

City of Flint, Michigan

*Third Floor, City Hall
1101 S. Saginaw Street
Flint, Michigan 48502
www.cityofflint.com*



Meeting Agenda - Final

Wednesday, June 15, 2022

5:30 PM

Council Chambers

SPECIAL CITY COUNCIL

Allie Herkenroder, Vice President, Ward 7

*Eric Mays, Ward 1
Quincy Murphy, Ward 3
Jerri Winfrey-Carter, Ward 5
Dennis Pfeiffer, Ward 8*

*Ladel Lewis, Ward 2
Judy Priestley, Ward 4
Tonya Burns, Ward 6
Eva L. Worthing, Ward 9*

Inez M. Brown, City Clerk

Davina Donahue, Deputy Clerk

This Special City Council meeting was called by Mayor Sheldon A. Neeley for the purpose of holding a public hearing on the City of Flint's Final Project Plan for Drinking Water System Improvements and to approve the adoption of the Final Project Plan and designate an authorized representative.

CALL TO ORDER

ROLL CALL

READING OF DISORDERLY PERSONS CITY CODE SUBSECTION

Any person that persists in disrupting this meeting will be in violation of Flint City Code Section 31-10, Disorderly Conduct, Assault and Battery, and Disorderly Persons, and will be subject to arrest for a misdemeanor. Any person who prevents the peaceful and orderly conduct of any meeting will be given one warning. If they persist in disrupting the meeting, that individual will be subject to arrest. Violators shall be removed from meetings.

PLEDGE OF ALLEGIANCE

PRAYER OR BLESSING

REQUEST FOR CHANGES AND/OR ADDITIONS TO AGENDA

Council shall vote to adopt any amended agenda.

PRESENTATION - DRINKING WATER SYSTEM IMPROVEMENTS

A Presentation by the City of Flint's Department of Public Works (DPW) on the 2023 Drinking Water State Revolving Fund (DWSRF) Cedar Street Reservoir and Northwest Transmission Main Water Extension Improvements Project Plan. [Please see Supplemental Information #1 and #2]

PUBLIC HEARINGS

220240.6 Public Hearing/Drinking Water System Improvements/2023 Drinking Water State Revolving Fund (DWSRF) Project Plan

A Public Hearing to present and received comment on the City of Flint's FY2023 Drinking Water State Revolving Fund (DWSRF) Project Plan for the Cedar Street Reservoir and Pump Station Rehabilitation and Northwest Transmission Main Replacements.

PUBLIC SPEAKING

Per the amended Rules Governing Meetings of the Council (as adopted by the City Council on Monday, June 12, 2017), three (3) minutes per speaker. Only one speaking opportunity per speaker.

COUNCIL RESPONSE

er the amended Rules Governing Meetings of the Council (as adopted by the City Council on Monday, June 12, 2017), Councilpersons may respond to any public speaker, but only one response and only when all public speakers have been heard. Individual council response is limited to two minutes.

RESOLUTIONS

220240 Final Project Plan/Drinking Water System Improvements/Authorized Project Representative

Resolution resolving that the City of Flint formally adopts a [drinking water system improvements] Project Plan [which recommends the rehabilitation of the Cedar Street Pumping Station and reservoir and replacement of 6,700 linear feet of the Northwest Transmission Water Main], and agrees to implement the selected alternative (Alternative 4 - Improving Existing Infrastructure), AND, resolving that the City of Flint Public Works Director, a position currently held by Michael J. Brown, is designated as the authorized representative for all activities associated with the Project. This includes the submittal of the Project Plan as the first step in applying to the State of Michigan for a Drinking Water State Revolving Fund (DWSRF) Loan to assist in the implementation of the selected alternative.

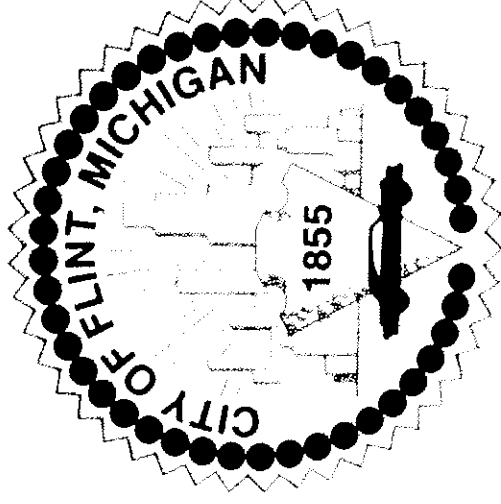
ADDITIONAL COUNCIL DISCUSSION

FINAL COUNCIL COMMENTS

ADJOURNMENT

SUPPLEMENTAL INFORMATION

#1



CITY OF FLINT

DEPARTMENT OF PUBLIC WORKS

2023 DRINKING WATER STATE REVOLVING FUND PROJECT PLAN PUBLIC HEARING



June 15, 2022
5:30 PM



What is the DWSRF Program?

- Michigan's Drinking Water State Revolving Fund (DWSRF) program is a low-interest loan financing program that assists communities with the construction of needed drinking water infrastructure improvements.
 - In 1996 the Drinking Water State Revolving Fund was established by amendments to the Safe Drinking Water Act (SDWA).
-



What is the DWSRF Program?

- Each fiscal year, Congress authorizes an amount to be appropriated that is allocated among the States.
 - \$256 Million available for FY2023 projects:
 - ☐ Improving drinking water treatment
 - ☐ Fixing leaky or old pipes
 - ☐ Improving sources of water supply
 - ☐ Replacing or constructing finished water storage tanks
 - ☐ Other infrastructure projects needed to protect public health
-



Public Hearing Requirements

- Description of Drinking Water Infrastructure & Alternatives
 - Description of Recommended Alternatives w/ Costs
 - Discussion of Project Financing
 - Description of Social & Environmental Impacts/ Mitigation of Impacts
-



City Water System Needs

- Rehabilitation of Cedar Street Pump Station and Reservoir

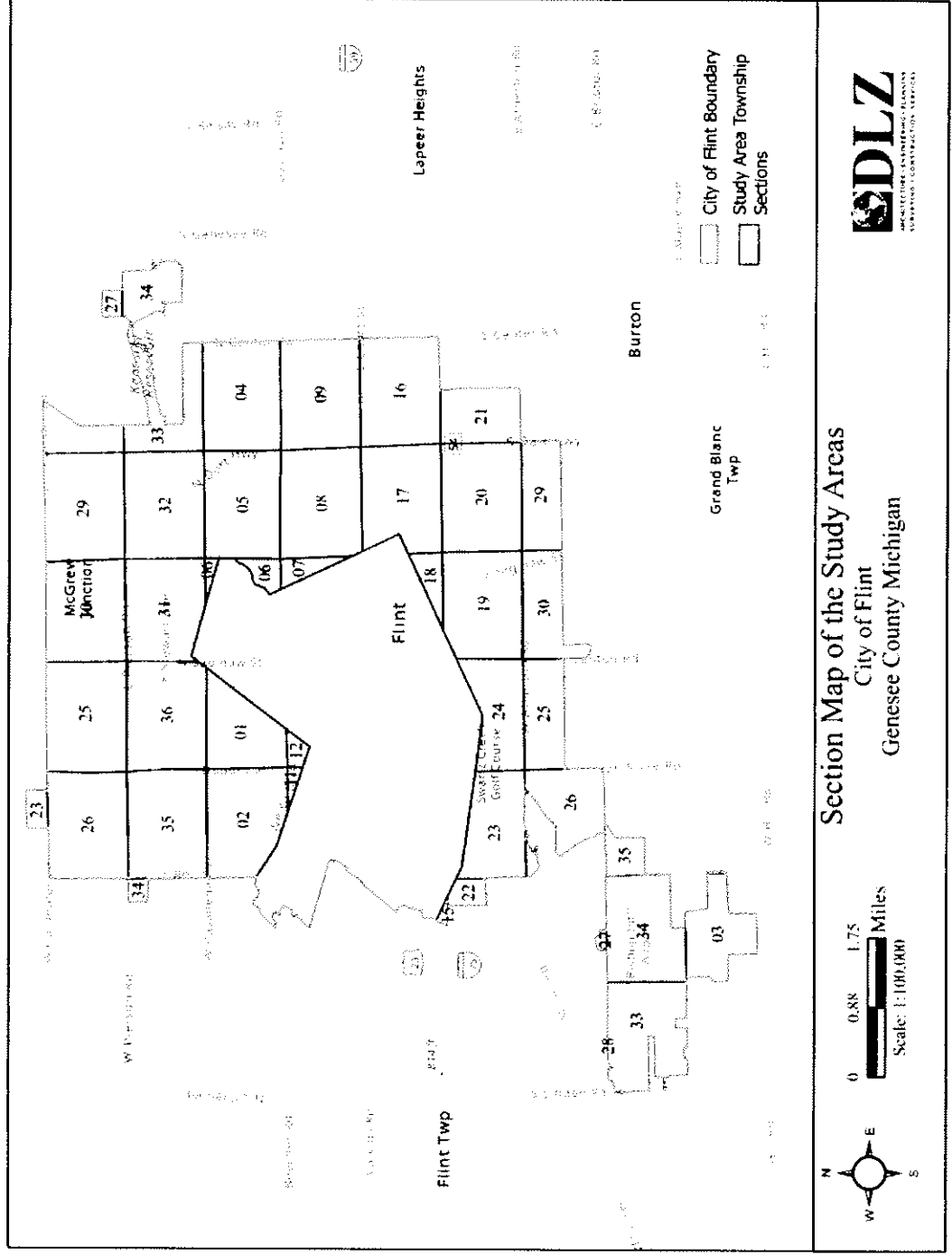
- Constructed in 1948
 - Recurring water quality / supply issues
- Replacement of 6,700 feet of the Northwest

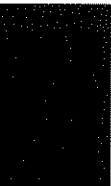
Transmission Water Main

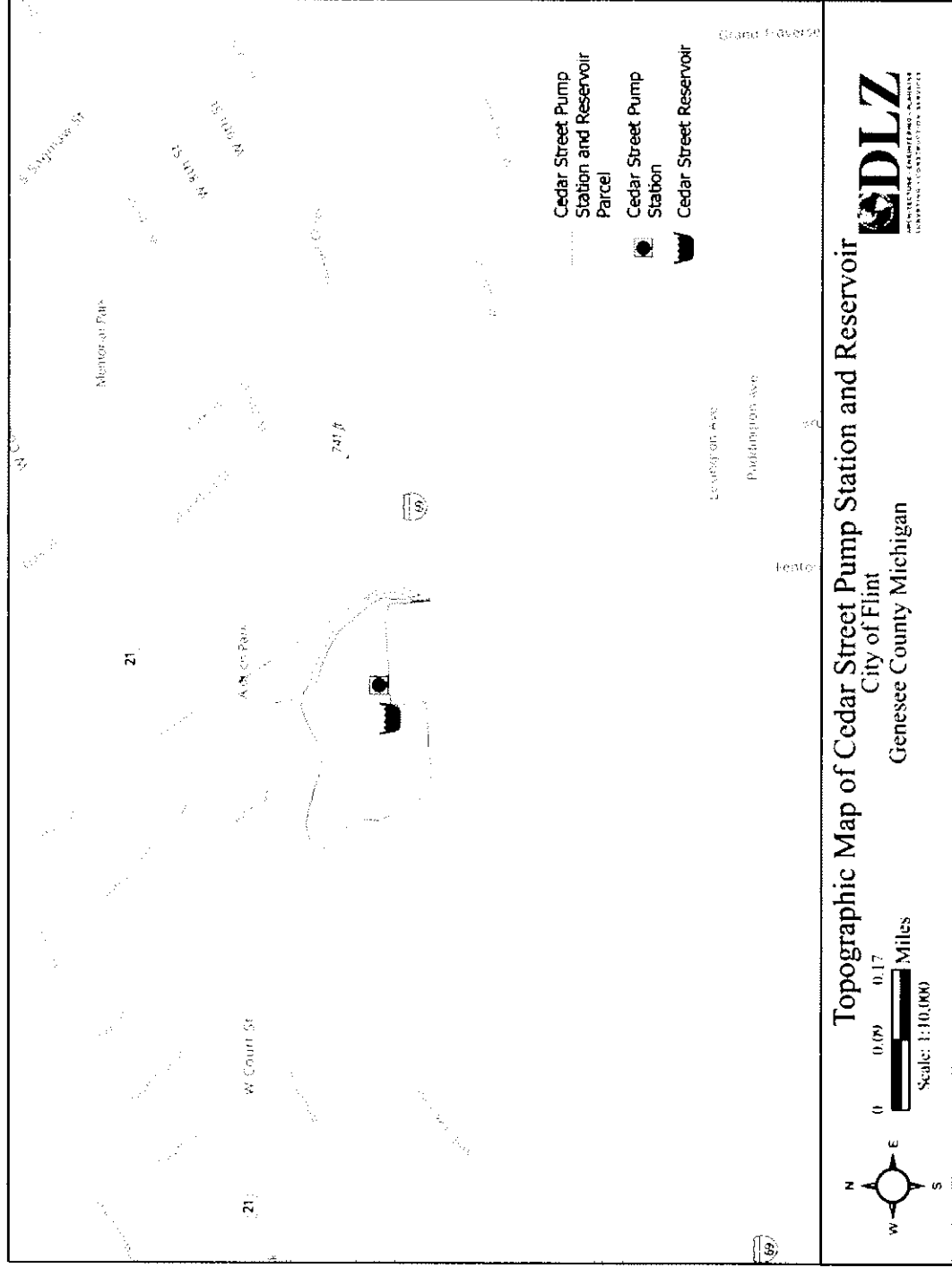
- Aging water main
 - Water main breaks
 - Water quality / public health concerns
-



CITY OF FLINT STUDY AREAS

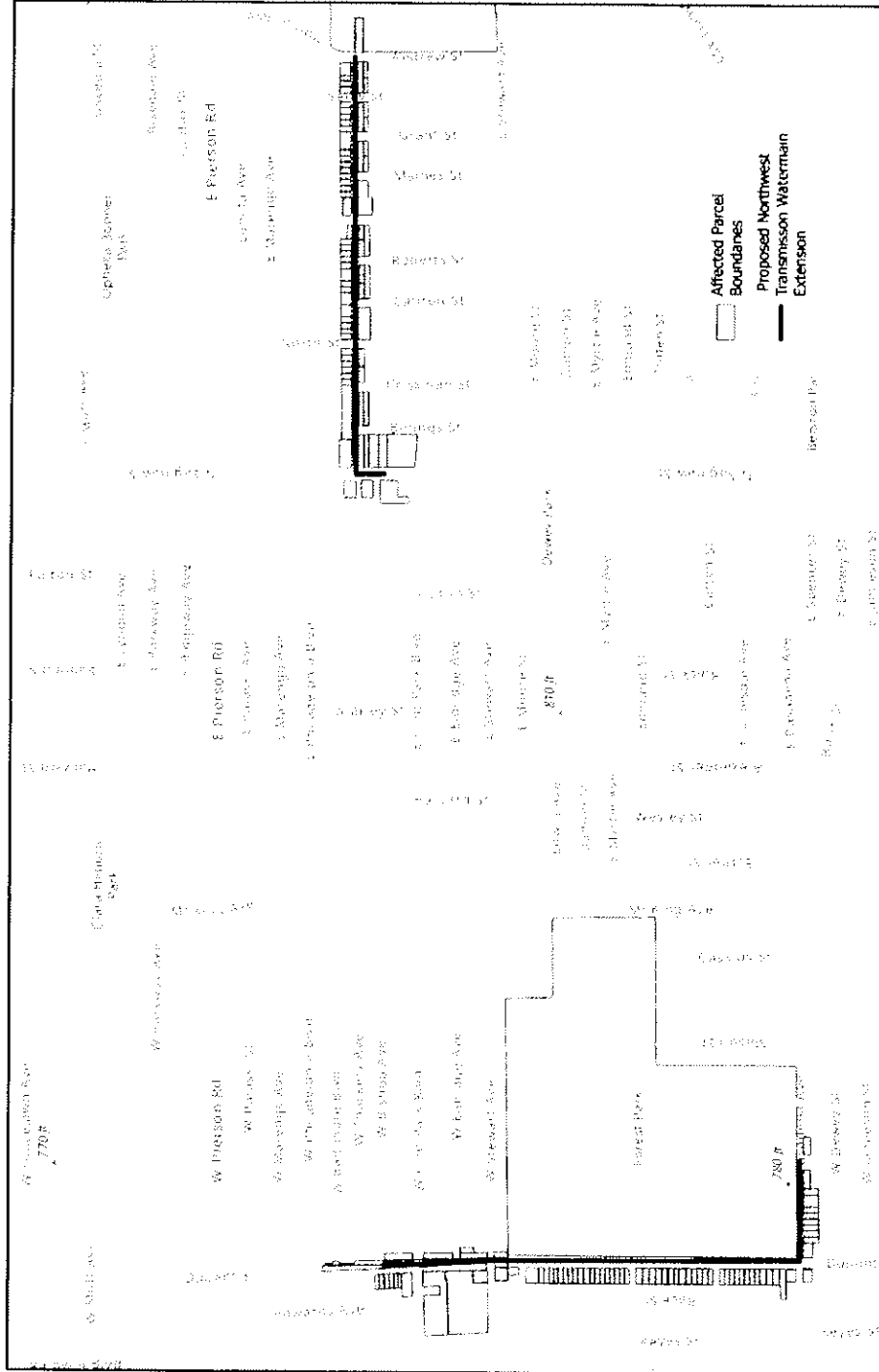






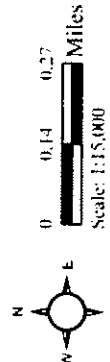


NORTHWEST TRANSMISSION WATER MAIN



Northwest Transmission Water Main Extension

City of Flint
Genesee County Michigan





Alternatives

1 – No Action

2 – Optimum Performance of Existing Facilities

- Operational changes to aging infrastructure
- New equipment
- Temporary solution

3 – Regional Alternatives

- Create an additional feed from Genesee Cty
- Change the routing of existing WM
- Not cost effective

4 – IMPROVING EXISTING INFRASTRUCTURE

- Direct & comprehensive water quality & reliability improvements
-



Project Overview- Alternative 4

- Rehabilitate the 20 Million Gallon Cedar Street Reservoir
 - Structural improvements to prolong the reliability & prolong the life of the reservoir
 - Enable the City to use it to full capacity
 - Provide repairs and improvements to the Cedar Street Pump Station
 - Replacement of valves, piping
 - New chlorine feed systems
 - 2 double wall chlorine tanks
 - Pump upgrades to improve energy efficiency
-



Project Overview- Alternative 4

- Repair/replace water main for the Northwest Transmission Main
 - Replace 6,700 ft of WM
 - Pasadena, Dupont to W Bishop
 - Wager, N Saginaw to Horton Ave
 - Provide high water quality
 - Reduce WM breaks
 - Increase reliability
 - Designs for the Cedar St Pumping Station, Reservoir & Northwest Transmission main were started under an existing State Grant & are 90% complete
 - Cost overruns under the existing grant
 - DWSRF will allow design & construction to be finalized
-



ESTIMATED CONSTRUCTION BUDGET

Option #	Description	Total Cost
1	No-Action	See Note 1
2	Optimum Performance	See Note 1
3	Regional Alternatives	\$24,000,000 (See Note 2)
4	Improvement of Existing Infrastructure	\$11,845,378
<p>Note 1 – Option 1 and 2 will have no initial construction cost due to leaving the system as-is (Alternative 1) and operating the system to an optimum performance, which the City of Flint is currently doing (Alternative 2). However, the asset O&M costs will continue to increase as time progresses for routine maintenance and spot repairs. This option is not recommended.</p> <p>Note 2 – According to the 2016 Water Reliability Study for the City of Flint, the replacement cost for the Northwest Transmission Main was estimated at \$20M. This would cover the replacement of 30,300 feet of pipe. Adjusting for inflation from 2016 dollars, and not considering the increase in price due to current supply issues, the regional alternative of complete transmission main replacement would be nearly \$24M. This estimate also does not consider any costs associated with regional alternatives to the Cedar Street Pump Station and Reservoir. Due to the exorbitant costs and feasibility issues, Regional Alternatives will not be considered for this project.</p>		



Estimated SRF Loan Budget

Description	Cost
Total Construction Cost	\$10,949,895
Design	\$354,882
Construction Administration, Construction Engineering, Inspection	\$443,602
Project Plan	\$30,000
Legal/Financial service	\$32,000
Bond Counsel	\$35,000
Total	\$11,845,378



Interest Rate Savings

- The City of Flint will be requesting EGLE Low Interest Loan funding at an estimated 1.875% interest rate
 - Annual principal & interest payment - \$715,715
 - P&I will be funded by O&M Budget, Unrestricted Sewer Fund Balance and capital charges
 - Bond market option interest rate estimated at 4.00%
 - Annual SRF loan to bond market savings - \$155,888
-



SRF Loan Savings vs Conventional Bond

SRF Loan

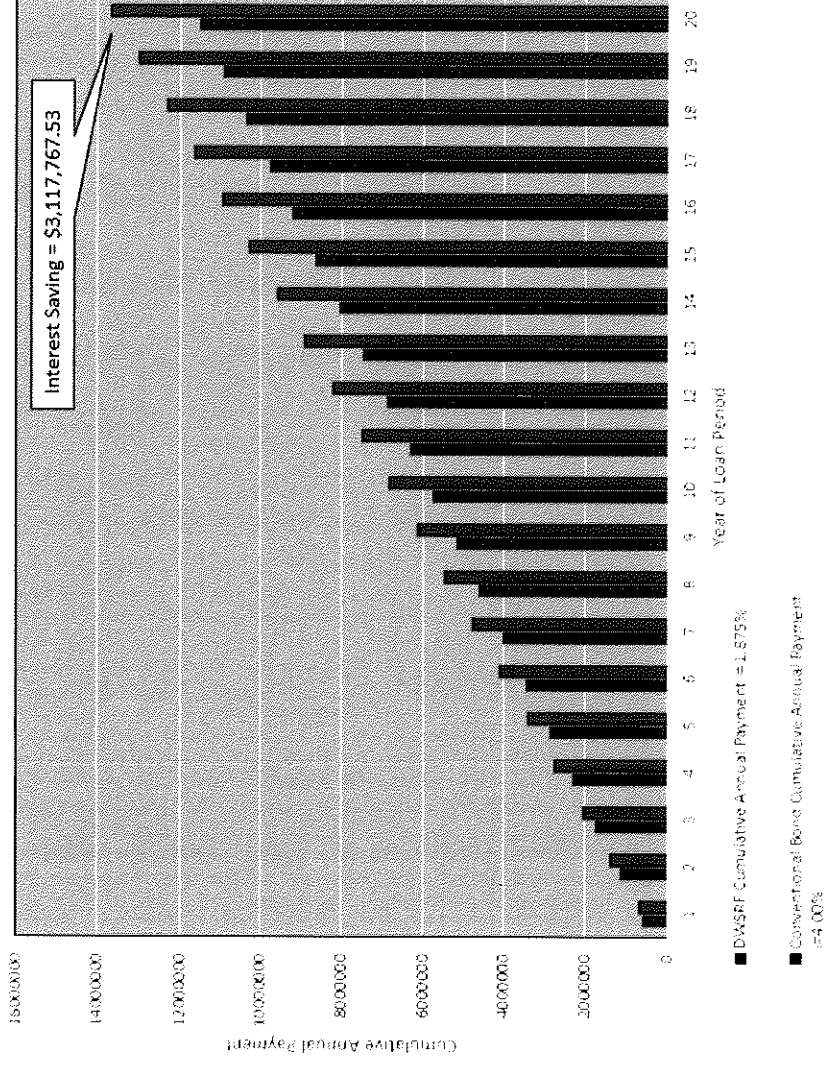
1.875%

Conventional Market Bond

4.00%

Estimated Loan Amount - \$11,845,377.69

Estimated DWSRF Project Cost - \$11,845,377.69





Social & Environmental Impacts

- Minimal traffic impacts in residential areas during construction. Existing sites will be reused.
 - ‘May Effect, Not Likely to Adversely Affect’:
 - Eastern Massasauga Rattlesnake
 - ‘No Effect’:
 - Indiana bat
 - Northern long-eared bat
 - Water billing rates will increase to accommodate annual loan payments. The amount of increase has not been decided.
-



Schedule - Q3 Funding

Due Date	Task
January 2023	<ul style="list-style-type: none">• Submittal of Draft Plans & Specifications
March 2023	<ul style="list-style-type: none">• Environmental Assessment• Submittal of Permit Applications• Final Submittal of Plans & Specifications
April 2023	<ul style="list-style-type: none">• EGLE Approval of Project Plan• EGLE Approval of Plans & Specifications• Submittal of Contractor Bids
August 2023	<ul style="list-style-type: none">• Start Construction
November 2024	<ul style="list-style-type: none">• Complete Construction



QUESTIONS?

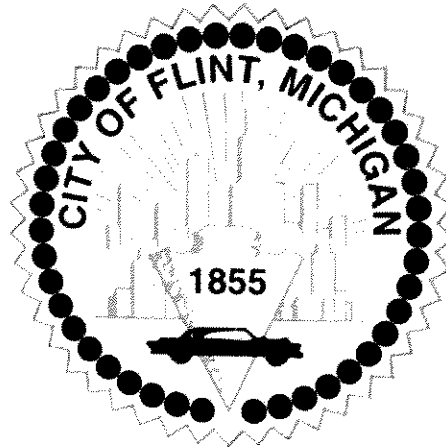
THANK YOU!

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SUPPLEMENTAL INFORMATION #2



CITY OF FLINT
FY2023 DRINKING WATER STATE REVOLVING FUND
CEDAR STREET RESERVOIR AND NORTHWEST TRANSMISSION MAIN
WATER EXTENSION IMPROVEMENTS
PROJECT PLAN



July 1, 2022

EXECUTIVE SUMMARY

The City of Flint (City) completed a Water System Reliability Study as requested by the Michigan Department of Environment, Great Lakes, and Energy (EGLE). State rules require the completion of the study every five years to evaluate the water system's present and future demands. The City of Flint completed a Water System Reliability Study and General Plan update in April of 2016.

The City has authorized the preparation of this *2023 Drinking Water State Revolving Fund (DWSRF) Project Plan* to develop a plan for water distribution system improvements. Information from this plan will be incorporated into an application document that will be submitted to EGLE for consideration to receive a DWSRF low interest construction loan to make necessary capital improvements to the City's water distribution system. The application documents can be found in Appendix I. The City submitted an *Intent to Apply* form in January 2022 to the EGLE Water Infrastructure Financing Section (WIFS). This form is included in Appendix II for reference.

The proposed projects that have been identified to be included in the Project Plan are the replacement of the Northwest Transmission Main and repairs to the Cedar Street Reservoir and Pump Station. Approximately 6,700 feet of the Northwest Transmission main will be replaced with new infrastructure along portions of West Pasadena Avenue, Dupont Street, North Saginaw Street, and Wager Avenue.

Improvements to the Cedar Street Pump Station include building upgrades including lighting, new roof, and restroom rehabilitation and the installation of three new pumps, chlorine feed system, pressure transducer as well as new valves in addition to a new transformer and various other station improvements. Improvements to the Cedar Street Reservoir include extensive concrete rehabilitation, column repair, and joint repair. All improvements at the Cedar Street Pump Station and Reservoir will be completed within the site, located at the intersection of Cedar Street and Fenton Road.

1.3 POPULATION DATA

The City has a population of 81,252 as of the 2020 U.S. Census. The City is not expected to experience a rapid growth in population in the coming few decades, but rather continually decline. The total population of the City has decreased by approximately 21,182 in the last 10 years. On average, the City has lost 19,000 people per decade. However, during the next few decades, the population rate of decrease is expected to slow. Population projections are shown in Table 2 and were provided by the Genesee County Metropolitan Planning Commission (GCMPC).

Table 2 – Population Projections

Year	Population	Source
1980	159,611	Census
1990	140,925	Census
2000	124,943	Census
2010	102,434	Census
2015	98,297	Census
2020	81,252	Census
2025	77,343	GCMPC
2030	72,527	GCMPC
2035	69,646	GCMPC
2040	67,133	GCMPC

1.4 WATER DEMAND

The City of Flint developed a hydraulic model in 2009 to aid in the analysis of water quality issues. Physical characteristics such as topography, pipe length, pipe diameter, tank elevations, and interior roughness were taken into consideration. Commercial water was added to the system demands while residential water use was averaged and dispersed throughout the system. For many Michigan communities, summer months see a trend of higher water usage. The City of Flint's water usage, however, has been higher during the winter months.

Average daily demand (ADD) is defined as the yearly water consumption divided by the number of days in the year. This rate is used for projecting supply and pumping costs that configure water sales. In 2021, the average daily demand was 9.1 million gallons per day (MGD). The flow rates that were used for the modeling could include as much as 3 MGD of unaccounted water.

Maximum daily demand (MDD) is defined as the maximum consumption of water that occurs over a 24-hour period. This demand is used to determine the size of water supply facilities and to ensure those facilities are meeting production and storage volume requirements for adequate water supply. The most recent maximum daily demand was 16.3 MGD in January 2022. The decrease in MDD from 2008 to 2022 correlates to the decrease in population and updates to the water system.

Table 3 shows the City's average day demand and maximum daily demand from 2008-2022. As can be deduced from the yearly totals, the water demand in the City is decreasing over time. Note that the City commenced purchasing water from the Great Lakes Water Authority and Genesee County Water System in 2021 and the full year's usage is not available.

Table 3 – Historical Water Use

Year	Total Volume Pumped (MG)			MDD/ADD Ratio
	Yearly Total	Average Day	Maximum Day	
2008 ¹		15.2	18.7	1.23
2009 ¹		14.0	21.6	1.54
2010	5145	14.1	17.5	1.24
2011	5081	13.9	20.4	1.47
2012	4406	12.1	17.8	1.48
2013	4903	13.4	17.4	1.29
2014	6645	18.2	24.5	1.34
2015	5951	16.3	25.4	1.56
2016	4628	12.6	18.9	1.50
2017	4151	11.2	77.6 ²	
2018	4152	11.2	18.7	1.67
2019	3815	10.3	15.4	1.50
2020	3570	9.6 ³	17.6 ³	1.83
2021 ¹		9.1 ³	14.3 ³	1.57
2022 ¹		10.9 ⁴	16.3 ⁴	1.50
Note 1: For these years, data was not available for the entire calendar year.				
Note 2: This was the maximum day demand according to the data supplied by the City. Based on max day information in other years, it is assumed this is a typo.				
Note 3: Available Daily Water Usage from August to December 2021.				
Note 4: Available Daily Water Usage from January and February 2022.				

1.5 EXISTING FACILITIES

1.5.1 SOURCE FACILITIES

The City of Flint Water Treatment Plant (WTP) was constructed in 1952, replacing the city's original WTP. That plant treated water from the Flint River until 1970 when its role transitioned to a secondary or backup supply system to purchased water from the Detroit Water & Sewerage Department (DWSD), which began to supply the City system with treated water. The City reverted back to sourcing and treating their own water from the Flint River in April of 2014 to October of 2015. High lead concentrations in that water raised water quality concerns and the City resumed purchasing water from DWSD to supply the water system again at that time. Currently, the existing WTP building has been converted to offices and the filtration equipment has been abandoned. The elevated tank, chemical building, reservoir, and pump station at the WTP site are still in use.

In 2016, the Great Lakes Water Authority (GLWA) formed and began operations as an independent regional water and wastewater authority and while separate from DWSD, began leasing the regional water infrastructure and treatment facilities from the City of Detroit. GLWA draws water from Lake Huron and treats it before a 72-inch transmission main conveys the water to the City of Flint's transmission and distribution facilities. This 72-inch transmission main also provides water service to Genesee County and several other communities in southeast Michigan.

The City of Flint also purchases a small amount of water from the Genesee County Water System (GCWS), operated by the Genesee County Drain Commissioner Division of Water and Waste Services (Appendix III). The GCWS sources water from Lake Huron with the Karegnondi Water Authority (KWA) Pipeline delivering untreated water to the Genesee County treatment plant in Oregon Township, Lapeer County. The KWA consists of Genesee County Drain Commissioner, Lapeer County Drain Commissioner, Lapeer City, Sanilac County Drain Commissioner, and the City of Flint.

In April of 2022, the City completed transition to a 95/5 blend: 95% GLWA source water and 5% GCWS source water to supply the water system. Water samples will be taken quarterly for the next year by the Michigan Department of Health and Human Services to ensure the high quality of water continues to be provided to City customers.

1.5.2 WATER TREATMENT AND RESIDUAL DISPOSAL

Currently, the City of Flint does not treat their own water, however the City of Flint monitors the water source from both GLWA and KWA as it enters the City system at the Chemical building. The City has the ability to add chlorine and phosphate to maintain the desired chlorine residual level and phosphate levels at the chemical building prior to distribution into the City of Flint's distribution and storage system. The City also monitors chlorine residual levels at the Dort pump station and Cedar Street pump station and can add chlorine at both location should the chlorine residual levels drop below desired levels.

1.5.3 WATER STORAGE AND PUMP STATIONS

The City of Flint owns and operates several pumping stations and storage facilities. All facilities were evaluated during EGLE's 2020 Water System Sanitary Survey, and deficiencies were identified in the report. A copy of the 2020 survey can be found in Appendix IV. The City of Flint uses a SCADA monitoring system at their reservoirs, pumping stations, and water treatment plant. Based on the sanitary survey report, the storage reservoirs, storage tanks, and pumping stations are not meeting all Michigan Safe Drinking Water Act requirements. Since the Dort reservoir and pump station is currently off-line for renovations, the 2020 survey does not identify the Dort facility as deficient. A brief overview of each facility can be found below.

1. Cedar Street Reservoir and Pumping Station (P.S. No. 3)

The Cedar Street reservoir is a 20-Million gallon (MG) ground storage facility located at the end Cedar Street of Fenton Road, near Thread Creek. The reservoir and pumping station facility were originally constructed in 1948. The pumping station is equipped with three single-stage horizontal centrifugal pumps rated at 8 MGD, 12 MGD, and 15 MGD. This station has a total capacity of 35MGD and a firm pump capacity of 20 MGD. The reservoir and pumping stations are currently used as a standby water supply during peak demands and emergency events. At this time, no backup power supplies are located at this facility.

The Cedar Street reservoir and pumping station can be controlled manually or from the water treatment plant. The reservoir is typically filled at night during periods of low demand. The pumping station is stocked with chlorination supplies to provide additional chlorine residual as needed. Water quality in the reservoir has been an issue at times due to the large volume of the reservoir and its location on the opposite side of the City from the water supply.

According to the preliminary inspection for the sanitary survey, several areas were identified with deteriorated concrete or cracking walls and roofs. The survey noted that other deficiencies cannot be addressed until the Dort Reservoir and Pumping Station are back online.

2. Dort Reservoir and Pumping Station (P.S. No. 4)

The Dort reservoir and pumping station is located at the City of Flint Water Treatment Plant. The pumping station was constructed in 1948/1949 with expansions in 1995. The reservoir is a 20 MG ground storage facility constructed in 1966. The pumping station is equipped with three centrifugal pumps and two turbine pumps, considered inoperable. Pumps 7, 8, and 9 are 2-20 MGD pumps and 1-6 MGD pump, respectively. These were installed in 1994 to increase turnover at the reservoir. The inoperable pumps 1 and 2 were installed in 1949. This station has a total capacity of 46 MGD with a firm pumping capacity of 26 MGD. The reservoir and pumping stations are currently used for emergency water storage and to house additional water supply for use during peak water demands.

Improvements and repairs to the Dort Reservoir were completed in 2020 and included concrete slab and wall joint replacement, caulking, spalling concrete repairs, carbon fiber v-wrap column reinforcement, new ladders and vent covers, and general cleaning/painting. The Dort Pumping Station is currently in the construction

phases of a rehabilitation project. Rehabilitation at the station includes installation of a new roof, lighting, interior door, valves on the pump suction and discharge lines, chlorine residual, chlorine feed system, and removal of two sluice gates as part of Phase I. Concrete repair, painting, the installation of three 5-MGD pumps, three new variable frequency drives, transformer, ship ladders, bearing supports, and second chlorine feed system, restroom rehabilitation, and the completion of electrical and control wiring and PLC programming are part of Phase II. Work is scheduled to be completed by October 2022.

3. West Side Reservoir and Pumping Station (P.S. No. 5)

The West Side reservoir and pumping station is located near Mackin Road and Jean Avenue. The reservoir is a 12 MG ground storage facility that was installed in 1970 but is not currently in service. The pumping station is equipped with four turbine pumps, all installed in 1970. Pumps 1 and 2 are three-stage turbine pumps, each with 4 MGD capacity. Pumps 3 and 4 are two-stage turbine pumps with 8 MGD each. This station has a total capacity of 24 MGD and a firm pump capacity of 16 MGD. The facility currently has no backup generator power.

The West Side reservoir and pumping station can be controlled manually or from the water treatment plant. When in service during the winter months, the reservoir is typically filled at night during the low demand periods. When in service during the summer months, the station operates continuously all day and alternates every other day with the Cedar Street pump station. The pumping station is stocked with chlorination supplies to provide additional chlorine residual as needed.

4. Torrey Road Pumping Station

The Torrey Road pumping station is equipped with two centrifugal pumps rated at 4 MGD and 2.8 MGD that were installed in 1954. This station has a total capacity of 6.8 MGD but a firm pump capacity of 2.8 MGD. New pumps were purchased and are awaiting installation. The primary function of this station is to provide increased pressure to the southwest portion of the City. The Torrey Road station acts as an in-line booster, taking water from the 24-inch transmission main on Hammerburg Road and discharging it to the 18-inch transmission main supplying the southwest pressure district. No backup power connections are provided at this facility.

5. Water Treatment Plant Elevated Tank

A 2 MG elevated storage tank is located at the Water Treatment Plant site. The elevated storage tank was constructed in 1952 and refurbished in 2009. This tank serves as emergency water storage and acts as a pressure buffer. The elevated tank fills and drains as system demands and pressures indicate. The sanitary survey determined the overflow pipe was not screened and the drain lines were not properly connected. A suitable plan and schedule was requested by EGLE to provide protected and air-gapped overflow and drain lines to the storage tank.

6. Water Treatment Plant Ground Storage

Also located at the Water Treatment Plant site is a 3 MG ground storage tank. It was constructed in 1954 as an emergency water supply and pumping source during peak demands. The ground storage tank is no longer in service, and there are no plans of rehabilitating the tank for future use.

1.5.4 SERVICE LINES

Service leads within the City have been providing adequate service. There are approximately 56,038 parcels in the City of Flint, and 43,406 are believed to be currently occupied.

The service leads material distribution is located in Table 4 below; this information is from the 2016 *Water Reliability Study* and the best information available at this point. The information was provided by the Department of Natural Resources with aid from local records and investigations. A portion of the service lines are lead piping. Experience has demonstrated many of the unknown services are also lead piping. It is expected that at least 18 percent of services may be lead. The City has replaced lead and galvanized services within the right-of-way during road and utility repair or replacement projects. The City and State are also working to provide material replacement of lead and galvanized services from the main all the way to the water meter. As of July 2021, the City has performed 27,133 excavations, found 17,074 copper service lines and replaced 10,059 services to the water meter.

Table 4 – Service Line Material Composition (as of 2016)

Service Material	All Parcels		Occupied Parcels	
	Quantity	Percentage	Quantity	Percentage
Copper	25,784	46.0%	22,995	52.9%
Galvanized	12,011	21.4%	7,889	18.2%
Lead	4,341	7.8%	3,414	7.9%
Unknown	13,898	24.8%	9,104	21.0%
Other	4	<0.1%	4	<0.1%
Total	56,038		43,406	

1.5.5 DISTRIBUTION SYSTEM

The water distribution system provides service to the entire City of Flint. It is comprised of approximately 583 miles of water main ranging in size from 2-inch diameter pipe to 72-inch diameter pipe. Much of the distribution network is arranged in looping patterns to increase hydraulic capacity and water quality. Looping systems prevent water from stagnating in dead end pipe sections that promote bacterial growth. Transmission

mains ranging from 12-inch to 24-inch diameter in size make up 11 percent of the system and are generally located near the center of the City, creating an interior transmission loop. Smaller 6-inch and 8-inch diameter water mains (approximately 75% of the system) branch off the transmission mains to service individual neighborhoods.

A breakdown of the water system by pipe size is shown in Table 5 below.

Table 5 – Water Main by Diameter

Diameter (in)	Length (ft)	Percentage of System
2	3,338	0.11%
3	8,022	0.26%
4	137,586	4.47%
6	1,588,740	51.59%
8	760,968	23.74%
10	18,029	0.59%
12	249,851	0.35%
14	24,906	0.81%
16	108,265	3.52%
18	58,452	1.90%
20	94	0.00%
24	119,622	3.88%
30	17,973	0.58%
36	10,668	0.35%
42	1,769	0.06%
48	400	0.01%
72	759	0.02%
Total	3,079,442	100%

The City's GIS data revealed that approximately 97% of the water system consists of cast iron pipes. Cast Iron tends to corrode and develop a pitted interior as it ages due to oxidation. When pitting occurs, the pipes allow for an environment that supports bacterial growth. Ductile iron, steel, concrete, galvanized, and other types

of pipes make up the remainder of the system. A breakdown of the system's pipe materials is shown in Table 6.

Table 6 – Water Main by Material

Material	Length (ft)	Percentage of System
Cast Iron	2,976,032	96.64%
Ductile Iron	81,210	2.64%
Steel	14,130	0.46%
Concrete	6,721	0.22%
Other	1,067	0.03%
Galvanized	282	0.01%
Total	3,079,442	100%

In the early 1900s, the City's water main only spread as far as the downtown sector, near the Flint River. Around 1920 the City experienced a large expansion due to the auto industry and many new water customers were added to the system farther from the river. In the 1950s, the City, including the water system, expanded once again to reach the current City limits. The average age of the City's water main is approximately 89 years old. A breakdown of the approximate age of system pipes can be found in Table 7 on page 12.

Table 7 – Water Main Age

Installation Date	Length (mi)	Percentage of System
1900-1910	20.2	3.5%
1911-1920	148.1	25.9%
1921-1930	194.2	34.0%
1931-1940	35.9	6.3%
1941-1950	7.1	1.2%
1951-1960	142.9	25.0%
1961-1970	11.7	2.1%
1971-1980	1.4	0.3%
1981-1990	9.7	1.7%
1991-2000	1.1	0.2%
2001-2011	10.8	1.9%

1.5.5.1 Appurtenances

An analysis of the system's water valves was undertaken from May to July of 2015. The initial survey as a part of this analysis found that only 44 percent of 8,228 in-line and hydrant valves assessed were in operable condition. To address this issue, a maintenance program was introduced that included the regular working of the valves on a rotating basis, with emphasis on the larger, critical valves. A follow up review was completed at the end of the analysis, and it was concluded that operability of the valves increased by approximately 26 percent, raising operability rates from 44 percent to 70 percent. The City water department staff continues to address remaining inoperable valves as a part of the maintenance program.

Since 2013, the City has completed annual inspections of hydrants within their distribution system. The inspections include the flushing of all hydrants, which addresses water age issues within the system. The City replaces hydrants on an as needed basis as a part of their maintenance program.

The City of Flint is responsible for five (5) dams that are no longer used for water supply but remain under the City's care. They were constructed between 1920 and 1955 when the Flint River was used for the City's water supply. The Holloway, Kearsley, Hamilton, and Thread Lake Dams were inspected in 2015, while the Utah Dam has not been inspected since 2008. The Thread Lake dam was recently rehabilitated after a flood caused the gates to fail. The conditions of each dam from their most recent inspection are as follows in Table 8 on page 13.

Table 8 – Dam Summary

Dam	Last Inspection	Dam Components	Condition
Holloway Dam	2015	Spillways, Control Structures, Dam Embankments	Good
Kearsley Dam	2015	Spillways, Control Structures, Dam Embankments	Poor
Hamilton Dam	2015	Dam Superstructure, Dam Substructure	Very Poor
		Dam Base, Sheet Piling	Fair
Thread Lake Dam	2015	Spillways, Control Structures, Dam Embankments	Poor
Utah Dam	2008	Superstructure concrete, Piers, Access Platform	Poor
		Gates	Inoperable
		Overall Structure	Fair to Poor

1.5.6 WATER METERS

The City replaces 3,000 meters per year on average. This equates to approximately 7 percent of all meters in the system. The City is nearing completion of an \$11 million investment project to upgrade all household water meters throughout the City with Badger LTE-M model meters which are remote broadcast over a cellular network. The City anticipates replacement of all water meters to be completed by 2022.

1.5.7 DISTRIBUTION SYSTEM OPERATION AND MAINTENANCE

The City of Flint water system was designed to service a population more than double that of Flint's current population size. A system with excess capacity can result in less revenue to support maintenance, high water age, and water quality issues. A list of some of the maintenance activities performed by the City to mitigate these issues include:

- Routine sampling of chlorine residual monitoring locations to stabilize chlorine levels throughout the system.
- Frequent flushing of water mains due to residual levels exceeding MCL requirements.
- Disinfectant Byproduct (DBP) every three months at each of the testing sites.
- Replacement of water meters that have surpassed the 20-year life span.
- During Fall, the annual hydrant flushing program inspects and flushes all hydrants within the system.
- A maintenance program was introduced for the system's valves to provide regular working and maintenance. The program focuses on the larger, critical valves on a more regular basis.

1.5.7.1 Water Main Breaks

The City has seen an increase in water main breaks caused by aged cast iron pipes and older pipes. When most of the City's water mains were installed, the typical bury depth was 3 ½ feet. Today's standards require 5 to 6

feet of ground cover for new water main installations. Continuous months of temperatures below freezing are believed to be the cause of increased water main breaks due to a rise in frost depths. Recent water main break information by year can be found in Table 9. Water main breaks for 2021 to 2022 are mapped in Figure 5 on page 15.

Table 9 – Water Main Breaks

Year	Number of Breaks
2010	134
2011	193
2012	148
2013	147
2014	296
2015	259
2016	Information Not Available
2017	Information Not Available
2018	Information Not Available
2019	Information Not Available
2020	Information Not Available
2021	238
2022	112 ¹
Note 1: Number of breaks to date, January 1, 2022 to May 10, 2022	



The City's contingency plan outlines the emergency precautions that should be followed in the event of an infrastructure failure or local disaster. The City's system has emergency interconnections to the Genesee

County water system. However, the systems operate at different hydraulic grade lines and the conditions of the connections are unknown. At this time, it is unclear if the emergency connections are adequate.

1.5.10 CLIMATE RESILIENCY

The largest climate threat to the City's water system would be the increased frequency of severe storms that may cause power outages. Ninety-five percent of the City's water is supplied from the Great Lakes Water Authority and their booster stations are equipped with backup generators. As a result, a power outage will not affect delivery of water unless it is a large-scale sustained regional power loss that impacts delivery of water to the City's system to adequately maintain the City's storage and pumping systems.

Out of the four (4) pumping facilities, the Cedar Street Pumping Station is the only facility that can be operated by generator. The Dort Reservoir has access to power via the redundant power service serving the Water Treatment Plant. The Torrey Road and West Side pumping stations and reservoirs do not have access to backup power. With the City signing a long-term water supply agreement with GLWA and GCDC, standby power options should be included for the pumping stations. According to City staff, the City of Flint is confident that GLWA is considering climate change and incorporating necessary steps to address them in their operating plans.

Failure of the remote monitoring SCADA system would require manual system monitoring and operation by City water department staff. The large storage volumes within the City would allow the system to continue operating in this manner until SCADA can be restored.

1.6 SUMMARY OF PROJECT NEED

1.6.1 CEDAR STREET PUMP STATION AND RESERVOIR

The Cedar Street Pumping Station and Reservoir is a 20-million-gallon storage facility with a three-pump system that has a firm capacity of 20 MGD. Both the pump station and the reservoir were installed in 1948 with reservoir additions completed in 1968, all of which require improvements and rehabilitation.

In the *Water Distribution System Optimization Plan* completed by Arcadis in 2018, hydraulic modeling and analysis determined the need for improvements at the Cedar Street Reservoir and Pump Station. A sudden water surge model resulted in pressure fluctuations localized around the reservoir with correlations to historic water main breaks in the system. The aged infrastructure requires replacement to meet the existing water quality needs and supply demands of the community. The analysis also determined that there are negative impacts to water age when the Dort and Cedar Street Reservoirs are operating simultaneously. Arcadis recommended the use of the Cedar Street Reservoir during the Spring through Fall seasons and use of both reservoirs during the Winter season.

Proposed improvements to the pump station include operational and system changes such as the replacement of process valves and piping, new chlorine feed systems, two double wall chlorine storage tanks, and pump upgrades to improve energy efficiency. Other improvements include architectural elements such as walls and

window removals, masonry replacement, door & frame replacement, new roof system, new roof vents and access hatches, lighting, restroom improvements, and security system upgrades.

Improvements to the reservoir are structural in nature and are proposed to improve the reliability and prolong the life of the reservoir as well as enable the City to use it to full capacity. The City is awaiting the completion of the Dort Pump Station Rehabilitation project prior to an inspection of the Cedar Street Reservoir because the Dort Reservoir needs to be in service in order to drain the Cedar Street Reservoir for access. The full scope of improvements and rehabilitation of the reservoir will be determined at that time. The location of the Cedar Street pump station and reservoir is shown in Figure 6.

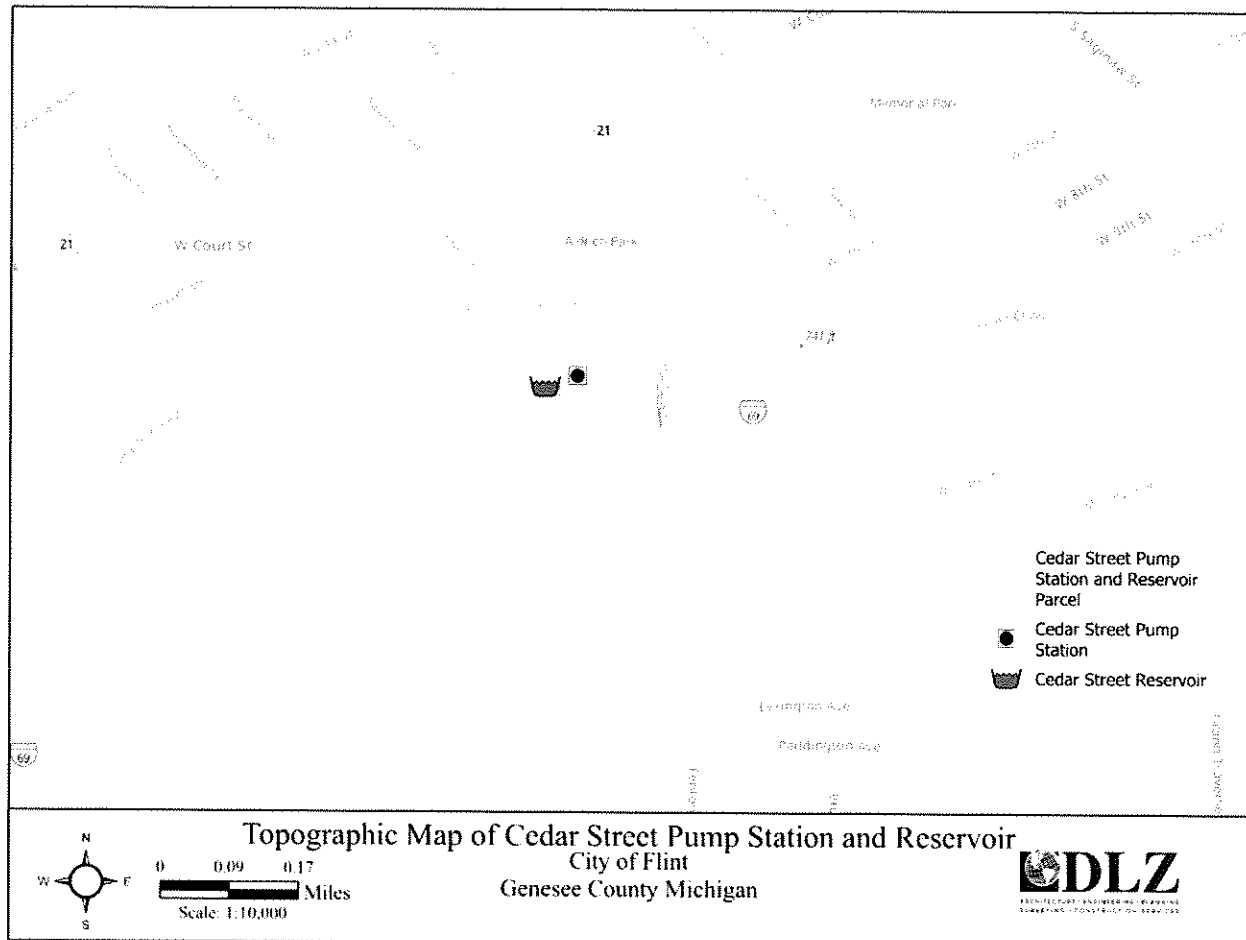


Figure 6 – Proposed Cedar Street Reservoir Repairs

1.6.2 NORTHWEST TRANSMISSION MAIN

The Northwest Transmission Main is the northwest portion of the large 24-inch water main loop that conveys water throughout the City of Flint. With aging and decaying portions of the transmission main, the overall reliability and water quality of the system is decreasing.

The proposed project will replace approximately 6,700 feet of the existing transmission main. The proposed 24-inch ductile iron pipe replacements are along West Pasadena Avenue to Dupont Street and North Saginaw Street to Wager Avenue. Replacement of the transmission main is expected to reduce water main breaks, provide high water quality, and increase reliability for the City. Valves and hydrants along the transmission main will also be repaired, providing reliable access for fire flows and required shut offs for emergency purposes. The proposed water main replacements and affected parcels are identified in Figure 7.

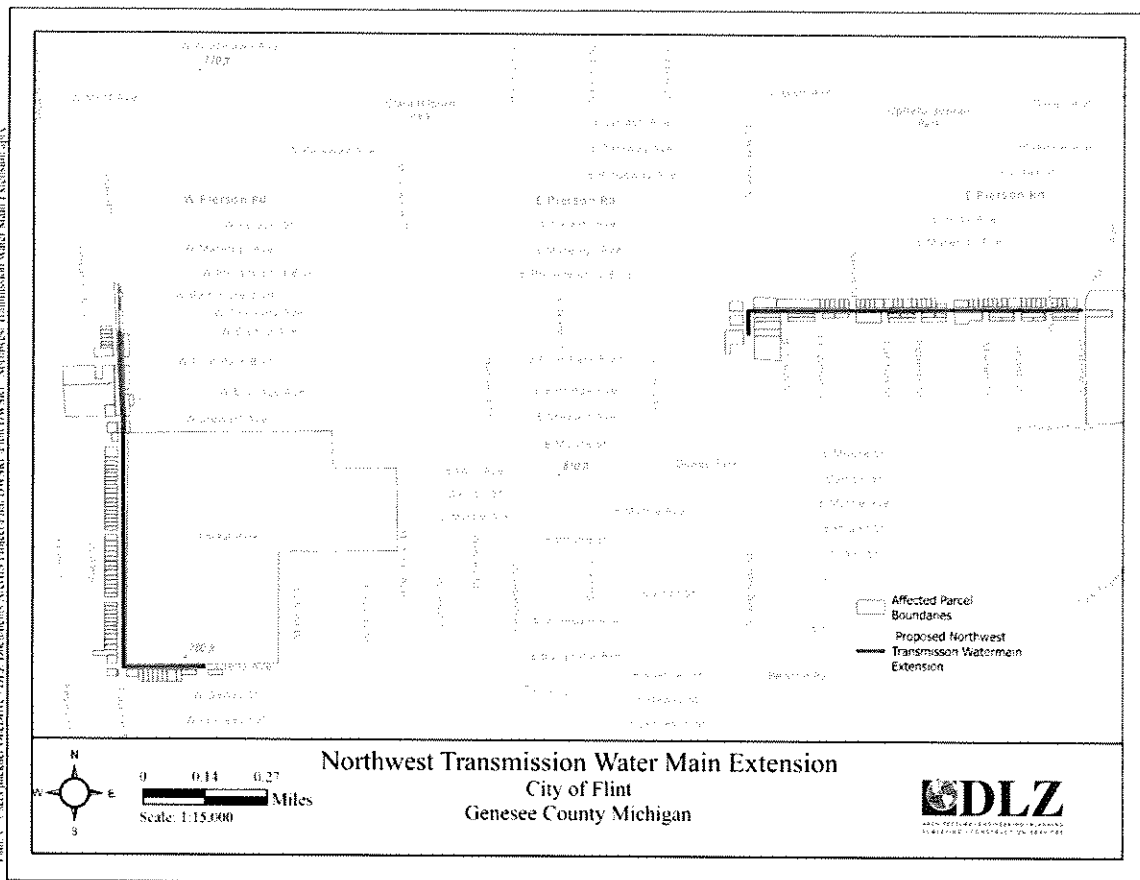


Figure 7 – Northwest Transmission Main

1.6.3 ORDERS OR ENFORCEMENT ACTIONS

A voluntary agreement with the Michigan Department of Environmental Quality (now EGLE), on December 17, 2018, was issued to supersede the requirements ordered by the Safe Drinking Water Act (Appendix V). The agreement outlined programs and timelines the City of Flint needed to adopt or follow to avoid monetary penalties to the State. Some of the conditions outlined in the agreement are as follows:

- Formally adopt a cross-connection control program to avoid non-potable water entering the public water system.
- Implement previously approved Standard Operating Procedures.
- Conduct a preliminary and final inspection of the Cedar Street Reservoir.
- Provide a proposal indicating how the City will meet technical, managerial, and financial capacity by 2023.

The agreement will not be terminated until all conditions have been met. Both parties' goal is to provide the City of Flint a self-reliant water system.

1.6.4 DRINKING WATER QUALITY PROBLEMS

In December of 2014, the City of Flint yielded unsatisfactory results of trihalomethanes (TTHM) in their water system. The maximum concentration level of TTHM is 80 parts per billion (ppb). The city was non-compliant with levels of TTHM at 93.6 ppb. In October 2015, the City's Technical Advisory Committee recommended returning to the GLWA water source after reports of elevated blood levels in children were analyzed. At this time, the Flint River produced two consecutive lead and copper tests that exceeded the 5 micrograms per liter (µg/L) standard.

Every six (6) months, the City is required to provide lead and copper test results to EGLE. Since July 2016, the city has met the lead and copper rule (LCR) standard of 15 parts per billion. The most recent period of July to December 2021, the city's water system tested at 7 ppb, well below the LCR requirement.

1.6.5 PROJECTED NEEDS FOR THE NEXT 20 YEARS

As shown in the 20-year Capital Improvement Plan (CIP), prepared by Arcadis, in Appendix VI, the City of Flint classifies their capital improvements into three (3) groups: Administrative and Support, Water Distribution, and Rehabilitation and Replacement. The City is currently undertaking, or has undertaken recently, seven (7) infrastructure improvement projects including: water quality monitoring, adding a secondary water source, service line replacements, construction of a chemical feed building at the water treatment plant, residential water meter upgrades, Dort Reservoir and Pumping Station rehabilitation, and local assistance/capacity development by adding personnel and expertise to oversee the projects and construction.

In addition to the current projects and the proposed improvements to the Cedar Street Pump Station, Reservoir and the Northwest Transmission Main, the City still has important issues to address within their water system. Four of the five dams maintained by the City are in imminent need of attention. It is recommended that the Hamilton Dam be removed and replaced, but the Utah Dam needs to be completely removed from the system.

The Kearsley Dam is not at the point of removal, but there is major work to the structural concrete and bridge required. At the Holloway Dam maintenance is only suggested. The recommended work includes installation of a river flow gauge, replacement of drum gate bearings, and new instruments to read water surface levels. In addition, the average age of water distribution system water main is nearly 100 years old and many water mains are still in need of replacement. Additional transmission main replacement will be necessary as well as systematic replacement of the smaller system mains in the next twenty years.

2.0 ANALYSIS OF ALTERNATIVES

2.1 ALTERNATIVE 1 – “NO-ACTION”

The No-Action alternative represents a do-nothing or business-as-usual scenario. This would mean that the City takes no action to improve the existing infrastructure and leaves the system as-is. In this scenario, the Cedar Street Reservoir and Pump Station would not be repaired and upgraded, and the Northwest Transmission Main would not be replaced. As these existing facilities and infrastructure are nearing the end of their useful lives, the No-Action alternative will not be considered based on their importance within the system.

The failure of the Northwest Transmission main would disrupt system looping, creating multiple dead-end water mains and cut off water feeds to adjacent neighborhoods. The Cedar Street Reservoir and Pumping Station is an important facility that provides storage and water distribution in the southern half of the City, opposite the source feed and water treatment plant. Modeling has shown the best long-term strategy for the water system, utilizing source water from GLWA, is to operate the Cedar Street Reservoir and Pumping Station all year long with the plant elevated tank to meet system demands. Thus, allowing the facility to reach useful life and removing it from service will prevent the City from providing adequate water supply to its customers.

2.2 ALTERNATIVE 2 – “OPTIMUM PERFORMANCE OF EXISTING FACILITIES”

Optimum performance of the existing facilities involves operational changes, addition of new equipment, or the addition and training of operating personnel. However, adding operational changes to aging infrastructure such as the Cedar Street Pump Station and Northwest Transmission Main only serves as a temporary solution. Operational changes and the optimum performance of the existing infrastructure has not been selected as an alternative. However, there will be additional operational changes to the Cedar Street Pumping Station as part of the improvements to the existing infrastructure, which is discussed under Alternative 4, to optimize the operation of the proposed improvements.

2.3 ALTERNATIVE 3 – “REGIONAL ALTERNATIVES”

There are various regional alternatives that have been considered for the Cedar Street Reservoir and the Northwest Transmission Main. One regional alternative for the Cedar Street Reservoir is to create an additional feed from Genesee County. This would require the construction of thousands of feet of water main, and a chemical feed to ensure compatibility with the water in the City of Flint. Regional alternatives to the Northwest Transmission Main include changing the routing of the existing main and abandoning the transmission main.

These regional alternatives will not be considered as they do not present a cost effective and feasible approach to achieving high water quality and reliability.

2.4 ALTERNATIVE 4 – “IMPROVE EXISTING INFRASTRUCTURE”

An alternative was explored to improve the existing infrastructure, which involves the repair and rehabilitation of the Cedar Street Reservoir and Pump Station and the replacement of the Northwest Transmission Main. The Cedar Street Reservoir was constructed in 1948 and is primarily used as an emergency water supply and pumping source during peak demand events. However, due to the large volume (20 million gallons) and its location on the opposite side of the City from the water supply, water quality issues have been a recurring problem. Repairs to the existing reservoir and pumping station would alleviate water quality and reliability concerns.

Due to nearing the end of its useful life, segments of the Northwest Transmission Main need to be replaced. These replacements address reliability issues associated with the aging infrastructure. Water main replacements will address water quality and public health concerns in the most cost-effective manner available.

Alternative 4 was chosen as the selected alternative due to the direct and comprehensive water quality and reliability improvements to the City of Flint infrastructure. Designs for the Cedar Street Pumping Station and Reservoir and the Northwest Transmission Main were started under an existing State Grant and are approximately 90% complete, however significant cost overruns under that existing grant has pushed these projects outside of the fundable range. Funding under this DWSRF will allow the design to be finalized and provide the necessary funds to complete construction of the proposed projects.

3.0 PRINCIPAL ALTERNATIVES

3.1 ENVIRONMENTAL EVALUATION

3.1.1 CULTURAL RESOURCES

There are multiple Cultural and Historical sites within the City of Flint, however it was determined that there would be no impacts to these locations from the proposed projects. The historical sites from the National Register of Historic Places are listed in



INNOVATIVE IDEAS
EXCEPTIONAL DESIGN
UNMATCHED CLIENT SERVICE

City of Flint
FY2023 DWSRF Cedar Street Reservoir and
Northwest Transmission Water Main Extension
Page 22 of 52

Table 10.

3.1.2.12 SOILS

Soils will not be heavily impacted as water main installation will be done with horizontal directional drilling methods which are less invasive when compared to open cut excavation methods.

3.2 MITIGATION

Permits necessary for the scope of the project will be applied for and obtained prior to construction. Mitigation during the replacement and improvement procedures are the responsibility of the contractor. Examples of mitigation procedures which may be taken include airborne dust control measures and construction noise control measures. The contractor shall follow all construction standards and work to minimize all potential environmental impacts which may occur during construction. Soil erosion and sediment control devices will be used to minimize the environmental impacts due to ground disturbance and runoff from the site.

3.3 TECHNICAL CONSIDERATIONS

All proposed installation of the water main, pump station, and reservoir improvements will follow applicable standards and an EGLE Permit for Water Supply Systems Act 399 Permit will be obtained for all construction activities.

3.4 RESIDUALS

The City has been experiencing development and redevelopment in recent years and will continue to experience redevelopment. However, as mentioned previously, these changes in development are not anticipated to occur in the study areas and therefore will not affect future demand within the existing service areas.

3.5 CONTAMINATION

There are two EGLE Part 201 and one Part 211 Environmental Management Sites within 1000 feet of the Cedar Street Pump Station and Reservoir, as well as one open EGLE Part 201 Environmental Management Site within 600 feet of the Northwest Transmission Main project site. A list of the contaminated sites can be found in Appendix VIII.

3.6 NEW/INCREASED WATER WITHDRAWALS

It is anticipated that there will be no new or increased water withdrawals as a result of the proposed projects.

4.0 SELECTED ALTERNATIVE – ALTERNATIVE 4

4.1 DESIGN PARAMETERS

Alternative 4 has been selected as the most operational and cost-effective option for the City. The repairs and rehabilitation to the Cedar Street Pump Station and Reservoir and Northwest Transmission Main will assure continued reliable water volume and quality to the City of Flint into the foreseeable future. With the proposed

DWSRF funding, the City of Flint is seeking to repair roughly 6,700 feet of water main, rehabilitate the 20 Million Gallon Cedar Street Reservoir, and provide repairs and improvements to the Cedar Street Pump Station.

Estimated construction costs for each of the alternatives are summarized in Table 11. Alternative 1 does not provide an adequate solution as it leaves the system as-is without improvements and optimization. The system will continue to deteriorate with age and could lead to critical system failure. System optimization and management, as outlined, in Alternative 2 can provide temporary relief of water system issues, but it does not present a long-term solution to the aging infrastructure and the system and/or components will eventually fail once the assets are past their useful life. Alternative 3 does not present a cost or operationally effective solution for the City of Flint.

Detailed cost breakdowns and estimates for each identified project is provided in Table 12.

Item quantities for the Cedar Pump Station and Reservoir were based on the previously designed Dort Pump Station and Reservoir. Item quantities for the Northwest Transmission Main were based on designs completed in 2015. Present day costs for each item were applied to estimate the total construction costs for each of the proposed projects.

Table 11 – Estimated Construction Costs of Alternatives

Alternative	Description	Total Cost	Present Worth
1	No-Action	\$ 0 ¹	\$ 0 ¹
2	Optimum Performance	\$ 0 ¹	\$ 0 ¹
3	Regional Alternatives	\$ 24,000,000 ¹	\$ 24,000,000 ²
4	Improve Existing Infrastructure	\$11,845,377.69	\$11,460,696.76
<p>Note 1: Option 1 and 2 will have no initial construction cost due to leaving the system as-is (Alternative 1) and operating the system to an optimum performance, which the City of Flint is currently doing (Alternative 2). However, the assets will continue to deteriorate due to the age of the system and costs will continue to increase as time progresses for routine maintenance and spot repairs. This option is not recommended.</p>			
<p>Note 2: According to the 2016 Water Reliability Study for the City of Flint, the replacement cost for the Northwest Transmission main was estimated at \$20,000,000.00. This would cover the replacement of 30,300 feet of pipe. Adjusting for inflation from 2016 dollars, and not considering the increase in price due to current supply issues, the regional alternative of complete transmission main replacement would be nearly \$24,000,000.00. This estimate also does not consider any costs associated with regional alternatives to the Cedar Street Pump Station and Reservoir. Due to the exorbitant costs and feasibility issues, Regional Alternatives will not be considered for this project.</p>			

Table 12 – Construction Cost Estimate

Description	Quantity	Unit	Unit Price	Item Price
Cedar Street Pump Station				
Remove and Replace Roof	1	LS	\$293,930.45	\$293,930.45
Demo for Access Hatches and Two New Hatches	2	EA	\$16,109.09	\$32,218.18
Demo of Wall Section Influent Channel	1	LS	\$144,449.53	\$144,449.53
48" Influent Manifold	1	LS	\$627,697.68	\$627,697.68
48" Butterfly Valve & Operator	1	LS	\$46,371.60	\$46,371.60
30" Butterfly Valve	6	EA	\$15,520.04	\$93,120.23
10" Butterfly Valve	3	EA	\$12,431.10	\$37,293.30
Three Horizontal Split Case Pumps with Motor and Shafts	3	EA	\$190,553.28	\$571,659.83
Intermediate Bearing Supports	3	EA	\$26,258.65	\$78,775.95
Grating on Existing Intermediate Bearing Supports	1	EA	\$24,075.98	\$24,075.98
Reagents less Cl ₂ Analyzer	1	EA	\$13,114.20	\$13,114.20
Pressure Transducer	1	EA	\$6,093.45	\$6,093.45
Cl Feed Systems Complete with Injection Piping	2	EA	\$31,109.79	\$62,219.58
Handrailing	1	LS	\$27,047.63	\$27,047.63
Ships Ladder	4	EA	\$11,914.24	\$47,656.95
Masonry Repair	1	LS	\$65,568.53	\$65,568.53
Sidewalk Replacement	1	LS	\$14,227.13	\$14,227.13
Lighting	1	LS	\$71,071.83	\$71,071.83
Transformer	1	EA	\$95,424.73	\$95,424.73
200 Hp 480V VFDs	3	EA	\$148,901.23	\$446,703.68
Electrical Equipment Demo	1	LS	\$26,453.35	\$26,453.35
New Pass Door	1	EA	\$15,257.83	\$15,257.83
Rest Room Rehabilitation	1	LS	\$34,950.30	\$34,950.30
Painting	1	LS	\$61,321.70	\$61,321.70
Piping, Fittings	1	LS	\$299,808.30	\$299,808.30
PLC Programming Allowance	1	LS	\$33,000.00	\$33,000.00
Remove & Plug Sluice Gate	2	EA	\$12,058.75	\$24,117.50
Check Wiring for Existing VFD for Pump #1 and Complete Wiring	1	LS	\$19,312.15	\$19,312.15

Start Up	2	EA	\$6,859.88	\$13,719.75
Arc Flash Analysis	1	LS	\$10,529.75	\$10,529.75
Short Circuit Calculation	1	LS	\$10,529.75	\$10,529.75
Contingency Allowance	1	LS	\$132,000.00	\$132,000.00
Building Permit Allowance	1	LS	\$55,000.00	\$55,000.00
Mobilization	1	LS	\$353,472.08	\$353,472.08
			Subtotal	\$3,888,192.83
Cedar Street Reservoir Rehabilitation				
Concrete Patching	100	SFT	\$231.00	\$23,100.00
Concrete Crack Repair	1500	LF	\$49.50	\$74,250.00
Top Slab Expansion Joint Repair	1400	LF	\$165.00	\$231,000.00
Exterior Wall and base Slab Expansion Joint Repair	1500	LF	\$57.20	\$85,800.00
Interior Wall Expansion Joint Repair	825	LF	\$60.50	\$49,912.50
Column Repair	64	EA	\$21,587.50	\$1,381,600.00
Roof Slab Bottom Coating	137800	SFT	\$2.70	\$371,371.00
Concrete Column Delamination Repair	650	SFT	\$198.00	\$128,700.00
Concrete Column Coating	7200	SFT	\$4.95	\$35,640.00
Concrete Cores and Testing	3	EA	\$1,870.00	\$5,610.00
Mobilization	1	LS	\$238,698.35	\$238,698.35
			Subtotal	\$2,625,681.85
Northwest Transmission Main				
GV and Box, 8 Inch	14	EA	\$2,500.00	\$35,000.00
Remove 8-inch Water Main	1046	LF	\$30.00	\$31,380.00
8-inch Water Main, DI	1817	LF	\$175.00	\$317,975.00
6-inch Water Main, DI	5	LF	\$175.00	\$875.00
16-inch Water Main, DI	23	LF	\$250.00	\$5,750.00
24-inch Water Main, DI	4901	LF	\$450.00	\$2,205,450.00
Abandon Ex. 24-inch Water Main with Flowable Fill	685	CYD	\$225.00	\$154,125.00
BFV and Well, 24 inch	7	EA	\$20,000.00	\$140,000.00
Connect to Ex. Water Main	17	EA	\$4,000.00	\$68,000.00
Remove Hydrant	4	EA	\$500.00	\$2,000.00
Hydrant Assembly	19	EA	\$9,500.00	\$180,500.00
Temporary Blow Off	23	EA	\$2,000.00	\$46,000.00
Curb Stop	26	EA	\$1,750.00	\$45,500.00
Water Service (3/4", 32' long)	26	EA	\$2,750.00	\$71,500.00

Sidewalk Removal	810	SYD	\$15.00	\$12,150.00
Sidewalk	6455	SFT	\$10.00	\$64,550.00
Sidewalk Ramp	391	SFT	\$10.00	\$3,910.00
Curb and Gutter Remove and Replace	1366	LF	\$40.00	\$54,640.00
Pavement Removal	9484	SYD	\$20.00	\$189,680.00
HMA Repair and Replace	3152	TON	\$125.00	\$394,000.00
Hand Patching	8	TON	\$150.00	\$1,200.00
Driveway	107	SYD	\$80.00	\$8,560.00
Mobilization	1	LS	\$403,274.50	\$403,274.50
Subtotal				\$4,436,019.50
Total Construction Cost				\$10,949,894.18

PROJECT BUDGET

The total project budget can be seen in Table 13. This estimate includes design costs at 8% of the total construction cost, construction administration which includes inspection and construction engineering at 10% of the total construction cost, and other items such as the project plan, legal services, and bond counsel.

Table 13 – Total Project Budget

Description	Cost
Total Construction Cost	\$10,949,894.18
Design (8%)	\$354,881.56
Construction Administration (10%)	\$443,601.95
Project Plan	\$30,000.00
Legal/Financial Service	\$32,000.00
Bond Counsel	\$35,000.00
Total Project Budget	\$11,845,377.69

RESOLUTIONS



220240

RESOLUTION NO.: _____

PRESENTED: 6-15-2022

ADOPTED: _____

BY THE CITY ADMINISTRATOR:

RESOLUTION TO ADOPT A FINAL PROJECT PLAN FOR DRINKING WATER
SYSTEM IMPROVEMENTS AND DESIGNING AN AUTHORIZED PROJECT REPRESENTATIVE

The City of Flint recognizes the need to make improvements to its existing drinking water system; and

The City of Flint authorized DLZ-Michigan, Inc. to prepare a Project Plan, which recommends the rehabilitation of the Cedar Street Pumping Station and reservoir and replacement of 6,700 linear feet of Northwest Transmission Water Main.

Said Project Plan was presented at a Public Hearing on June 15, 2022 and all public comments have been considered and addressed.

IT IS RESOLVED, that the City of Flint formally adopts said Project Plan and agrees to implement the selected alternative (Alternative 4 – Improving Existing Infrastructure).

IT IS FURTHER RESOLVED, that the City of Flint Public Works Director, a position currently held by Michael J. Brown, upon City Council's approval, is designated as the authorized representative for all activities associated with the project referenced above. This includes the submittal of said Project Plan as the first step in applying to the State of Michigan for a Drinking Water State Revolving Fund Loan to assist in the implementation of the selected alternative.

APPROVED AS TO FINANCE:

Robert J. F. Widigan
Robert J. F. Widigan Jun 14, 2022 13:58 EDT

Robert J. F. Widigan, Chief Financial Officer
Chief Financial Officer

APPROVED AS TO FORM:

William Kim
William Kim Jun 14, 2022 14:13 EDT

William Kim
Acting Chief Legal Officer

CLYDE D. EDWARDS
CLYDE D. EDWARDS Jun 14, 2022 14:28 EDT

Clyde Edwards, City Administrator

CITY COUNCIL:

FY22 – KRN

TODAY'S DATE: June 14, 2022

BID/PROPOSAL# N/A

AGENDA ITEM TITLE – Final Project Plan for Drinking Water System Improvements and Designating an Authorized Project Representative

PREPARED BY Kathryn Neumann for Michael J. Brown, Director of Public Works

VENDOR NAME:

BACKGROUND/SUMMARY OF PROPOSED ACTION:

The purpose of this resolution is to adopt a final project plan for drinking water system improvements and designating an authorized project representative, Michael J. Brown.

FINANCIAL IMPLICATIONS: None

BUDGETED EXPENDITURE? YES ☒ NO ☐ IF NO, PLEASE EXPLAIN:

WILL YOUR DEPARTMENT NEED A CONTRACT? YES ☐ NO ☐

(If yes, please indicate how many years for the contract)

OTHER IMPLICATIONS (i.e., collective bargaining): None

STAFF RECOMMENDATION: (PLEASE SELECT): ☒ **APPROVED** ☐ **NOT APPROVED**

DEPARTMENT HEAD SIGNATURE:

Michael J. Brown

Michael J. Brown (Jun 14, 2022 13:50 EDT)

Michael J. Brown, Director of Public Works