/US 41
- Deer Path Middle School is located east of project site
- Deerpath Road is an emergency services route and the Lake Forest Police Station is located east of the project site
- Northwestern Medicine Lake Forest Hospital is located northwest of project site
- US 41 isolates downtown Lake Forest from the west.



Road Closures Due to Flooding

Waukegan and Deerpath roads were closed in all directions early

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41 remain

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- Connection's Academy East: Closed
- District 73 - Bondant School: Closed



Nov. 2018

Sept. 2019

Sept. 2015

Flooding of Deerpath Road at the Viaducts



Project Coordination

- IDOT
- City of Lake Forest
- Union Pacific Railroad
- ComEd
- Deerpath Golf Course
- Faith Lutheran Church
- Northwestern Hospital
- Lake Forest Fire and Police
- Deer Path Middle School
- Lake Forest Parks and Recreation
- Local Residents



IDOT/ City of Lake Forest Coordination

- Lake Forest experiencing flooding at US 41 viaduct and Deerpath Road; requests improvement by IDOT
- IGA between IDOT and Lake Forest
- Lake Forest provides construction easements on the City owned Golf Course property
- Lake Forest Provides Landscaping Design
- IDOT provided land for Pump Station Site
- Funding and construction by IDOT
- Watermain Relocation
- Jurisdictional Transfer of Pump Station and Detention Ponds to Lake Forest
- Designed and Built to Lake Forest and IDOT Standards



Safety and Other Improvements

- Provided minimum 7-foot-wide sidewalk along Deerpath Road
- Widened area under US 41 to provide two left turn lanes in lieu of existing shared left turn lane
- Sight distance improvements at intersection of US 41 and Deerpath Road
- Addressed bank erosion and washout occurring along toe of UP Railroad Bridge slope and Deerpath Road sidewalks

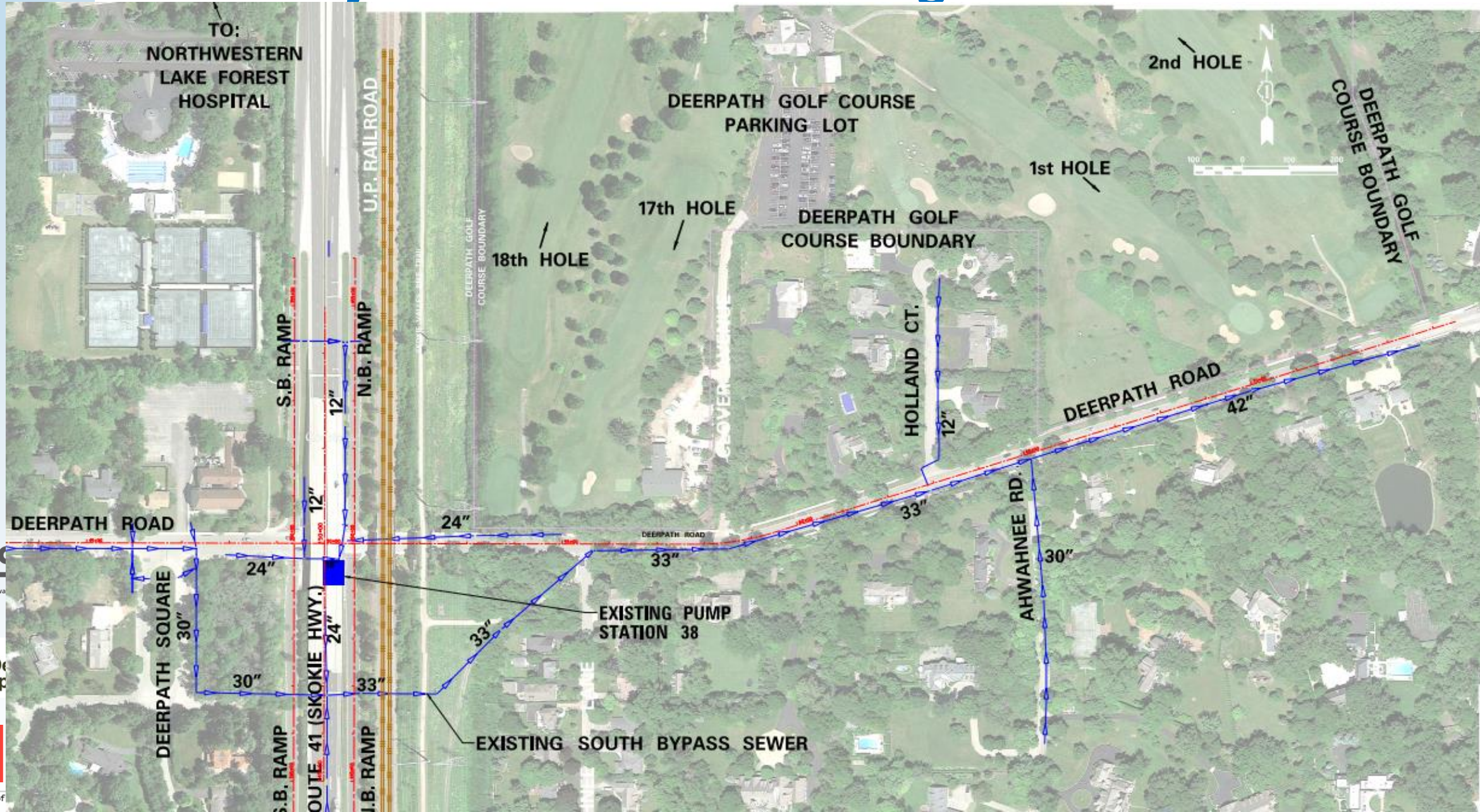


Existing Drainage Concerns

- Existing pumps undersized
- Existing bypass sewer undersized
- Pump station discharge pipe connects to undersized bypass sewer
- US 41 scupper system deteriorated and would fill the bridge vaults with water which would overflow onto Deerpath Road.
- Washout occurring between UPRR and bike path bridges, contributing to clogged inlets on Deerpath Road



Project Overview – Existing Conditions



Illinois Association for Floodplain and Stormwater Management



Illinois Department of Transportation



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Existing Drainage Concerns



Existing Undersized Pumps 2- 2500 gpm
Installed in 1936 (Pump #2 replaced in 1992)

Existing Drainage Concerns



Existing Discharge Chamber 24" outlet pipe, connects to 24"/33" inch bypass sewer which is undersized (10 year capacity, surcharged at 50 year)

Existing Drainage Concerns



US 41 Scupper Piping Disconnected – Flooding Vault under US 41

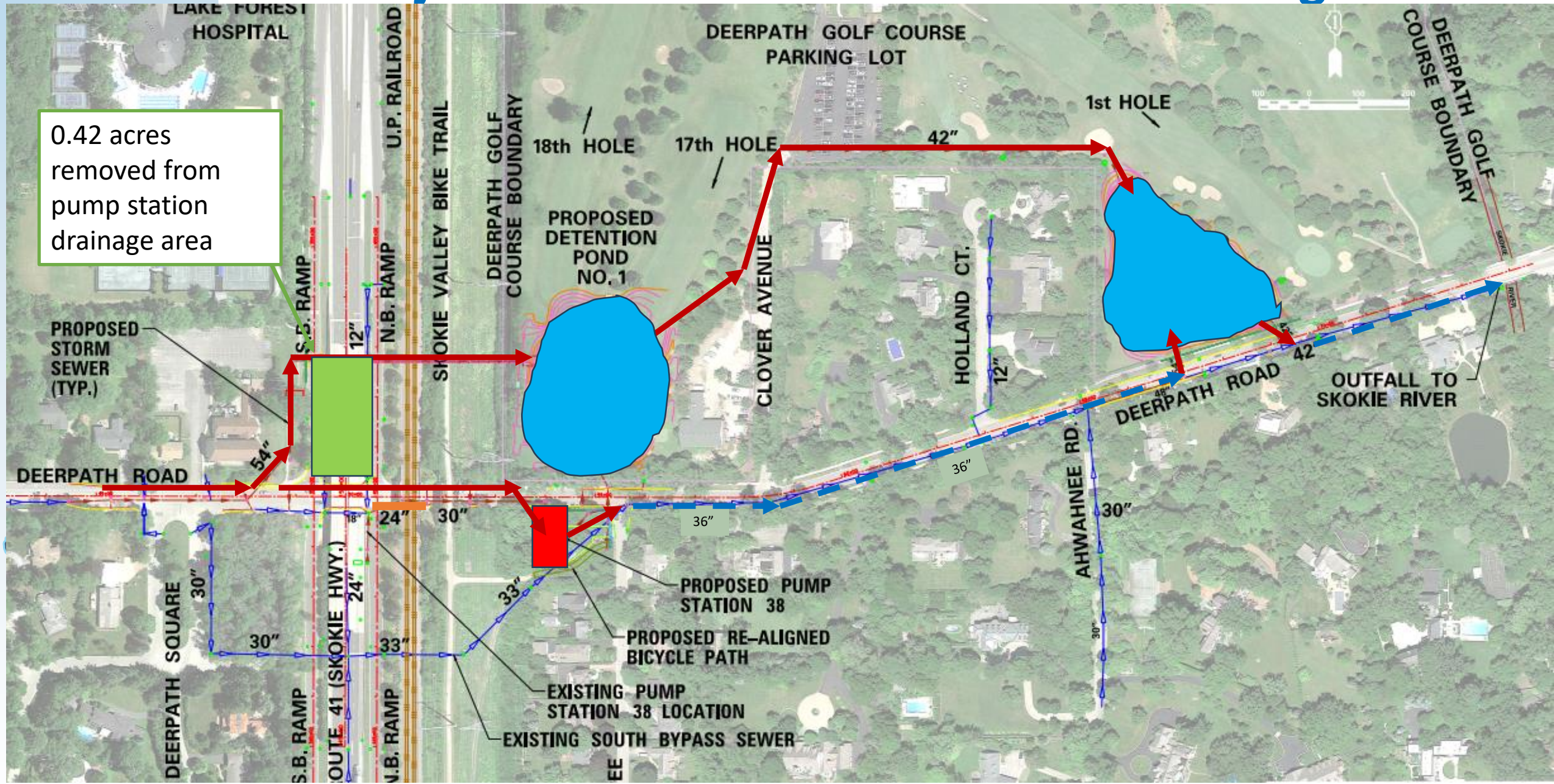
Existing Drainage Concerns



Sediment Washout on Deerpath Road

Project Overview – What are we building?

0.42 acres removed from pump station drainage area

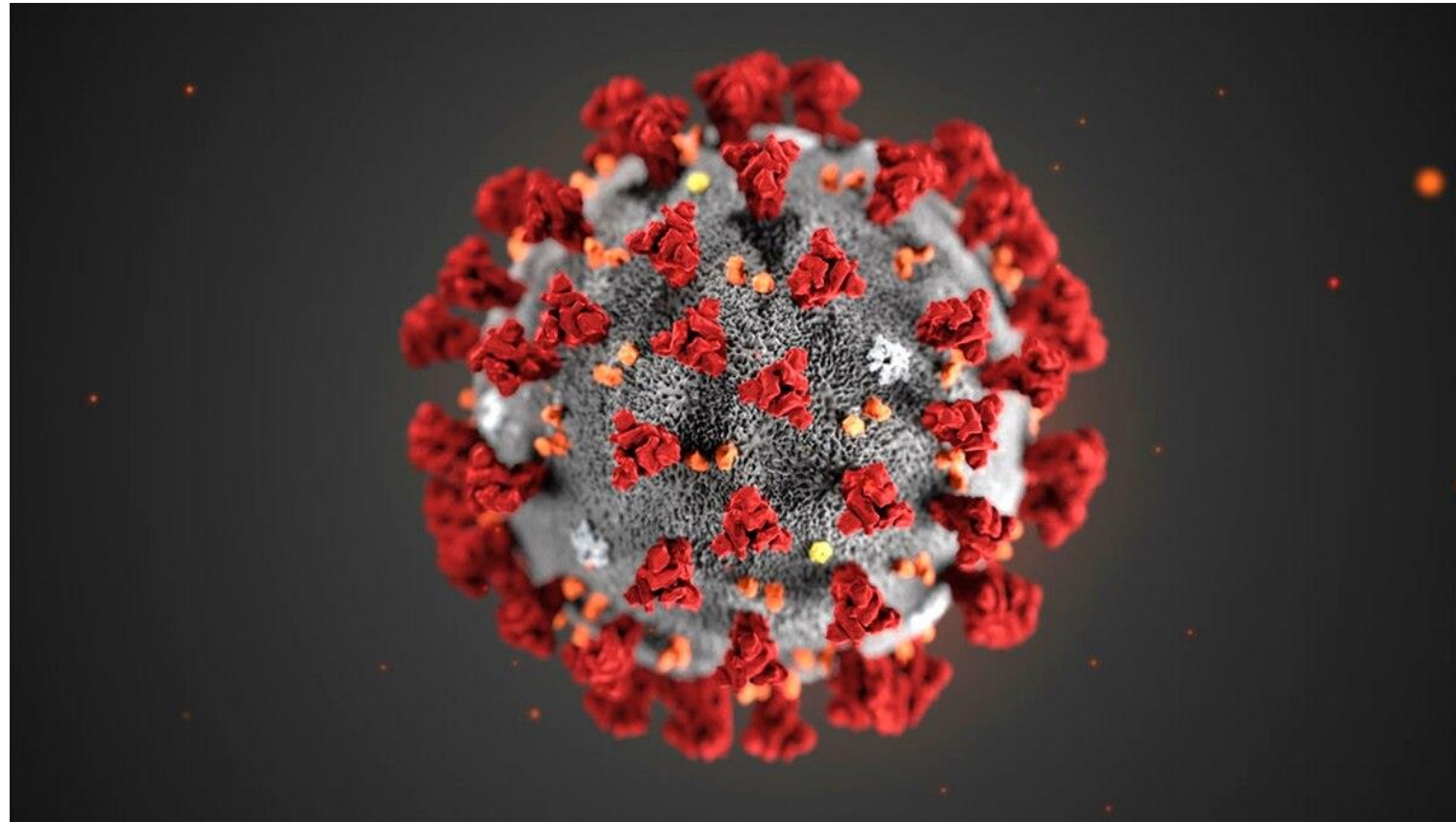


Challenges



Challenges - COVID

- Onset of Covid restricted in-person meetings communication with stakeholders



Challenges – Tree Removal

- Tree removal scheduling restrictions due to Northern Long Eared Bat City of Lake Forest Tree Replacement Policy



Challenges – ByPass Sewer Boring

- Byp
- sub



Challenges – Sheet Piling

- S

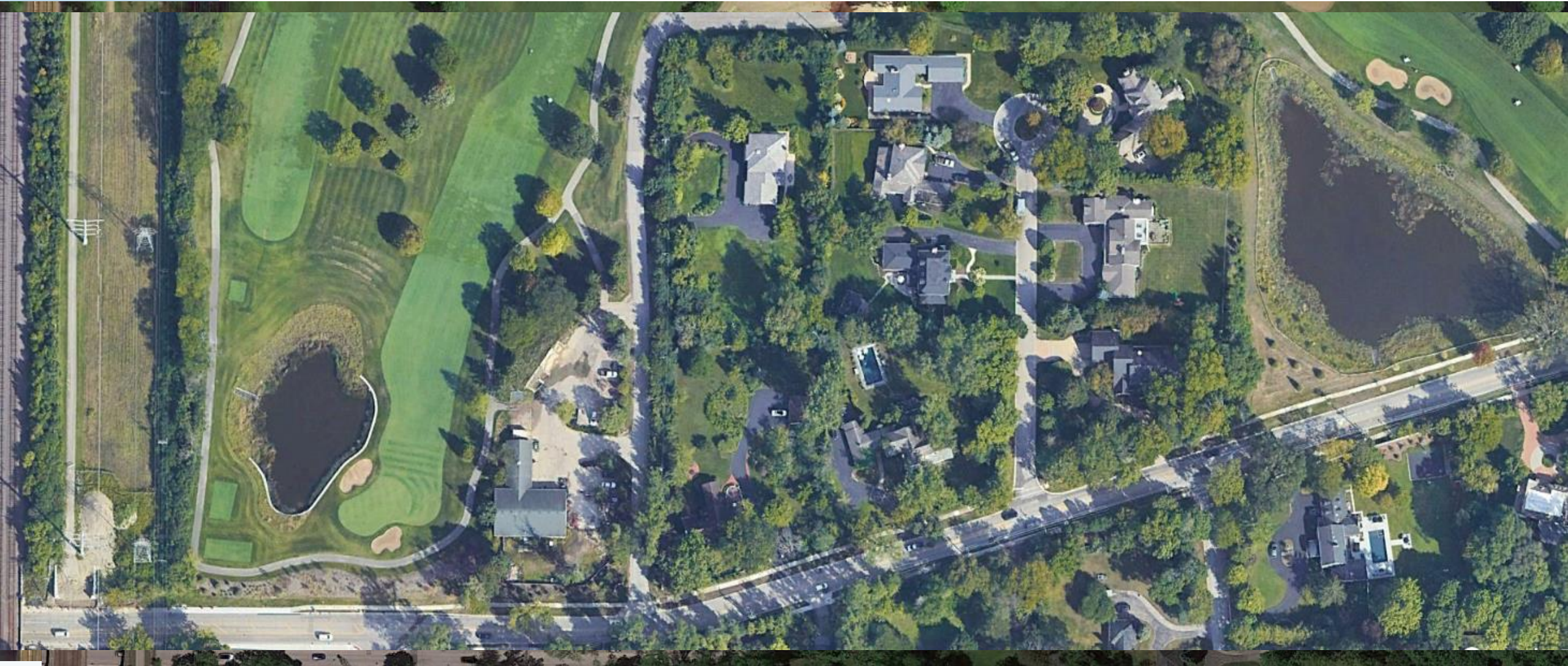


Challenges – Backup Power -



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Challenges – Golf Course



Challenges – Detention Pond near Homes

- Detention Pond near homes on golf course residents objecting to project during construction.



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Other Challenges

- Coordination Bridge Replacement of Skokie Valley Bike Path ComEd Bridge Over Deerpath Road
- Traffic Control and MOT plan coordination provided with schools and Emergency Services
- Limited ramp closures on US Route 41 at Deerpath Road needed for storm sewer installation



Construction Phase Photos



Construction Phase Photos



Pump Station Building Foundation and Discharge Chamber Foundation 42' x 39' (Discharge Chamber protrudes 7 feet)

Construction Phase Photos



Dry Well with Pumps Partially Installed 3 – 5,700 gpm and 1 – 1,900 gpm

Construction Phase Photos



Pump Station Site with Materials Storage

Construction Phase Photos



Deerpath Golf Course West Detention Pond Excavation and Retaining Walls
6.05 ac-ft (13.45 ac-ft total)

Construction Phase Photos



Deerpath Golf Course East Detention Pond Completed Excavation and Erosion Control Installed
7.40 ac-ft (13.45 ac-ft total)

Pump Station 38

- 3 Main Pumps, 5700 GPM each
- 1 Low Flow Pump, 1900 GPM
- Overhead Pump Removal Crane
- Natural Gas Backup Generator
- Water on Pavement Sensor
- SCADA connects to Lake Forest Public Works via fiber connection



Pump Station 38



Pump Station 38 Site and Front of Building Exterior



Pump Station 38



Pump Station 38 Site and Front of Pump House and Generator Building Exterior

Pump Station 38



Pump Station 38 Site and Rear of Building Exterior

Pump Station 38



Pump Station 38 Site and Deerpath Road with Retaining Wall and New Sidewalk

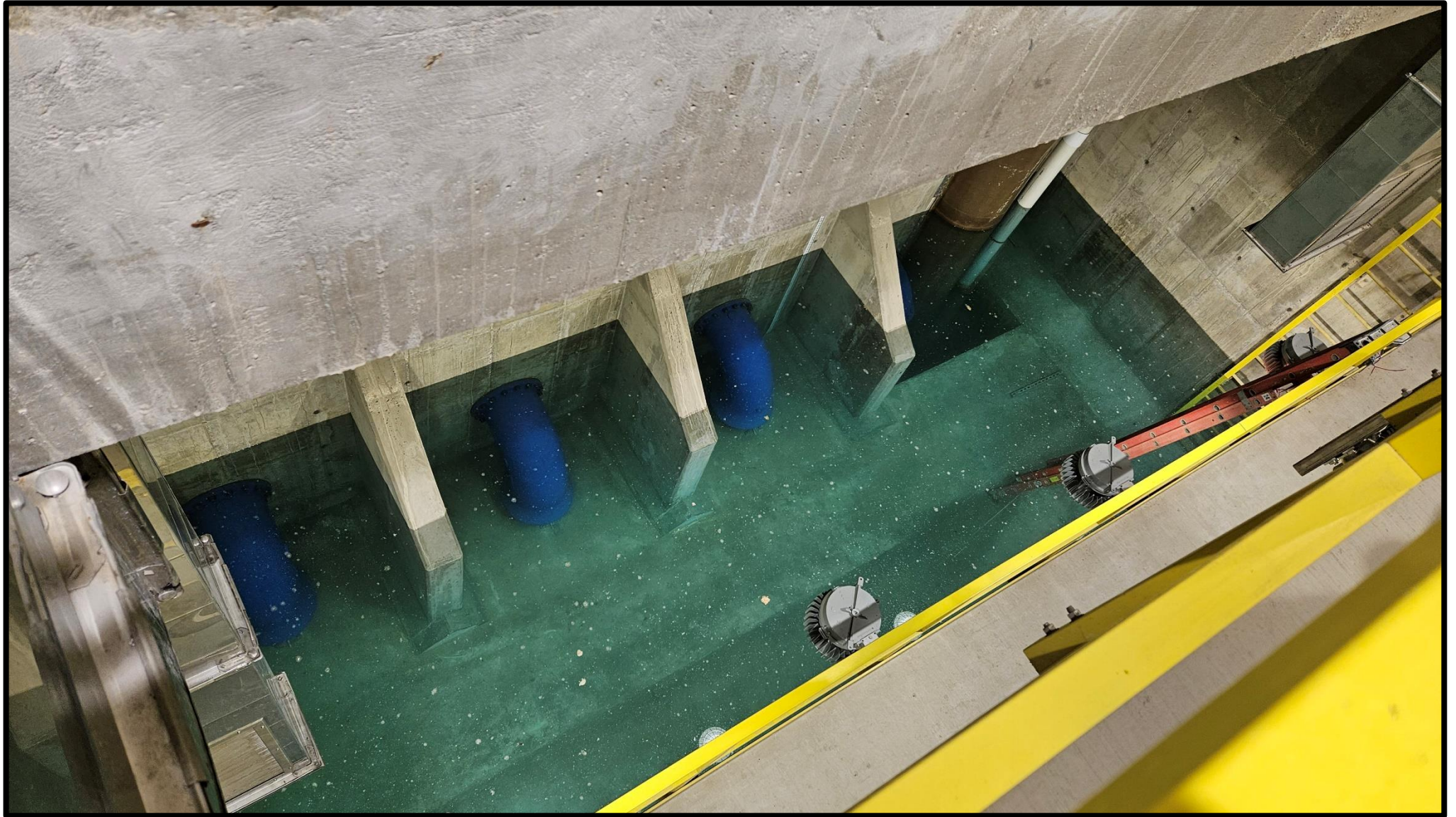
Pump Station 38



Overhead View of Pumps and Risers



Pump Station 38



Overhead View of Wet Well with Test Water

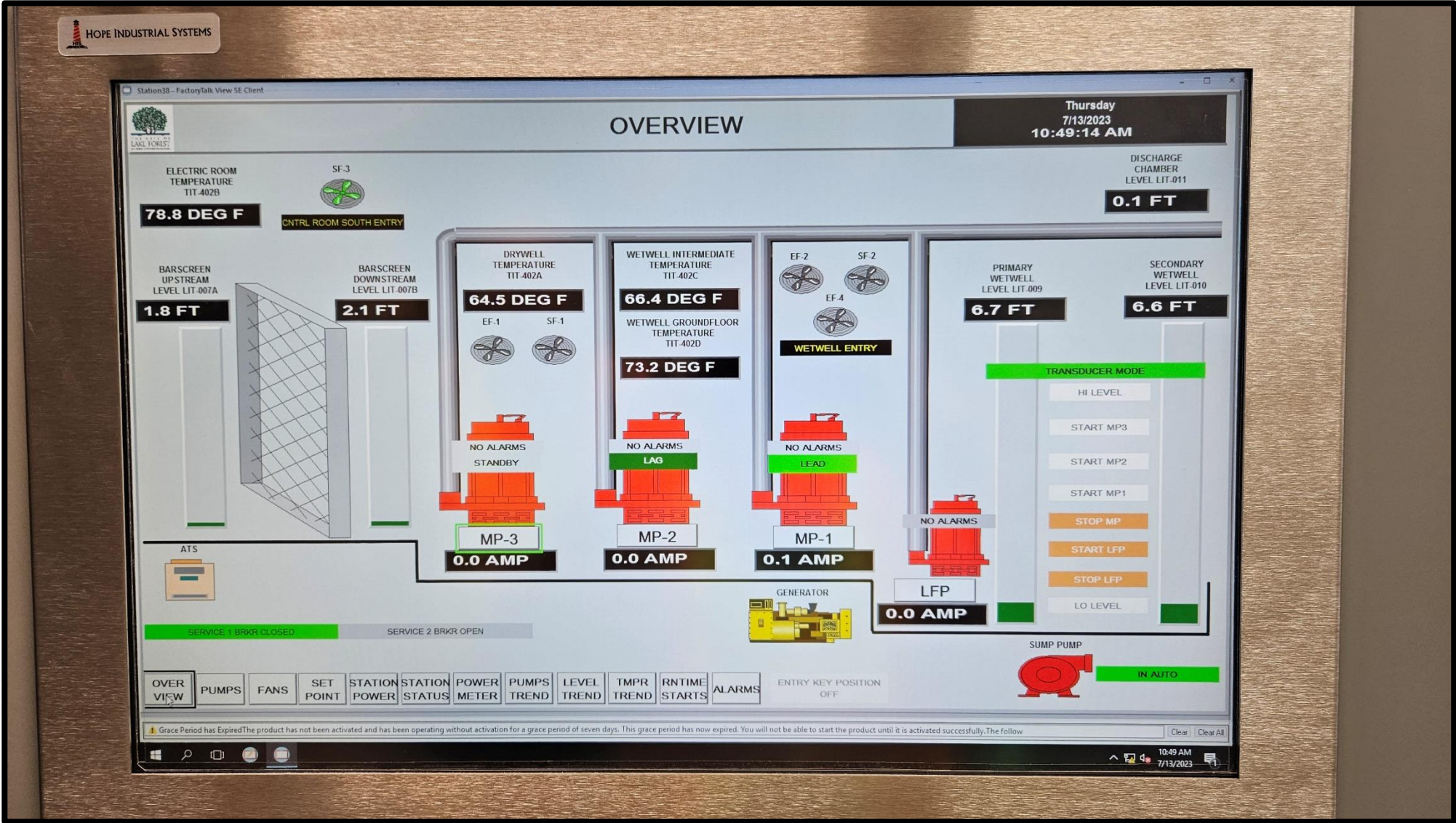
Pump Station 38



Electric Room SCADA Panel



Pump Station 38



Status Panel in Operation



Sediment Control



New Retaining Wall built taller to ease slope



Detentions Ponds

- Two Detention ponds constructed on City's Deerpath Golf Course
- Landscaping design by City creates Golf Course amenity
- 13.45 Acre-Feet of storage combined
- Detains for increased flows and provides flood relief Skokie River
- Reduces flows to local sewers and Skokie River (77.8cfs to 68.1cfs in the 100-year event)



Detentions Ponds



Deerpath Golf Course West Detention Pond with “Serpentine” Retaining Wall



Detentions Ponds



Deerpath Golf Course East Detention Pond



Recognition



Thank you! Questions?

