



**CITY OF NOVI CITY COUNCIL**  
**JULY 26, 2021**

**SUBJECT:** Consideration of approval of Change Order No. 10 to DVM Utilities, Inc. for the Nine Mile Road Sanitary Sewer project (Evergreen Court to Kensington) in the amount of \$1,577,521.68, and amend the budget.

**SUBMITTING DEPARTMENT:** Department of Public Works, Engineering Division

<b>EXPENDITURE REQUIRED</b>	<b>\$ 1,577,521.68</b>
<b>AMOUNT BUDGETED</b>	<b>\$ 1,847,676.00 (FY 2020-21 Budget Rollover)</b>
<b>APPROPRIATION REQUIRED</b>	<b>\$ 1,992,774.00</b>
<b>LINE ITEM NUMBER</b>	<b>592-592.00-976.029</b>

**BACKGROUND INFORMATION:**

The Nine Mile Sanitary Sewer project involves the replacement of approximately 6,400 feet of force main sanitary sewer with gravity sewer from Evergreen Court to Kensington. The purpose of this project is to provide redundancy to the Park Place pump station, which is 1.6 miles from the closest gravity outlet (near Kensington). The project is currently 86% complete, with 880 feet of sewer left to install.

The project recently surpassed a major challenge causing significant project delays. The rock obstructions that had prevented the standard boring equipment from breaking through was finally penetrated using a new method. Rather than using a drilling auger to establish the pipe's path through the ground, a large 30-inch steel casing was hammered through the ground using a technology referred to as pipe ramming. This process utilized a ramming force of 1,500 tons, compared to the 250 tons of force for the standard drilling process. Following the installation of the 30-inch casing, the soil and rock were removed from within the pipe, and the sewer pipe was pulled through the casing. This last step completed the segment between manholes 3 and 4. Once the excavations in this area are backfilled, preparations for the next segment will begin. Completion of the next segment will involve an excavation at a midpoint between manhole 2 and 3 which includes the other rock obstruction slowing down progress.

Public meetings were held on May 5 and June 23 of 2021 to address the ongoing delays and residents concerns. The major concern was dropping water levels to area lakes and ponds from the extended dewatering operations. The installation of the 12-inch diversion pipe to Garfield Lake is now being implemented to address that specific location. This additional diversion will allow four times as much water to be diverted than is currently being pumped. Recently, the pond adjacent to Edinborough responded well to rainfall, and has remained full for the past four weeks. All areas of concern are being monitored by staff and regular communications to residents are sent via updates from Community Relations. Any legitimate resident concerns thus far have been and continue to be addressed promptly by staff and/or by the OHM field inspection team.

These recent project additions and previous challenges result in additional effort and funding to complete the work. For further details on the current status and history of this project, refer to the administrative memos included in the packet.

A timeline has been difficult to predict since ground conditions dictate the contractor's methods and approach, slowing the progress of work. Staff has brought several change orders and expectations for completion forward previously and has been incorrect to this point. At this time based on input from DVM and OHM, we anticipate substantial completion of the project within the next two to three months. Based on the ability to construct Manhole 2, we are optimistic the rock obstructions may not be as prevalent as the project continues to progress east.

Below is a summary of the previous and proposed change orders for this project:

Change Order No.	Date Approved	Amount	Description of Change Order
1	4/15/2019	\$20.00	Balancing of Tree Clearing Items No. 7 & 8
2	7/8/2019	-\$11.32	Xypex Treatment additive and balancing of Erosion Control – Silt Fence item
3	1/10/2020	\$99,000.00	Upsize the dewatering header pipe from 12-inch to 18-inch, material only
4	2/24/2020	\$97,332.34	Additional increases for dewatering header pipe and increases for crew days on Basin "B" Improvements and CMP installation
5	5/4/2020	\$536,429.91	Increase Item No. 7 (Tree Removal, 6" - 18") and Item No. 82 (Emergency Excavation) and addition of dewatering claims from the contractor for additional effort, rental equipment, pumps, drop pipes, etc. along with the correlated inspection crew days and contract time.
6	7/13/2020	\$81,712.51	Materials for larger 18" dewatering header from MH5 to MH1

7	9/14/2020	\$74,250.00	Additional effort to install piping to divert water to Garfield Lake and operate system for three months.
8	11/23/2020	\$481,772.00	Two emergency excavations, three months of diversion of water to Garfield Lake (October - December), rock drilling equipment and effort to complete the work.
9	2/22/2021	\$984,279.84	Dewatering operations through December 2020, dewatering operations (January through March), diversion of water to Garfield Lake (January - March), Steel sheeting rental and replacement.
10	Proposed	\$1,577,521.86	Additional dewatering claims from the contractor for additional effort, rental equipment, pumps, etc., ten months of diversion of water to Garfield Lake (March - October), pipe ramming equipment and effort to complete the work.

The construction engineering services and geotechnical engineering services related to this project will also be increased to reflect the additional effort anticipated to complete the remainder of the project, and is summarized below:

<b>OHM</b>		
Contract Administration	Additional services anticipated for remainder of project.	\$138,000
Crew Days	Additional 90 days x \$700 daily inspection fee	\$112,000
<b>Testing Engineers and Consultants (TEC)</b>		
Material Testing	Additional consultation and investigation, piezometer monitoring, and additional geotechnical services anticipated for remainder of project.	\$7,500

**RECOMMENDED ACTION:** Approval of Change Order No. 10 to DVM Utilities, Inc. for the Nine Mile Road Sanitary Sewer project (Evergreen Court to Kensington) in the amount of \$1,577,521.68, and amend the budget.

**RESOLUTION**

NOW, THEREFORE BE IT RESOLVED that the following  
Budget Amendment for change order No. 10 to  
DVM Utilities, Inc. for construction associated with  
the Nine Mile Road Sanitary Sewer project  
from Evergreen Court to Kensington is authorized:

	<b>INCREASE (DECREASE)</b>
<b>WATER &amp; SEWER FUND</b>	
<b>APPROPRIATIONS</b>	
Capital Outlay	1,992,774
<b>TOTAL APPROPRIATIONS</b>	<u><b>\$ 1,992,774</b></u>
<b>Net Increase (Decrease) to Fund Balance</b>	<u><u><b>\$ (1,992,774)</b></u></u>

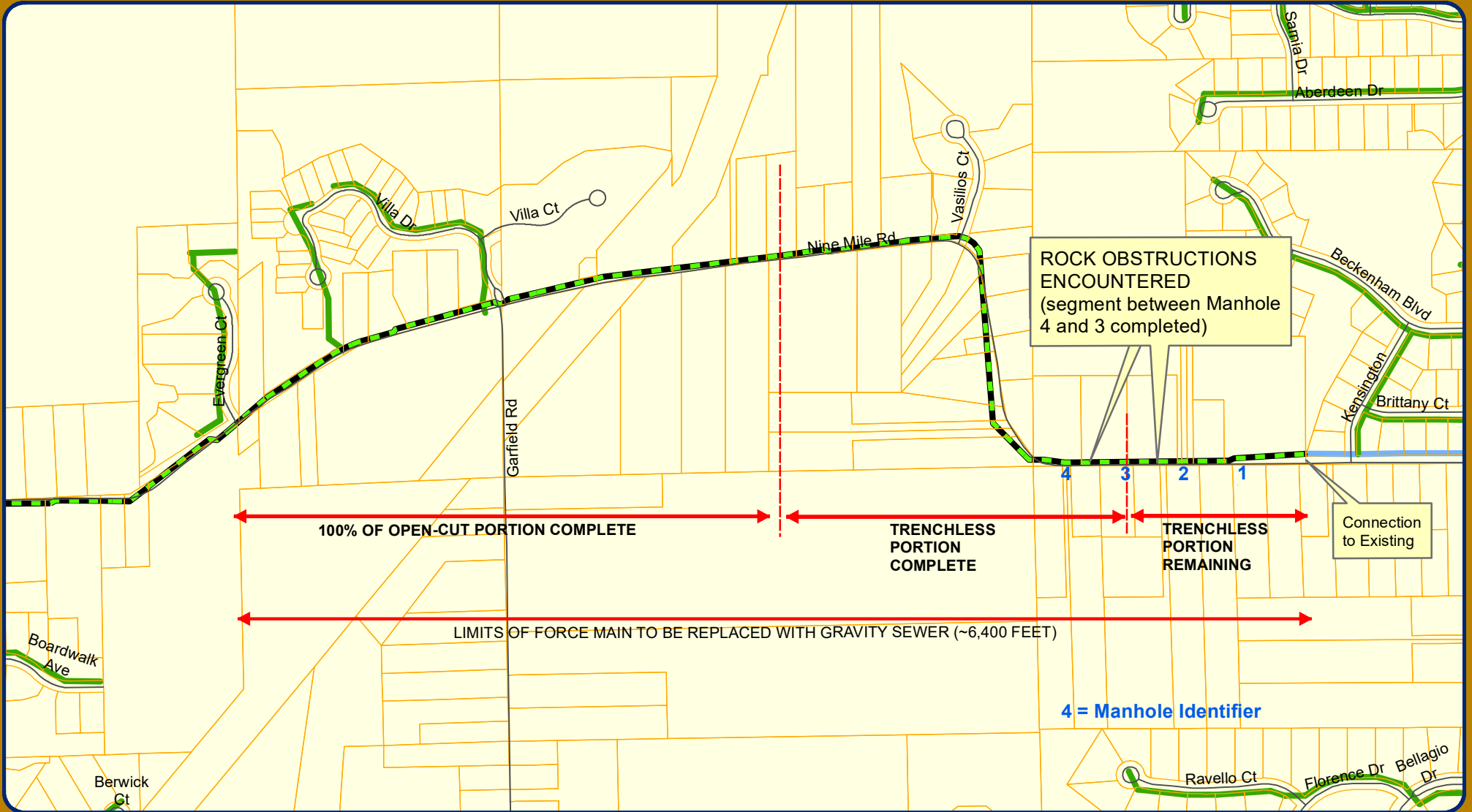
I hereby certify that the foregoing is a true and complete copy of a  
resolution adopted by the City Council of the City of Novi  
at a regular meeting held on July 26, 2021.

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Cortney Hanson  
City Clerk

# NINE MILE GRAVITY SEWER PROJECT

## Location Map






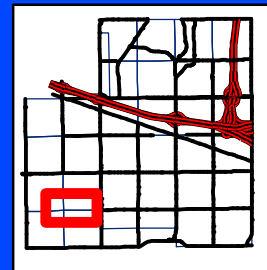
Map Author: Croy  
Date: 7/16/2021  
Project: Nine Mile Gravity Sewer  
Version #: v1.0

**MAP INTERPRETATION NOTICE**

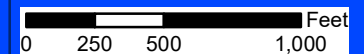
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### Map Legend

-  6" Sanitary Force Main
-  8.0" Gravity Sanitary Sewer
-  12.0" Gravity Sanitary Sewer



**City of Novi**  
Engineering Division  
Department of Public Works  
26300 Lee BeGole Drive  
Novi, MI 48375  
cityofnovi.org



# MEMORANDUM



**TO:** JEFFREY HERCZEG, DIRECTOR OF PUBLIC WORKS  
**FROM:** BEN CROY, CITY ENGINEER  
**SUBJECT:** NINE MILE SANITARY SEWER PROJECT UPDATE  
**DATE:** FEBRUARY 12, 2021

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The Nine Mile Sanitary Sewer project involves the replacement of approximately 6,400 feet of force main sanitary sewer with gravity sewer from Evergreen Court to Kensington. The project is approximately 88% complete, with 5,600 feet of sewer installed (800 feet remaining). Deep construction and the high-water table have made the project challenging and resulted in cost overages and delays.

Most recently, drilling operations were delayed by boulder obstructions which required new bits and additional equipment fabrications by the contractor. Currently, the new method has been successful enabling progress to continue, even if additional rock obstructions are encountered. The delays associated with the rock, the on-going dewatering effort (and diversions), and the other construction modifications have caused the project to continue well beyond the originally anticipated completion date. As expected, the additional effort during this time has resulted in additional costs incurred by the contractor (DVM).

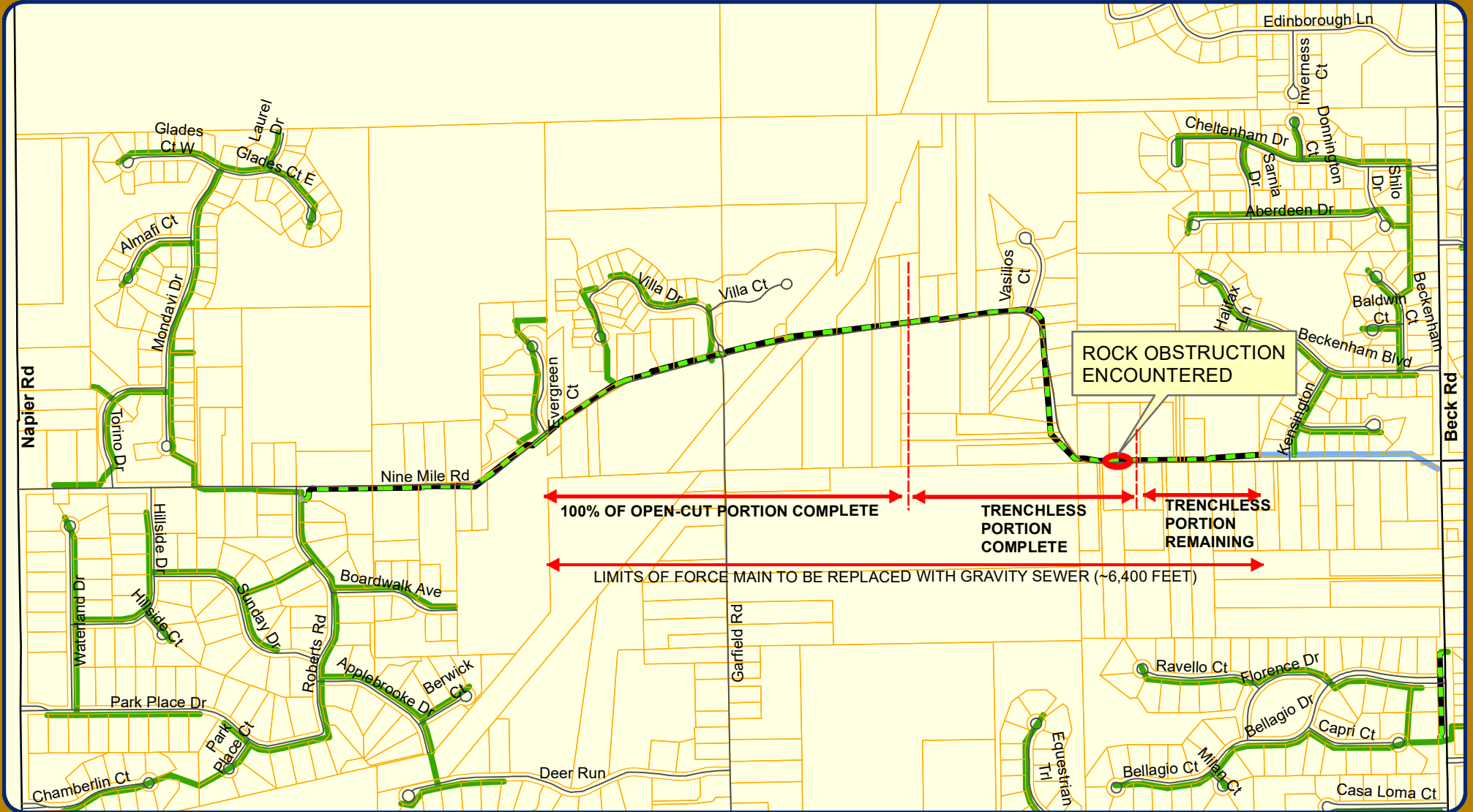
DVM submitted a final claim in the amount of \$661,393 to cover the operation and maintenance of the dewatering system through the end of 2020, which staff anticipated when the last change order was requested in November of 2020. The existing dewatering system costs \$72,963 per month, along with the ongoing \$12,250 monthly cost to divert water to Garfield Lake. An additional \$67,248 cost is associated with the sheet piles used to construct the caissons (pits) for the drilling operations.

All of the above requested items result in a total claim of \$984,280 to cover operations through March 2021. However, there is approximately \$260,000 worth of items in the original contract that are expected to be credited, reducing the current net change to the contract to \$724,280. Furthermore, there is \$183,000 of unencumbered funds for any future contract changes that arise, or if unused, will reduce the overall impact to the final project budget. Based on the current status and success managing the rock obstructions, staff expects this change order to cover the remainder of the major project expenses through to the end of construction.

This change order will be on the February 22, 2021 City Council Meeting agenda for consideration. Based on the current status and conditions, we estimate the project could be substantially complete in the next two to four months.

# NINE MILE GRAVITY SEWER PROJECT

## Location Map






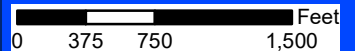
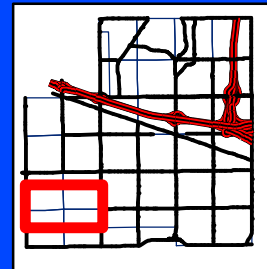
Map Author: Croy  
 Date: 2/4/2021  
 Project: Nine Mile Gravity Sewer  
 Version #: v1.0

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### City of Novi

Engineering Division  
 Department of Public Works  
 26300 Lee BeGole Drive  
 Novi, MI 48375  
[cityofnovi.org](http://cityofnovi.org)



# MEMORANDUM



**TO:** PETE AUGER, CITY MANAGER  
**FROM:** JEFFREY HERCZEG, DIRECTOR OF PUBLIC WORKS  
**SUBJECT:** NINE MILE SEWER PROJECT UPDATE  
**DATE:** NOVEMBER 12, 2020

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The Nine Mile Sanitary Sewer project involves the replacement of approximately 6,200 feet of force main sanitary sewer with gravity sewer from Evergreen Court to Kensington. The project is currently 80% complete, having completed 5,000 feet of sewer installation. The purpose of this project is to provide redundancy to the Park Place pump station, which is 1.6 miles from the closest gravity outlet (near Kensington). The project has taken considerably more effort than originally anticipated primarily due to the following construction related issues:

- Intensive dewatering that has been required to allow for safe construction.
- Diversion pumping to surrounding wetlands to address effects of dewatering.
- New pipe installation technology used to avoid open cutting and prevent tree removal.
- Gravel and rock sub grade obstructions impeding the boring process.

Staff expected this project to be complicated, as most sewer installations of this magnitude are far from routine (especially at depths to 30'). However, it became clear in late 2019 the challenges were going to result in a significant cost increase due to circumstances out of the control of the contractor. A series of update memos from January, April, and September of 2020 are included in this packet to establish a timeline and explain the challenges over the last year.

Staff, OHM, and the contractor have been working to keep the project progressing and have administered change orders for validated items (materials and labor for increased dewatering and diversion pumping). The executed change orders (listed below) have brought the project from the awarded contract amount of \$5.8M (bids ranged from \$5.8M to \$8.7M) to the current \$6.7M amount.

Change Order No.	Date Approved	Amount	Description of Change Order
1	4/15/2019	\$20.00	Balancing of Tree Clearing Items No. 7 & 8
2	7/8/2019	-\$11.32	Xypex Treatment additive and balancing of Erosion Control – Silt Fence item



3	1/10/2020	\$99,000.00	Upsize the dewatering header pipe from 12-inch to 18-inch, material only
4	2/24/2020	\$97,332.34	Additional increases for dewatering header pipe and increases for crew days on Basin "B" Improvements and CMP installation
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6	7/13/2020	\$81,712.51	Materials for larger 18" dewatering header from MH5 to MH1
7	9/14/2020	\$74,250.00	Additional effort to install piping to divert water to Garfield Lake and operate system for three months.

The progress is now again delayed by rock obstructing the pilot bore and preventing pipe installation. The contractor provided an alternative specialized boring head (Mincon rock hammer) to fracture and penetrate through the rock for an additional cost of \$250,000. The other alternative would involve excavating (open cutting) and removing the latest obstruction. Excavating to that depth is hazardous and would result in at least 40 additional tree removals and a lengthy full road closure. Therefore, staff recommends use of the rock hammer boring head, and will bring the accompanying change order forward to the City Council meeting on November 26, 2020.

The alternative boring head method will again extend the timeline for completion which now is estimated to be in spring of 2021. Furthermore, another change order will be forthcoming near the end of construction to cover the additional effort discussed herein and the ongoing contractor efforts since late 2019. In order to determine the estimated total project cost, a comprehensive submittal from the contractor will again be analyzed by staff and OHM and will likely require more detailed negotiation before finalizing. However, staff estimates the total project cost could be similar to the high bid originally submitted (~\$9M).

The long-term benefits from replacement of the force main with new gravity sewer still outweigh the additional costs, as it provides 100-year gravity sewer infrastructure with the following benefits:

- Allows for reasonable mitigation of any major failure of the Park Place pump station.
- Eliminates sanitary pump stations to support future development in the area (e.g. Terra), as pump stations present the highest risk of failure.
- Eliminates long-term pump station maintenance (significant staff time and effort, pumps and equipment replacements, utility costs).
- Eliminates need for parallel force main redundancy.
- Allows Nine Mile residents connections to the sewer without the need to maintain a private grinder pump station at their residence.
- Mitigate failing septic systems in the area.

- Allows for the protection of hundreds of trees, as well as vegetative screening for residents on Nine Mile.

Fortunately, the City of Novi has been fiscally responsible and has established a water and sewer fund that allows management of projects that experience unforeseen challenges. Staff and OHM continue to supervise the contractor's operations and claims for delays and construction challenges. Staff continues to work toward solutions to keep costs as reasonable as possible and will update City Council on the project as information becomes available.

# MEMORANDUM



**TO:** PETE AUGER, CITY MANAGER  
**FROM:** JEFFREY HERCZEG, DIRECTOR OF PUBLIC WORKS  
**SUBJECT:** GARFIELD LAKE DIVERSION PUMPING  
**DATE:** SEPTEMBER 4, 2020

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The Nine Mile Sanitary Sewer project which replaces approximately 6,200 feet of force main sanitary sewer with gravity sewer from Evergreen Court to Kensington, has taken longer than anticipated and provided several challenges. Extreme dewatering in order to construct the project has potentially caused a negative impact to the surrounding area, including the water level in Garfield Lake.

After several residents reported a receding lake level, staff investigated options to return water back into the lake and surrounding wetlands. Since the dewatering for the project was routed towards the new Terra subdivision detention basin, the simplest and most cost effective solution to get water back to Garfield Lake, was to pump from the Terra basin south down Garfield Road. In late June, a temporary 6" pipe line was installed through the ditch line with an outlet in Garfield Lake (see attached map). Staff cooperated with residents to find an appropriate route for the piping along Garfield Road and over to Garfield Lake. One of the residents installed a "gauge" on his dock that has allowed staff to closely monitor the lake levels (see below pictures).

The redirection pumping has been in operation for over two months and instantly made an impact on the water level (raised 2.5 feet). The level has been closely monitored after the initial rise and has fell around 0.5 feet. Over the past month, it has remained relatively constant (2 feet higher). According to an Ecologist on OHM Advisors staff, the lake level is approximately 1.5 feet below the "normal annual low" water level.

Staff will be bringing a change order to the September 14 City Council Meeting to cover the costs for the setup, pumps, and fuel associated with the three months of temporary diversion pumping. To date, the costs are approximately \$70K. Since the water level is fluctuating and the project still has several months of construction remaining, staff recommends continuing the diversion pumping for the duration of the project. Additional costs are ~\$13K/month and can be included in a balancing change order with other items when the project is closer to completion.

Furthermore, staff recommends leaving one or two of the dewatering shafts and the temporary pipe in place after the project is complete. This will provide a security measure to pump more into the impacted lake and surrounding wetlands if necessary.



Based on current progress, the installation of the sanitary sewer main is anticipated to be substantially complete by November. The contractor is currently constructing the deepest portion of the project. Staff is optimistic that good progress will be made over the next few months, provided no further subsurface obstructions are encountered.

### *Temporary Diversion Pumping System to Garfield Lake*



*Piping along Garfield Road*



*Piping along resident's yard*



*Water Level "gauge"*



*Pump used to direct water*

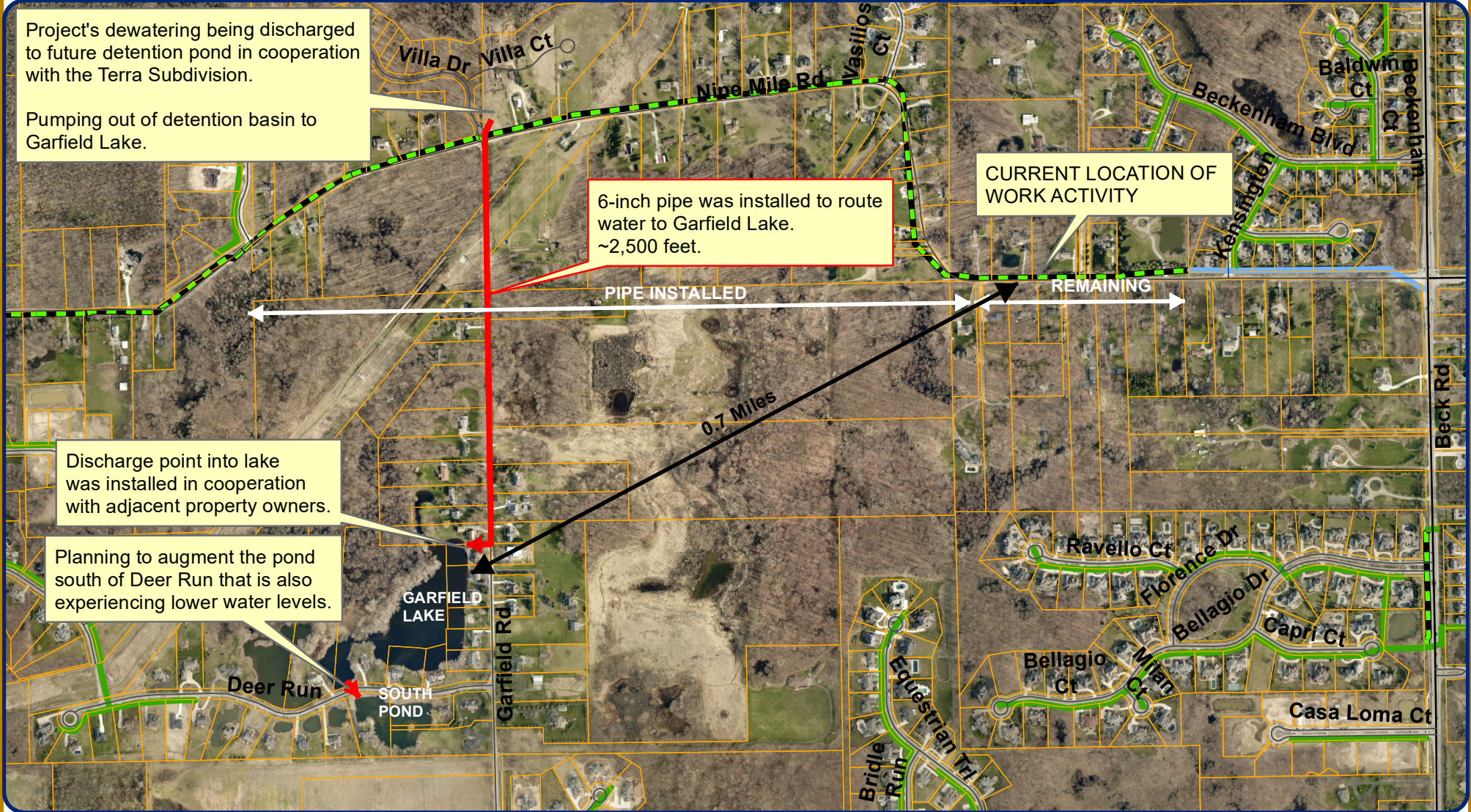


*Discharge point*



# NINE MILE GRAVITY SEWER PROJECT

## Location Map



Project's dewatering being discharged to future detention pond in cooperation with the Terra Subdivision.

Pumping out of detention basin to Garfield Lake.

6-inch pipe was installed to route water to Garfield Lake. ~2,500 feet.

CURRENT LOCATION OF WORK ACTIVITY

Discharge point into lake was installed in cooperation with adjacent property owners.




Planning to augment the pond south of Deer Run that is also experiencing lower water levels.

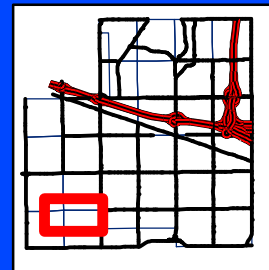
Map Author: Croy  
Date: 9/1/2020  
Project: Nine Mile Gravity Sewer  
Version #: v1.0

### MAP INTERPRETATION NOTICE

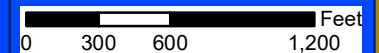
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# MEMORANDUM



**TO:** JEFFREY HERCZEG, DIRECTOR OF PUBLIC WORKS  
**FROM:** BEN CROY, CITY ENGINEER  
**SUBJECT:** NINE MILE SANITARY SEWER PROJECT UPDATE  
**DATE:** MAY 15, 2020

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The Nine Mile Sanitary Sewer project involves the replacement of approximately 6,200 feet of force main sanitary sewer with gravity sewer from Evergreen Court to Kensington. This project has required a significant amount of dewatering to facilitate construction. On May 4, 2020 staff was notified and responded to a concern about the receding water level of a pond (aka Garfield Lake) west of Garfield Road at Deer Run (see attached map). Although the cause is uncertain, there is potential this drawdown is related to the dewatering for the sewer installation. This seems unlikely given the pond is 0.6 miles away from the project activity; regardless, staff has initiated an investigation for potential solutions.

Staff has been in contact with multiple residents in the area, and continues to be available to anyone looking for additional information. Furthermore, OHM Advisors, the engineering consultant who is performing the construction engineering and inspection on the project, has started an assessment of the pond and surrounding wetlands. OHM's staff Ecologist visited the area last week to gather some initial data, and will continue a monitoring program over the next several seasons as appropriate. In addition, the geotechnical engineering consultant for this project, TEC, and the City's wetland consultant, ECT, have also been engaged to provide technical expertise.

City staff has contacted the Michigan Department of Environment, Great Lakes and Energy (EGLE), who issued the permits for the sewer installation and the associated dewatering. EGLE has indicated the City is in compliance with these permits, and they will work with staff to coordinate any potential solutions to help reverse the lowering pond elevations.

Two of the preliminary solutions being investigated are summarized below:

- **Reroute Dewatering Discharge** – It may be possible to re-rout some of the existing dewatering discharge to directly into the pond. This would involve the installation of approximately 2,200 feet of above-ground pipe to convey the water to the pond. Additional survey will be necessary before this option can be pursued further.
- **Installation of Augmentation Well** – The installation of a temporary well on nearby City property to be used to pump water to the pond may be a viable solution. The depth of the well along with the size of the pump will need to be determined before this option can be pursued further. The well would need to be deep enough to avoid exacerbating the existing issue being observed, but not is expected to be unreasonably deep.

Both of the above options would require a temporary easement from one of the residents adjacent to the pond.

A few of the residents in the area have indicated there is interest in attending an upcoming City Council meeting to express their concern. Staff has advised them how to participate in a virtual meeting should they decide to attend a meeting prior to a return to normal operations.

Below is a summary of the current status of this project (see attached map):

- **100% of the 2,850 feet of the open-cut (Traditional Trench Excavation)** – this portion of the project is complete. This is the western half of the project which is the shallower portion of the pipe installation.
- **40% of the 3,500 feet of the trenchless (Guided Pilot Tube)** - this is the deeper, eastern half of the project. This trenchless method allows for reduced impact to the road, natural features, and residential properties.

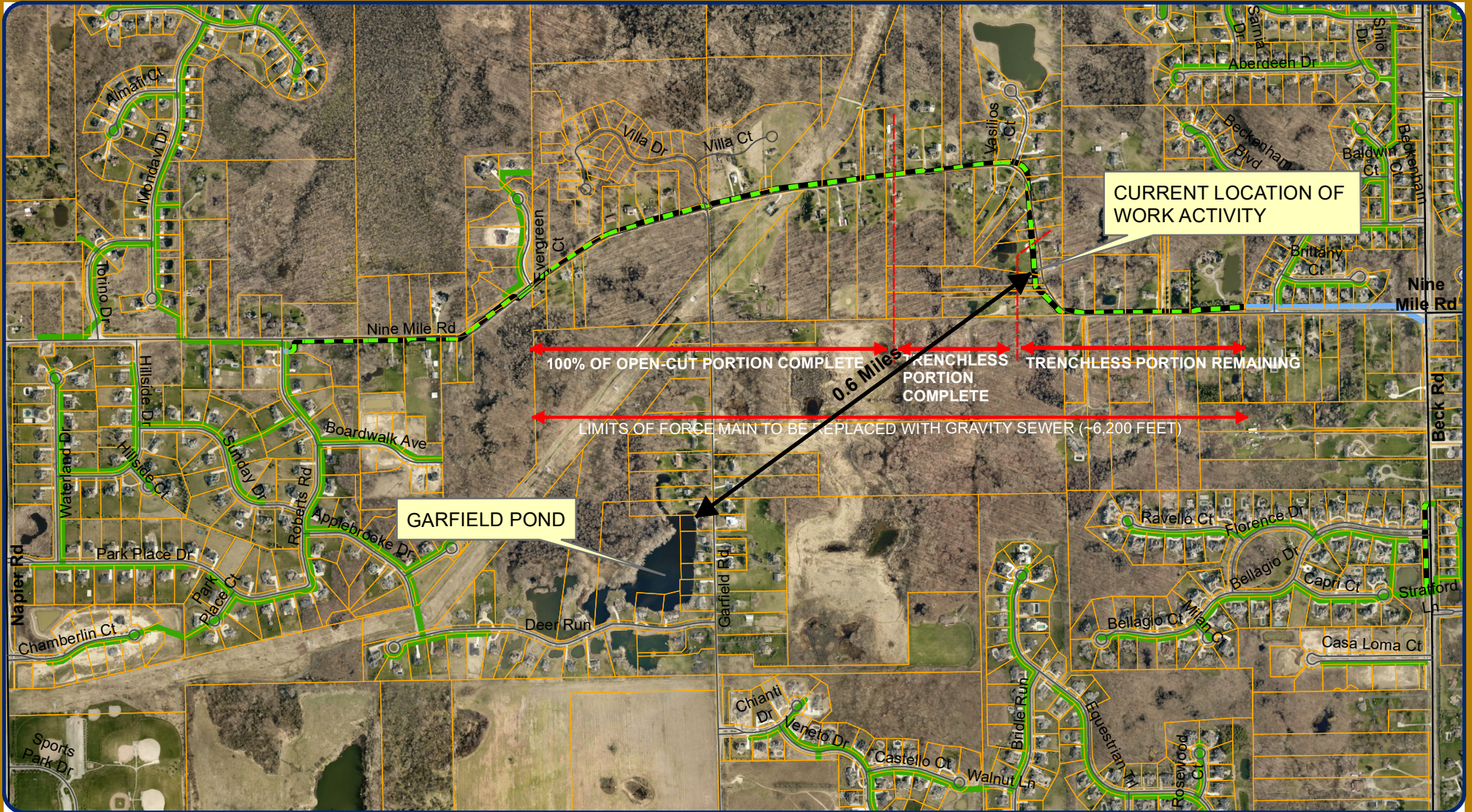
Staff is encouraged the project can proceed at a pace closer to originally anticipated moving forward. Based on the current status and conditions, we estimate the project could be substantially complete by the end of October, with final restoration in the spring 2021.

Cc: Megan Mikus, Deputy Director of Public Works  
Aaron Staup, Construction Engineering Coordinator  
Scott Roselle, Water and Sewer Manager



# NINE MILE GRAVITY SEWER PROJECT

## Location Map






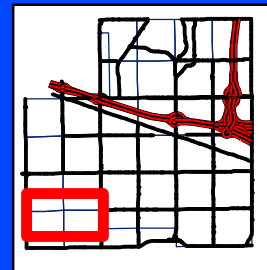
Map Author: Croy  
 Date: 5/10/2020  
 Project: Nine Mile Gravity Sewer  
 Version #: v1.0

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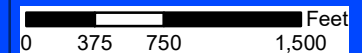
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# MEMORANDUM



**TO:** JEFF HERCZEG, DIRECTOR OF PUBLIC WORKS  
**FROM:** BEN CROY, CITY ENGINEER  
**SUBJECT:** NINE MILE SANITARY SEWER PROJECT UPDATE  
**DATE:** JANUARY 23, 2020

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The Nine Mile Sanitary Sewer project involves the replacement of approximately 6,200 feet of force main sanitary sewer with gravity sewer from Evergreen Ct. to Kensington. The purpose of this project is to provide redundancy to the Park Place pump station which is 1.6 miles from the closest gravity outlet (near Kensington Drive). A failure of the existing force main could result in loss of service to the entire area and would likely result in a major sewage spill. The construction of this project has taken longer than originally anticipated for two primary reasons – excessive dewatering required for the underground construction, and a challenging installation of one segment of the trenchless pipe installation.

Dewatering is required for any underground construction wherever groundwater is encountered. Although significant dewatering was anticipated for this project, the actual dewatering effort has proven to be significantly more than expected. The contractor, DVM, installed a relatively elaborate dewatering system and operated it during the initial stages of the project, however, they were not able to lower the groundwater elevation to the depth needed for construction. There is a prolific aquifer in this area and after modifying pumping operations, it was determined a larger capacity dewatering system would be required. The larger system has now been operational for several weeks and has effectively dewatered the construction zone allowing construction to progress.

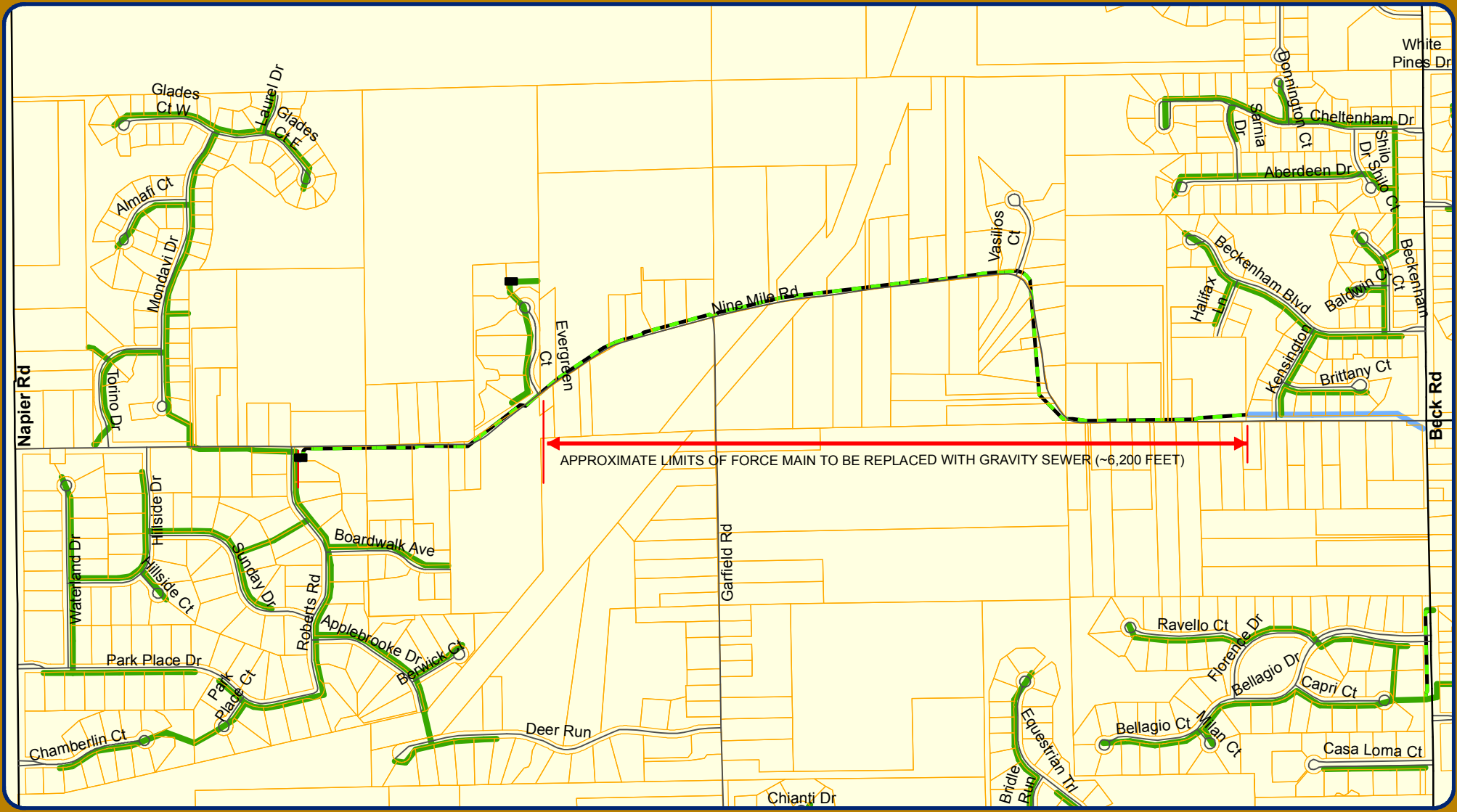
The pipe installation west of Vasilios Court has been a significant challenge. The groundwater in this area has been described as “free-flowing water” which introduced some unforeseen challenges. These groundwater conditions, coupled with the intense dewatering efforts, compromised the structural stability of the soil in this area. Therefore, an unplanned area had to be excavated to correct the problems encountered. This work has been particularly difficult due to the unusually narrow road, and the existence of a 47-inch Oak tree directly adjacent to the excavation which requires extra care and protection.

Given the construction modifications and current progress, staff is encouraged the project can now proceed at a pace closer to originally anticipated. In the coming weeks, the project timeline will be updated and a technical memo will be issued on the project modifications by the engineering consultant OHM Advisors who is performing the construction engineering and inspection on the project.

Cc: Megan Mikus, Deputy Director of Public Works  
Aaron Staup, Construction Engineering Coordinator  
Scott Roselle, Water and Sewer Manager

# NINE MILE GRAVITY SEWER PROJECT

## Location Map






APPROXIMATE LIMITS OF FORCE MAIN TO BE REPLACED WITH GRAVITY SEWER (~6,200 FEET)

Map Author: Croy  
 Date: 4/28/17  
 Project: Nine Mile Gravity Sewer  
 Version #: v1.0

**MAP INTERPRETATION NOTICE**

Map information depicted is not intended to replace or substitute for any official or primary source. This map was intended to meet National Map Accuracy Standards and use the most recent, accurate sources available to the people of the City of Novi. Boundary measurements and area calculations are approximate and should not be construed as survey measurements performed by a licensed Michigan Surveyor as defined in Michigan Public Act 132 of 1970 as amended. Please contact the City GIS Manager to confirm source and accuracy information related to this map.

### Map Legend

-  6" Sanitary Force Main
-  8" Gravity Sanitary Sewer
-  12" Gravity Sanitary Sewer



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