



FINAL DRAFT
14 Mile Road Transmission Main Loop
Drinking Water Revolving Fund (DWRF)
Project Plan
March 2019

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List of Abbreviations

AACE	Association for the Advancement of Cost Engineering	NPDES	National Pollutant Discharge Elimination System
ADM	Adams Pump Station	NPV	Net Present Value
AMP	Asset Management Plan	NREPA	Natural Resources and Environmental Protection Act
AWWA	American Water Works Association	NRHP	National Register of Historic Places
BC	Brown and Caldwell	NWB	Newburgh Pump Station
CIP	Capital Improvement Program	NWI	National Wetlands Inventory
CMAR	Construction Manager at Risk	O&M	Operation and Maintenance
CMMS	Computerized Maintenance Management System	OME	Ontario Ministry for the Environment
Co.	County	OSAC	Ontario Spills Action Centre
CWMP	Comprehensive Water Master Plan	PDB	Progressive Design-Build
DR	Drive	POR	Preferred Operating Range
DWRF	Drinking Water Revolving Fund	PSI	Pounds per Square Inch
DWSD	Detroit Water and Sewage Department	RD	Road
ESA	Endangered Species Act	R&R	Replacement and Repair
FPDB	Fixed-Price Design-Build	RFP	Request for Proposal
FRK	Franklin Pump Station	SSO	Sanitary Sewer Overflow
FSP	Financial Sustainability Plan	SEMCOG	Southeast Michigan Council of Governments
GLWA	Great Lakes Water Authority	SESC	Soil Erosion and Sedimentation
GPM	Gallons per Minute	SHPO	State Historic Preservation Officer
HAG	Haggerty Pump Station	THPO	Tribal Historic Preservation Office
HP	Horsepower	TM	Transmission Main
HUD	United States Department of Housing and Urban Development	Twp	Township
IPaC	Information for Planning and Consultation	US	United States
LWCF	Land & Water Conservation Fund	USACE	United States Army Corps of Engineers
M	Million	USEPA	United States Environmental Protection Agency
MDEQ	Michigan Department of Environmental Quality	USFWS	United States Fish and Wildlife Service
MDNRE	Michigan Department of Natural Resources and Environment	USGS	United States Geological Survey
MG	Million Gallons	VFD	Variable Frequency Drive
MGD	Million Gallons per Day	WAM	Work and Asset Management
MI	Michigan	WRRDA	Water Resources Reform and Development Act
MNFI	Michigan Natural Features Inventory	WSE	Water Surface Elevation
MPHI	Michigan Public Health Institute	WWP	Water Works Park

Section 1

Project Definition and Overview

1.1 Introduction and Purpose

This document has been prepared in accordance with the planning guidelines adopted by the Michigan Department of Environmental Quality (MDEQ) for the Drinking Water Revolving Fund (DWRf) low interest loan program. It is the intent of the Great Lakes Water Authority (GLWA) to seek low interest loan assistance under the DWRf program for the recommended work. The purpose of this document is to present the Project Plan and meet the project planning requirements of the MDEQ. The MDEQ stipulates a planning period of 20 years. This report is based on the period from 2019 through 2039. The Project Plan also serves as the basis for public review and comment on the proposed work in accordance with the public participation requirements of the DWRf program.

1.2 The Project

GLWA retained Brown and Caldwell (BC) to complete a DWRf Project Plan for the engineering, design, and construction of a new transmission main connecting the 14 Mile RD Transmission Main and the 8 Mile RD Transmission Main (TM). This project is referred to as the 14 Mile Transmission Main (TM) Loop project.

Currently, the 14 Mile TM supplies water to the communities of Novi, Farmington Hills, West Bloomfield, Commerce, Walled Lake, and Wixom. The 14 Mile TM originates near the Franklin Pump Station (FRK), which supplies the pressure and flow. The TM traverses west along 14 Mile RD to the Haggerty Pump Station (HAG) then continues west to its end west of Walled Lake. See Figure 1.1. The 14 Mile TM was constructed of PCCP which has been compromised by corrosion and faulty construction materials and is subject to catastrophic failure. The pipeline experienced such a failure in October 2017. Currently, the 14 Mile TM is not part of a looped system and when it experiences an outage the communities west of Franklin PS cannot be supplied adequate supplies of water.

The 8 Mile TM lies within 8 Mile RD and flows from east to west. The Newburgh Pump Station (NWB) is an in-line booster pump station that boosts the pressure so water can be delivered to the western portions of 8 Mile TM. This transmission main is also constructed of compromised PCCP and is vulnerable to damage from pressure surges.

The proposed 14 Mile Road Transmission Main Loop Project consists of construction of two new transmission mains. The new transmission mains are the Haggerty/Halsted TM and the 14 Mile Reinforcement TM. The Haggerty/Halsted TM would interconnect 8 Mile TM and 14 Mile TM to increase the reliability in the western portion of the distribution system. The new Haggerty Halsted TM would be able to deliver flow from the 8 Mile TM to the suction side of Haggerty PS (HAG) which will boost the pressure and deliver flow to all reaches of the 14 Mile TM. The Haggerty/Halsted TM will also be able to deliver flow from the suction side of HAG to 8 Mile TM. This interconnection will allow flow to 8 Mile TM in the event of an outage on 8 Mile TM.

The 14 Mile Reinforcement TM will start near M-5 and reconnect to the existing 14 Mile TM at Novi RD. This 14 Mile Reinforcement TM will ensure that all the critical service connections west of HAG will be able to keep all the critical service connections on 14 Mile RD operational.

By creating a loop, customers along the 14 Mile TM and 8 Mile TM will benefit from increased redundancy and resiliency in the water system.

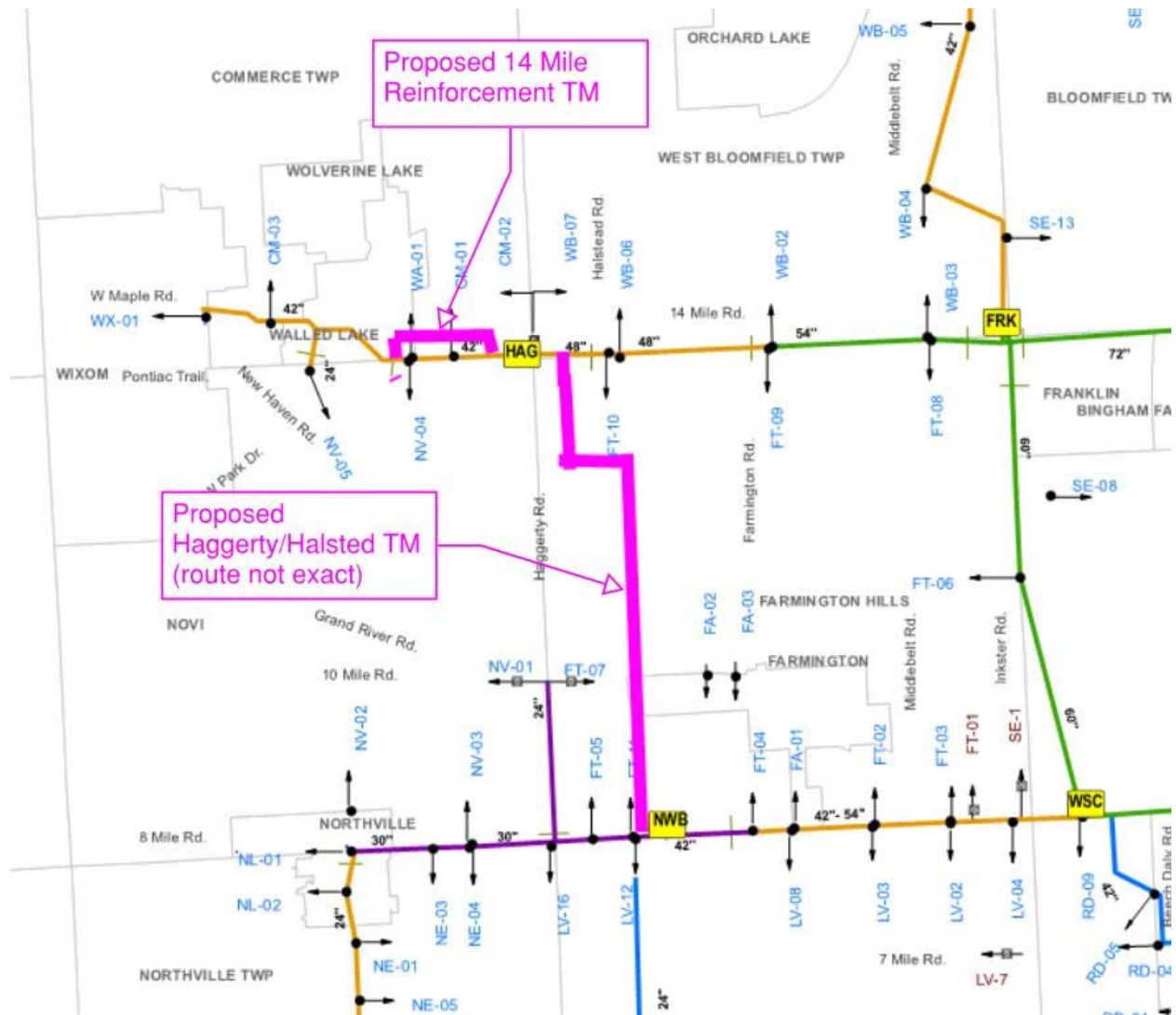


Figure 1.1: GLWA System Map showing Haggerty/Halsted TM and 14 Mile Reinforcement TM

1.3 Schedule

Design of the 14 Mile TM Reinforcement will begin in March 2019. Design of the Halsted/Haggerty TM will commence with a route study and then preliminary design will begin in September of this year.

The project will be broken into two construction packages. Construction Package 1 (CP1) is the 14 Mile Reinforcement TM. Construction Package 2 (CP2) is the Haggerty/Halsted TM. CP1 is scheduled to go out for bidding in January 2020 and enter the construction phase in June 2020. CP2 will bid in January 2021 and enter construction in June 2021. CP1 will be completed by July 2022 and the 14 Mile TM will be online. CP2 will be completed in 2023. See Table 1.1 and Figure 1.2.

Table 1.1 Implementation Schedule		
Project Activity	Estimated Project Milestone (Contract #1)	Estimated Project Milestone (Contract #2)
Post Draft DWRF Project Plan and Public Hearing Notice (Start of 30-Notice Period)	March 22, 2019	
Public Hearing (32 days after Public Hearing Notice)	April 24, 2019	
Submit Project Plan to MDEQ	May 1, 2019	
Complete Route Analysis and Preliminary Design	July 2019	February 2021
Procure Construction Contract	January 2020	January 2021
Start of Construction	July 2020	July 2021
Complete Construction	July 2021	December 2023

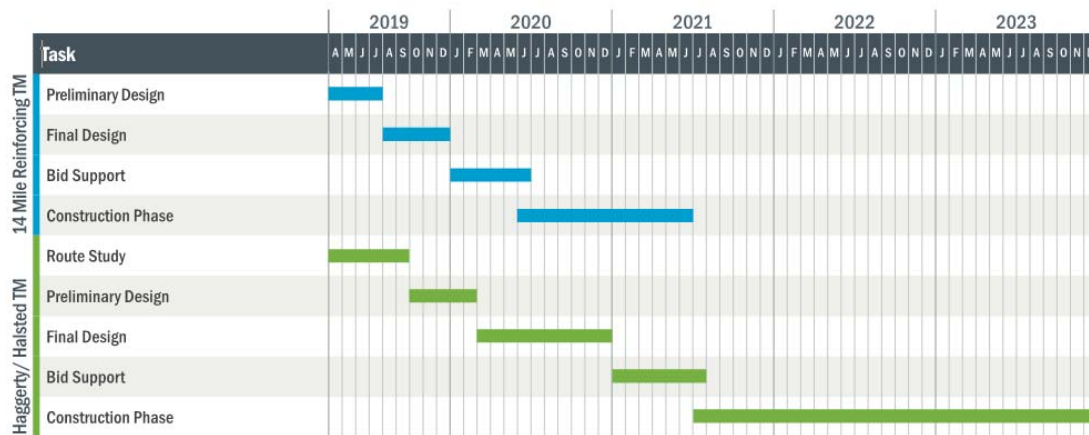


Figure 1.2 Schedule of Haggerty/Halsted TM and 14 Mile Reinforcement TM

1.4 Estimated Costs

The estimated cost for the proposed 14 Mile Loop Project consists of construction costs, plus costs to cover engineering (design and construction) and GLWA project related administrative tasks. The estimated cost is based on the cost estimate as prepared by GLWA Engineers and the consultants that developed the concept. The estimated total costs are summarized in Table 1.2. Section 6.2 includes a more detailed cost breakdown. It is the intent of GLWA to seek low interest loan assistance under the DWRF program to fund as much of the project as possible.

Table 1.2 Estimated Cost of Selected Alternative	
Item	Estimated Cost
Estimated Construction Cost	46,740,000
Engineering Design Consultant Costs	7,000,000
GLWA Engineering and Administrative Costs	700,000
Total	54,440,000

* Current Project Estimate based on GLWA CIP No. 122013

Section 2

Study Area and Project Zone

2.1 Location

This project will provide service to the following communities: Novi, Farmington Hills, West Bloomfield Township, Commerce Township, Walled Lake, Wixom, Livonia, and Northville. These communities are part of the northwestern suburbs of Metropolitan Detroit. Figure 2.1 shows the study area of the 14 Mile Loop Project.

These communities are on the western edge of GLWA's service area. GLWA services this area by utilizing the Franklin Pump Station (FRK) and Haggerty Pump station (HAG) to provide flow and head to the 14 Mile RD TM and the West Service Center and Newburgh Pump Station to provide flow and pressure to the 8 Mile RD TM.

The existing 14 Mile RD TM runs along 14 Mile Road from Inkster Road to west of Walled Lake. It provides service to West Bloomfield Township, Farmington Hills, Farmington, Commerce Township, Walled Lake, and Novi. It provides service to Novi, Farmington Hills, West Bloomfield Township, Commerce Township, Walled Lake, and Wixom.

The 8 Mile RD TM runs along 8 Mile RD and services Novi, Farmington Hills, Livonia and Northville.

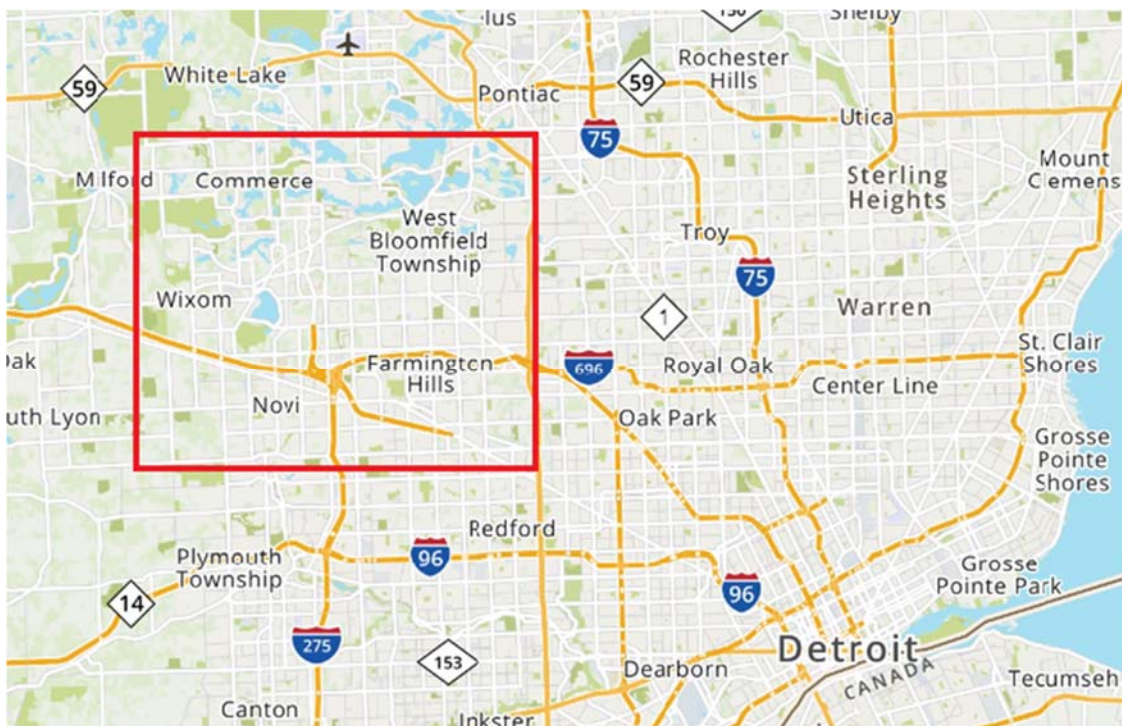


Figure 2.1: 14 Mile Loop Project Area

2.2 Population Data

Current and projected future populations for the project area to the year 2040 are presented below in Table 2.1. The population data is based upon Southeast Michigan Council of Governments (SEMCOG) database. The projections reflect anticipated overall growth of 4.12% for the affected area. Only a portion of some of these communities is in the project area so the total population exceeds the actual service area population.

Table 2.1 Population Projections for Study Area 2020-2040

Community/Year	2020	2025	2030	2035	2040	Change 2020-2040	% Change
Commerce	39548	40555	40690	41157	41869	2321	5.87
Farmington Hills	80442	81290	82283	83452	84448	4006	4.98
Livonia	92342	91997	92415	92923	93665	1323	1.43
Northville	5765	5798	5888	6005	6113	348	6304
Novi	63966	64801	65638	66609	67061	3095	4.84
Walled Lake	7429	7467	7443	7493	7648	219	2.95
West Bloomfield	66660	65992	66953	68631	69763	3103	4.65
Wixom	16101	16609	16783	17032	17021	920	5.71
Overall	372253	374509	378093	383302	387588	15335	4.12

<https://semcog.org/Community-Profiles>

2.3 Water Demand

In accordance with the Michigan Safe Drinking Water Act, Type 1 water systems are required to have firm supply capacity sufficient to meet the maximum day demand. This project provides redundancy and resiliency so that GLWA's system will be able to meet these needs under normal and emergency conditions. The project will be sized to provide projected future demands and emergency flows if 14 Mile Road TM or 8 Mile TM are not in service.

A hydraulic analysis will be performed in the design phase of this project to determine the size of the pipelines so that the pipelines can meet existing and future water demands and emergency flow conditions. The analysis will also review the impacted pump stations and recommend modifications, so they will be able to meet future/emergency flows.

In addition, these pipelines will be sized to meet the following demands:

- Water Consumption by domestic, industrial, commercial and institutional users follows diurnal and annual patterns.
- Fire flow requirements for wholesale customers are accounted for in the volumes and pressures provided in their service contracts.
- Non-revenue water includes unmetered public use, water loss through leaks and water main breaks, and metering and accounting losses.

Table 2.2 shows the current and future water demands of the community.

Table 2.2 Projected Water Demands for 2015-2035				
Water Demand	2015 Demand (MGD)		2035 Demand (MGD)	
	Average Day	Maximum Day	Average Day	Maximum Day
Commerce	2.27	6.00	3.56	9.38
Farmington Hills	9.29	22.56	9.82	23.86
Livonia	12.40	29.66	12.36	29.56
Northville	0.69	1.49	0.69	1.47
Novi	6.72	15.28	7.28	16.56
Walled Lake	0.72	1.38	0.74	1.42
West Bloomfield	6.18	15.08	6.50	15.86
Wixom	1.74	4.52	1.89	4.90

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Section 3

Existing Facilities

The northwestern edge of GLWA's transmission system is composed of Franklin PS and Haggerty PS which provide pressure and flow for the 14 Mile Road Transmission Main and the West Service Center PS and Newburgh PS which provide pressure and flow for the 8 Mile TM.

GLWA's transmission system and the service area of the project is shown in Figure 3.1. The main elements of the transmission system in the service area are: Franklin PS (FRK), Haggerty PS (HAG), 14 Mile Road Transmission Main, West Service Center (WSC), Newburgh PS (NWB), and 8 Mile Road Transmission Main. See figure 3.2 for a blowup of the transmission mains serving the project area.

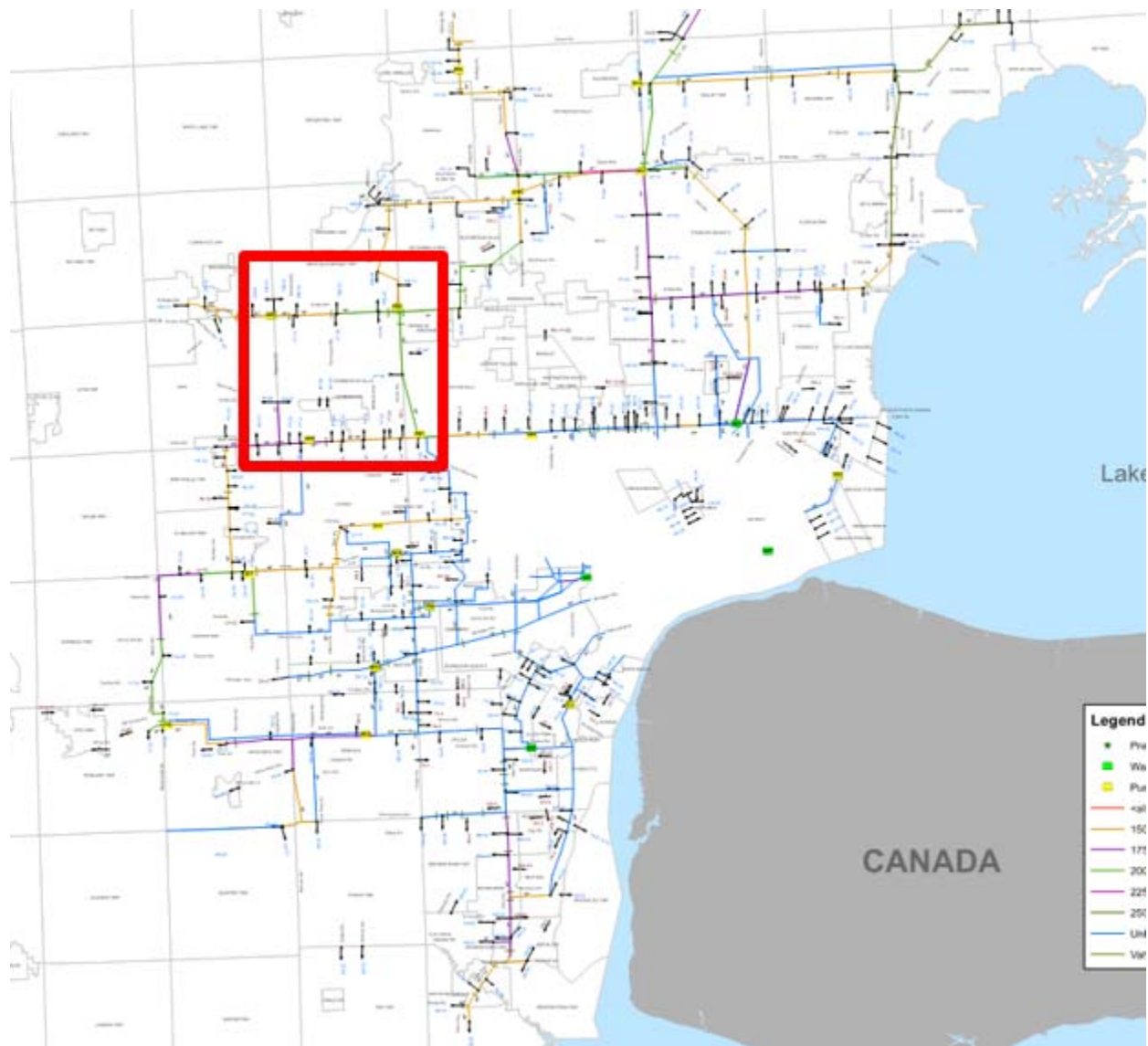


Figure 3.1 - GLWA Transmission System Map

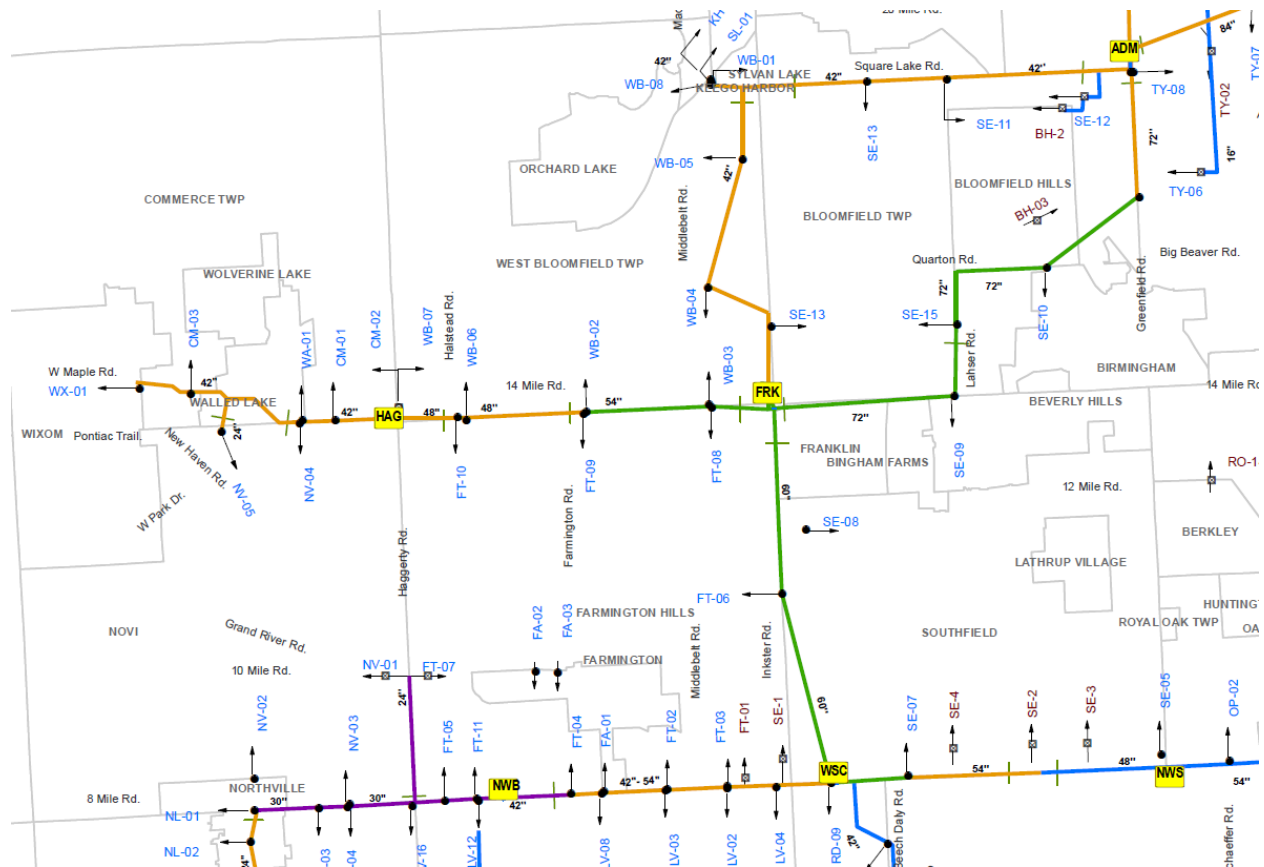


Figure 3.2 – Project Specific GLWA Transmission Facilities

Franklin PS

FRK serves the southwest portion of the Lake Huron service area and receives water from a combination of the WSC high-pressure system and North Service Center Pump Station (NSC) through a 60-inch-diameter main flowing northward on Inkster RD Incoming flow can be stored in the reservoir (with subsequent pumping from the reservoir pumps to the PS discharge header) or pumped directly from the suction header to the FRK system:

- West to the Haggerty RD Pump Station (HAG)
- North to the Adams RD Pump Station (ADM)

The direction of the flows leaving FRK depends on the demands at the Wholesale automated meter reading (WAMR) locations and the amount of pumping occurring at FRK and ADM.

Haggerty PS

HAG is located at the intersection of 14 Mile RD and Haggerty RD It consists of a pump building and a 10-million-gallon-above-ground reservoir. HAG is designed to operate on an as-needed basis and to be bypassed when service demands are low. During high periods of demand, HAG acts as a booster station to increase the pressure and flow going west. HAG has the pumping capacity to provide an emergency supply of water of up to 28 MGD in the event of a water main break between HAG and FRK.

14 Mile RD Transmission Main

The 14 Mile RD TM originates near the Franklin Pump Station (FRK), which supplies the pressure and flow. The 14 Mile RD TM traverses west along 14 Mile RD to the Haggerty Pump Station (HAG) then continues west to its end west of Walled Lake. The 14 Mile RD TM supplies water to the communities of Novi, Farmington Hills, West Bloomfield, Commerce, Walled Lake, and Wixom.

The 14 Mile TM was constructed of prestressed concrete cylinder pipe (PCCP). The pipeline recently experienced a catastrophic failure in October 2017. The failed pipe section was evaluated and the PCCP was found to be compromised by corrosion. The compromised pipe section was built using high strength wire which become brittle and is subject to failure due to transient pressures. Since all of the pipe was constructed of this high strength wire, it is believed the entire pipeline is vulnerable to failure due to transient pressure events.

In the existing system configuration, the 14 Mile Road TM is fed solely by FRK making the communities it services vulnerable to outages when the pipe is out of service due to maintenance or pipeline failure. Since the service area has only one pipeline it is vulnerable to loss of service if the pipeline has a failure, needs to be shut down or if the FRK or HAG pump stations are not operational for any reason.

West Service Center

The West Service Center Pump Station (WSC) receives water from the Springwells WTP high-pressure system through a 60-inch-diameter main flowing westward on 8 Mile RD Incoming flow can be stored in the reservoirs or pumped through the main pump house to:

- The Franklin Pump Station (FRK) system
- To the Newburgh PS and Farmington PS systems.

Newburgh PS

The Newburgh Pump Station (NWB) receives water from the West Service Center PS (WSC) through a 42-inch-diameter main flowing westward on 8 Mile RD Incoming flow is pumped directly from the suction header to the NWB system which provides flow to:

- West to WAMRs
- West to YPS

8 Mile Transmission Main

On the south end of the project boundary is the Newburgh Pump Station (NWB), located at the intersection of 8 Mile Road and Halsted Road. Its purpose is to boost the pressure and flow of water in order to serve the western portions of the 8 Mile Road TM. The 8 Mile Road TM, like the 14 Mile Road TM, is made of PCCP and is vulnerable to damage from pressure surges.

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Section 4

Project Need

Currently, the 14 Mile RD TM is the only source of water to 150,000 users in Commerce Township, Walled Lake, West Bloomfield Township and Novi. A break or lengthy repair on the transmission main west of FRK would leave 150,000 users without an adequate supply of potable water.

In October 2017, there was a catastrophic break in the existing TM along 14 Mile RD that affected 14 local suburban communities. Three of those communities (Commerce, Walled Lake, and Novi) were left with inadequate water pressure and volume. This emergency situation demonstrated the vulnerability associated with the 14 Mile RD TM and its lack of redundancy.



Figure 4.1 – Aftermath of the 2017 14 Mile TM pipeline failure

The water main break and evaluation of its causes showed that the PCCP pipe used to construct the 14 Mile RD Transmission Main has a systemic problem. GLWA is currently conducting inspection of this transmission main and it is likely that the TM will need to be taken out of service for extended periods to perform the necessary repairs.

In 2017, GLWA analyzed the 14 Mile Transmission System by using an updated hydraulic model of the local community's distribution systems. In this analysis, these local systems were used to distribute water to the impacted portions along 14 Mile Transmission Main, west of FRK. The model evaluated the scenario in which all of the local agencies opened their emergency connections to supply water to customers along 14 Mile RD. The conclusion was that the system was unable to meet the MDEQ supply and pressure requirements. Figure 4.2 shows the results of the analysis.

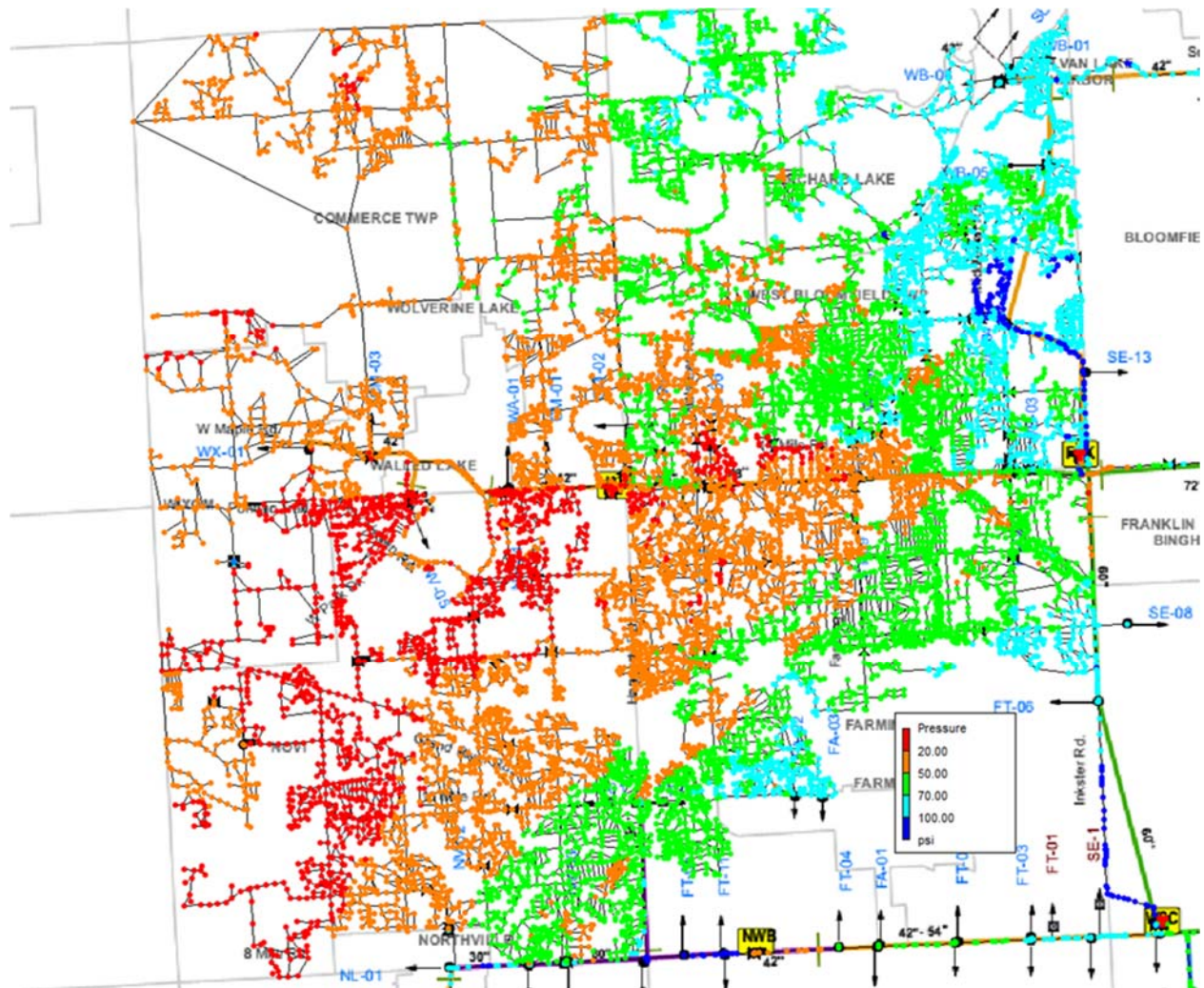


Figure 4.2 – GLWA's 2017 Hydraulic Analysis shows how water pressure in the study area is affected when the 14 Mile TM is out of service

This 14 Mile Road Transmission Main Loop project completes a transmission main loop and provides adequate capacity and pressure in the event that either the 14 Mile RD or 8 Mile RD TMs are out of service. The existing 14 Mile RD TM will likely undergo repairs in the near future. This project will allow those repairs to be made without causing any water outages for customers in the study area. This project will dramatically improve reliability for tens of thousands of GLWA customers well beyond 2035.

Section 5

Alternatives Analysis

In May 2017, GLWA produced an evaluation of 14 Mile Transmission Main redundancy alternatives. The evaluation detailed four possible ways to provide redundant water service to the communities west of Haggerty RD. Three of the four alternatives would create a transmission main loop. The evaluation considered cost, ability to meet emergency demand, operation and maintenance needs, leveraging use of existing facilities, additional improvements that would be necessary. Alternative 3 was determined to be the best alternative.

5.1 Alternative 1: Beck RD Loop

The first alternative was the construction of 12.3-mile-long, 54-inch pipeline that starts at the NWB and goes west along 8 Mile Road and then goes north along Beck Road until it connects to the 14 Mile RD Transmission Main on West Maple Road. This option creates a loop and avoids the cluster of highways and busy intersections present near Haggerty Road and Halsted Road. The estimated total cost for this option is \$145 million. This option will not be pursued primarily because GLWA and consulting engineers believe Alternative 3 is less expensive and feasible despite road congestion during construction.

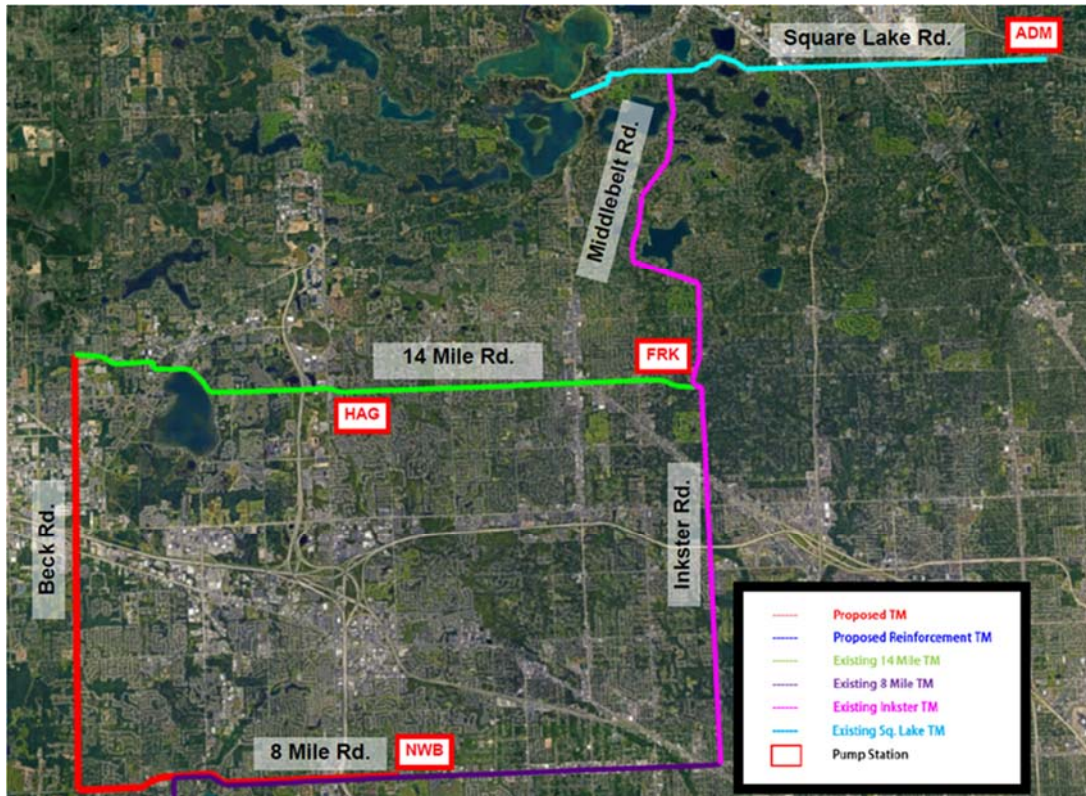


Figure 5.1 Alternative 1: 8 Mile RD TM to 14 Mile RD TM Loop

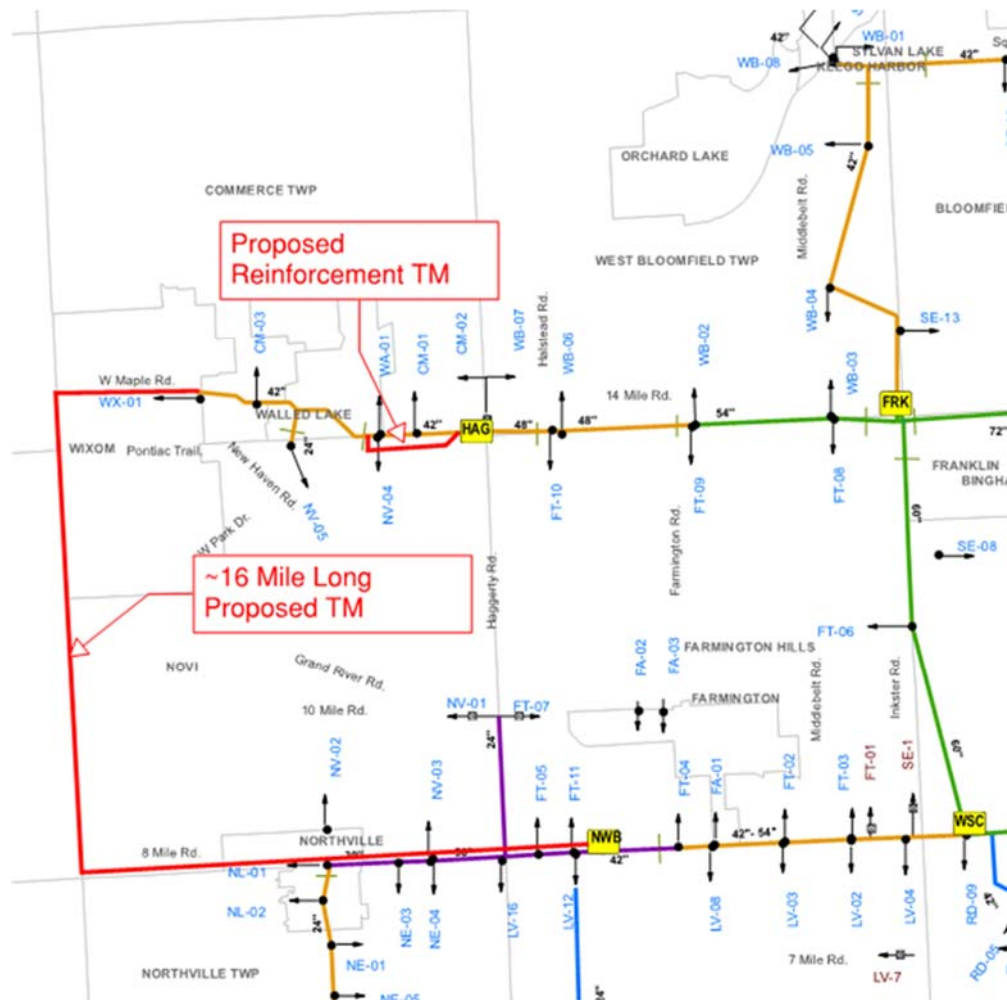


Figure 5.2 Alternative 1: Transmission Map showing 14 Mile RD TM to 14 Mile RD TM Loop

5.2 Alternative 2: 14 Mile RD Parallel Main

The second alternative was the construction of a parallel to the 14 Mile Road TM that extends from the FRK to the meters WA-01 and NV-04, west of the HAG. The estimated total cost for this option is \$47.2 million, the lowest cost option of the four options considered. However, this option does not create a loop in the transmission system making it vulnerable to a single point of failure. If FRK was to be out of service, this alternative would leave the communities west of FRK with inadequate supplies of water and pressure. This option was not selected because the single point of failure and lack of redundancy outweighs the benefit of the lower cost of this option.



Figure 5.3 Alternative 2: 14 Mile RD TM Parallel

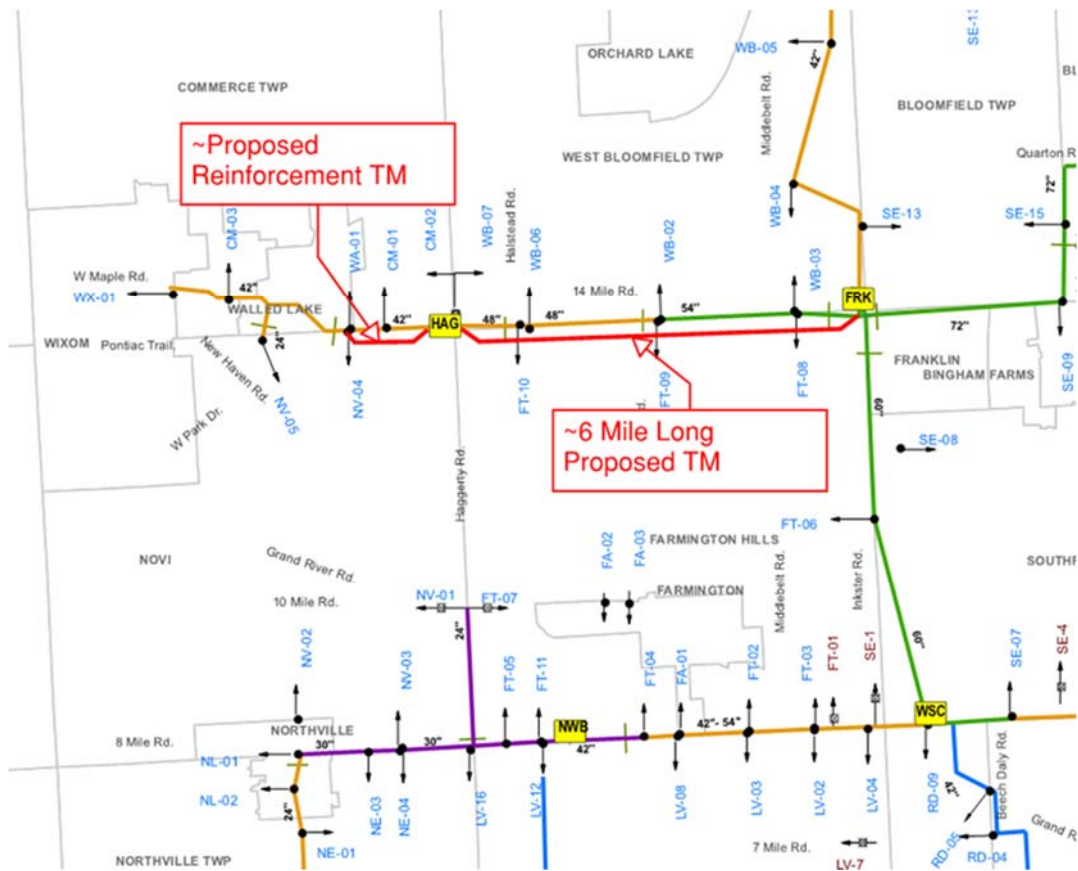


Figure 5.4 Alternative 2: GLWA Transmission Map 14 Mile RD Parallel Main

5.3 Alternative 3: Haggerty Loop

The third alternative interconnects the 14 Mile Road TM with the 8 Mile Road TM. In addition, the 14 Mile Road TM west of HAG will also be paralleled to Novi RD. The route for the north/south transmission main is still being evaluated. One potential route is shown below in Figure 5.5 by the red line.

This is the alternative that GLWA favors for its cost effectiveness, constructability, and the resiliency that it brings to the system. This option provides redundancy for both the 14 Mile Road TM and the 8 Mile Road TM. This option has an estimated total cost of \$54.4 million, slightly more than Alternative 2 but much less than Alternatives 2 and 4. This option would be able to supply the required pressure/flows under all conditions including emergency conditions.



Figure 5.5 Alternative 3: Haggerty Loop TM

Figure 5.7 was taken from GLWA's 2017 hydraulic analysis of the study area. The simulation was run as if there were a break in the existing 14 Mile Transmission and the Haggerty Loop was functional. The result shows that very few areas would receive water service at less than 50 PSI of water pressure. Most areas will receive above 70 PSI, which is above adequate quality of service.

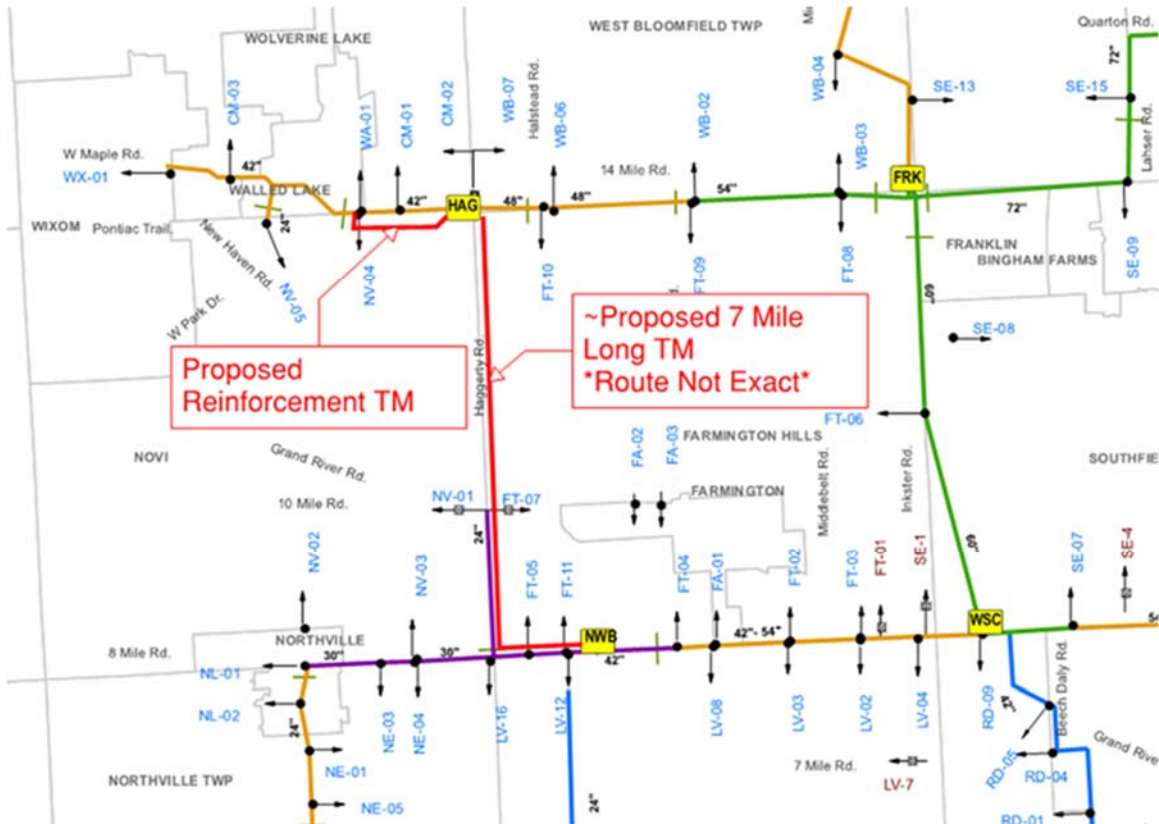


Figure 5.6 Alternative 3: GLWA Transmission Map Haggerty Loop

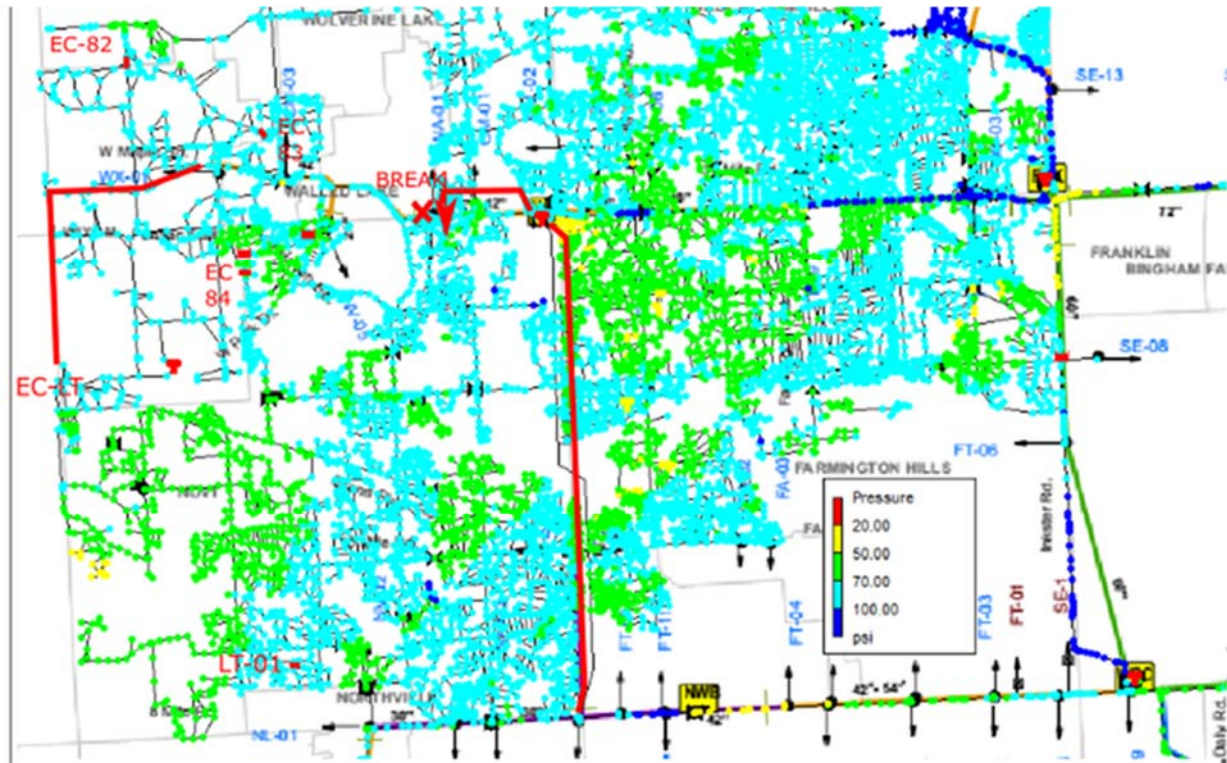


Figure 5.7 Expected pressures during a 14 Mile TM break with the Haggerty Loop option in place.

5.4 Alternative 4: Adams Branch Loop

The fourth alternative proposal was the construction of roughly 11 miles of new 48” diameter pipeline starting at the meter on West Maple Road (WX-01) and running north into Commerce Township, then east until connecting to a meter in Keego Harbor. This pipeline would exceed pressure/flow requirements for emergency conditions west of Haggerty Road. The strategically placed connection in Keego Harbor would allow the pipeline to be fed by either the FRK or the Adams Pumping Station (ADM). This alternative would include a reinforcement TM on 14 Mile RD. The estimated total cost of \$121.5 million is considerably more expensive than Alternative 3. Although this option does create a looped and resilient service, the cost and length of pipeline for this option is double the cost of Alternative 3. This alternative was not selected due to its cost relative to Alternative 3.

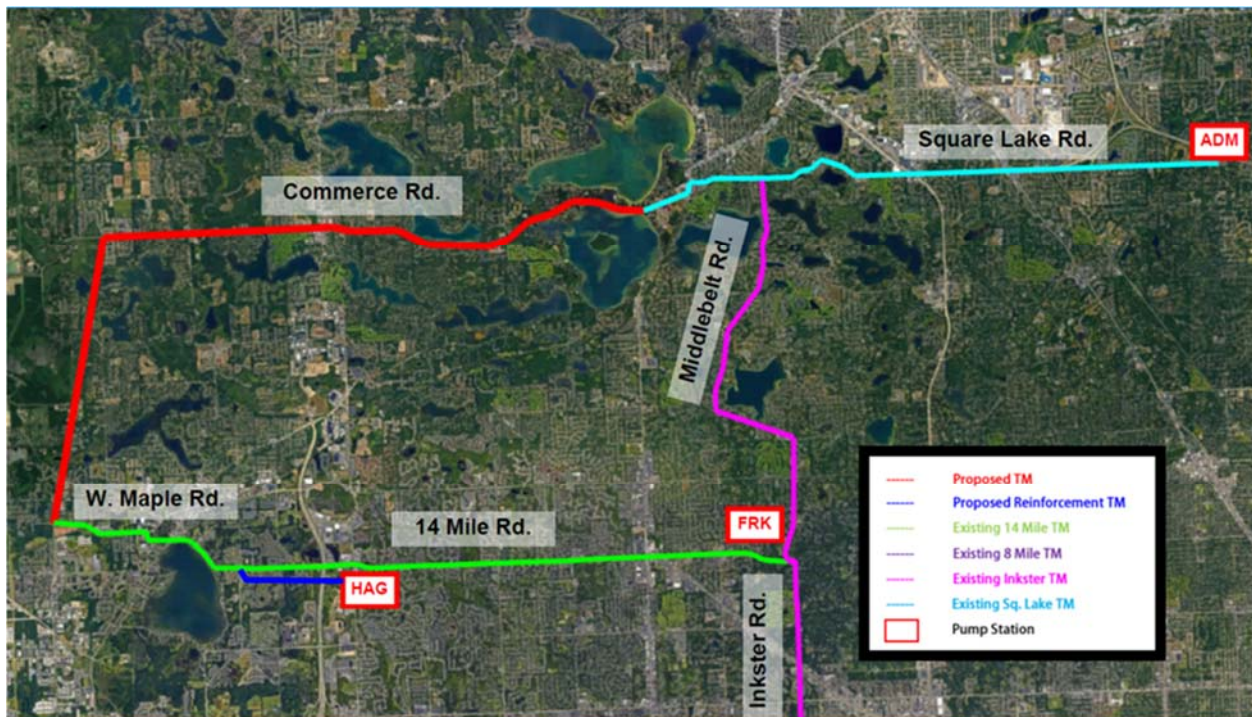


Figure 5.8 Alternative 4: Adams Branch Loop

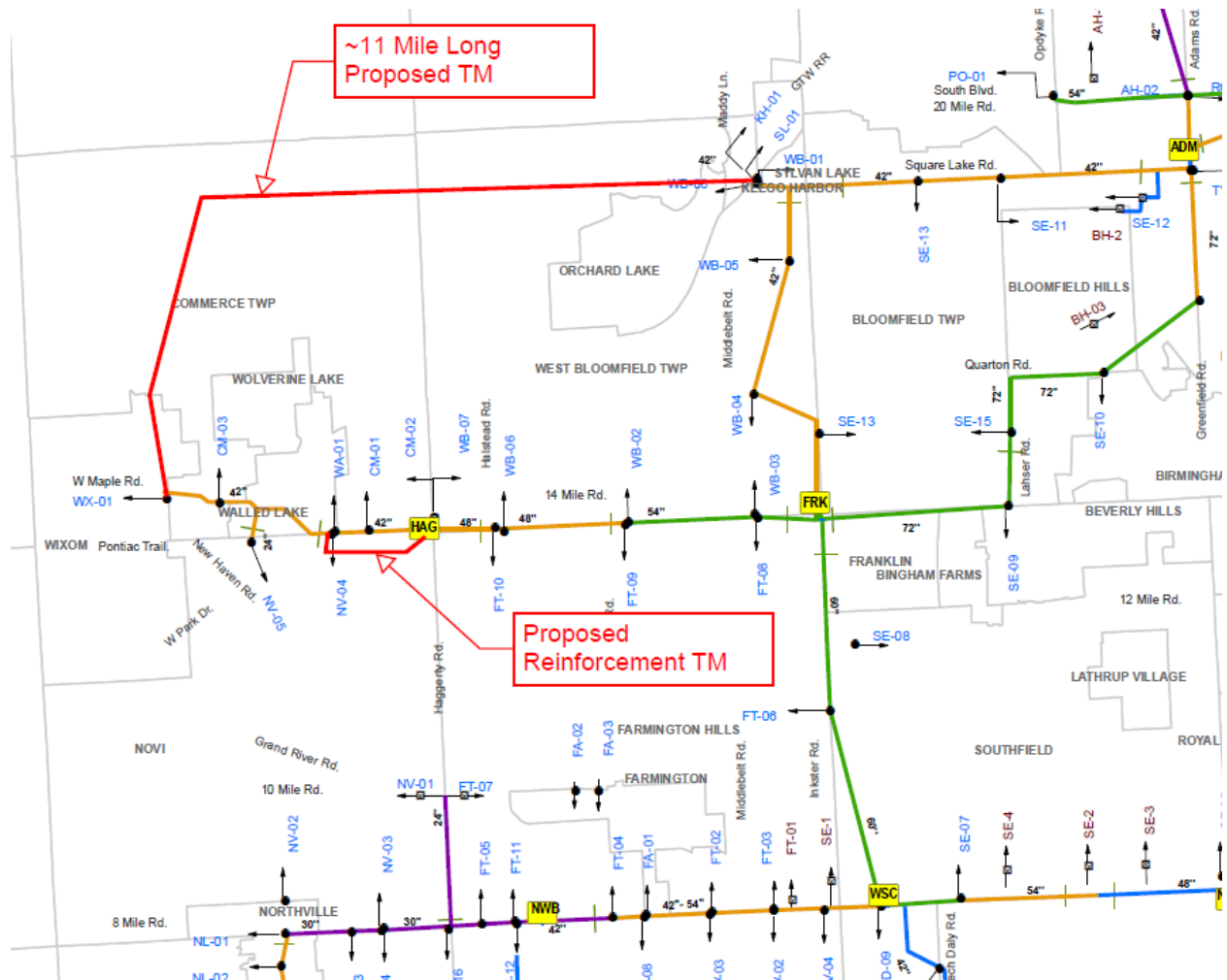


Figure 5.9 Alternative 4: GLWA Transmission Map Adams Branch Loop

Section 6

Proposed Project

6.1 Selected Alternative

GLWA is proceeding with Alternative 3: the Haggerty Loop Alternative. This alternative was selected because it is the most cost-effective project that provides the required system redundancy and resilience that the current system lacks. See Table 6.1 for comparison of the cost and redundancy between the various options.

Alternative 3 consists of two pipelines. The first pipeline will interconnect the 14 Mile RD TM with the 8 Mile RD TM. This interconnection will provide redundancy for both the 14 Mile RD TM and the 8 Mile RD TM. This pipeline will be approximately six miles long and will be approximately 48 inches in diameter. The pipeline will be near Haggerty Road. A route study is currently being conducted to determine the best alignment. The pipeline design will require a control valve along the alignment, sectionalizing valves, air release and vacuum valves and other valves and structures as required to dewater the pipeline, measure the flow and control the flow and pressure in the pipeline.

The second pipeline (referred to as the 14 Mile Reinforcing TM) parallels the existing 14 Mile Road TM and is currently in the preliminary design phase. This pipeline will provide the redundancy for all customer service connections west of HAG. This pipeline will be about 24 inches in diameter and will be about 1.25 miles long. The 14 Mile RD Reinforcing TM will also include connections to all the critical service connections along 14 Mile Road west of HAG. The pipeline design will also include isolation valves, sectionalizing valves, air release and vacuum valves and other valves and structures as required to dewater the pipeline and measure the flow in the pipeline.

Table 6.1 Cost Comparison of Options

Alternative	1	2	3	4
Name of Alternative	Beck RD Loop	14 Mile RD Parallel Main	Haggerty Loop	Adams Branch Loop
Cost Estimate (Million USD)	145	47.2	54.4	121.5
Does Alternative provide redundancy?	Yes	No	Yes	Yes
Selected Alternative	No	No	Yes	No

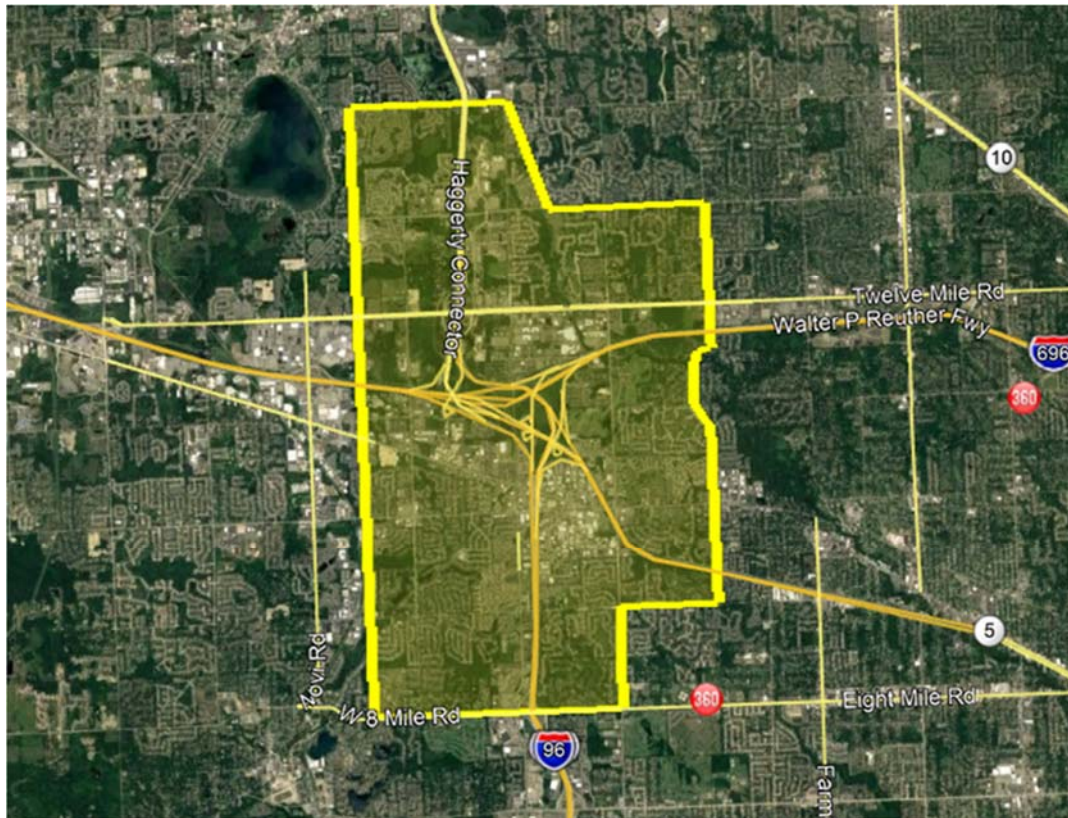


Figure 6.1 – Project Area

Figure 6.1 shows the area that will contain the final route selection. Possible alignments for the approximately 6-mile-long north-south pipeline are Meadowbrook RD, Halsted RD, Haggerty RD, I-275, and Cranbrooke DR. GLWA and consultants are evaluating the top route combinations based on cost, environmental risk, tunneling feasibility, utility congestion, O&M, and disruptions to the public.

6.2 Cost Per Year

Table 6.2 gives the estimated costs per fiscal year for construction, engineering, and administration. This table is based on the most up-to-date project schedule. Note that construction will not begin until FY 2020 on the 14 Mile Reinforcement TM. It is the intent of GLWA to seek low interest loan assistance under the DWRF program to fund as much of the project as possible.

Table 6.2 Cost Breakdown by Fiscal Year					
Cost Breakdown by Fiscal Year	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Estimated Construction Cost	0	3,116,000	6,232,000	18,696,000	18,696,000
Engineering Design Consultant Costs	1,400,000	1,400,000	1,400,000	1,400,000	1,400,000
GLWA Engineering and Administrative Costs	140,000	140,000	140,000	140,000	140,000
TOTAL COST PER YEAR (USD)	1,540,000	4,656,000	7,772,000	20,236,000	20,236,000

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Section 7

Environmental Review

7.1 General

The anticipated environmental impacts resulting from implementing the recommendations of this Project Plan include both direct and indirect. The following is a brief discussion of the anticipated environmental impacts of the selected alternative.

7.2 Historical/Archaeological Sites

It is likely that all areas to be disturbed by the proposed project will lie within existing road right-of-way and other areas previously disturbed by development. Coordination with the Michigan State Historic Preservation Officer (SHPO) has been initiated to determine if any previously documented historic or archaeological sites have been previously identified.

A review of the National Register of Historic Places (NRHP) online database identified only one (1) historic site within the project area. It is a private single family dwelling located at 42580 Eight Mile Road, between Novi Road and Meadowbrook Road, in the city of Novi.

The local communities have a number of listed historic landmarks within the project area. Coordination with each community will occur to ensure that all known historic sites are considered during the alternative evaluation. Novi lists the following:

- Bank Building – Novi Road and Grand River Avenue
- MSU Tollgate Farm – 12 Mile Road and Meadowbrook Road
- Bassett School – 13 Mile Road and Meadowbrook Road
- Casino Dance Hall and Amusement Park – 13 Mile Road and Old Novi Road
- Erastus Ingersoll Homestead – 10 Mile Road and Haggerty Road
- Knapp Cemetery – 9 Mile Road east of Novi Road
- Rogers Residence – 9 Mile Road east of Novi Road
- Wool House – Novi Road and Grand River Avenue
- Novi Cemetery – Novi Road south of Grand River Avenue

The cities of Farmington and Farmington Hills also have mapping and information about historic districts, buildings, and marker sites. Within the 12 square mile area bounded by 8 Mile Road, Haggerty Road, 14 Mile Road, and Drake Road, there are at least 25 sites and 14 markers, with some sites having markers being included in the total.

7.3 Rivers, Streams, and Drains

There are several flowing watercourses within the project area, which is entirely within the Upper or Middle Rouge River Watersheds (HUC10 0409000401 and 0409000402, respectively). Mapping obtained from the office of the Oakland County Water Resources Commissioner (OCWRC) and Michigan Department of Environmental Quality's Wetland Mapper identified a number of flowing watercourses within the project area. While most are relatively small, there are several watercourses that cross roadways via culverts or under bridges and will need to be considered during alternatives evaluation and design. These include:

- Seeley Drain – originates north of 14 Mile Road west of Haggerty Road, crossing Haggerty Road in multiple locations north of 13 Mile Road, 12 Mile Road west of Halsted Road, Halsted Road south of 12 Mile Road, and Drake Road south of I-696.
- Walled Lake Branch, Bishop Creek, and Thornton Creek – originates northwest of the project area and cross Novi Road south of 11 Mile Road and north of 9 Mile Road, 11 Mile Road west of Meadowbrook Road, 10 Mile Road east of Novi Road and west of Haggerty Road, Meadowbrook Road south of 11 Mile Road and north of 9 Mile Road, and 9 Mile Road west of Meadowbrook Road.

7.4 Floodplains

Floodplains are relatively flat areas or lowlands adjacent to channels of water courses or water bodies which may be temporarily covered by flood water during periods of high precipitation. In the project area, floodplains are found along virtually all rivers and lakes, including the rivers, streams, and drains noted above and other smaller watercourses.

7.5 Wetlands

Wetlands are defined by Michigan's wetland statute, Part 303, Wetlands Protection, of the Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451, as amended, as "land characterized by the presence of water at a frequency and duration sufficient to support, and that under normal circumstances does support, wetland vegetation or aquatic life, and is commonly referred to as a bog, swamp, or marsh." The definition applies to public and private lands regardless of zoning or ownership. Wetlands have historically been mapped by a variety of agencies, including the U.S. Fish & Wildlife Service (USFWS) in the National Wetland Inventory (NWI). NWI maps are intended to produce reconnaissance level information on the location, type, and size of wetland resources and prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology, and geography and have an inherent margin of error. MDEQ has integrated NWI mapping into their Wetland Mapper, which identifies wetlands scattered throughout the project area. An assessment of wetlands will be performed as part of the alternatives analysis, with a more detailed review performed for the selected alternative to determine how to avoid or minimize impacts based on a number of factors. In Michigan, MDEQ has 404 jurisdiction of wetlands and is responsible for reviewing permits to impact wetlands and other regulated water resources through a digital online Joint Permit Application. If it is determined that permits are also needed from the U.S. Army Corps of Engineers (USACE), MDEQ will notify applicants.

NREPA allows a local unit of government can regulate wetlands by ordinance, in addition to state regulation, if certain criteria are met. According to the MDEQ list of communities with local ordinances (dated June 22, 2010), the city of Novi is the only community within the project area that has notified MDEQ that they have a local wetland ordinance. Impacts to wetlands or adjacent buffer areas may require permits from the city of Novi.

7.6 Soils and Geology

The project area is part of the vast central lowland of North America. The topography consists of plains and low hills, with few extremes of slope or relief. In this region, landforms are the result of the deposition and erosion of loose materials (sand, gravel, silt, and clay particles) in recent geologic time, by either moving water or melting geologic ice. Local topography is described quantitatively in measures of relative relief and slope. Severe slopes that limit development and agricultural land use are rare in the area. There are several areas within the project area that include hydric soils, including histosols (peat and muck) and other soils with high organic content, that may require

special construction considerations. A geotechnical analysis will be performed along the selected alternative in areas suspected of containing poor soils to ensure the proper design is implemented.

7.7 Protected Species

The USFWS is the federal agency entrusted with protecting plant and animal species that are listed as endangered (E) or threatened (T) and protected under the Endangered Species Act (ESA). A review of the USFWS's Information for Planning and Consultation (iPaC) website can be done to generate a list of species and other resources under USFWS jurisdiction that are known or expected to occur within a project area defined by the user. The results of the iPaC inquiry is not a substitute for formal coordination with USFWS. The iPaC inquiry identified two (2) mammals, one (1) reptile, three (3) mussels, one (1) insect, and one (1) flowering plant that may be found within the project area. In addition, 17 species of birds protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act may also utilize the project area for nesting and/or resting during migration.

The state of Michigan Natural Features Inventory (MNFI) is charged with similar protections of species. The MNFI website instantly provides County Element Data for species which have locations recorded in the database for each county. Since records in the database include occurrences to the mid-19th century and some listed species have not been observed in over 50 years, some of the species listed are likely no longer found within the county. The County Element Data can be used as a reference about which natural features currently or historically were recorded in the county and should be considered during project planning. In most cases, species protected at the federal level by USFWS are also protected at the state level. Michigan includes state species status as E, T, and Special Concern (SC). The Oakland County Element Data includes two (2) amphibians, 43 plants, 16 mussels, five (5) fish, 12 birds, 14 insects, six (6) crayfish/snails, six (6) reptiles, and three (3) mammals.

7.8 Vegetation

Land use within the project area is primarily suburban and urban development. The area has been settled for well over a century and areas suitable for farming were cleared during the settlement period. Subsequently, the conversion of farmland and other areas suitable for residential, commercial, and institutional development has occurred. This has resulted in conversion of much of the expansive areas of native vegetation to cultural landscape comprised of manicured lawns and landscaping. There are remnants of natural ecosystems in the few remaining vacant parcels, which are not abundant. Most of the parcels within the project area have been subdivided and developed. The presence of trees is important for a number of reasons, including aesthetics, provision of shade during summer, and wildlife habitat. The impact to various vegetation will be included in the analysis and design of the selected alternative and attempts to minimize tree removal will be made, particularly to mature trees.

7.9 Parks and Recreation Areas

There are several parks and areas of recreation within the project area. City parks of both the Novi and Farmington Hills are located throughout the project area, along with several private recreation areas. Projects developed using the federal Land & Water Conservation Fund (LWCF) are subject to protection under Section 6(f) of the Land and Water Conservation Fund Act. A review of the list of LWCF grants between 1965-2011 found that the city of Farmington, city of Farmington Hills and city of Novi have all received LWCF grants for various projects. A review of the specific LWCF projects funded, as well as obtaining current information and the impact to all parks and recreation areas will be performed during the alternatives evaluation.

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Section 8

Other Impacts or Concerns

8.1 Improved Efficiency and Long-Term Energy Savings

On top of creating a more reliable and redundant transmission system, there is potential for this project to enhance system hydraulics and pump station operations. Pumps are designed to operate in a certain range of elevational and flow conditions. This range is known as the Preferred Operating Range (POR). Within that range is the Best Efficiency Point (BEP), where the pump is running at peak efficiency. GLWA's hydraulic model for 2035 indicates that one of the pumps at the NWB operates outside the POR for many current conditions. When pumps operate outside of the POR, they are not only using more energy than necessary, but they become prone to deterioration in the mechanical and structural pump components. A feature of this project is the ability for the NWB to help fill the HAG reservoir. The overexerted NWB pump will therefore have fewer conditions where it will be outside the POR under future operating conditions. Figure 8.1, shown below, shows that there are currently multiple low flow conditions under which the particular NWB pump is running outside of the POR. These conditions could be rectified upon the completion of the proposed work. The overall achievable benefits of the hydraulic analysis included in this project are energy savings, increased lifespan of pumps, and long-term cost savings for customers.

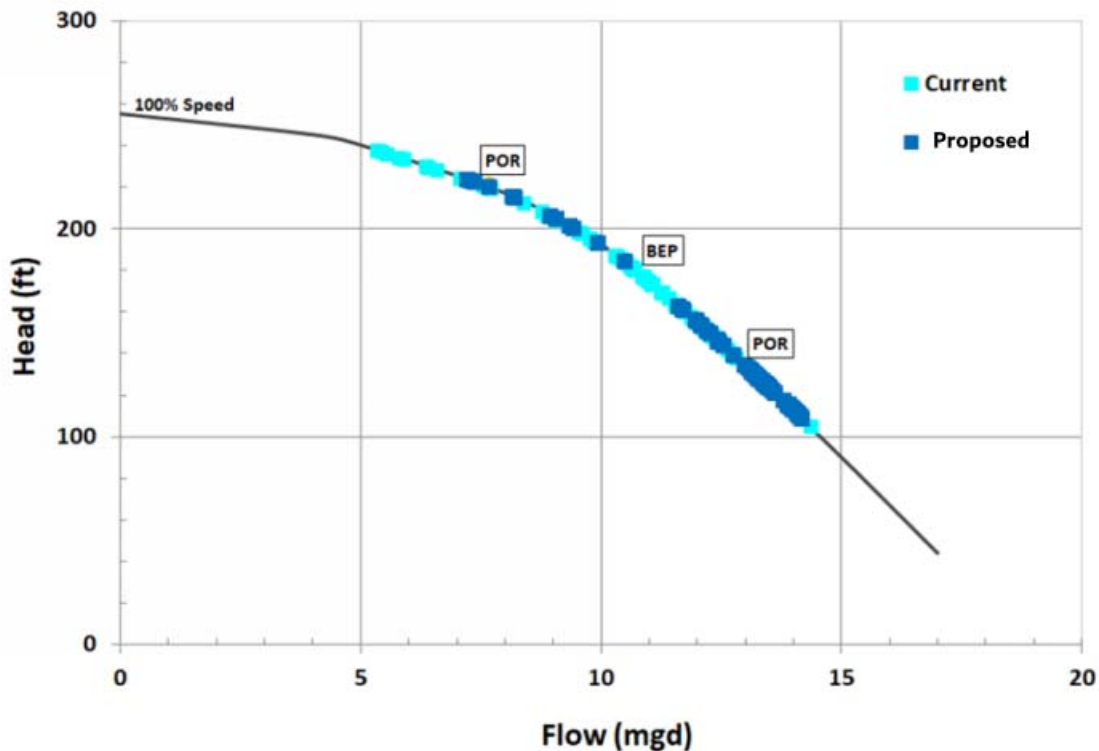


Figure 8.1: Current Vs. Future Pump Conditions where NWB can fill HAG Reservoir

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Section 9

Mitigation

9.1 General

Where adverse impacts cannot be avoided, mitigation methods will be implemented. Mitigating measures for the projects such as soil erosion control, if required, will be utilized as necessary and in accordance with applicable laws. Details will be further specified in the construction contract documents used for the project.

9.2 Short-Term Impacts

Short-term impacts due to construction activities such as noise, dust and minor traffic disruption cannot be avoided. However, efforts will be made to minimize the adverse impacts by use of thorough design and well-planned construction sequencing.

Site restoration will minimize the adverse impacts of construction, and adherence to the Soil Erosion and Sedimentation Act will minimize the impacts due to disturbance of the soil structure, if such disturbance is found to be necessary. Specific techniques will be specified in the construction contract documents.

9.3 Long-Term Impacts

Adverse long-term impacts due to the proposed project are not anticipated. The aesthetic impacts of construction within the boundaries of the project area will be mitigated by site restoration.

9.4 Indirect Impacts

In general, it is not anticipated that mitigative measures to address indirect impacts will be necessary for the recommended improvements addressed in this Project Plan. The proposed improvements are located within the project area so they do not promote growth in areas not currently served by GLWA. Therefore, indirect impacts are not likely to be a significant concern for these improvements.

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Section 10

Public Involvement

10.1 Public Hearing Advertisement

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A Public Hearing Notice will be published on March 22, 2019 to alert parties interested in the Project Plan and request input at least 30 days prior to its adoption. The notice will be included in Appendix B.

(To be updated after the Public Hearing on April 24, 2019).

10.2 Public Hearing

A formal public hearing on the Draft Project Plan will be held before the GLWA Board on April 24, 2019. The hearing will include a presentation on the project, as well as an opportunity for public comment and questions.

(To be updated after the Public Hearing on April 24, 2019).

#

10.3 Public Hearing Transcript

The public hearing transcript will be included in Appendix D along with the attendance list.

(To be updated after the Public Hearing on April 24, 2019).

#

10.4 Public Hearing Contents

A copy of the visual aids (handout) used during the presentation at the Public Hearing will be included in Appendix E.

(To be updated after the Public Hearing on April 24, 2019).

#

10.5 Comments Received and Answered

(To be updated after the Public Hearing on April 24, 2019).#

#

10.6 Adoption of the Project Plan

The Project Plan is expected to be approved by the Great Lakes Water Authority Board, which is

expected to adopt a Resolution at its meeting on April 24, 2019, authorizing GLWA to proceed with official filing of the Project Plan for purposes of securing low interest loan assistance under the DWRP Program. An executed copy of the GLWA Board’s Resolution approval for the Project Plan will be included in Appendix F of this document.

(To be updated after the Public Hearing on April 24, 2019).



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Appendix A: Tribal Historic Preservation Office Review Requests

100 W. Big Beaver Rd., Suite 540
Troy, MI 48084

T: (248)786-4761



March 18, 2019

Ms. Paula Carrick, THPO
Bay Mills Indian Community
12140 W. Lakeshore Drive
Brimley, Michigan
49715

Subject: GLWA Project 1802448
14 Mile Road Transmission Main Loop Project
Tribal Historic Preservation Officer Review

Dear Ms. Carrick:

The Great Lakes Water Authority (GLWA) is submitting a Project Plan to the Drinking Water Revolving Fund to finance the design and construction of a new drinking water transmission main pipeline. This letter is to invite your Tribal Historic Preservation Officer or applicable representative to offer comments regarding the proposed project. The enclosed figures outline the areas possible construction.

Construction for this project could be located in Oakland County, Novi, Sections 1, 12, 13, 24, 25, and 36, and in Farmington Hills, Sections 7, 8, 17, 18, 19, 20, 29, 30, and 31.

The proposed work consists of the engineering, design, and construction of a new drinking water transmission main pipeline that will connect the transmission main on 8 Mile Road with the transmission main on 14 Mile Road. The project is necessary to provide all residences and businesses in the area with a redundant source of water. All construction will occur in city road, county road, or state highway right-of-way's, as well as within legally obtained easements if necessary.

GLWA would appreciate if comments were returned within three weeks from the day this letter is received. Thank you for your assistance. If you have any questions or require additional information, please contact me at (248)786-4761 or DNitz@BrwnCald.com.

Very truly yours,

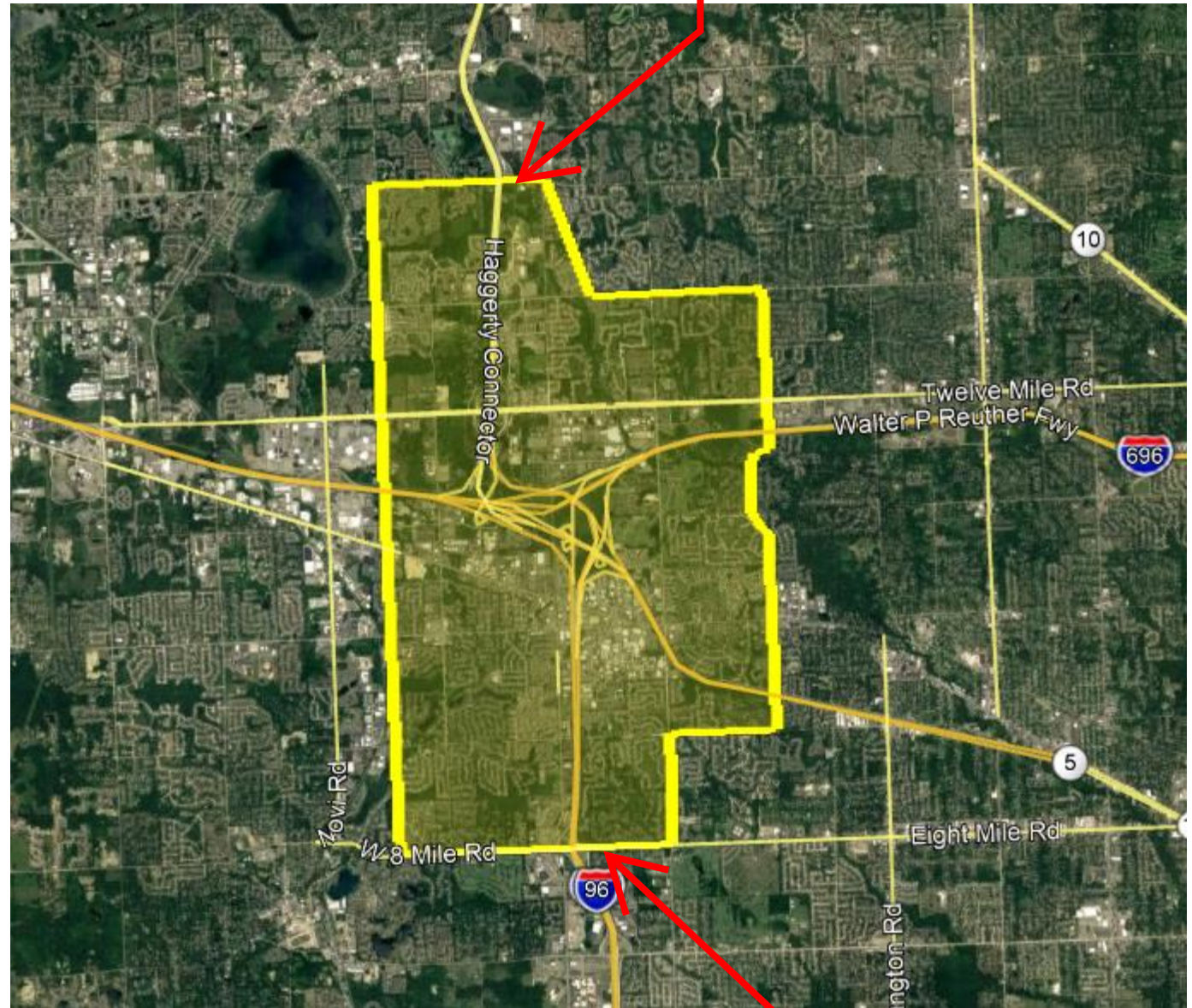
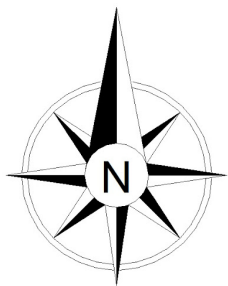
Brown and Caldwell, LLC

A handwritten signature in blue ink that reads 'David C. Nitz'. The signature is stylized and cursive.

David C. Nitz, P.E.
Director, Client Services
T: (248)786-4761
E: DNitz@BrwnCald.com

Zone of all possible pipeline locations

Pipeline will run mostly North to South, be approximately 7 miles long, and will connect the Haggerty Pump Station to the Newburgh Pump Station.



Approximate location of Haggerty Pump Station

Approximate location of Newburgh Pump Station

100 W. Big Beaver Rd., Suite 540
Troy, MI 48084

T: (248)786-4761



March 18, 2019

Ms. Cindy Winslow
Grand Traverse Band of Ottawa and Chippewa Indians
2605 NW Bayshore Drive
Peshawbetown, Michigan
49682

Subject: GLWA Project 1802448
14 Mile Road Transmission Main Loop Project
Tribal Historic Preservation Officer Review

Dear Ms. Winslow:

The Great Lakes Water Authority (GLWA) is submitting a Project Plan to the Drinking Water Revolving Fund to finance the design and construction of a new drinking water transmission main pipeline. This letter is to invite your Tribal Historic Preservation Officer or applicable representative to offer comments regarding the proposed project. The enclosed figures outline the areas possible construction.

Construction for this project could be located in Oakland County, Novi, Sections 1, 12, 13, 24, 25, and 36, and in Farmington Hills, Sections 7, 8, 17, 18, 19, 20, 29, 30, and 31.

The proposed work consists of the engineering, design, and construction of a new drinking water transmission main pipeline that will connect the transmission main on 8 Mile Road with the transmission main on 14 Mile Road. The project is necessary to provide all residences and businesses in the area with a redundant source of water. All construction will occur in city road, county road, or state highway right-of-way's, as well as within legally obtained easements if necessary.

GLWA would appreciate if comments were returned within three weeks from the day this letter is received. Thank you for your assistance. If you have any questions or require additional information, please contact me at (248)786-4761 or DNitz@BrwnCald.com.

Very truly yours,

Brown and Caldwell, LLC

A handwritten signature in blue ink that reads "David C. Nitz". The signature is fluid and cursive, with a prominent loop at the end of the last name.

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Troy, MI 48084

T: (248)786-4761



March 18, 2019

Mr. Earl Meshigaud
Hannahville Potawatomi Indian Community
N-14911 Hannahville B-1 Road
Wilson, Michigan
49896

Subject: GLWA Project 1802448
14 Mile Road Transmission Main Loop Project
Tribal Historic Preservation Officer Review

Dear Mr. Meshigaud:

The Great Lakes Water Authority (GLWA) is submitting a Project Plan to the Drinking Water Revolving Fund to finance the design and construction of a new drinking water transmission main pipeline. This letter is to invite your Tribal Historic Preservation Officer or applicable representative to offer comments regarding the proposed project. The enclosed figures outline the areas possible construction.

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GLWA would appreciate if comments were returned within three weeks from the day this letter is received. Thank you for your assistance. If you have any questions or require additional information, please contact me at (248)786-4761 or DNitz@BrwnCald.com.

Very truly yours,

Brown and Caldwell, LLC

A handwritten signature in blue ink that reads 'David C. Nitz'. The signature is stylized and cursive.

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Troy, MI 48084

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March 18, 2019

Mr. Gary Loonsfoot, Jr., THPO
Keweenaw Bay Indian Community
16429 Bear Town Road
Baraga, Michigan
49908

Subject: GLWA Project 1802448
14 Mile Road Transmission Main Loop Project
Tribal Historic Preservation Officer Review

Dear Mr. Loonsfoot:

The Great Lakes Water Authority (GLWA) is submitting a Project Plan to the Drinking Water Revolving Fund to finance the design and construction of a new drinking water transmission main pipeline. This letter is to invite your Tribal Historic Preservation Officer or applicable representative to offer comments regarding the proposed project. The enclosed figures outline the areas possible construction.

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GLWA would appreciate if comments were returned within three weeks from the day this letter is received. Thank you for your assistance. If you have any questions or require additional information, please contact me at (248)786-4761 or DNitz@BrwnCald.com.

Very truly yours,

Brown and Caldwell, LLC

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David C. Nitz, P.E.
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Troy, MI 48084

T: (248)786-4761



March 18, 2019

Ms. Giiwegizhigookway Martin, THPO
Lac Vieux Desert Band of Lake Superior Chippewa Indians
P.O. Box 249
Watersmeet, Michigan
49969

Subject: GLWA Project 1802448
14 Mile Road Transmission Main Loop Project
Tribal Historic Preservation Officer Review

Dear Ms. Martin:

The Great Lakes Water Authority (GLWA) is submitting a Project Plan to the Drinking Water Revolving Fund to finance the design and construction of a new drinking water transmission main pipeline. This letter is to invite your Tribal Historic Preservation Officer or applicable representative to offer comments regarding the proposed project. The enclosed figures outline the areas possible construction.

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Very truly yours,

Brown and Caldwell, LLC

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100 W. Big Beaver Rd., Suite 540
Troy, MI 48084

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March 18, 2019

Mr. Jay Sam, Director
Little River Band of Ottawa Indians
2608 Government Center Drive
Manistee, Michigan
49660

Subject: GLWA Project 1802448
14 Mile Road Transmission Main Loop Project
Tribal Historic Preservation Officer Review

Dear Mr. Sam:

The Great Lakes Water Authority (GLWA) is submitting a Project Plan to the Drinking Water Revolving Fund to finance the design and construction of a new drinking water transmission main pipeline. This letter is to invite your Tribal Historic Preservation Officer or applicable representative to offer comments regarding the proposed project. The enclosed figures outline the areas possible construction.

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GLWA would appreciate if comments were returned within three weeks from the day this letter is received. Thank you for your assistance. If you have any questions or require additional information, please contact me at (248)786-4761 or DNitz@BrwnCald.com.

Very truly yours,

Brown and Caldwell, LLC

A handwritten signature in blue ink that reads 'David C. Nitz'. The signature is fluid and cursive, with a large, stylized 'N'.

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Troy, MI 48084

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March 18, 2019

Mr. Wes Andrews
Little Traverse Bay Band of Odawa
7500 Odawa Circle
Harbor Springs, Michigan
49740

Subject: GLWA Project 1802448
14 Mile Road Transmission Main Loop Project
Tribal Historic Preservation Officer Review

Dear Mr. Andrews:

The Great Lakes Water Authority (GLWA) is submitting a Project Plan to the Drinking Water Revolving Fund to finance the design and construction of a new drinking water transmission main pipeline. This letter is to invite your Tribal Historic Preservation Officer or applicable representative to offer comments regarding the proposed project. The enclosed figures outline the areas possible construction.

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Very truly yours,

Brown and Caldwell, LLC

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March 18, 2019

Ms. Heather Bush
Match-e-be-nash-shee-wish Gun Lake Band of Potawatomi Indians
2872 Mission Drive
Shelbyville, Michigan
49344

Subject: GLWA Project 1802448
14 Mile Road Transmission Main Loop Project
Tribal Historic Preservation Officer Review

Dear Ms. Bush:

The Great Lakes Water Authority (GLWA) is submitting a Project Plan to the Drinking Water Revolving Fund to finance the design and construction of a new drinking water transmission main pipeline. This letter is to invite your Tribal Historic Preservation Officer or applicable representative to offer comments regarding the proposed project. The enclosed figures outline the areas possible construction.

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The proposed work consists of the engineering, design, and construction of a new drinking water transmission main pipeline that will connect the transmission main on 8 Mile Road with the transmission main on 14 Mile Road. The project is necessary to provide all residences and businesses in the area with a redundant source of water. All construction will occur in city road, county road, or state highway right-of-way's, as well as within legally obtained easements if necessary.

GLWA would appreciate if comments were returned within three weeks from the day this letter is received. Thank you for your assistance. If you have any questions or require additional information, please contact me at (248)786-4761 or DNitz@BrwnCald.com.

Very truly yours,

Brown and Caldwell, LLC

A handwritten signature in blue ink that reads 'David C. Nitz'. The signature is fluid and cursive, with a large, stylized 'N'.

David C. Nitz, P.E.
Director, Client Services
T: (248)786-4761
E: DNitz@BrwnCald.com

100 W. Big Beaver Rd., Suite 540
Troy, MI 48084

T: (248)786-4761



March 18, 2019

Ms. Mon-ee Zapata, Cultural Specialist
Nottawaseppi Band of Huron Potawatomi
1485 Mno-Bmadzewen Way
Fulton, Michigan
49052

Subject: GLWA Project 1802448
14 Mile Road Transmission Main Loop Project
Tribal Historic Preservation Officer Review

Dear Ms. Zapata:

The Great Lakes Water Authority (GLWA) is submitting a Project Plan to the Drinking Water Revolving Fund to finance the design and construction of a new drinking water transmission main pipeline. This letter is to invite your Tribal Historic Preservation Officer or applicable representative to offer comments regarding the proposed project. The enclosed figures outline the areas possible construction.

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Brown and Caldwell, LLC

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Troy, MI 48084

T: (248)786-4761



March 18, 2019

Mr. Marcus Winchester, THPO
Pokagon Band of Potawatomi
58620 Sink Road
Dowagiac, Michigan
49047

Subject: GLWA Project 1802448
14 Mile Road Transmission Main Loop Project
Tribal Historic Preservation Officer Review

Dear Mr. Winchester:

The Great Lakes Water Authority (GLWA) is submitting a Project Plan to the Drinking Water Revolving Fund to finance the design and construction of a new drinking water transmission main pipeline. This letter is to invite your Tribal Historic Preservation Officer or applicable representative to offer comments regarding the proposed project. The enclosed figures outline the areas possible construction.

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Very truly yours,

Brown and Caldwell, LLC

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David C. Nitz, P.E.
Director, Client Services
T: (248)786-4761
E: DNitz@BrwnCald.com

100 W. Big Beaver Rd., Suite 540
Troy, MI 48084

T: (248)786-4761



March 18, 2019

Mr. William Johnson, Interim THPO
Saginaw Chippewa Indian Tribe of Michigan
6650 E. Broadway
Mt. Pleasant, Michigan
48858

Subject: GLWA Project 1802448
14 Mile Road Transmission Main Loop Project

Dear Mr. Johnson:

The Great Lakes Water Authority (GLWA) is submitting a Project Plan to the Drinking Water Revolving Fund to finance the design and construction of a new drinking water transmission main pipeline. This letter is to invite your Tribal Historic Preservation Officer or applicable representative to offer comments regarding the proposed project. The enclosed figures outline the areas possible construction.

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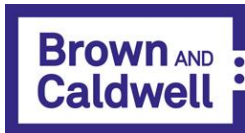
Very truly yours,

Brown and Caldwell, LLC

David C. Nitz, P.E.
Director, Client Services
T: (248)786-4761
E: DNitz@BrwnCald.com

100 W. Big Beaver Rd., Suite 540
Troy, MI 48084

T: (248)786-4761



March 18, 2019

Ms. Colleen Medicine
Sault Ste. Marie Tribe of Chippewa
523 Ashmun
Sault Ste. Marie, Michigan
49783

Subject: GLWA Project 1802448
14 Mile Road Transmission Main Loop Project
Tribal Historic Preservation Officer Review

Dear Ms. Medicine:

The Great Lakes Water Authority (GLWA) is submitting a Project Plan to the Drinking Water Revolving Fund to finance the design and construction of a new drinking water transmission main pipeline. This letter is to invite your Tribal Historic Preservation Officer or applicable representative to offer comments regarding the proposed project. The enclosed figures outline the areas possible construction.

Construction for this project could be located in Oakland County, Novi, Sections 1, 12, 13, 24, 25, and 36, and in Farmington Hills, Sections 7, 8, 17, 18, 19, 20, 29, 30, and 31.

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GLWA would appreciate if comments were returned within three weeks from the day this letter is received. Thank you for your assistance. If you have any questions or require additional information, please contact me at (248)786-4761 or DNitz@BrwnCald.com.

Very truly yours,

Brown and Caldwell, LLC

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David C. Nitz, P.E.
Director, Client Services
T: (248)786-4761
E: DNitz@BrwnCald.com

Appendix B: Public Hearing Notice

**GREAT LAKES WATER AUTHORITY
PUBLIC HEARING NOTICE 14 MILE TRANSMISSION MAIN LOOP
FY20 DRINKING WATER REVOLVING FUND PROJECTS**

The Great Lakes Water Authority (GLWA) announces a Public Hearing regarding its Project Plan for the proposed 14 Mile Road Transmission Main Loop Project. GLWA will be seeking low interest Drinking Water Revolving Fund (DWRWF) loan assistance for FY20. The project is comprised of the evaluation, design, and construction of an approximately seven-mile-long drinking water transmission main that will connect the 8 Mile Road Transmission Main to the 14 Mile Road Transmission Main in order to create a loop in the drinking water transmission system.

In recent years, the existing 14 Mile Transmission Main has experienced operational disruptions resulting in water outages for customers in the service area. The 14 Mile Transmission Main provides the only source of water for many communities west of Haggerty Road, including Commerce, Novi, and Wixom. Due to the type of failures that have occurred, there is a potential risk for future failures.

The 14 Mile Transmission Main Loop will drastically improve the redundancy and resiliency of the system. In addition to the approximately seven-mile-long north-south proposed pipeline, the project also includes a reinforcement pipeline parallel to the existing 14 Mile Transmission Main between the Haggerty Pump Station and Decker Road. This pipeline can serve the area while the existing transmission main is being repaired. When it is repaired, there will be two fully functional services along 14 Mile Road.

The total cost of this project is currently estimated at \$54,426,000. The 14 Mile Transmission Main Loop Project is eligible for participation under the State of Michigan low interest DWRWF loan program.

The Public Hearing will present a description of the recommended project, its evaluation, and estimated costs, as well as the cost per household impact for customer communities. The purpose of the hearing is not only to inform, but to seek and gather input from people that will be affected. Comments and viewpoints from the public are requested.

THE MEETING WILL BE HELD ON:

DATE: April 24, 2019

PLACE: Great Lake Water Authority
Water Board Building
735 Randolph
5th Floor, Board Room
Detroit, Michigan 48226

TIME: 2:00 p.m.

Information on the Project Plan will be available for review March 22, 2019, at the following locations:

GLWA Website: www.glwater.org

or

Great Lakes Water Authority
Water Board Building
735 Randolph, Suite 1601
Detroit, MI 48236

If you have questions or would like to submit written statements for the Public Hearing Record, call or write:

Mr. Jonathan Wheatley
Great Lakes Water Authority
Public Finance
735 Randolph, Suite 1601
Detroit, MI 48226

Statements will be accepted at the above address if received prior to 5:00 p.m., Wednesday, April 24, 2019.

Great Lakes Water Authority
Sue F. McCormick
CEO

Appendix C: Public Hearing Sign-In Sheet

Appendix D: Public Hearing Transcript

Appendix E: Public Hearing Visual Aids

Appendix F: GLWA Board’s Resolution Approval

Appendix G: DWRF Project Plan Submittal Form

Appendix H: SHPO Letters

Appendix I: DWRF Applicant Self-Certification Form

SRF-DWRF-NPS Applicant Self-Certification Forms (Rev. Draft 16 Jan 2019)

APPLICANT INSTRUCTIONS FOR SECTIONS "A" and "B"

<p>■ Use streamlined checklists A & B below during and after the pre-application meeting to help determine which project planning elements are most relevant for developing a Project Application Narrative (PAN). The PAN proposed for pilot testing will be a streamlined version of the SRF-DWRF Project Plan. Refer to the Project Plan Preparation Guidance and Applicant Actions for details.</p>
<p>■ The PAN is an Executive Summary-style planning document to be submitted with all new or amended projects in lieu of an SRF-DWRF Project Plan. For editorial consistency in this test of streamlining, the PAN will provide a ten-point table of contents described elsewhere in another guidance document.</p>
<p>■ Important: <i>All planning elements in "A" and "B" must be considered for all projects, and all boxes must be marked, thereby attesting to the applicant's completion of a comprehensive planning process.</i> To streamline the narrative portion of the application, only the minimally required and most relevant elements must be described in the PAN (streamlined project plan).</p>
<p>■ After considering <u>each</u> element, circle the appropriate box to indicate either: "Yes, the project is likely to involve or likely to impact" (Yes); or "No, the project is not likely to involve or not likely to impact" (No). Include "NA" if it is neither relevant nor applicable to the proposed project (NA).</p>
<p>■ "REQUIRED FOR ALL" means the element must be considered <u>and also</u> briefly described in the narrative portion of the streamlined PAN, even if the statement is "no impact." Additional information can be attached or incorporated by reference. Add a check mark to confirm completion of this step.</p>
<p>■ If a project involves multiple sub-projects or contracts with different characteristics and different answers for certain boxes, add clarifying comments, notes, or additional pages.</p>
<p>■ In addition to the required Act 399 (water) or Part 41 (wastewater) construction permits, any other permits likely to be required prior to construction must be identified in Section "B".</p>
<p>■ Submit the completed, signed self-certification forms "A" and "B" with the streamlined PAN document. .</p>

A. Purpose and Alternatives Analysis including Cost and Effectiveness PROJECT NO. _____

<p>Project Need and Eligibility (identify problems, NOT the project to be constructed)</p> <p><input checked="" type="checkbox"/> REQUIRED FOR ALL</p>	<p>Protection of Public Health and the Environment</p> <p><input checked="" type="checkbox"/> REQUIRED FOR ALL</p>	<p>Removal of Lead Service Pipes in Water Systems (DWRF only)</p> <p>Yes <input checked="" type="checkbox"/> NA</p>	<p>Public Information and Education</p> <p><input checked="" type="checkbox"/> REQUIRED FOR ALL</p>
<p>Existing Facilities (only as relevant to proposed project)</p> <p><input checked="" type="checkbox"/> REQUIRED FOR ALL</p>	<p>Compliance Violation, Enforcement Action, or Related Concerns</p> <p>Yes <input checked="" type="checkbox"/> NA</p>	<p>Alternatives: Option to optimize performance and improve operation and maintenance</p> <p><input checked="" type="checkbox"/> REQUIRED FOR ALL</p>	<p>Alternatives: Facility Regionalization / Coordination with Regional Planning Agencies</p> <p><input checked="" type="checkbox"/> REQUIRED FOR ALL</p>

Continued on Page 2

<p>Comparative "Cost and effectiveness" of Feasible Alternatives, processes, materials, techniques, and technologies <input checked="" type="checkbox"/> REQUIRED FOR ALL <i>This checkbox satisfies the USEPA requirement</i></p>	<p>Comparative non-monetary analysis of Feasible Alternatives (environmental, operational, other) <input checked="" type="checkbox"/> REQUIRED FOR ALL</p>	<p>Financial, legal, institutional, managerial, social, or other community considerations impacting planning analysis <input checked="" type="checkbox"/> REQUIRED FOR ALL</p>	<p>Enviro-Topographical-Geographical Constraints / Constructability concerns (e.g. poor soils, steep slopes) <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> NA</p>
<p>Alternative Facility Locations or Pipe Routings <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> NA</p>	<p>CSO separation or system upgrades (SRF only) <input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> NA</p>	<p>Structural Integrity PACP/MACP (SRF only) <input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> NA</p>	<p>Reduction of excessive infiltration and inflow (SRF only) <input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> NA</p>
<p>Water / Wastewater Pretreatment requirements <input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> NA</p>	<p>Other Planning Elements Relevant to Project Analysis: Changes to Land Use, Changes to Capacity, Long-Term Sustainability, Climate Resilience, Facility Security, Phasing of Construction, Geotechnical-Hydrogeological-Biological-Tree Survey, etc (please identify) <input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> NA</p>		
<p>Green Infrastructure for stormwater / Energy-water-wastewater conservation or resource recovery (USEPA Green Project Reserve) / Alternative or innovative technologies <input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> NA</p>		<p>Integrated Asset Management Planning Principles and Practices, including coordinated construction (water, sanitary, storm, transportation) <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> NA</p>	
<p>Planning consideration of construction and operational impacts on water levels in streams, rivers, and groundwater aquifers (e.g., major dewatering, large water withdrawals) <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> NA</p>		<p>Planning consideration of operational impacts to downstream processes, e.g., WTP or WWTP discharges, mgmt and disposal of spent filters, mgmt and disposal of sludges & other treatment residuals, etc. <input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> NA</p>	
<p>Description of Selected Alternative (the project to be constructed) <input checked="" type="checkbox"/> REQUIRED FOR ALL</p>	<p>User Impacts, Affordability, Disadvantaged Community, Environmental Justice <input checked="" type="checkbox"/> REQUIRED FOR ALL</p>	<p>Eligibility, construction schedule, and project delivery considerations (e.g., ineligible components, contracting method, project phasing or segmenting, other funding sources) <input checked="" type="checkbox"/> REQUIRED FOR ALL</p>	
<p>DOCUMENTS INCORPORATED BY REFERENCE AND/OR SUBMITTED IN LIEU (CIRCLE AS APPROPRIATE)</p> <p>USDA-RD Preliminary Engineering Report & Enviro Review SSES (SRF only) I/I Study (SRF only) PACP/MACP/NASSCO Report AMP <input checked="" type="radio"/> CIP Basis of Design Geotechnical-Hydrogeological-Biological-Tree Survey Environmental Assessment Report Watershed Management Plan Master Plan Compliance Documents (letters, ACO, LTCAP, permit schedule, DCA, other - please specify) Water Reliability Study (DWRf only) Sanitary Survey (DWRf only) SWPP (DWRf only), Symposia/Workshop Findings Engineering Proposal Rate Study Existing Permit Other</p>			
<p>Applicant Comments (attach additional page if necessary)</p>			
<p>MDEQ Reviewer Comments (attach additional page if necessary)</p>			

B. Environmental Preview / Review (NEPA-Like) and Useful Life Analysis PROJECT NO. _____

SHPO: Archeo-Histor-Cultural <input checked="" type="checkbox"/> LETTERS SENT, REQUIRED FOR ALL	THPO: Tribal <input checked="" type="checkbox"/> LETTERS SENT, REQUIRED FOR ALL	Protected Plants and Animals (Endangered-Threatened) USFWS/MNFI Yes <input checked="" type="radio"/> No NA	Protected or Important Habitats (including Trees) Yes <input checked="" type="radio"/> No NA
Floodplain Impacts and/or Permit <input checked="" type="radio"/> Yes No NA	Wetlands Impacts and/or Permit <input checked="" type="radio"/> Yes No NA	Inland Lakes & Streams Impacts and/or Permit <input checked="" type="radio"/> Yes No NA	Airspace and Airports Yes No <input checked="" type="radio"/> NA
Soil Erosion and Sedimentation and/or Permit <input checked="" type="radio"/> Yes No NA	Construction Storm Water Permit, Storm Water Discharge Permit <input checked="" type="radio"/> Yes No NA	Great Lakes Coastal Zone and related (Shorelands, Sand Dunes, Submerged Lands, etc) and/or Permit Yes No <input checked="" type="radio"/> NA	Wild, Scenic and Natural Rivers / National Natural Landmarks / Farmland Preservation Yes No <input checked="" type="radio"/> NA
Air Quality (beyond temporary construction) Yes <input checked="" type="radio"/> No NA	Water or Wastewater Facility NPDES Discharge Permit (New or Modified) Yes <input checked="" type="radio"/> No NA	Other permits anticipated for water-wells, roads, buildings, local health dept, lagoon berm, etc (please identify) <input checked="" type="radio"/> Yes No NA	
Public Lands, Recreational Areas, Scenic Areas, Beauty Roads, Open Space, etc <input checked="" type="radio"/> Yes No NA	Noise-Sensitive or Security-Sensitive Zones (e.g., hospitals, schools, apartments) <input checked="" type="radio"/> Yes No NA	<p>USEFUL LIFE ANALYSIS (SRF ONLY) <i>This checkbox satisfies the USEPA requirement</i></p> <p>The Useful Design Life of the project or activity is ____ years. For projects with multiple sub-components, see XYZ for determining the Useful Life.</p>	
Applicant Comments (attach additional page if necessary) Other permits TBD but likely to include Novi wetland permit, Oakland County Water Resources Commission (work within county drain/easement)			
MDEQ Reviewer Comments (attach additional page if necessary)			

APPLICANT CERTIFICATION (Please print or type)

I certify that all the above-referenced planning requirements Pages 1-3 have been considered, including the environmental preview, and including additional planning elements where relevant and applicable to the proposed project.

Name of Professional Engineer MICHAEL R McREYNOLDS

Signature of Professional Engineer [Signature] Date 3/19/19

Name of Authorized Representative _____

Title of Authorized Representative _____

Signature of Authorized Representative _____ Date _____

MDEQ Review (attach existing May 1/July 1 Screening checklist until Rules / Law are amended)

I certify that I have completed a thorough review of the above-referenced proposed SRF/DWRF loan project, using steps consistent with the long-established State Environmental Review Process and associated historical and recent guidance documents.

Date of PAN Screening Review _____

Name of Reviewer _____

More Info Needed? Y / N

Preliminary Tier 1 - 2 - 3

Approve for Initial PPL? Y / N

End Draft 5 January 2018 CJC

Rev. Draft 30 Nov 2018 CJC

Rev. Draft 16 Jan 2019 CJC (added the PM certification on Page 4)

