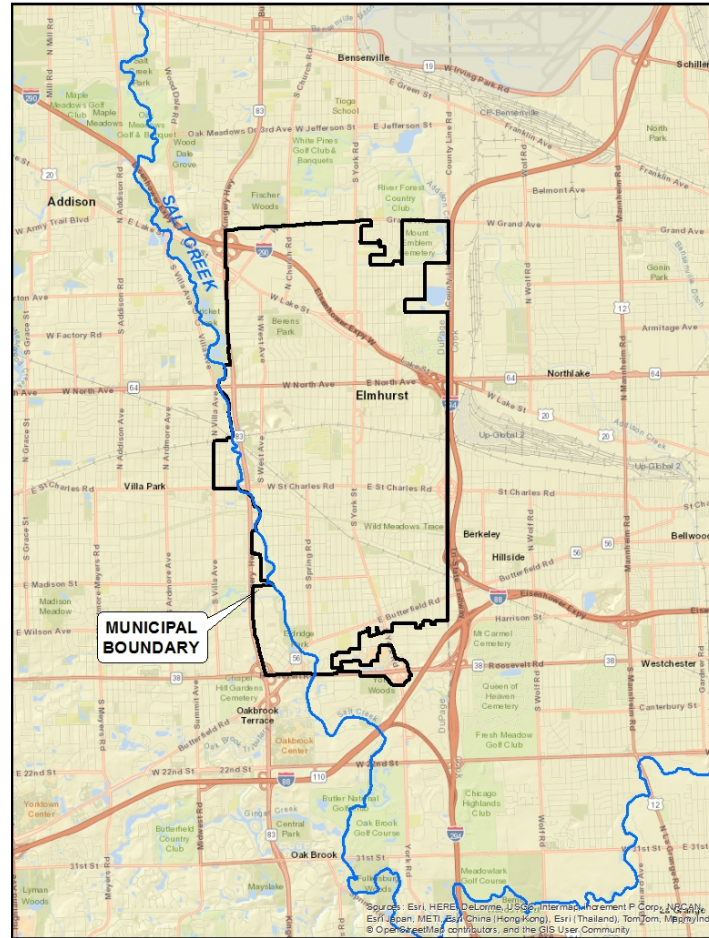
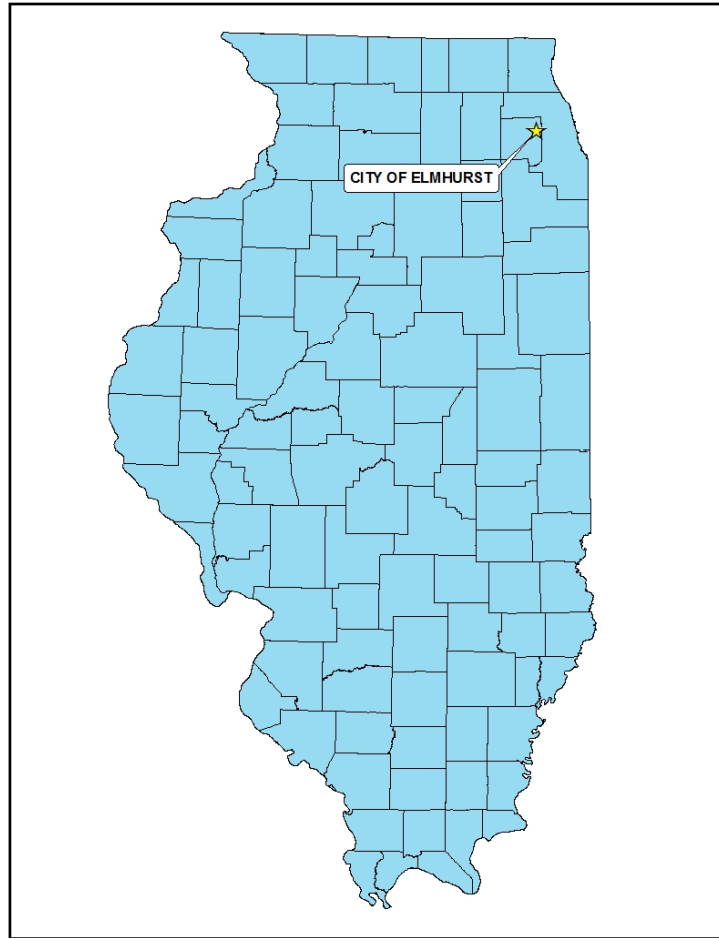


Walnut/Myrtle/Evergreen Stormwater Improvement Project City of Elmhurst



Luke J. Sherry, PE, CFM
Christopher B. Burke Engineering, Ltd.
March 9, 2017





City Facts:

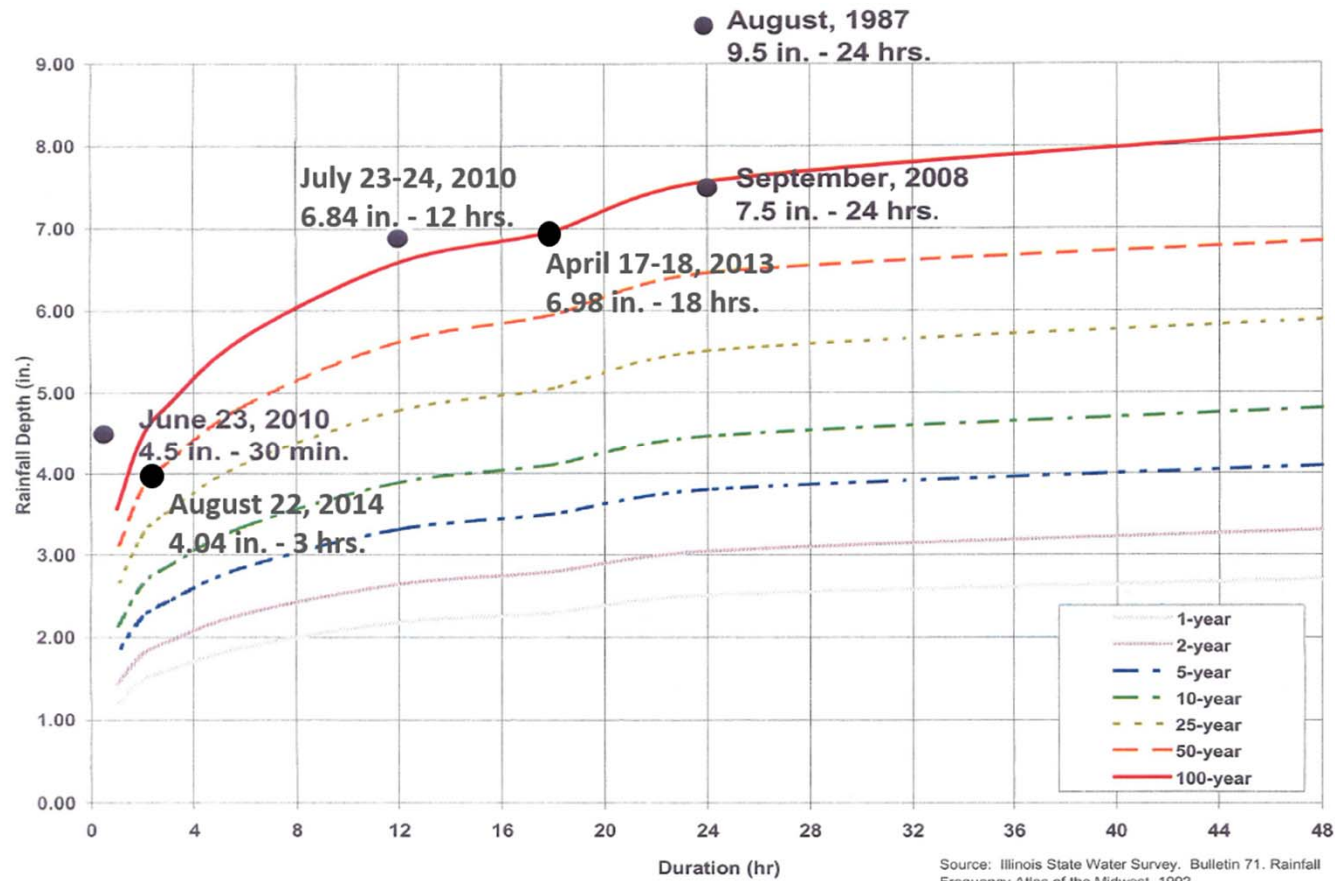
- Incorporated in 1910
- 46,000 people
- Approximately 10 square miles
- Located 16 miles west of Chicago Loop in DuPage County

City Drainage System Overview

- Combined sewer system until late 1960's
- Existing storm sewer has approximately 5-year capacity based on today's design standards (Bulletin 70)
- City developed prior to modern stormwater management requirements
- Very little regulatory floodplain following completion of levee along Salt Creek
- Flooding experienced throughout City from capacity issues of local drainage system



Recent Storms vs. Design Storms



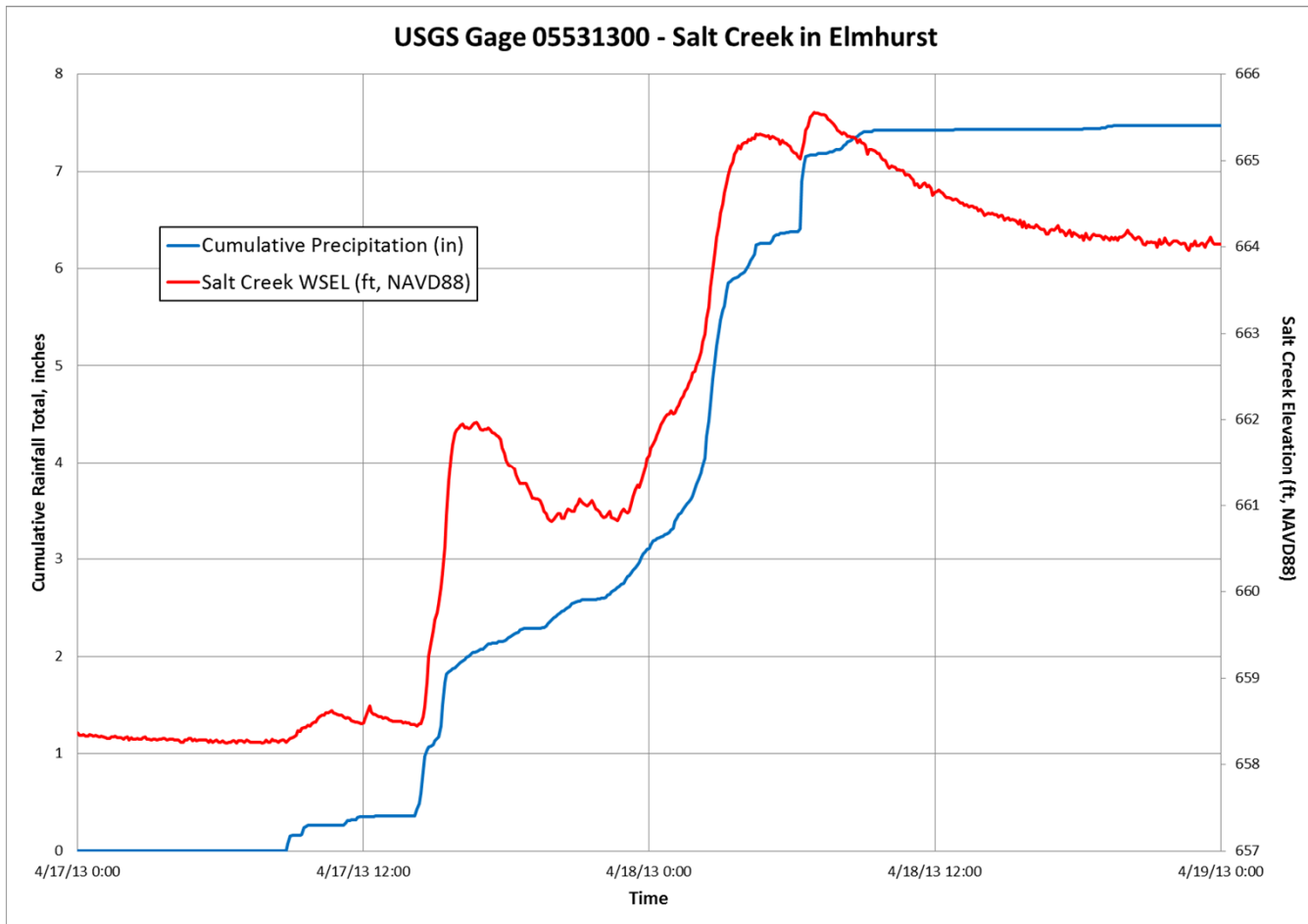


Project Background

- In response to severe flooding experienced during the recent storms of June & July 2010 and April 2013, CBBEL was hired to study several flood-prone areas of the City, which included the Walnut/Evergreen/Myrtle Study Area.
- XP-SWMM hydrologic and hydraulic modeling was used to determine the existing level of flood protection and develop drainage improvements to increase the level of flood protection in those areas.
- Drainage improvements generally consisted of the creation of flood storage in open space areas of the City, the construction of relief sewers, upsizing existing storm sewers, and flood proofing options.

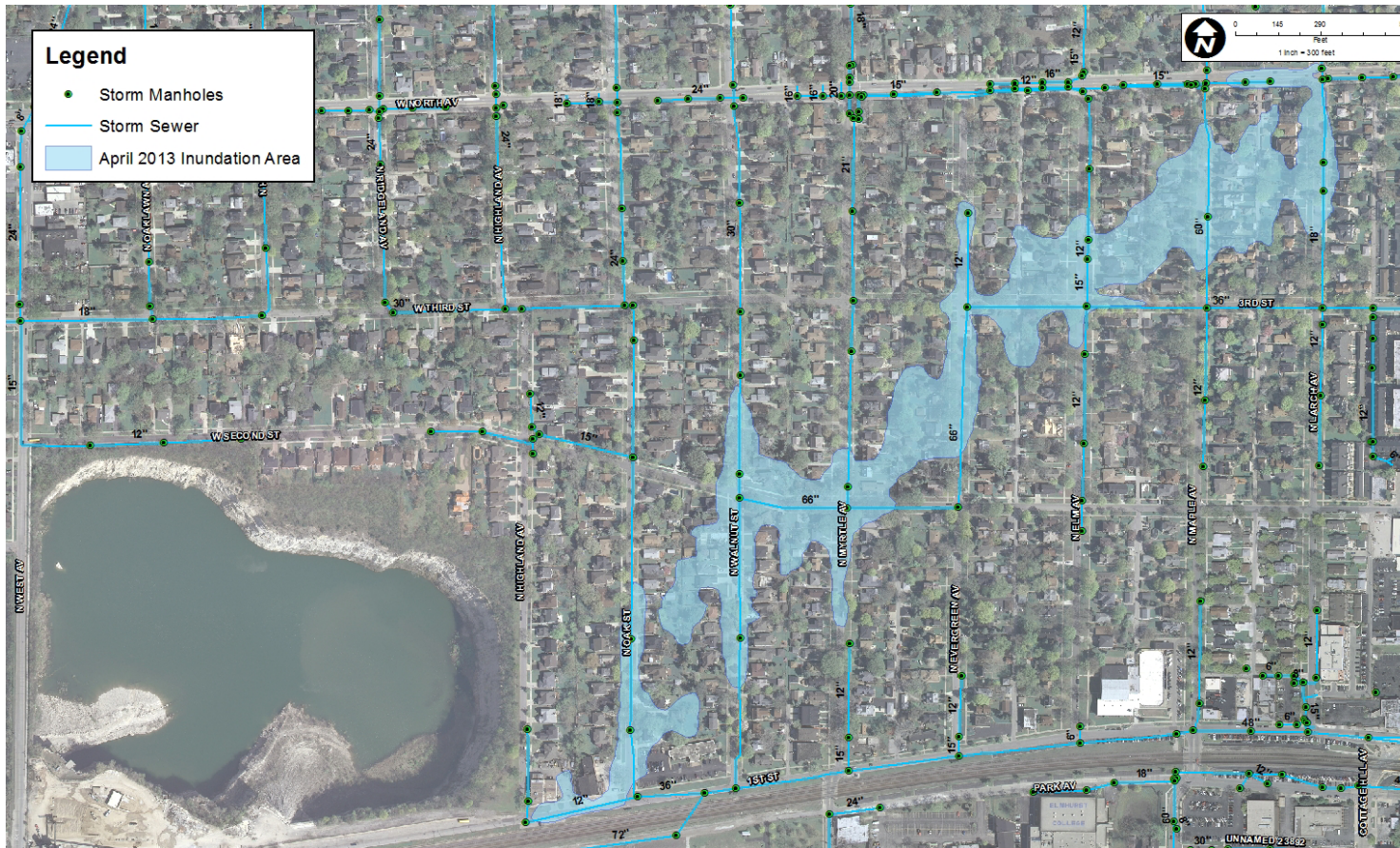


Project Background



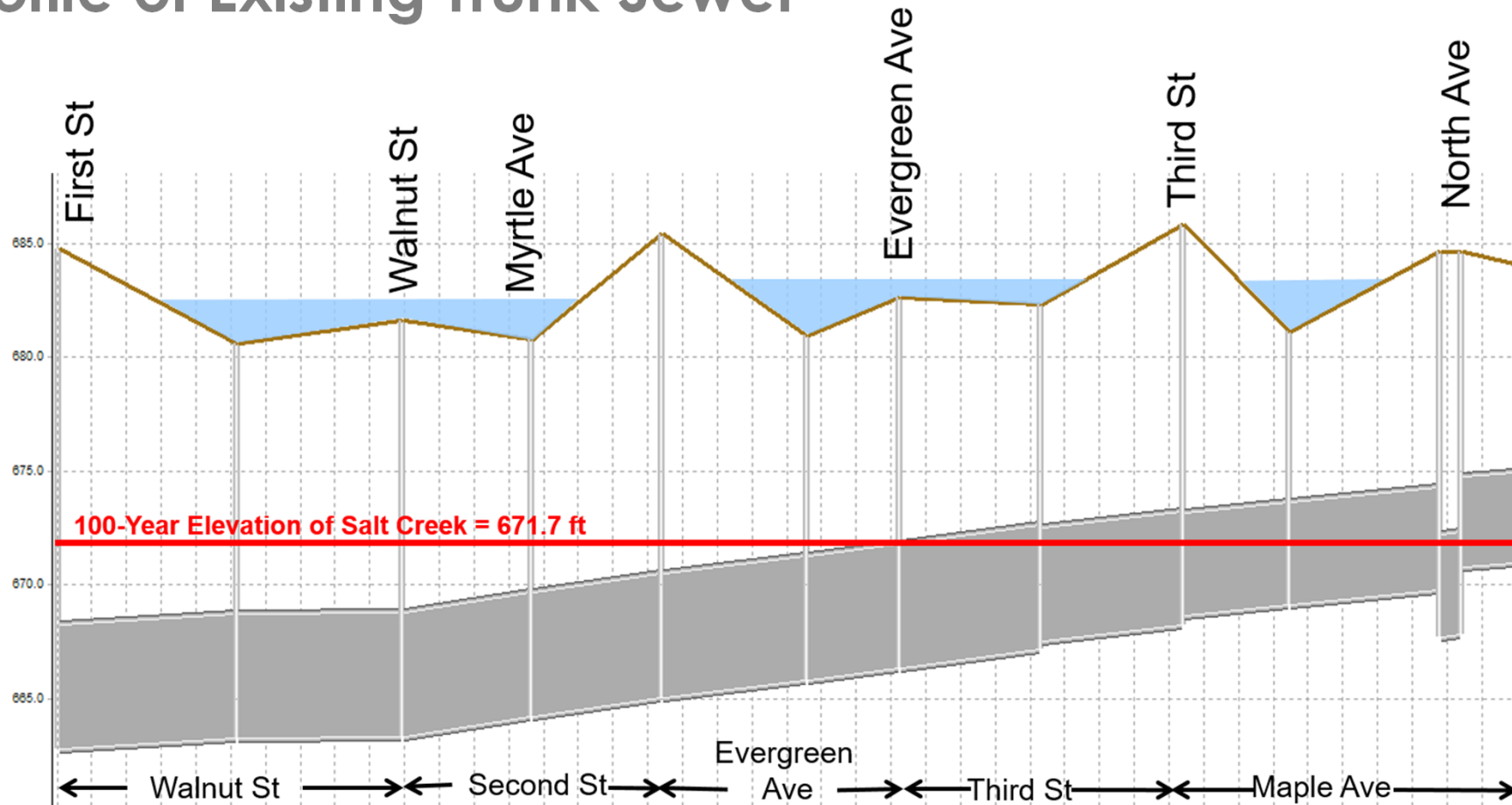
- As shown to the left for the April 2013 event, the level of Salt Creek rises rapidly during extreme storm events, which reduces the capacity of the existing storm sewer system.

April 2013 Inundation Area



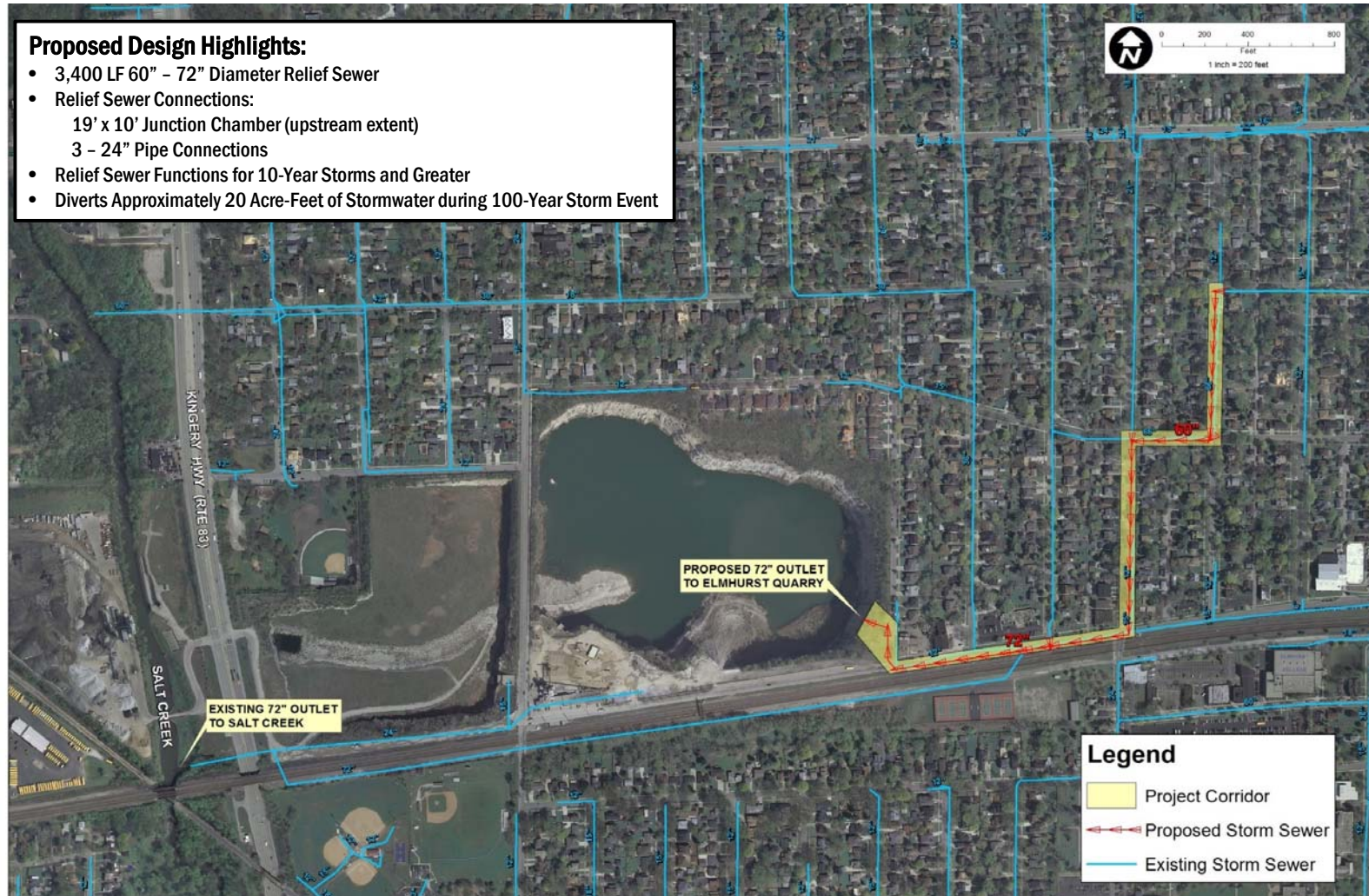
- In excess of two feet of ponding along streets in affected areas
- 76 homes within April 2013 flood inundation area

Profile of Existing Trunk Sewer



Proposed Design Highlights:

- 3,400 LF 60" – 72" Diameter Relief Sewer
- Relief Sewer Connections:
 - 19' x 10' Junction Chamber (upstream extent)
 - 3 – 24" Pipe Connections
- Relief Sewer Functions for 10-Year Storms and Greater
- Diverts Approximately 20 Acre-Feet of Stormwater during 100-Year Storm Event



Elmhurst Quarry

- In conjunction with the XP-SWMM analysis of the study area, CBBEL analyzed the effect of the proposed outlet on Salt Creek flood elevations using FEQ modeling.
- With the approval of the downstream Salt Creek communities, the City entered into an Intergovernmental Agreement (IGA) with DuPage County to allow 20 acre-feet of stormwater volume to be diverted from the flood problem area to the Elmhurst Quarry.



Drone Technology

Outfall Location

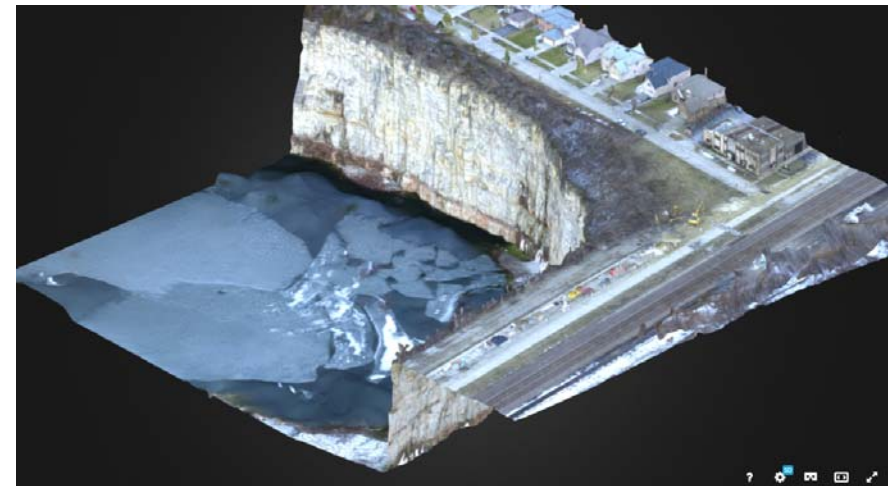
After reviewing the drone video footage, the location of the new relief sewer outfall was determined by visually surveying the vertical jointing and horizontal bedding planes where the rock was sound and stable.



Drone Technology

Survey Data

- To obtain survey data around the edge, along the high wall, and at the bottom of the quarry, drone technology was utilized to collect elevation data in these locations
- Specialized app allows drone to take photos in series at specified angles
- Altitude, latitude/longitude, and x-y-z coordinates all embedded in photos
- Used *ContextCapture* software to create 3-D model by stitching together photos using common points
- Incorporate survey points from overlapping areas



Relief Sewer Construction

- Working within Developed, Residential Area
- Resolution of Watermain & Sanitary Sewer Conflicts
- Utility Coordination
- Coordination with Residents



Outfall Construction

Overburden Removal



Outfall Construction

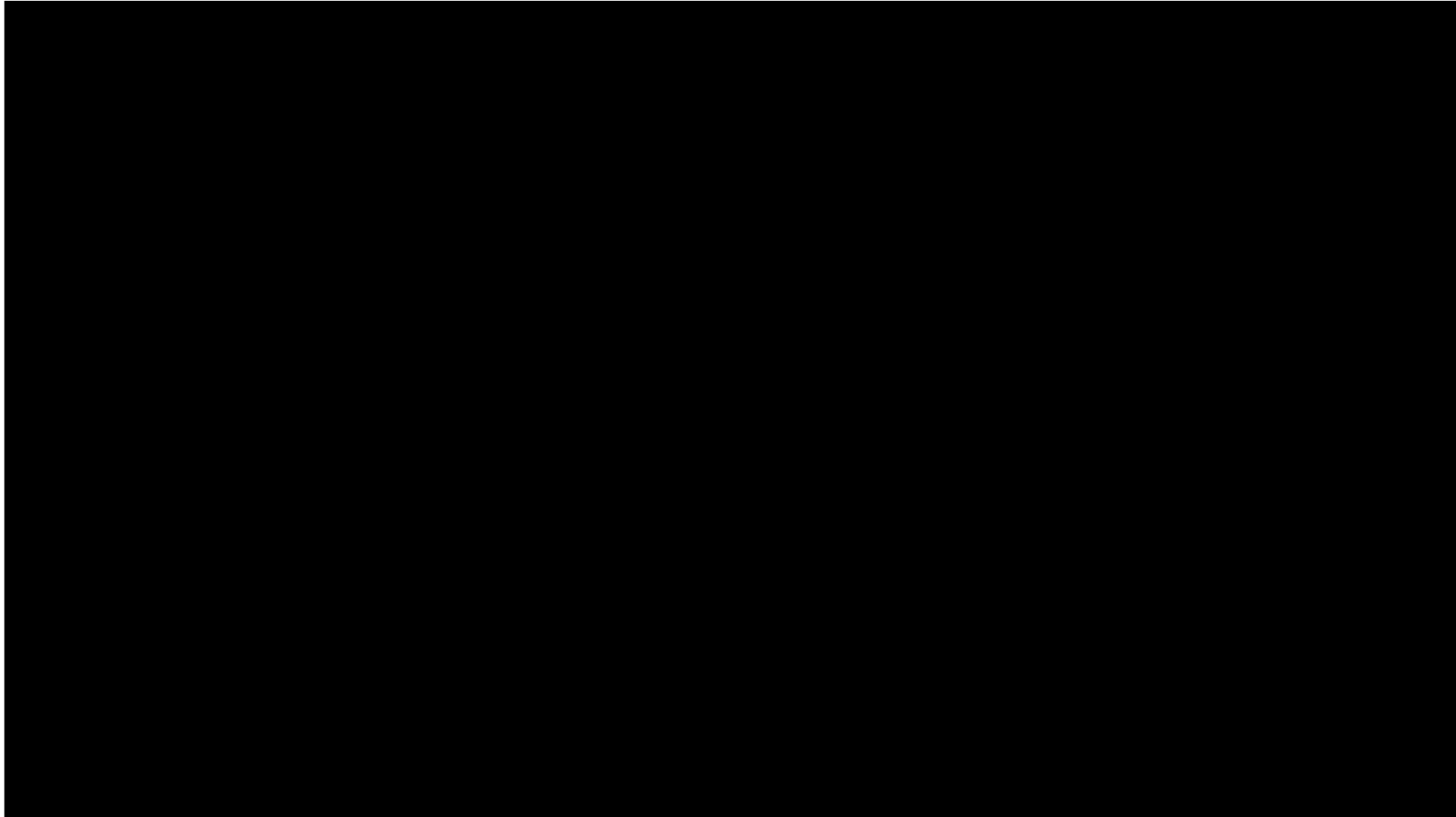
Trim Blasting

- Removes fractured rock all at once vs. mechanical means
- Eliminates need for energy dissipation measures (plunge pool)
- Eliminates need for rockfall (safety) netting
- Significantly less expensive





Trim Blasting of Quarry High Wall



Outfall Construction

Trench Excavation/Rock Anchor Installation



Outfall Construction

Pipe Installation

- 72-inch diameter steel pipe (66-ft welded segment)
- 5-foot cantilever over quarry wall
- U-Shaped steel straps connected to rock anchors
- Concrete encasement



Project Team

Owner

- City of Elmhurst/DuPage County

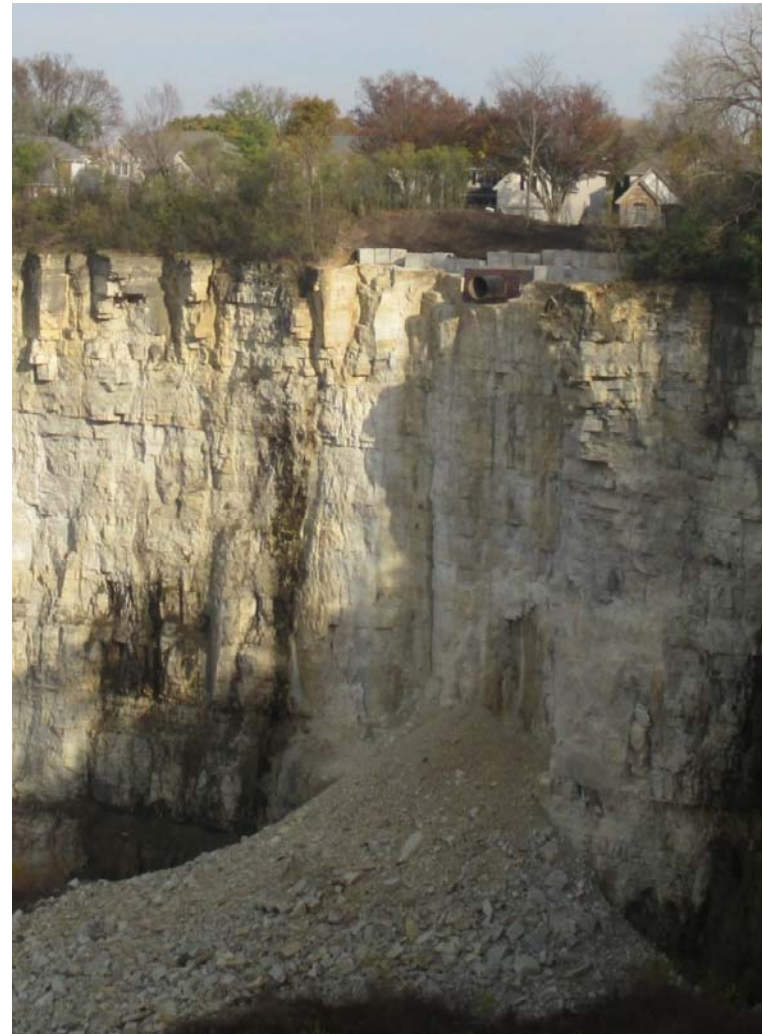


Design Team

- Engineer: Christopher B. Burke Engineering, Ltd.
- Subconsultant: Black & Veatch
- Geotechnical Investigation: Testing Service Corporation

Construction Team

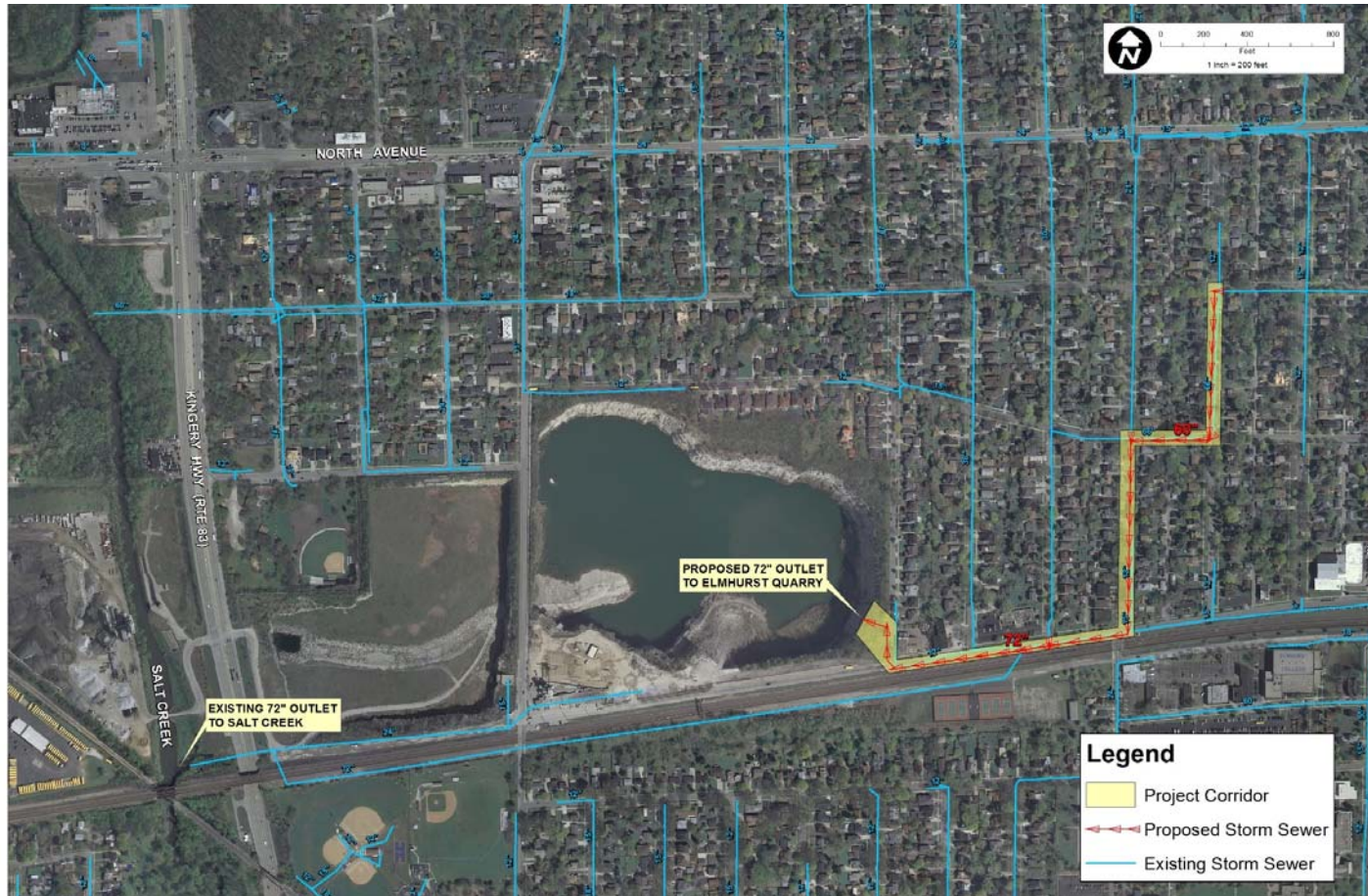
- General Contractor: Bolder Contractors
- Subcontractors: Hi-Tech Rockfall Construction, Ludwig Explosives
- Construction Engineer: Christopher B. Burke Engineering, Ltd.
- Materials Testing: Testing Service Corporation



Christopher B. Burke Engineering, Ltd.



Project Summary



Project Area: 4 acres

Major Items of Work:

- 5,000 LF Storm Sewer (10" to 72" diameter)
- 19' x 10' Junction Chamber
- 72" Outfall to Elmhurst Quarry
- Trim Blasting/Scaling of Quarry Wall
- 1,400 LF Sanitary Sewer (8" to 42" diameter)
- 1,000 LF Water Main (6" to 8" diameter)
- 70 Water and Sewer Service Replacements
- Street Patching and Resurfacing

Results/Benefits

Public

- Provides 100-Year Level of Flood Protection for 76 homes within study area
- Reconstructed/resurfaced roads
- New water main/sewers and services



WALNUT/EVERGREEN/MYRTLE STORMWATER IMPROVEMENT PROJECT TIMELINE

