

Keep the Water Flowing:

Investments and Initiatives in our Stormwater and Sanitary Sewer Infrastructure

City of North Olmsted

Mayor Kevin M. Kennedy



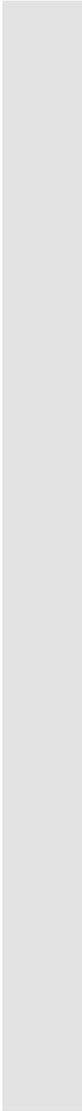
**CITY of
NORTH
OLMSTED**



Over the last decade, North Olmsted city officials have prioritized projects and initiatives to reduce the instances and impacts of flooding in our community during significant rain events.

The city has made significant investments in our storm and sanitary infrastructure to expand capacity and better manage flow. A proactive maintenance strategy and strict stormwater management regulations for development and redevelopment are creating better outcomes during heavy rains.

Much has been accomplished, but there is more work to do. The following slides provide information about the projects and partnerships that have made a positive impact on our drainage systems and projects on the horizon that will continue this effort.





Definitions

- **Sanitary Sewer**: An underground piping system for transporting sewage from houses and commercial buildings (but not stormwater) to treatment facilities for disposal.
- **Storm Sewer**: Infrastructure designed to drain excess rain and ground water from impervious surfaces such as streets, parking lots, sidewalks and roofs.
- **Bioretention Basin**: Landscaped depressions or shallow basins used to slow and treat on-site stormwater runoff, which percolates through the system and ultimately infiltrates the soil or is directed to nearby drains.
- **Culvert**: A tunnel carrying a stream or open drain under a road or apron.
- **Dredge**: To clean out the bed of an area of water by scooping out mud, silt and rubbish.



Definitions

- **Equalization (EQ) Basin**: Facility designed to provide consistent influent flow to the Waste Water Treatment Plant by retaining high flow fluctuations.
- **Infiltration**: Process by which water on the ground surface enters the soil.
- **Interconnect**: Sewer linkages that provide for relief and system equalization.
- **Lift Station**: Facility with equipment for pumping fluids from one place to another.
- **Sewage Grinder**: Machine that grinds waste in sewage water into a fine slurry and pumps it to the central sewer system.



Sanitary System

Clague Park EQ Basin & Lift Station, Dover Lift Station & Lebern Lift Station

2012-2013 | \$5.2M

This project added 1.25 million gallons of storage capacity in an underground cast-in-place equalization tank along with a new lift station at Clague Park. At the Dover and Lebern Lift Stations, three existing pumps were replaced and two channel grinders were added to each location to reduce clogging in the system.





Sanitary System

Walter Relief Sewer

2012-2013 | \$2.8M

The project consisted of replacing 1,800 linear feet of sanitary sewer on Beech Lane and Hunter Drive and installing 4,240 linear feet of new parallel relief sewer along Walter Road and Deerfield Drive.



Sanitary System

Dover EQ Basin & Chapel Hill Relief Sewer

2013 | \$2.5M

The city acquired a residential lot on Dover Center Road for the construction of a 635,000 gallon underground EQ basin. Additionally, 1,120 lineal feet of 24-inch sanitary relief sewer along Chapel Hill Drive was installed to provide additional storage and conveyance capacity during heavy rain events.





Sanitary System

Waste Water Treatment Plant Upgrade

2013-2015 | \$38.6M

Upgrades for performance, efficiency and OEPA requirements. Design average daily flow remained 7.0 mgd. Design peak flow increased from 21.6 to 30 mgd. Design peak hourly flow increased to 40 mgd.





Sanitary System

Broxbourne Lift Station Grinder

2014 | \$54,427

The new sewage grinder for debris and solids was installed in order to improve flow, prevent blockages and reduce operations and maintenance costs.





Sanitary System

Bradley Lift Station Improvements

2017 | \$734,205

This project replaced existing pumps, motors and controls and installed an additional sewage grinder. The improvements were needed due to age of the equipment and improved performance, efficiency and reliability.





Stormwater System

City Hall Permeable Pavers and Bioretention

2011-2012 | \$238,000 (OEPA SWIF Grant)

The city installed permeable pavers and a bioretention swale in the parking lot of City Hall with a grant from the Ohio EPA. This project modeled to developers the type of stormwater management features that could be incorporated into commercial redevelopment.





Stormwater System

Burns Culvert Replacement

2012 | \$124,087

This project involved replacing an existing 5-foot by 4.5 foot box culvert with a larger 7-foot by 4-foot reinforced concrete box culvert.





Stormwater System

North Olmsted Park Permeable Pavers and Rain Garden

2013 | \$214,177 (OEPA SWIF Grant)

Permeable pavers and a rain garden were installed with grant funds from the Ohio EPA.



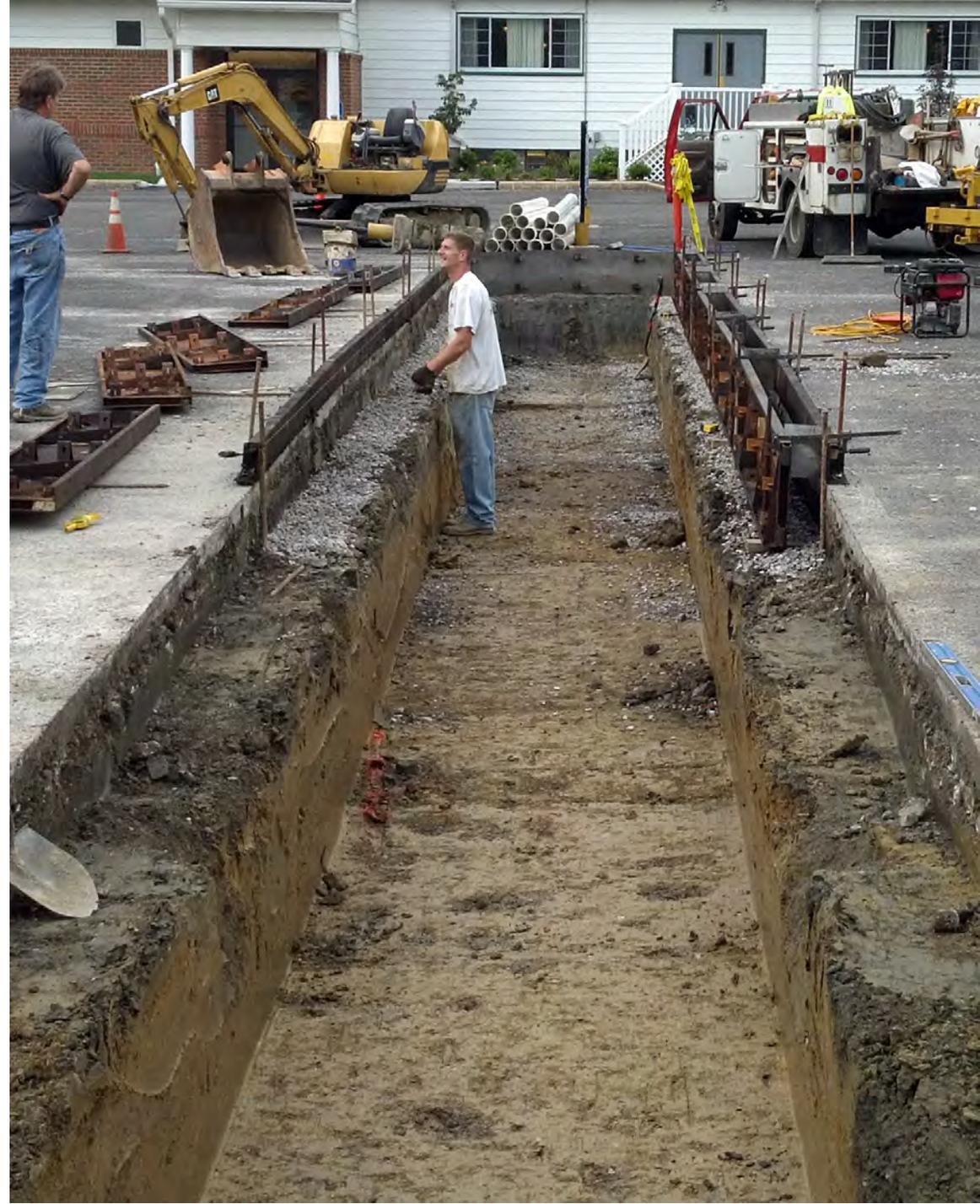


Stormwater System

Springvale Parking Lot Bioretention

2013 | \$34,442 (OEPA SWIF Grant)

A bioretention swale was installed to drain and filter stormwater from the parking lot with grant funding from the Ohio EPA.





Stormwater System

Fitch Culvert Cleaning

2014

The City Service Department dredged and removed sediment from Root Ditch between North Olmsted High School and Fitch culvert south of I-480.





Stormwater System

Windsor Culvert Replacement

2015 | \$337,318

This project involved replacing an existing 16-foot by 4.625-foot corrugated steel plate, single arch shaped culvert with a larger 9-foot by 4.5-foot twin reinforced concrete box culvert.





Stormwater System

Springvale Pond Modifications & Dredging

2015, 2017, 2020 | \$48,000 each

In 2015, the city's contractor installed a secondary outlet control structure to provide additional water level control and overflow discharge capacity during extreme storms. The project included dredging of a portion of the pond. The pond was dredged again in 2017 and 2020.





Stormwater System

Storm Sewer Interconnects

2015 | \$27,050

This project involved connecting adjacent, separate drainage systems to provide relief during extreme storms by equalizing flow. Interconnects were made at Carey Lane, Sherwood Drive and Walter Road.





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Stormwater System

Pine Drainage Basin Improvements

2017 | \$401,606

The city purchased property from the North Olmsted City School District for this improvement that added approximately 1 million gallons of stormwater storage. The project involved expanding existing pond storage volume, installing infiltration trench, modifying the outlet structure to control outflow and installing a storm sewer interconnect between two systems on Driscoll Lane.





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Stormwater System

Bradley Road Culvert Replacement

2018 | \$320,564 (city 40% design, 20% construction)

This project involved replacing an existing 16-foot by 5.167-foot corrugated steel plate, single arch shaped culvert with a 12-foot by 6-foot reinforced concrete box culvert.



Commercial
Development

Sears/Ollie's Basin Improvements

2015

The property owner installed a trash rack with a pipe header and risers surrounded with filter aggregate at outlet to prevent blockages. Half of the concrete channel in the basin was removed to increase infiltration.





Commercial Development

Aloft and Burntwood Tavern

2015

The stormwater management system serving the hotel and restaurant involves two retention ponds (intended to be wet ponds) constructed to provide both stormwater quality treatment and quantity control. A fountain aerator was installed in the pond near Burntwood Tavern. A bubble diffuser was provided in the pond near Butternut Ridge Apartments.





Commercial
Development

Ganley Honda Expansion

2016

The property owner replaced non-functioning pump discharge drainage system with larger, gravity operated stormwater management system.





Commercial
Development

Grace Church

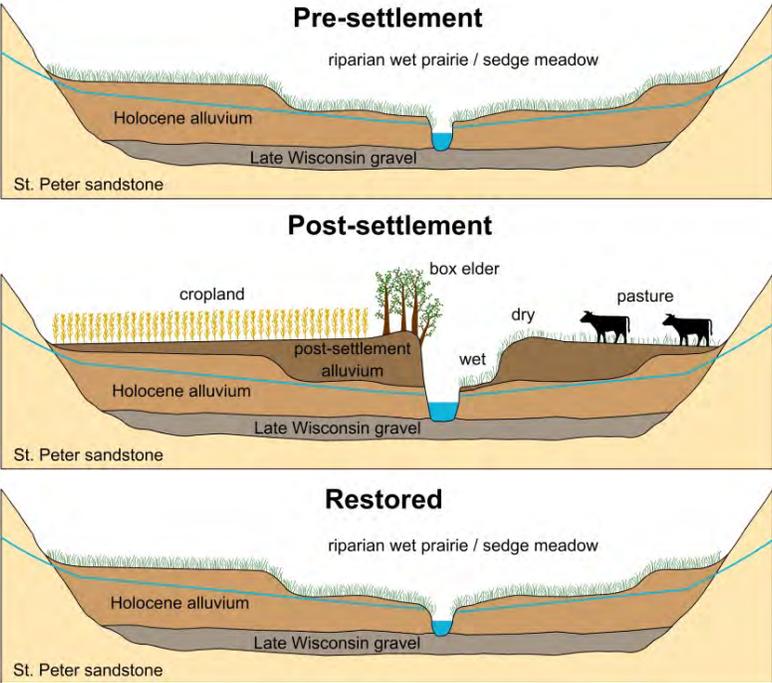
2016

A detention pond, which is normally dry, was installed for this parking lot expansion project.

North Olmsted High School-Middle School Campus

2016-2017

Contractors for the North Olmsted City School District restored the flood plain to provide storage during extreme storms. Over 550,000 cubic feet or 4.1 million gallons of storage was installed.



Commercial Development



**North Olmsted High School-
Middle School Campus: Dry
Conditions**



North Olmsted High School-Middle School Campus: Wet Conditions





Commercial
Development

Blue Falls Car Wash

2018

A detention pond containing over 5,000 cubic feet of available storage was added to the existing stormwater management system comprised of 292 linear feet of 36-inch diameter underground pipe.



Commercial Development

Vitalia Senior Living Facility

2019-2020

The property owner installed a system of underground chambers and a detention basin to provide a combined storage volume of over 79,000 cubic feet. The system was designed to promote infiltration into the sandy soil below, minimizing discharge from the site into Roots Ditch. The property owner also replaced the storm water pipe crossing Christman Drive with a larger pipe in an effort to reduce ponding on the roadway during heavy events.



Vitalia Senior Living: underground storage chambers (left) shown during construction; above ground detention basin (below) as completed





Vitalia Senior Living: replacement culvert pipe under Christman Drive discharging into Roots Ditch



Commercial
Development

Extra Space (24002 Lorain Road)

2020

The existing pond will be enlarged for the proposed self-storage facility development and to meet current city standards. Several violations were also addressed due to lack of maintenance by the previous property owner.



Commercial Development

Other Notable Developments (2010-2013)

These are smaller scale projects where stormwater management systems were replaced, increased or installed.

- Ganley Subaru (2010)
- Sprinter (2010)
- Dollar Bank (2011)
- First Federal Savings and Loan (2011)
- Giant Eagle GetGo (2011)
- Halleen Kia (2011)
- North Olmsted Town Centre (2011)
- Walmart (2011)
- St. Richard's Senior Apartments (2012)
- Aston Martin/Maserati (2013)
- Aura Dental (2013)



Commercial Development

Other Notable Developments (2014-2020)

These are smaller scale projects where stormwater management systems were replaced, increased or installed.

- Porsche of North Olmsted (2014)
- Mercedes-Benz of North Olmsted (2014)
- Chambers Funeral Home (2014)
- North Olmsted City Schools Administrative Offices (2016)
- University Hospitals (2017)
- Ganley Westside Imports (2017)
- Drug Mart plaza (2017)
- Swensons (2018)
- Schmidt Office Warehouse (2018)
- Ganley Subaru (2019)
- Arby's (2020)



Administrative

Policy and Enforcement

The city has kept current with OEPA best practices, amending and strengthening stormwater management requirements twice since 2010. Commercial and residential projects that affect stormwater are required to bring the property into compliance with city codes.

Ditch Inspections

Staff inspects ditches annually to ensure they are maintained and functioning properly. This proactive monitoring and abatement of drainage violations ensures ditches are unobstructed by vegetation, grass clippings and other yard debris.



Administrative

Commercial SCM Inspections

Commercial property owners with Stormwater Control Measures (SCMs) installed on their property are required to maintain their systems and submit inspection reports on an annual basis. The city intends to begin proactive inspections for properties failing to submit reports in 2020.

Residential Stormwater Fair

Residents were invited to learn about sanitary and stormwater drainage and discuss their concerns with city staff at this first community open house event in February 2020.

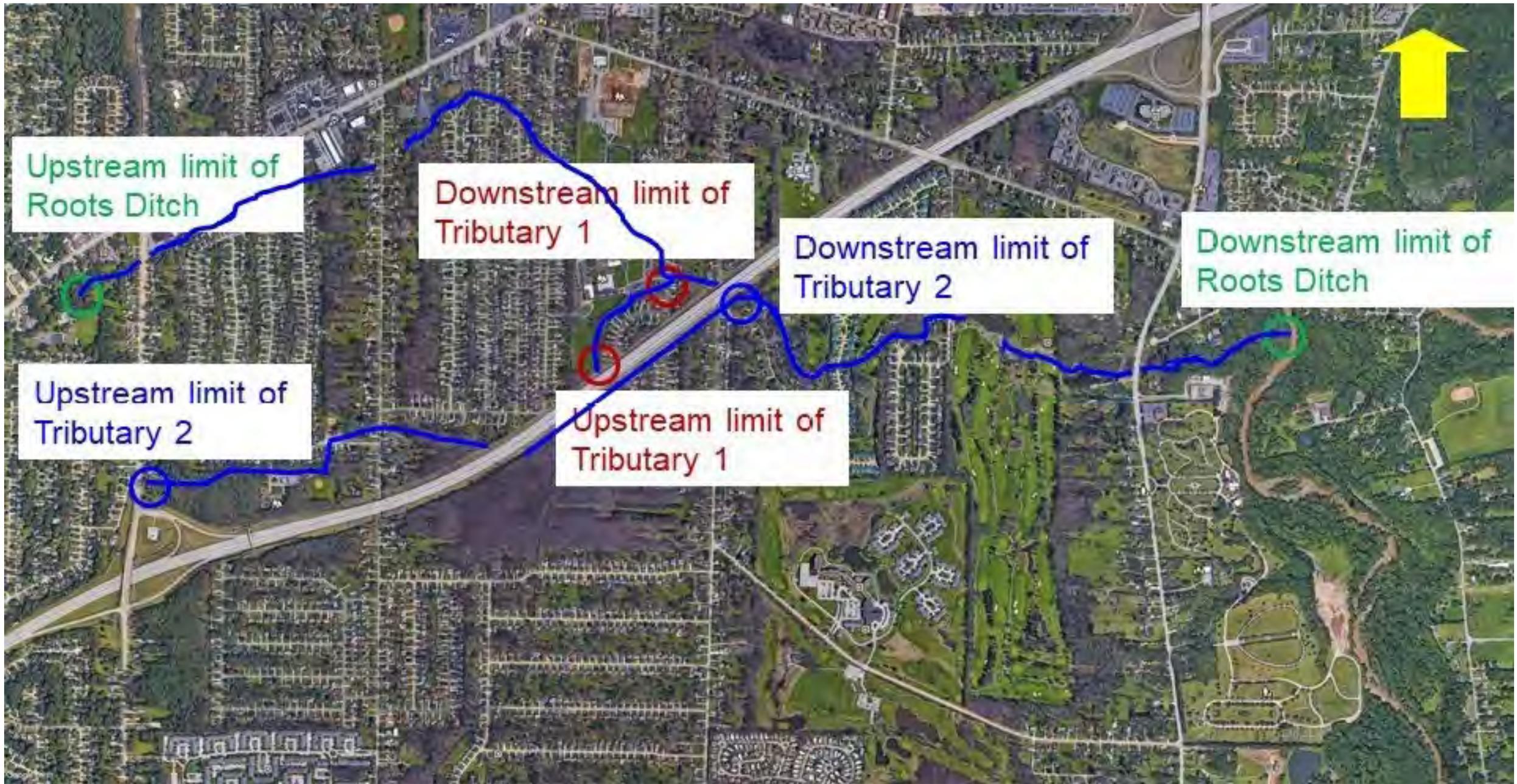


Administrative

Roots Ditch Study

2019 | Hydrosphere Engineering

The city's consultant created a hydrological model of the Roots Ditch watershed and evaluated the effectiveness of various stormwater control measures including enlarging existing stormwater structures and adding more above-ground retention facilities.



Upstream limit of
Roots Ditch

Downstream limit of
Tributary 1

Downstream limit of
Tributary 2

Downstream limit of
Roots Ditch

Upstream limit of
Tributary 2

Upstream limit of
Tributary 1





Administrative

South Interceptor Study

2019 | CT Consultants

The consultant was engaged to study the South Interceptor and identify alternatives to improve system capacity and eliminate sanitary sewer overflow events. Construction estimates were developed for each alternative.

City of North Olmsted South Interceptor Model Layout

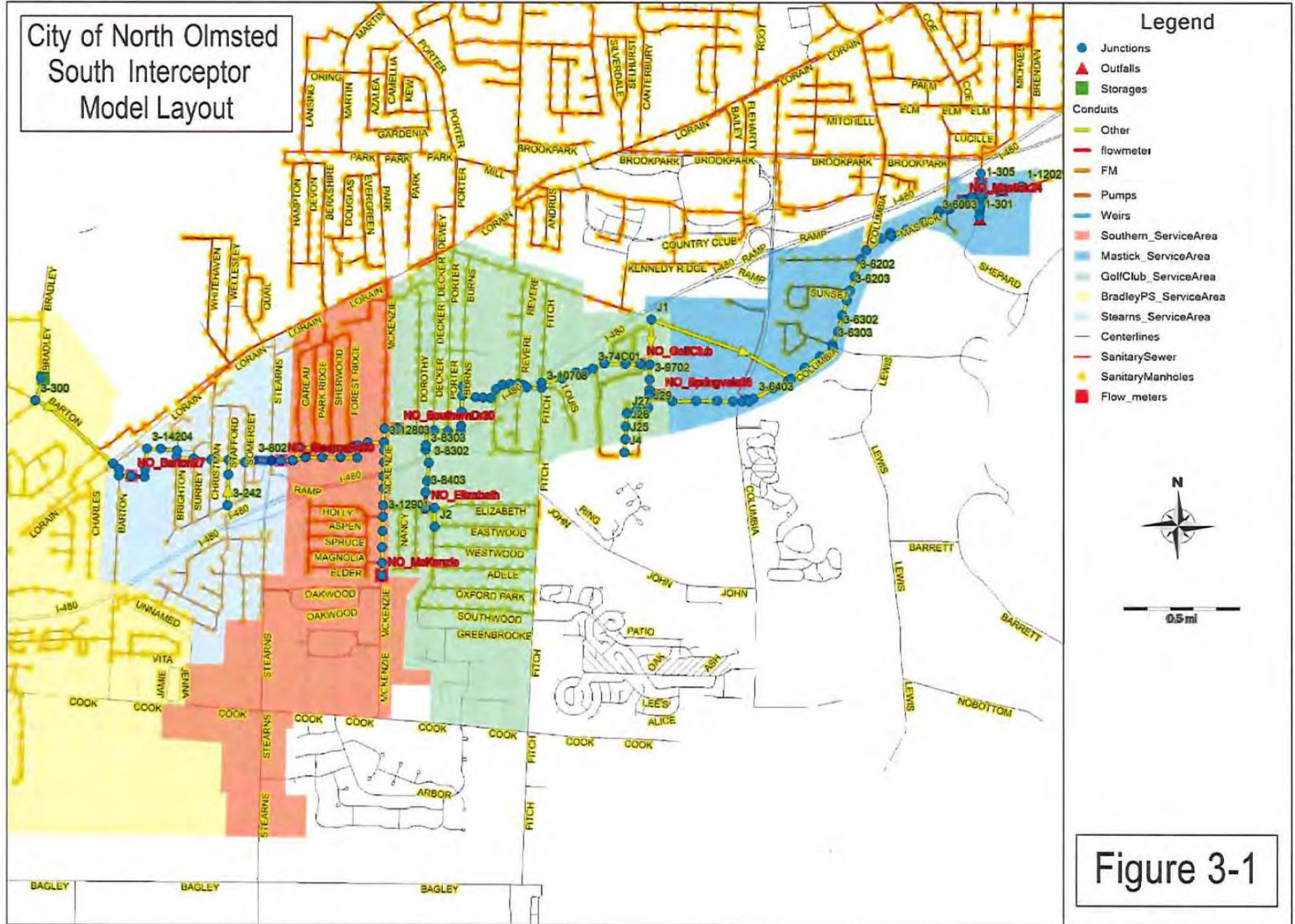


Figure 3-1



Administrative

Personnel

Full-Time Employees by Division

Division	2010	2015	2020
Road	9	9	11
Forestry	3.5	6.5	6
Storm	3.5	6.5	8
WWTP	28	25	26
Total	44	47	51



Administrative

Maintenance

Proactive system maintenance begins by having the right tools for the job. Below are notable equipment purchases since 2010.

- Vac-Truck (2010)
- CCVT Truck (2011)
- Flow Loggers (2012-2017)
- New Holland Backhoe (2014)
- Kubota Mini-Excavator (2017)
- CCTV Line Camera (2018)
- Vac-Truck (2019)



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Maintenance

Ongoing maintenance activities are prioritized that reduce flooding and the occurrence of inflow and infiltration.

Action	2015	2016	2017	2018	2019
Sanitary Sewer CCTV Investigation (miles televised)	19.2	23.9	26.6	20.1	21.1
Lateral Launches (mainline or SeeSnake)	138	74	158	122	122
Sanitary Sewer Jet Cleaning (miles cleaned)	25.9	26.6	34.6	22.9	23.9
Manholes Sealed, Repaired or Rebuilt	36	113	159	173	140
Trenchless Pipe Patches	31	39	22	20	30
Sewer Lining (linear feet)	0	478	1,281	1,825	103
Storm Channel Vegetation Control, Debris Removal (miles)	30.0	36.9	33.6	42.8	50.6
Lateral Repairs	1	2	1	2	7
Root Control (linear feet)			4,600	5,005	



Administrative

Maintenance

Both public and private efforts are required to keep our stormwater control infrastructure working as intended.

- City responsibilities
 - Clean and replace storm mains, tees and laterals
 - Jet, repair and replace larger culverts
 - Clean and repair catch basins
 - Re-swale roadside ditches
 - Dye/flow testing for waterproofing permits
- Property owner responsibilities
 - Keep storm laterals on private property free from debris
 - Keep roadside ditches clear of debris, including culverts under aprons, replacing deteriorated culverts as necessary



Future Projects

South Interceptor EQ Basin

The South Interceptor Study made recommendations for expanding system capacity through the addition of equalization storage, which is an underground tank that holds sewage during peak flows. The city is currently identifying potential locations for this project and is preparing to request proposals from engineers for project design.

Sanitary Sewer Rehab

Inflow and infiltration can be reduced through routine inspection of sanitary sewer laterals for leakage, and grouting of pipe joints or lining laterals as necessary.



Future Projects

Stormwater Detention Basin

The Roots Ditch Study made recommendations for expanding storage of stormwater through one or more large above ground detention basins during heavy rain events. The city is currently identifying potential locations for this project.

Mackenzie Culvert Relining

Mackenzie Culvert is planned to be relined in 2020.