DRAFT

DOWNRIVER WASTEWATER TREATMENT FACILITY - ULTRAVIOLET DISINFECTION SYSTEM REPLACEMENT

Clean Water State Revolving Fund

B&V PROJECT NO. 415050
B&V FILE NO. 30.2100

PREPARED FOR

DUWA

Downriver Utility Wastewater Authority

29 MARCH 2023

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1.0 Background

The Downriver Utility Wastewater Authority (DUWA) owns and operates the Downriver Sewage Disposal System (DSDS) which includes the Downriver Wastewater Treatment Facility (DWTF), several miles of interceptor pipe, and a wet weather tunnel system. OHM Advisors (OHM) is the System Manager for DUWA and Veolia N.A. (Veolia) is the System Operator. The DWTF is located at 797 Central Avenue, Wyandotte, Michigan 48192. The site is located in a relatively industrial area. The Detroit River is located east of the DWTF.

The DWTF utilizes preliminary, primary, secondary, and disinfection treatment processes to treat sewage prior to discharging treated effluent to the Trenton Channel of the Detroit River. The DWTF utilizes oxygen activated sludge (OAS) treatment to provide secondary wastewater treatment. The DWTF's typical dry weather flows range from 30-60 MGD. However, the DWTF has the capacity to fully treat 137.5 Million Gallons per Day (MGD), and the capability to process up to 225 MGD during extreme wet weather events. DUWA's existing UV disinfection system consists of Trojan UV4000 equipment installed in the late 1990s manufactured by Trojan Technologies (Trojan).

The DWTF requires replacement of the existing Trojan ultraviolet (UV) disinfection system, which has been operating since its installation in the late 1990's. In 2021, the equipment manufacturer informed DUWA (and all users of this model technology) that they will no longer support this existing model with spare parts starting in July 2022. Based on a condition assessment performed in 2022, the useful life of the existing UV disinfection system was limited to the availability of spare parts, at which time the system would no longer be able to function per original design criteria.

In order to maintain permit compliance for disinfection limits under their National Pollutant Discharge Elimination System (NPDES) permit, a solution to replace the existing disinfection system must be implemented immediately. In March 2023, the DWTF experienced its first permit violation in over 5 years during prolonged duration of high flows with the disinfection capabilities unable to perform. The disinfection system must have capacity to meet the entire range of flows to the DWTF.

This Project Plan was prepared to obtain financing from the Michigan Department of Environment, Great Lakes, and Energy (EGLE) for the construction of the proposed UV system replacement at the DWTF as part of the Clean Water State Revolving Fund (SRF) program.

1.1 Study and Services Areas

DSDS serves 13 communities in Wayne County: City of Belleville, City of Ecorse, City of Lincoln Park, City of River Rouge, City of Southgate, City of Wyandotte, City of Allen Park, City of Taylor, City of Dearborn Heights, City of Romulus, City of Riverview, Charter Township of Van Buren, and Charter Township of Brownstown. A map of the service area can be seen in the Figures in Appendix F. The DWTF is located at 797 Central Avenue in the City of Wyandotte, Michigan south of Detroit on a 34-acre site situated along the Detroit River. There is no expansion to the service area or plant site as part of this project.

1.2 Population

The current population served by the DWTF is 277,830 people. Population data obtained from the Southeast Michigan Council of Governments (SEMCOG) indicates that the population in the DWTF service area is expected to slightly decrease through 2045. There is no seasonal fluctuation in population in the service area. Table 1-1 presents the projected population for all 13 communities service by DWTF.

Table 1-1 Projected Population Data

Community	Population Served	2045 Projected Population Served
Allen Park	25,224	23,821
Belleville	4,008	3,787
Brownstown Twp	11,031	11,861
Dearborn Heights	19,472	19,242
Ecorse	9,305	8,690
Lincoln Park	40,245	35,618
River Rouge	7,224	5,462
Riverview	12,490	12,662
Romulus	22,489	23,518
Southgate	30,014	30,615
Taylor	63,409	58,820
Van Buren Twp	7,865	9,313
Wyandotte	25,058	24,078
TOTAL	**277,834**	**267,487**

1.3 Existing Environment Evaluation

1.3.1 Cultural and Historic Resources

Cultural and historic sites are listed in several places: State Register of Historic Sites (SRHS), the National Register of Historic Places (NRHP), and the Michigan Historical Markers (MHM). There are several designated sites within approximately three (3) miles of the DWTF but none are located within the immediate vicinity of the DWTF. The following sites were identified:

- America's First Bessemer Steel Mill – Van Alstyne Blv, Wyandotte (MHM, 1957).
- Angus Keith House – 9510 Horse Mill Rd, Grosse Ile (MHM, 1989).
- Eighteenth-century Gristmill Site – East River Rd, Grosse Ile (MHM, 1965).
- Amo-Juchartz House – 434 Plum Street, Wyandotte (SRHS, 1991).
- William Armstrong House – 2234 Biddle Ave., Wyandotte (SRHS, 1991).

- Eureka Iron Works – Northwest corner of Van Alstyne Boulevard and Elm Street, Wyandotte (SRHS, 1957).
- Ford Village Municipal Building – 994 Biddle Avenue, Wyandotte (SRHS, 1989).
- Ford-Bacon House – 45 Vinewood, Wyandotte (SRHS, 1987 and NRHP, 1997).
- George P. MacNichol House – 2610 Biddle Avenue, Wyandotte (SRHS, 1973 and NRHP, 1984).
- Marx House – 2630 Biddle Avenue, Wyandotte (SRHS, 1976 and NRHP, 1976).
- Gustave C. Mehlhose House – 367 Oak Street, Wyandotte (SRHS, 1991).
- Louis Mehlhose House – 355 Oak Street, Wyandotte (SRHS, 1994).
- Michigan Alkali Company Administration Building – 1609 Biddle Street, Wyandotte (SRHS, 1990).

The work associated with the UV disinfection replacement construction is not anticipated to impact these sites, or any area outside of the DWTF UV disinfection facility site.

As of publication of this report, this project has not been determined to be an Equivalency Project, thus correspondence with the State Historical Preservation Office, and the Tribal Historical Preservation Office is not required.

1.3.2 Air Quality

The Clean Air Act of 1963, as amended in 1970, 1977, and 1990 requires the Environmental Protection Agency (EPA) to set the National Ambient Air Quality Standards (NAAQS) to define pollutants that could be harmful to public health and the environment. Primary standards are related to public health protection and secondary standards protect public welfare like damage to animal, crops, vegetation, and buildings. The standards are periodically reviewed and revised when necessary. The current six pollutants monitored are: carbon monoxide (CO), Lead (Pb), Nitrogen Dioxide (NO_2), ozone (O_3), particle pollution (PM), and sulfur dioxide (SO_2). The standards are listed in Table 1-2.

Table 1-2 Air Quality Standards

Pollutant	Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)	Primary	8 hours	9 ppm	Not to be exceeded more than once per year
		1 hour	35 ppm	
Lead (Pb)	Primary and secondary	Rolling 3 month average	0.15 µg/m^3	Not to be exceeded
Nitrogen Dioxide (NO_2)	Primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	Primary and secondary	1 year	53 ppb	Annual Mean
Ozone (O_3)	Primary and	8 hours	0.070 ppm (1)	Annual fourth-highest daily

		secondary			maximum 8-hour concentration, averaged over 3 years
Particle Pollution (PM)	$PM_{2.5}$	Primary	1 year	12.0 µg/m^3	annual mean, averaged over 3 years
		Secondary	1 year	15.0 µg/m^3	annual mean, averaged over 3 years
		Primary and secondary	24 hours	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	Primary and secondary	24 hours	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)		Primary	1 hour	75 ppb (2)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

Notes:
1. Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O3 standards are not revoked and remain in effect for designated areas. Additionally, some areas may have certain continuing implementation obligations under the prior revoked 1-hour (1979) and 8-hour (1997) O3 standards.
2. The previous SO2 standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2)any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and which is designated nonattainment under the previous SO2 standards or is not meeting the requirements of a SIP call under the previous SO2 standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required NAAQS.

EGLE conducts air quality monitoring throughout the state in accordance with EPA standards. Non-attainment areas exceed the concentrations outlined in the NAAQS standards. The EGLE monitors these standards as part of the Air Quality Division, EGLE is working on a web portal (MIEnviro Poral for Air) to show the results from the Air Monitoring Stations. The following data is taken from the EPA's interactive map called AirData Air Quality Monitors on GIS. According to the EPA, the DWTF resides in two non-attainment areas according to the current 2015 standards. An Ozone Non-Attainment Area exists for the Detroit metropolitan area which includes the 13 communities in the Service Area. A Sulfur Dioxide Non-Attainment area exists that exceeds the 1-hour limit within the Detroit Metropolitan area along the Detroit River. This area includes the entire City of River Rouge, City of Ecorse, City of Wyandotte, and City of Riverview. Portions of Brownstown Township, City of Southgate, City of Lincoln Park, and City of Allen Park reside in the Sulfur Dioxide Non-Attainment area.

There is no portion of this project that will have significant effect on the local air quality.

1.3.3 Wetlands

The Fish and Wildlife Service's National Wetlands Inventory Mapper was used to identify wetland within the Service area. There are a few areas designated as a Freshwater Forested/Shrub Wetland and Lakes

as seen in Appendix F. There are ash lagoons located on the western end of the DWTF property that are small man-made wetlands. There are no regulated wetlands on the DWTF site.

1.3.4 Great Lakes Shorelands, Coastal Zones, and Coastal Management Areas

DWTF is located approximately 1,200 feet from the shoreline of the Detroit River, which serves as the coastal waterway between Canada and the United States. The coastal zone boundary defined by Michigan, generally extends a minimum of 1,000 feet inland from the Ordinary High Water Mark of the Great Lakes and connecting channels. This project does not impact the coastal zone as all modifications are limited to within the DWTF site.

There are streams, wetlands, and waters in the vicinity of the project, however, no impacts to these waterways are anticipated. This project does not involve the construction of any structure in or over any navigable waters.

1.3.5 Floodplains

Floodplains are defined by the Federal Emergency Management Agency (FEMA) floodplain maps through the National Flood Hazard (NFHL) Viewer. A figure in Appendix F, shows the floodplain boundaries for the different flood zone designations. The DWTF site is not located within a delineated floodplain area.

1.3.6 Natural or Wild and Scenic Rivers

The DWTF is located approximately 1,200 feet from the shoreline of the Detroit River but that is not defined as a Natural or Wild and Scenic River.

1.3.7 Major Surface Waters

The Detroit River is the only surface water near the DWTF and currently receives the treated effluent. There will be no change in treatment processes that will affect the effluent to this surface water.

1.3.8 Topography

The DWTF is approximately 581 feet above sea level with a flat topography.

1.3.9 Geology

The surface geology of Southeast Michigan is characterized by two broad zones, a lowland zone and hill zone. These zones parallel each other in a northeast-southwest direction through the length of the region. The lowland zone, a belt of low, flat lands, varying in width from 20 to 30 miles, lies between the Great Lakes shoreline and the edge of the zone of hills and valleys. This lowland is composed mainly of clay and sand deposits. The Study Area is located entirely within the lowland zone. A map of the geological deposits in the services area can be seen in Appendix F.

1.3.10 Soil Types

The planning area includes soils classified as USA Soils Hydrogeological Group A, Group A/D, Group B, Group B/D, Group C, and Group C/D. The soil distribution within the planning area is shown in Appendix F. According to the U.S. Soil Conservation Service, the area around the DWTF contains soils of the

Pewamo-Blout association. These soils are classified as almost level and gently sloping, somewhat to very poorly drained soils with moderately fine textured and fine textured subsoil.

1.3.11 Agricultural Resources

There is no agricultural land in the vicinity of the DWTF site.

1.3.12 Fauna and Flora

A species list was obtained from the Michigan Ecological Services Field Office of the United States Fish and Wildlife Service, using the Information for Planning and Consultation (iPAC) tool. Eleven listed species were identified as endangered, threatened, or candidate as Shown in Table 1-3.

Table 1-3 Federally Threatened and Endangered Species

Species	Status
Indiana Bat	Endangered
Northern Long-eared Bat	Threatened
Tricolored Bat	Proposed Endangered
Piping Plover (Bird)	Endangered
Red Knot (Bird)	Threatened
Eastern Massasauga (Reptile)	Threatened
Northern Riffleshell (Clam)	Endangered
Snuffbox Mussel (Clam)	Endangered
Monarch Butterfly	Candidate
Eastern Prairie Fringed Orchid	Threatened

There were no identified critical habitats in the service area.

1.4 Existing System

The DWTF was originally constructed in 1938 as a primary treatment plant with solids incineration. The facility has undergone expansions and upgrades in 1964, 1970, 1975, and 1989. In the early 1990s, a State Revolving Fund (SRF) Project Plan was completed, resulting in construction of numerous improvement expansion projects, including improvements required to accommodate a peak flow of 225 MGD.

1.4.1 Wastewater Treatment and Condition of Facilities

The DWTF utilizes preliminary, primary, secondary, and disinfection treatment processes to treat sewage prior to discharging treated effluent to the Trenton Channel of the Detroit River. The DWTF is an oxygen activated sludge (OAS) facility providing secondary wastewater treatment. The treatment plant's typical dry weather flows range from 30-60 million gallons per day (MGD). However, the treatment plant has the capacity to fully treat 137.5 MGD, and the capability to process up to 225 MGD during extreme wet weather events.

Preliminary treatment consists of influent pumping, screening and grit removal. After grit removal, wastewater enters the primary treatment facilities. In the primary treatment facilities, there are seven (7) primary settling tanks with ferric chloride and anionic polymer feed capabilities. DUWA uses ferric chloride for phosphorus removal.

During wet weather conditions, preliminary treatment flow in excess of 150 MGD and up to 225 MGD is pumped by the Tunnel Pump Station. The Tunnel Pump Station bypasses excess preliminary treatment flow from primary treatment and re-introduces the flow into primary treatment effluent flow before the low lift pump station. The low lift pump station has a pumping capacity of 200 MGD and pumps flow into the secondary treatment process. Secondary treatment consists of pure oxygen fed activated sludge processing and final settling. Wastewater from the secondary treatment process is conveyed by gravity to the UV disinfection system, which is the final step in the treatment process.

1.4.2 Design Capacity

The DWTF design flow rates and characteristics on DWTF influent wastewater are included in Table 1-4.

Table 1-4 DWTF Design Parameters

Parameter	Value	Unit
Minimum Flow	25	mgd
Dry Weather Flow	45	mgd
Average Annual Flow	65	mgd
Maximum Rated Flow	150	mgd
Secondary Treatment Capacity	137.5	mgd
Disinfection Rated Capacity (sustained)	175	mgd
Disinfection Rated Capacity (intermittent)	225	mgd
Average BOD Loading	68,300	lbs/day
Average TSS Loading	97,200	lbs/day
Maximum Month BOD Loading	85,300	lbs/day
Maximum Month TSS Loading	143,800	lbs/day

1.4.3 Disinfection

Disinfection treatment reduces and breaks down the microorganism populations in the wastewater before discharge into the Trenton Channel of the Detroit River. DUWA's existing ultraviolet (UV) disinfection system consists of Trojan UV4000 equipment installed in the late 1990s manufactured by Trojan Technologies (Trojan). The DWTF disinfects sustained flows of 175 MGD of primary and secondary effluents before they are discharged to the main plant outfall. Wastewater flows greater than 175 MGD may be discharged to the Southgate-Wyandotte Outfall to the east, by cresting over the emergency overflow weir gates. The current practice is to operate two channels during dry weather flow conditions. Once flows exceed 87.5 MGD, which typically occurs during wet weather conditions, operating staff place one or both remaining (standby) channels in service. This system was designed to

disinfect up to 225 MGD during intermittent wet weather flows for short periods. The DWTF maintains disinfection compliance during dry and wet weather events with the existing system.

Wastewater is conveyed through the system by gravity with the downstream hydraulic elevation controlled by a static weir located downstream of the UV disinfection system. Treated primary and/or secondary effluent enters the common UV influent channel from Junction and Bypass Chambers. Wastewater flows eastward through one or more of the four UV channels. Wastewater is discharged from the in-service UV reactor-channels and flow back towards the south in the common UV effluent channel. The majority of the flows will continue southward to the main plant outfall.

The UV disinfection system is housed in an enclosed area adjacent to the Administration Building and consists of five concrete channels; however, only four channels are currently equipped with modules of Trojan UV4000 lamps. A fifth channel is empty and available for expansion of the system. Each channel is equipped with slide gates located at both the upstream and downstream ends. Each UV module consists of two banks of nine (9) racks, with ten (10) lamps per rack, for a total of 90 lamps per module and 180 lamps per channel, or 720 lamps total.

The lamps have variable intensity capability between 30% and 100% of the maximum output capacity of 2800 watts/lamp. Power is supplied by one Power Distribution Center (PDC) for each of the eight banks. The power is carried through electronic ballasts (one per lamp) that are cooled by a circulating cooling system.

There are several control gate types associated with the Disinfection system.

- UV Channel Gates: Each UV channel is equipped with an inlet gate, an outlet gate, and a drain valve.
- Emergency Overflow: There are two Emergency Overflow Relief Weir Gates. These weir gates are used to allow the effluent from the UV System to flow to the Southgate-Wyandotte Outfall in the case of extremely high influent flow or high river elevation.
- Other Control Chamber Gates, Junction Chamber Gates, and Bypass Chamber Gates.

Flow streams within the UV treatment process include:

- Phosphoric Acid (lamp sleeve cleaning) - disabled due to operational issues. Originally this system was used to clean the quartz sleeves to maintain the transfer of the UV into the water. The cleaning system comprises of hollow collars that contain the cleaning solution. Staff indicated that grit would get imbedded into the collar and scratch the sleeve.
- Glycol (lamp ballast cooling system) - the medium pressure lamp technology generates heat that has to be dissipated to maintain the life of ballasts. The glycol acts as a heat exchanger removing the heat from the ballast and transferring it into the water.

Flow streams from the UV treatment process include Plant Effluent.

The major equipment associated with the existing UV system is summarized in Table 1-5 and further detailed herein:

Table 1-5 Existing UV System Design Data

Description	Design Features
No./Type	4 – Trojan UV400
Quantity of Lamps	720
Length of Submerged Outfall Sewer	2,900 ft
Diameter of Outfall Sewer	7 ft
Peak Disinfection Flow	175 mgd
Design Disinfection Dose	20,000 mw. Sec/cm2

There are four UV channels; each is 41' long, 6'-2" wide and 15'-8" in overall channel height. Water depths vary with influent flows; a fixed position outlet weir maintains the minimum water depth. The reactor chamber within each channel is 15'-8" in length and approximately 4'-8" in both width and height.

1.4.4 Sludge Handling and Disposal

Primary sludge is pumped to gravity thickeners for co-processing with wasted secondary biosolids from the OAS process. Secondary waste activated sludge (WAS) is pumped to the gravity thickeners. Thickened biosolids, typically 2 to 3 % total solids (TS), are pumped to the Solids Handling Building for dewatering and drying (pending treatment type) and cake conveyance to the enclosed truck loading bay. Raw (undigested) cake biosolids (typical range of 23 to 31+%TS) are hauled away in double-hitch gravel train trailers (55-ton loads) to landfill(s) for disposal when only dewatered. It should be recognized that DUWA is nearing completion of a Dryer Project that will improve the drying facility to produce sludge that will be disposed of in landfills, applied to land, or beneficially reused as a Class A biosolid. The Dryers will take the dewatered raw cake and reduce its mass down to +90%TS. The dried cake is loaded into double-hitch gravel train trailers to landfills for disposal.

1.4.5 Collection System

The proposed project does not involve, nor does it have any impact on the DSDS collection system. Infiltration and Inflow (I/I), as well as the presence, location and/or operation of system bypasses, including sanitary sewer overflows and combined sewer overflows are not relevant to the DWTF UV disinfection system replacement project.

1.4.6 Industrial Discharges

Industrial discharges are not expected to impact the UV system replacement and were not evaluated as part of this project planning document.

1.4.7 Climate Resiliency

The DWTF experiences significant swings in flow related to wet weather events and is capable of treating the range of flows under various operating strategies. A summary of the DWTF strategies to treat normal versus wet weather flows was discussed earlier in Section 1.4.1. More detail is available in the DWTF Operation and Maintenance (O&M Manual).

Power to the DWTF is fed from two substations, each capable of providing sufficient power to run the plant. In the case of complete power loss, the DWTF is equipped with three emergency back-up generators to continue facility operations.

1.5 Need for the Project

Disinfection in a wastewater treatment process is essential for water quality and human health. If the disinfection system is not operating properly there are risks with complying with the National Pollutant Discharge Elimination System (NPDES) permit (see Appendix E) permit and creating water quality issues in the discharge waters. Since the existing UV system is no longer being supported by the manufacturer as of July 2022 (see Bulletin from Trojan Technologies in Appendix D), DUWA has a limited supply of spare parts and cannot obtain additional manufacturer parts. Immediate replacement of this system is critical to achieving the appropriate disinfection and compliance with NPDES permit requirements.

As previously mentioned, a condition assessment report completed in September 2022 indicated that the useful life of the existing UV disinfection system was limited to the availability of spare parts, at which time the system would no longer be able to function per original design criteria. The condition assessment report estimated reaching that point in approximately 20 months from the time of the report – May 2024. Based on preliminary input from disinfection system vendors and current market supply chain issues, equipment lead times for replacement UV equipment are expected to be 36-40 weeks (9-10 months). This report is included in Appendix D.

In order to continue disinfecting wastewater and maintaining permit compliance for disinfection limits under their NPDES permit replacement of the existing disinfection system must be implemented immediately. The DWTF is not currently under court order, federal or state enforcement orders, or administrative consent orders. A copy of the March 2023 NPDES Permit violation and required corrective actions is included in Appendix E.

1.5.1 Permit Compliance

Since DUWA took over the DSDS and operation of the DWTF in 2018, Monthly Operator Reports supplied by DUWA demonstrate disinfection compliance is achieved. However, during the weekend of March 11-12, 2023, DUWA experienced their first exceedance of the monthly 7-day moving average for fecal counts. The NPDES permit limit is 400 colonies/100 ml and the DWTF hit 404 colonies/100ml. The DWTF staff mentioned that they tried supplementing with bleach and noted that the UV system was at its highest power setting of the previous 10 days. During this event, the Wyandotte area experienced an extremely large and prolonged rain event during a period of snow melt in which the plant saw a substantial increase in flow rate. Up until this point there had not been an exceedance of any kind since DUWA took over operation of the system.

This exceedance is further evidence that a new system needs to be installed and is critical to provide future adherence to the NPDES permit requirements.

As climatological factors continue to change, larger, wet weather events could occur at increased frequency and intensity. The existing system has a design capacity of 175 MGD but is able to treat up to 225 MGD for short periods of time during wet weather events.

1.5.2 Water Quality Problems

DUWA has indicated that the turbidity increases when major rain events occur. Although this has an effect on UV transmittance (UVt), it has not affected DUWA's ability to disinfect water and meet permit limits – other than the March violation. See NPDES permit in Appendix E for other water quality parameters.

1.5.3 Stormwater Projects

This project is not explicitly related to storm water treatment. The DWTF operates on a combined sewer system and increased stormwater during wet weather creates high flow events to the DWTF and can create treatment capacity problems. This project will provide additional disinfection capacity in order to treat the full 225 MGD for sustained periods as necessary during high flow events caused by increased stormwater. The Alternatives evaluate ways to treat normal dry weather flows and additional flows due to storm water. Alternatives will evaluate different hybrid approaches that could be used in these situations.

1.6 Projected Future Needs

Since this a replacement project there is not additional flow being requested as a result of this project.

2.0 Analysis of Alternatives

2.1 Optimum Performance of Existing System

There are no optimization steps that could be taken to improve the current system's performance due to availability of replacement parts. As previously described, the existing system vendor is no longer manufacturing spare parts for the Trojan UV4000. DWTF staff have attempted to use non-OEM spare parts with little success. Operations staff are working to manually maintain and clean lamps to maintain the optimal delivery of UV light into the wastewater during all flow conditions. To maintain compliance during high flow events, sodium hypochlorite is periodically added upstream of the UV System as determined on a case-by-case basis.

This project is necessary to replace the UV system as the existing system is no longer being supported by the vendor and the system is nearing the end of its useful life. With limited replacement parts available it is difficult to optimize the existing system and measures described above are attempts to prolong the life of the existing system. Efforts to keep the existing UV system in operation require more labor from operations and maintenance staff. In addition, the automatic cleaning system on the UV system failed over 3 years ago and cannot be repaired or replaced.

The DWTF has an onsite laboratory for testing that is used to test the performance throughout the treatment plant. The laboratory and personnel are already equipped to test performance of the UV system. Operations staff are trained to conduct microbial testing as well as lab staff.

There are no process modifications throughout the DWTF that are required to implement disinfection. Different alternatives may require additional infrastructure to implement, but no major changes to overall treatment flow are required.

Industry contributions to the wastewater flow are minimal. Implementing an industrial pretreatment program would not mitigate the necessity of this project. This project will not be impacted by a reduction in I/I and will have no impacts on disposal systems. Public education would not solve the issue that leads to this project.

This project needs to be completed and there are no optimization efforts that can be made to change the need for replacement of the existing UV disinfection system.

2.2 Regionalization

Regionalization is defined as the ability to connect to an existing regional system or create a shared regional system with neighboring municipalities. This is not applicable to the proposed project. The existing system needs to be replaced and capacity is not the main driving force. The capacity of the DWTF is sufficient to satisfy current and projected future needs of the service area. The option of constructing a new regional wastewater treatment facility as a response to replacing the DWTF disinfection system is not feasible and was not considered further.

2.3 Identification of Potential Alternatives

There are several disinfection alternatives that could be considered as part of this effort and the following treatment alternatives were developed as part of this project plan:

- Alternative 1 – No action
- Alternative 2 – UV Disinfection
- Alternative 3 – UV and Sodium Hypochlorite
- Alternative 4 – UV and Peracetic Acid
- Alternative 5 – Ozone Treatment

2.3.1 Alternative 1: No Action

As indicated throughout this report, disinfection is a necessary treatment step to meet requirements of the DWTF's NPDES permit. Taking no action would result in the existing system operating until it exhausts its supply of spare parts and no longer provides disinfection. No action would result in allowing the system to reach the end of its useful life and the DWTF being unable to meet NPDES permit requirements by mid-2024. This alternative is not feasible and will not be considered moving forward.

2.3.2 Alternative 2: Ultraviolet (UV) Disinfection (In-Kind)

UV is a physical disinfecting agent that, unlike the chemical disinfectant alternatives, uses light of approximately 254 nm wavelength to penetrate bacteria and virus cell walls to break apart the cellular DNA and RNA . UV light provides rapid, effective inactivation of microorganisms through a physical process. When microorganisms are exposed to germicidal wavelengths of UV light, they are rendered incapable of reproducing and infecting. The overall process adds nothing to the water except UV light, has no impact on chemical composition or dissolved oxygen content, and does not create byproducts. For the purposes of conceptual design, the new generation of Trojan UV disinfection equipment (Trojan Signa) was utilized. Detailed design will include evaluation of other viable UV disinfection system suppliers. Conceptual design criteria for this alternative are presented in Table 2-1.

Table 2-1 Design Criteria for Alternative 2

Parameter, units	Description
No/Type	(4 operating + 1 redundant) 5 Channels
Total Number of lamps	690
Operating number of lamps	552
Wattage of Lamps, watt	1000
Peak Disinfection flow, mgd	225
Peak UV dose, mj/cm2	20
Design UV transmittance, %	53
Design TSS, mg/L	30

2.3.3 Alternative 3: Hybrid Disinfection – Ultraviolet (UV) and Sodium Hypochlorite

For this option, a combination of UV and chemical disinfection using sodium hypochlorite (chlorine) is evaluated – UV as the primary disinfectant and chlorine as the secondary disinfectant to be used during high flows (i.e. wet weather). In order to include chlorine as a viable alternative, it needs adequate contact time with the water to disinfect to meet permit limits. The detention time required for chlorine would require approximately a 2.3-million-gallon contact tank if it were the primary source of disinfection. If chlorine were to be used in conjunction with UV disinfection, then chlorine contact tanks would be sized for wet weather flows seen at the plant (137.5 to 225 mgd). A bulk chlorine tank and a chlorine feed system including pumps, containment and other ancillary components would need to be constructed. Further sizing would need to be finalized in preliminary/final engineering design if this alternative were selected.

Under this alternative, the UV system would be sized to treat up to 137.5 mgd and chlorine would be used to treat flows in excess of 137.5 mgd. Thus, the chlorine system would be used to disinfect 88 mgd so that the total plant capacity of 225 mgd at the plant can be maintained and sufficiently disinfected. For this conceptual design, 88 mgd of flow would be diverted from primary effluent, requiring a 427,000-gallon contact tank, and would be disinfected at a chlorine dose of 12 mg/L. This is a typical chlorine dose rate that was validated during bench-scale testing at the DWTF in March 2023. Detention time in the primary chlorine contact tank would be 10 minutes. Flow from the primary chlorine contact tank would combine downstream of the UV system. Table 2-2 provides the conceptual design criteria for Alternative 3.

Table 2-2 Design Criteria for Alternative

Parameter, units	Description
UV System	
No/Type	4 Channels + 1 Redundant Channel
Total Number of lamps	585
Operating number of lamps	487

Parameter, units	Description
Wattage of Lamps, watt	1000
Peak Disinfection Flow, mgd	137.5
Peak UV dose, mJ/cm^2	20
UV transmittance (UVt), %	58
Design TSS, mg/L	30
Chlorine System	
Capacity	88 mgd
Detention time @ peak flow	7 minutes
Volume, gallons	427,000
Chlorine dose, mg/L	12
Chemical Storage volume, gallon	10,000
Storage time, days	4

In a preliminary discussion with Trojan Technologies, they indicated that decreasing the flow treated by UV from 225 to 137.5 mgd did not significantly reduce the number of lamps required due to the flow rate per lamp that was used in the validation equation. While the flow decreased the total number of lamps, it did not decrease significantly. The minimal price decrease in reducing UV lamps does not come close to offsetting the cost to implement chlorine storage, feed and contact system needed to disinfect flows above 137.5 mgd.

Additionally, this alternative would require the addition of a sodium bisulfate system for dechlorination to meet permit requirements.

Hybrid alternatives offer good approaches for treating high wastewater flows due to increased stormwater flow during wet weather events. However, due to the minimal cost benefit of sizing the UV system for partial capacity, the associated costs of the chlorine system, as well as the logistical and spatial constraints of constructing the chlorine system, this alternative was not recommended for additional evaluation.

2.3.4 Alternative 4: Hybrid Disinfection – Ultraviolet (UV) and Peracetic Acid (PAA)

For this option, a combination of UV and chemical disinfection using peracetic acid (PAA) is presented – UV as the primary disinfectant and PAA as the secondary disinfectant to be used during high flows (i.e. wet weather). PAA has been regularly used as a wastewater disinfectant in Europe and Canada for the past 30 years. However, this technology is still under investigation and testing by the EPA with limited installations in the U.S. This is not an EGLE-approved method for disinfection, however EGLE is currently having discussions on whether to consider this disinfectant in the future. This alternative would also require the use of sodium bisulfate for dechlorination to meet permit requirements. For these reasons, PAA was eliminated from further evaluation and not considered as a viable alternative.

2.3.5 Alternative 5: Ozone Disinfection

Ozone is used to oxidize the DNA of bacteria in the water. Ozone is most commonly used in drinking water applications because it improves smell and taste of water. However, ozone is also utilized at wastewater treatment facilities within the United States, although is not common practice, often due to the high capital and operating cost. The DWTF is a pure oxygen facility which could make the feasibility of using ozone easier given the facility already utilizes oxygen onsite. However, implementation of ozone disinfection at the DWTF would be challenging due to the facility's highly variable flow and water quality during wet-weather events. In addition, retrofitting the existing facility to accommodate ozone or constructing a new ozone contact basin for the appropriate contact time would result in significant capital cost. Based on ozone demand studies conducted at other pure oxidation facilities, ozone would be very costly to the point of not being a viable solution. Due to these reasons, ozone will not be considered for further evaluation.

2.4 Analysis of Principal Alternatives

There was only one alternative considered feasible and identified as a principal alternative: Alternative 2 – UV Disinfection (in-kind replacement). Reusing the existing structures in place for the UV disinfection system is the most cost effective, sustainable, and practical solution. The principal alternative was evaluated further and considered monetary impacts, environmental considerations, and other technical aspects.

2.4.1 Monetary Evaluation

The monetary evaluation includes a present worth analysis which summarizes costs for Alternative 2 over the 20-year planning period.

2.4.1.1 Sunk Cost

Sunk costs are the investments or financial commitments made before or during the project planning. Sunk costs were excluded from the present worth cost as they have already been committed regardless of the alternative selected. Sunk costs typically include the cost of existing facilities and land, outstanding bond indebtedness, and the cost of preparing the project planning document.

2.4.1.2 Present Worth

Total present worth is used to compare alternatives including OM&R, capital costs, and salvage value. Present worth (PW) is the sum of money that, if invested now at a given interest (discount rate), would provide the funds necessary to pay for all future and present costs. The OM&R present worth was calculated using a 5% interest rate over 20 years. The PW for OM&R and capital costs are calculated to 2024 values.

Operating costs were only developed for the selected alternative of UV disinfection for the entire flow range. These costs we developed based on design conditions of 225 mgd and average flow of 53 mgd. Consumable costs were based on a recent (March 2023) project for Ann Arbor, MI. Table 2-4 presents the annual operating costs for this alternative. Operating costs were developed based on power costs of $0.10/kWh and labor costs of $50.00/hour. Chemical costs are based on what is being added for the self-cleaning of the quartz sleeves.

Table 2-3 contains a summary of the present worth analysis for Alternative 2, operating at maximum capacity of 225 mgd.

Table 2-3 Principal Alternative Present Worth

Category	Cost
Construction Cost	$ 16.5 million
Annual operating cost	$252,000
PW of operating cost	$3.14 million
Total Present Worth	$ 19.6 million

Table 2-4 Principal Alternative O&M Cost Summary

Criteria	Annual Cost
Labor	$10,000
Power	$142,400
Consumables	$94,600
Chemical	$5,000
Total	$252,000

2.4.1.3 Salvage Value

The planning period of this evaluation is 20-years. The anticipated useful life of the new UV System and associated equipment is 20 years or less, so there is no salvage value associated with this alternative.

2.4.1.4 Escalation

Land and energy costs are not included in the evaluation of the principal alternatives. No escalation cost is necessary because land is not being acquired. There are no major differences to electricity demand between the UV disinfection (only) and the hybrid UV disinfection alternatives.

2.4.1.5 Interest During Construction

Anticipated interest during construction is assumed to be negligible. The construction period will be less than two years, as meeting NPDES permit requirements is contingent on completion of this project. The project will be executed using Design-Bid-Build delivery method. Any interest costs will be fixed at the time of bidding.

2.4.1.6 User Costs

The user costs were developed based on estimated project cost and do not include influence of potential grant funding support that may offset project costs. DUWA is pursuing low interest loan funding support through the CWSRF program. With CWSRF support, rate payer increases are expected to range from 8.55-10.00% in 2023 and taper down from 7.50-4.00% through 2029. Repayment of the estimated capital expense to construct Alternative 2 is anticipated to cost the average user $0.48 per month.

Alternative 2 costs associated with OM&R, administration, financial and legal services are anticipated to have a net zero impact to the user. This alternative is essentially in-kind replacement. To support capital improvements design and construction, a Force Account cost of $300,000.00 is included to cover project inception to completion.

2.4.1.7 Project Delivery Method

The project delivery method will be the traditional Design-Bid-Build. DUWA advertised the project as Design-Bid-Build, unless bidders believed there was benefit to an alternate project delivery method such as Construction Manager At-Risk (CMAR) or Design-Build. Considering the long-lead times for various equipment, there were no schedule benefits to these alternate methods. In order to meet DUWA's success factors and performance results, Design-Bid-Build was the chosen project delivery method.

2.4.2 Environmental Evaluation

A robust environmental evaluation associated with Alternative 2 was not included, as the project consists of in-kind equipment replacement, construction limited to within the existing UV disinfection system enclosure, and no changes to the DWTF site. With regard to the selected disinfection technology, UV disinfection has also been used for a number of years, but technology and power consumption have improved greatly, especially over the last 5 years. The newer UV disinfection technologies utilize less power which ultimately reduces cost and is better for the environment. If not stored and used correctly, chlorine, especially gaseous chlorine can be harmful not only to personnel but also to the environment. UV disinfection is considered to be safer and has less of an impact on the environment. The UV only alternative will fit in the existing footprint of the treatment plant facility.

Chlorine in the form of sodium hypochlorite will likely be implemented as a temporary disinfectant during construction. Any environmental impact will be short-term and addressed during detailed design and permitting.

Construction of Alternative 2 will have no impact to floodplains, wetlands, or lakes and streams as part of this project. There will be no environmental customer impact from this project.

2.5 Design Parameters

Based on the Alternatives Evaluation, Alternative 2: UV Disinfection only is the recommended alternative. The following sections provide detail on the project components such as design criteria, schedule, costs and implementation.

Design conditions were developed for the replacement UV system as shown in Table 2-5. As previously mentioned, for the purposes of conceptual design, the new generation of Trojan UV disinfection equipment (Trojan Signa) was utilized to estimate equipment layout, capital and OM&R cost, etc. Detailed design will include evaluation of other viable UV disinfection system suppliers and the number of bank/modules, lamps and wattage may change. The number of channels needed for UV equipment to treat full flow is expected to be equivalent regardless of final selection of UV system supplier.

Table 2-5 UV Design Capacity

Parameter, unit	Features
No/Type	5 Channels (4 operating + 1 redundant)
Total Number of lamps	690
Wattage of Lamps, watt	1000
Peak Disinfection flow, mgd	225
Peak UV dose, mJ/cm^2	20
Design UV transmittance (UVt), %	53
Design TSS, mg/L	30

This replacement also provides an additional 50 mgd of treatment capacity within the UV system which is intended to eliminate the need for any additional chemical for disinfection. In addition, the selected alternative replaces the existing UV system with equipment that will have a functional cleaning system to minimize labor associated with cleaning and maintenance. The concept for this alternative would be to utilize the existing channels and structural framework. An influent gate would need to be installed in the existing open channel. Skylights in the roof would be removed and new equipment lowered through the roof and then replaced. The Trojan Signa system was designed to replace the Trojan UV4000 (current system) so minimal channel modifications will be necessary. At 225 mgd each of the 5 channels would have 45 mgd of capacity so 2 channels would be in operation at average flow conditions.

2.6 Useful Life

The overall useful life of the UV system is expected to be 20 years. The existing UV4000 uses lamps that are less energy efficient, have a shorter lamp life (5000 hours), and have a shorter ballast life. Components within new UV systems are more efficient (i.e. 1000 watt lamps for Trojan Signa) and have a longer lamp life (15,000 to 20,000 hours). Therefore, the new UV disinfection systems use lamps that are more efficient for a longer period of time.

2.7 Project Maps

The new UV disinfection system would include UV banks installed in the four existing channels, as well as modifications to the fifth channel in order to install UV banks in the currently empty channel. This configuration will achieve the design disinfection capacity for flows up to 225 mgd. A figure in Appendix F presents the concept of the location of the UV equipment.

2.8 Water and Energy Efficiency

There are no expected differences in water efficiency as a result of implementation of the selected alternative and compared to the existing system. The system will be designed to treat wastewater to meet discharge permit requirements. This water can be reused throughout the plant as non-potable plant effluent water. DUWA has not expressed interest in evaluating partnership with other companies for direct water reuse.

Energy efficiency, however, is expected to increase through utilization of more efficient lamp technology in the new UV system as compared to the existing Trojan UV4000 system. The power use for the Trojan UV4000 was calculated to be $416,000/year based on an average daily flow of 53 mgd and design flow of 175 mgd. Based on preliminary evaluation of the new system, designed to treat average flow of 53 mgd and 225 mgd peak flow, the replacement UV system is estimated to generate an annual power savings cost of $273,600/year. This estimate is based on $0.10/Kwh and was developed based on an average daily flow of 53 mgd. The associated power savings at peak capacity of 225 mgd is estimated to be $142,400/year.

2.9 Schedule for Design and Construction

Detailed design is expected to kick-off in April 2023, with conceptual design, on-site testing to validate design criteria and evaluate existing site conditions in process. The construction schedule shown in Table 2-6 is estimated assuming the selected UV system supplier is awarded a purchase order after bidding and then initiates shop drawing development. Equipment lead times start after shop drawing approval, and current market conditions indicate lead times of 36-40 weeks for UV equipment.

Table 2-6 Design and Construction Schedule

Activity	Start	Completion
Conceptual Design and Planning	February 2023	April 2023
Detailed Design	April 2023	October 2023
Bidding and Award	October 2023	December 2023
Equipment Lead Time	March 2024	November 2024
Construction	December 2024	July 2025

This schedule shows new UV equipment arriving, and construction starting, after the estimated end of life of the existing UV system. There may be options to compress the schedule and initiate construction sooner. These options will be explored during design.

2.10 Cost Summary

Based on conceptual design and initial equipment budget from the vendors, a high-level construction cost was developed and shown in Table 2-7. The cost summary includes purchase and installation of replacement UV equipment, associated electrical and controls equipment such as power supply units, PLCs, electrical wiring to MCC, and controls integration. The cost estimate also includes structural modification to the existing channels and the addition of new isolation and controls gates for the spare channel. The total construction cost is estimated at $16.5 million. The UV equipment cost includes a 6% escalation increase effective at the end of 2023. Cost estimates will be refined during detailed design and will depend on availability of equipment and supply chain issues.

Table 2-7 High Level Cost Summary

Project Item	Estimated Cost
UV Equipment, incl. installation	$7,600,00
Channel Modifications, incl. gates	$575,000
Electrical, Instrumentation & Controls	$3,400,000
Start-up, Testing and Commissioning	$150,000
Contingency	$1,750,000
General Requirements, Conditions, OH&P	$3,000,000
TOTAL COST	**$16,475,000**

2.11 Authority to Implement Selected Alternative

DUWA owns and operates the DWTF and has the authority to implement the selected alternative to replace the existing UV disinfection system. DUWA is responsible for, and committed to, maintaining compliance with their NPDES permit and maintaining the level of service to their customers. In the case that grant funding and low interest loans are not secured, DUWA will be required to seek other financing options such as bonding.

3.0 Environmental and Public Health Impacts

3.1 Direct Impacts

EGLE defines direct impacts as the social and environmental impacts that are directly attributable to the construction and operation of the project. Direct impacts due to the project are minimal and considered negligible.

All construction is limited to in-plant modifications. There are no residential areas near the plant that would be disturbed by the construction. There will be minimal changes to the operation of the existing wastewater treatment plant UV disinfection under the recommended alternative. Since the DWTF currently uses UV disinfection, the change to a newer technology will require training and education but the basic principles of operation will remain the same. These minimal operational changes are all within the plant facility and no changes within the service area will be made as part of this project.

There will be minimal to no social impacts as a result of this project. The associated user rate increases associated with this project are described in Section 2.4.1.6.

3.2 Indirect Impacts

No change in rate, density, or type of development (residential/commercial/ industrial) is anticipated with these DWTF improvements. No change in land use is anticipated with these DWTF improvements. Minimal to no changes in air or water quality are anticipated with these DWTF improvements. Due to the location, no impact will be made to traffic, local or state roads or residential communities around the area. No change is anticipated to the natural setting or sensitive features in or around the DWTF. This improvement will be a replacement in kind of equipment.

Minimal to no impact will be made to cultural, human, and social resources. The improvements will be an operational improvement to those maintaining it and will be an economic benefit to the rate payers as power consumptions will decrease due to the newer technology. There will be no impact to area aesthetics. The improvements will be made within the DWTF property and unnoticeable to those outside of the DWTF. The recommended UV only alternative would not require outside resources like chemical addition, so there is no resource consumption to note.

3.3 Cumulative Impacts

Cumulative impacts are defined as those impacts to the environment that increase in magnitude over time or that result from individually minor but collectively significant actions taking place over time. The recommended alternative and improvement at the DWTF will not have any cumulative impact to the environment or surrounding area in comparison to the existing UV disinfection system. The water quality of the effluent will be maintained which will be discharged to the Detroit River.

4.0 Mitigation

4.1 Mitigation of Short-Term Impacts

Due to the location and type of the improvements that are recommended for this project, any mitigation of short-term impacts will assist with maintenance of plant operations. A construction sequencing plan will be included in the contract documents and the contractor must follow general conformance to this sequencing plan, but it does not dictate means and methods of construction. Construction will take the impact of wet weather into consideration and coordinate major efforts as much as possible. Potentially replacing equipment in 1 UV channel at a time will confirm that disinfection can and will be completed even during construction. Due to the nature of this project, no construction is happening in or near sensitive features and would likely not require special permits.

The typical EGLE Part 41 construction permit will be obtained outlining the recommended alternative with no special permits or requirements anticipated. EGLE will be included in all deliverable review meetings with the design engineer and DUWA to provide insight and comment on the deliverables. EGLE is already aware of the project and proposed improvements and will continue to be included in correspondence throughout all stages of the project.

As mentioned previously, due to the nature and location of the project improvements, no wetlands, or interfaces with water/waterways, etc. is anticipated thus no mitigation measures are outlined. No joint permits will be required in the EGLE/USACE permit.

4.2 Mitigation of Long-Term Impacts

As stated in Section 4.1, all mitigation will be short term and temporary due to the construction activities. The project scope strictly replaces existing technology in kind. No other impacts are anticipated thus no further mitigation is needed.

4.3 Mitigation of Indirect Impacts

The anticipated direct long-term impacts are strictly operationally based. Mitigation efforts to lessen these impacts will be focused on training DWTF personnel to properly operate the facility. Multiple training sessions are already planned with maintenance and operations staff to be able to properly run, diagnose, and fix issues that come up during the operation of the UV system. Training sessions will be conducted by the UV system vendor. All operation and maintenance manuals will be made available to DWTF staff to consult as needed and troubleshoot if issues arise. UV vendors have support teams that can be contacted should additional issues arise.

5.0 Public Participation

This section will be finalized after the public meeting.

5.1 Public Meeting

A public meeting will be held to allow the public the opportunity to comment of the project and the information provided herein. The public meeting will take place during DUWA's Board Meeting on April 13th, 2023 at 9:00 am. The public may attend virtually or in-person at City of Taylor Council Chambers, 23555 Goddard Road, Taylor, MI 48180.

The Project Plan will be available for public review and comment via DUWA's website at: https://duwauthority.org/psa/

5.2 Public Meeting Advertisement

The public meeting was advertised on March 29, 2023, which is 15 days prior to the scheduled meeting. The meeting was advertised on DUWA's website. The advertisement lists the public hearing date, describes the availability of the report viewing, and briefly describes the proposed project and estimated costs.

This advertisement includes a link to the project planning document for public review. The Notice of Public Hearing is included in Appendix B.

This public meeting and notification period is in accordance with CWSRF guidelines.

5.3 Public Meeting Summary

The public meeting summary will be provided in a new Appendix of the final report after the April 13th DUWA Board Meeting and 15-day public comment period. The meeting summary will include:

- A summary of the meeting held and what was covered during the meeting.
- List of all attendees with contact information.
- Any specific concerns that were raised during the meeting and the responses.
- Any written comments that were received during the public notice period and the responses.
- Any changes that were made to the project because of the public comment.

5.4 Adoption of the Project Planning Document

DUWA intends to consider a resolution to adopt the final project plan during its April 13th Board Meeting. A sample resolution is included in Appendix C.

6.0 Technical Considerations

Infiltration and/or inflow (I/I) can enter the collection system during wet weather or high ground water conditions. This increases the amount of water that is conveyed and treated taking up capacity at the treatment plant. Infrastructure conditions can affect the amount of I/I entering the system. An evaluation of mitigating ways to reduce I/I can be a cost-effective way to add capacity. This includes a sewer system evaluation survey (SSES) and structural integrity evaluation. This project does not cover any sewer system modifications or address any capacity issues. Therefore, I/I evaluations and removal considerations are not applicable to this project.

Although this project doesn't directly impact the collection system and subsequent effect of I/I, the DSDS system does have precautions and systems in place to assist with these higher levels of I/I, ground water, and wet weather events. During wet weather conditions, preliminary treatment flow in excess of 150 MGD and up to 225 MGD is pumped by the Tunnel Pump Station. The Tunnel Pump Station bypasses excess preliminary treatment flow from primary treatment and re-introduces the flow into primary treatment effluent flow before the low lift pump station. The low lift pump station has a pumping capacity of 200 MGD and pumps flow into the secondary treatment process.

6.1 Infiltration and Inflow Removal

I/I considerations are not applicable to this project as they are already built into the overall flow calculations for consideration of the improvements.

6.2 Sewer System Evaluation Survey

A SSES which would evaluate specific sources contributing to excess I/I is not necessary for this project. Due to the nature of this project, the flow rate impact of existing I/I is already built into the design criteria for consideration of the improvements.

6.3 Structural Integrity

Based on a site visit conducted on March 6, 2023, the structural integrity of the project area was reviewed, and no major defects were detected or outlined. Any structural defects that potentially arise during construction can be addressed during construction and will have to be determined on a case-by-case basis. With regards to I/I, any I/I entering the channels based on these potential structural defects in the area of improvements would be considered negligible and not applicable to this project.

6.4 Fiscal Sustainability Plan

The CWSRF program requires development and implementation of a Fiscal Sustainability Plan (FSP) for the replacement of treatment components. FSP components include the following:

A. An inventory of critical assets that are part of the treatment works.
B. Evaluation of the condition and performance of inventoried assets.

C. Certification that implementation of water and energy conservation efforts have been evaluated as part of the plan.
D. A plan for maintaining, repairing, funding, and as necessary, replacing the treatment works

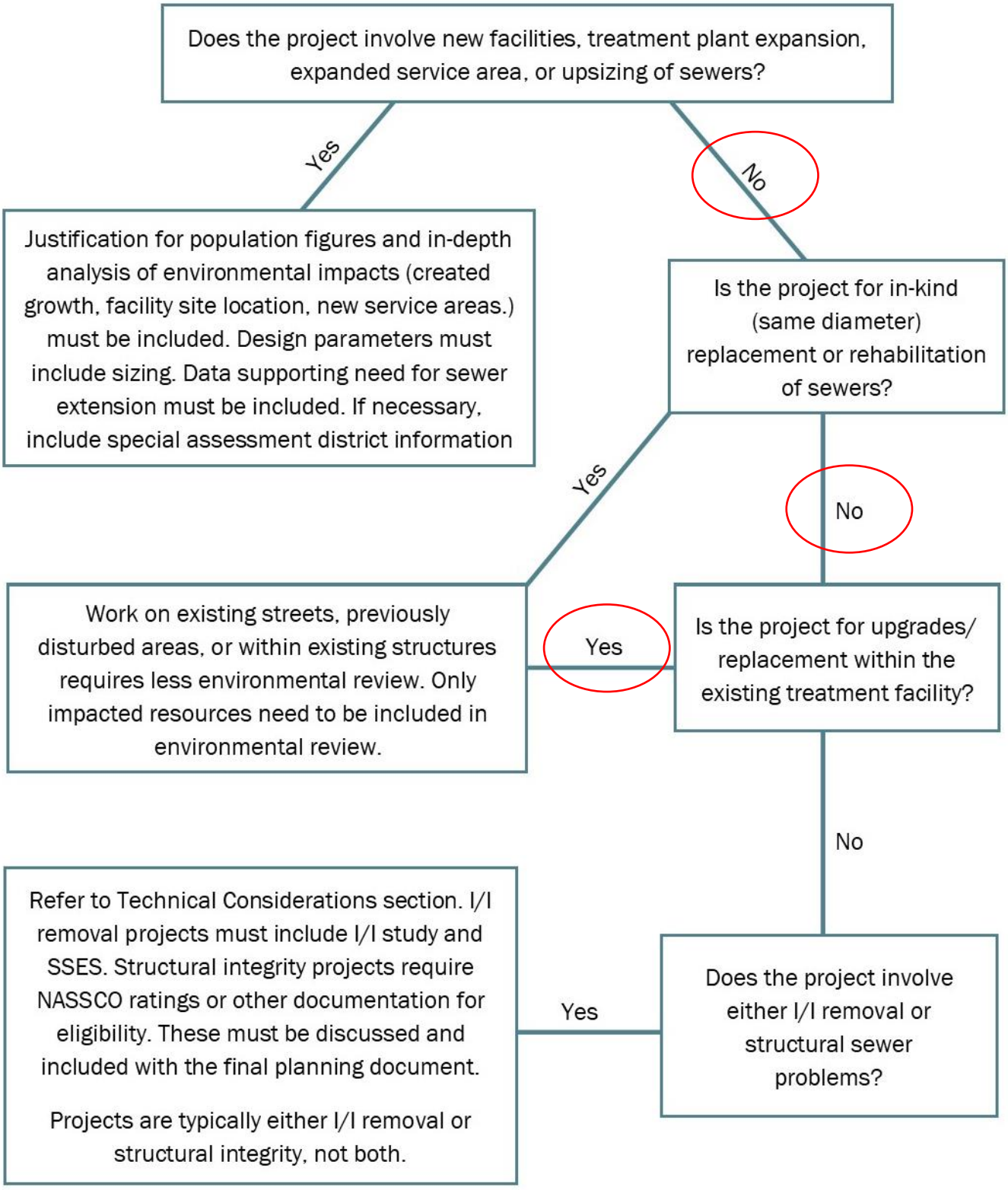
The project involves the replacement of the existing UV disinfection system at the DWTF, thus the assets included in the Fiscal Sustainability Plan are those of the existing UV disinfection system. DUWA is able to certify that the required components of the Fiscal Sustainability Plan have been met. The Fiscal Sustainability Plan criteria have been met.

6.5 Special Assessment District Projects

This is not a special assessment project, and no land acquisition is required.

Appendix A. Planning Document Required Components

APPENDIX 1: PLANNING DOCUMENT REQUIRED COMPONENTS



Appendix B. Notice of Project Planning Public Meeting

Allen Park
Belleville
Brownstown Twp.
Dearborn Heights
Ecorse
Lincoln Park

Downriver Utility Wastewater Authority

25605 Northline Road ● Taylor, Michigan 48180

River Rouge
Riverview
Romulus
Southgate
Taylor
Van Buren Twp.
Wyandotte

PUBLIC HEARING NOTICE FOR FY2024 CLEAN WATER STATE REVOLVING FUND (CWSRF) PROJECT

The Downriver Utility Wastewater Authority (DUWA) announces a Public Hearing regarding its Project Plan for the proposed Ultraviolet Disinfection Replacement Project at the Downriver Wastewater Treatment Facility (DWTF) in Wyandotte, MI. The purpose of this public hearing is to receive comments from interested persons.

The Ultraviolet Disinfection Replacement Project involves replacement of the existing ultraviolet (UV) disinfection system with an upgraded disinfection system. The existing UV disinfection system is obsolete in that the manufacturer no longer provides technical support nor supplies spare parts, and it has now reached the end of its useful life. UV disinfection is the final step in the wastewater treatment process where the DNA from bacteria and other pathogenic microorganisms is damaged such that the bacteria cannot reproduce. Disinfection is necessary to ensure the effluent water is safe to be discharged to the Detroit River in accordance with the DWTF's discharge permit requirements.

The temporary impact of construction activities will be minimized as all work is planned to occur within the existing building and facilities at the DWTF. Improvements to the infrastructure are needed to maintain the long-term reliability of the DWTF to treat wastewater from the surrounding communities. This project will improve the treatment of sewage flows through the DWTF.

Adverse impacts on historical, archaeological, geographic, or cultural areas are not expected as all work is proposed to take place on the DWTF site where earth has been previously disturbed for construction. However, if any potential impacts arise, construction will be halted and the proper steps will be taken following appropriate guidelines.

The cost of this project is currently estimated at $16.5 million and is eligible for participation in the Michigan Department of Environment, Great Lakes, and Energy (EGLE) low interest Clean Water State Revolving Fund (CWSRF) financing program. DUWA intends to pursue this low interest funding opportunity for FY2024.

The public hearing on the FY2024 CWSRF Project proposed by DUWA will be held for the purpose of receiving comments from interested persons. The presentation at the public hearing will provide a description of the need for the project and the proposed improvements, their estimated costs, anticipated impacts, as well as the cost per household impact for customer communities. Comments and viewpoints from the public are requested. The Project Plan document will be available for review online after March 29, 2023 on the DUWA Website: https://duwauthority.org/psa/.

THE MEETING WILL BE HELD ON:

DATE: **Thursday, April 13, 2023**

TIME: **9:00 AM, Eastern Time**

PLACE: **In person:**
City of Taylor Council Chambers
23555 Goddard Road
Taylor, MI 48180

Zoom Videoconferencing:
Zoom link: https://ohm-advisors.zoom.us/j/92351387718?pwd=bnpMVXQ3NVNJWWtWYURoSFoyRGZEUT09
Meeting ID: 923 5138 7718
Passcode: DUWA

Telephonic Hearing:
Phone Number: 1-301-715-8592
Meeting ID: 923 5138 7718
Passcode: 194624

Members of the public may offer comments in the following manner:

In Person: Members of the public who, subject to capacity, wish to attend the meeting and/or offer public comments in person may attend the meeting at the location provided above.

By Zoom Videoconferencing: Members of the public who wish to use Zoom videoconferencing to attend the meeting and/or offer public comment may "raise their hand" by using that feature within the Zoom software program during the portion of the hearing designated for public participation.

By Telephone: Members of the public who wish to attend the meeting and/or offer public comment by telephone should call in at the phone number provided above and press *9 on their keypad to "raise their hand" during the portion of the hearing designated for public participation. During other portions of the meeting, members of the public are asked to mute their line by pressing *6 on their keypad to mute or unmute their line.

By Email: Members of the public may provide written comments to the Board by emailing those comments to duwa@ohm-advisors.com on or before 5:00 p.m. EST on Thursday, April 13, 2023, and should reference "April 13, 2023 Public Hearing on Proposed SRF Project" in the subject line of the email. The opportunity to submit written comments by email may remain open throughout the duration of the public hearing.

By U.S. Mail: Members of the public may provide written comments by United States mail addressed to:

Downriver Utility Wastewater Authority
c/o DUWA System Manager, OHM Advisors
34000 Plymouth Road
Livonia, MI 48150

Written comments by U.S. mail should reference "April 13, 2023 Public Hearing on Proposed SRF Project" in the letter. The opportunity to submit written comments by U.S. mail may remain open throughout the duration of the public hearing.

If a member of the public requires accommodation due to a disability, please contact duwa@ohm-advisors.com or call (734) 522-6711 and ask to speak with DUWA's System Manager no less than 72 hours prior to the date of the meeting.

Appendix C. Sample Resolution

A RESOLUTION ADOPTING A FINAL PROJECT PLANNING DOCUMENT

FOR WASTEWATER SYSTEM IMPROVEMENTS

AND DESIGNATING AN AUTHORIZED PROJECT REPRESENTATIVE

WHEREAS, the Downriver Utility Wastewater Authority recognizes the need to make improvements to its existing wastewater treatment and collection system or its existing NPS pollution control/stormwater treatment system; and

WHEREAS, the Downriver Utility Wastewater Authority authorized Black & Veatch Ltd of Michigan to prepare a Project Planning Document, which recommends the construction of Alternative 2 – Replacement of Existing Ultraviolet Disinfection System with New Ultraviolet Disinfection Equipment

WHEREAS, said Project Planning Document was presented at a Public Hearing held on April 13, 2023 at 9:00 a.m. (EST) and all public comments have been considered and addressed.

NOW THEREFORE BE IT RESOLVED, that the Downriver Utility Wastewater Authority formally adopts said Project Planning Document and agrees to implement the selected alternative Alternative 2 – Replacement of Existing Ultraviolet Disinfection System with New Ultraviolet Disinfection Equipment

BE IT FURTHER RESOLVED, that the Associate Vice President , a position currently held by Black & Veatch Ltd of Michigan, is designated as the authorized representative for all activities associated with the project referenced above, including the submittal of said Project Planning Document as the first step in applying to the State of Michigan for a Clean Water State Revolving Fund Loan to assist in the implementation of the selected alternative.

Yeas (names of Members voting Yes):

Nays (names of Members voting No):

I certify that the above Resolution was adopted by the Downriver Utility Wastewater Authority on April 13, 2023 .

BY: _____ _____

Name (please print or type) Title

_____ _____

Signature Date

Appendix D. System Condition Assessment

DOWNRIVER UTILITY WASTEWATER AUTHORITY

DUWA Existing UV Disinfection System

CONDITION ASSESSMENT & RECOMMENDATION

September 27, 2022

WADE TRIM

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TABLE OF CONTENTS

APPENDICES

Acronyms	
DUWA	Downriver Utility Wastewater Authority
ft/s	Feet Per Second
GPM	Gallons Per Minute
MGD	Million Gallons per Day
MRM	Module Removal Mechanisms
OEM	Original Equipment Manufacturer
PDC	Power Distribution Center
PLC	Programmable Logic Controller
UV	Ultraviolet

EXECUTIVE SUMMARY

The Downriver Utilities Wastewater Authority (DUWA) has an existing ultraviolet (UV) disinfection system that consists of equipment installed in the late 1990s manufactured by Trojan Technologies (Trojan) that is nearing the end of its useful life for this type of equipment. While DUWA has initiated internal discussions and preliminary review of currently available UV systems for planning a Capital Improvement Plan (CIP) project to replace the existing system, additional factors regarding non-availability of technical support and spare parts from the manufacturer have raised further concerns on the timeframe that operations staff will be able to sustain the effectiveness of the existing equipment. Since replacement of the disinfection system is a major capital investment, and the disinfection system performance serves a major role in the treatment process for meeting monitored discharge limits of the NPDES Permit, **DUWA requested that Wade Trim assess the existing system condition for an opinion on the anticipated remaining useful life, and to confirm the priority schedule needed for implementing the disinfection system replacement project.**

As part of this assessment, Wade Trim technical staff conducted site visits on two separate occasions to examine the existing system components, discussed operation and maintenance issues facing plant operators, reviewed available maintenance records, and assessed the likelihood of failure of the existing equipment for the typical predictable replacement parts required, as well as the recent history of unforeseen failures that have occurred at an approximate interval of once per month.

A major factor impacting the remaining service life assessment is that as of July 1, 2022, Trojan has ceased technical support of the Trojan UV4000 units (which they had previously taken out of production in 2013). And as of September 1, 2022, Trojan will no longer supply OEM spare parts for the system components of these units. While non-OEM spare parts have been installed by Operations staff, they have reported reduced performance and efficiency as compared with the OEM spare parts, with additional maintenance required and other issues encountered with use of these parts.

Based on the information gathered from the site visits for assessment of the existing UV disinfection system, and review of the available information provided by Veolia staff from their available maintenance records (which includes estimates for the typical service life they are achieving for the expendable parts), **we have projected for the remaining service life for the existing predictable equipment needed (bulbs and ballasts), assuming new replacement parts are installed, is approximately 20 months**. However, this period will be significantly impacted by any unforeseen failures of any electronic equipment modules, or any major equipment failures such as the recent incident that required replacement of an entire bank of lights due to an unforeseen system failure.

While maintenance staff are attempting to secure and maintain an inventory of bulbs and ballasts for the replacement of predictable spare parts needed, it will be more problematic in the future as the available OEM and non-OEM supplies dwindle, and increasingly more difficult and unlikely to secure replacement parts for other major mechanical or electrical equipment module failures. The increased frequency of equipment failures reported by maintenance staff, coupled with the reduced availability and reliability of spare parts, puts the existing system at risk for disinfection system failures that may ultimately affect the facility's ability to safely and effectively meet its permit requirements.

Given this, **it is therefore our recommendation that DUWA commence planning activities for replacement of the UV disinfection system immediately.** Depending on the CIP schedule programming requirements and project delivery system selected, it could take approximately two to four years to plan, design, and install a new disinfection system, which points to the urgency for initiating planning for the replacement project immediately. In the interim period, it is recommended that Operations staff continue their efforts to secure and maintain an inventory of available spare parts for the existing system and develop an emergency operations protocol should any of the disinfection channels go out of service. It is further recommended that the replacement schedule for the UV system be coordinated to fit with the requirements for any potential funding opportunities that may be currently available to offset the cost of the replacement project.

1.0 INTRODUCTION

The final step in the municipal wastewater management process is disinfection treatment. Disinfection treatment is required to reduce and break down the microorganism populations in the wastewater before discharge into the receiving body of water. Ultraviolet (UV) light provides rapid, effective inactivation of microorganisms through a physical process. When microorganisms are exposed to germicidal wavelengths of UV light, they are rendered incapable of reproducing and infecting. The overall process adds nothing to the water, but UV light has no impact on chemical composition or dissolved oxygen content and does not create byproducts.

The DUWA existing UV system consists of equipment installed in the late 1990s manufactured by Trojan Technologies (Trojan). Trojan has been one of the major manufacturers of UV disinfection systems, especially in the wastewater sector, with one of the most popular systems being the Trojan UV4000 suite of systems. Due to the evolution of UV technology and the commercialization of newer UV wastewater treatment systems, in 2013 continuous production of the Trojan UV4000 ceased. Trojan continued to support the systems, however, until July 1, 2022. Further, September 1, 2022, marks the last day to purchase a number of replacement parts for the Trojan UV4000 systems, including certain off-the-shelf items and manufactured/custom items (see Appendix A for a list of available parts).

DUWA has requested that Wade Trim assess the existing system and prepare recommendations regarding the need to replace the system. The following is therefore a summary of the assessment conducted, as well as our recommendations.

2.0 EXISTING UV SYSTEM DESCRIPTION

Design and installation of the existing UV disinfection system at DUWA began in the late 1990s and was designed to disinfect up to 225 mgd (during intermittent wet weather flows). **The plant maintains disinfection compliance during dry and wet weather events with the existing system.** The UV system, which is housed in the Administration Building, consists of five concrete channels, but only four are currently equipped with two modules of Trojan UV4000 lamps. A fifth channel is empty and available for future expansion of the system.

Each channel is equipped with slide gates, located at both the upstream and downstream ends. Plant effluent flows through the system by gravity with the downstream hydraulic elevation controlled by a static weir located downstream of the UV disinfection system. Each UV module consists of two banks of 9 racks, with 10 lamps per rack, for a total of 90 lamps per module and 180 lamps per channel, or 720 lamps total.

Based on information provided by Veolia staff, the current practice is to operate two channels during dry weather flow conditions. Once flows exceed 87.5 mgd – which typically only occurs during wet weather – operating staff place one or both remaining (standby) channels in service.

3.0 CONDITION ASSESSMENT

On June 29, 2022, Wade Trim personnel met with Jason Tapp (Veolia) to discuss the condition of the existing UV disinfection system. Based on this visit, as well as a subsequent site visit on August 25, 2022, and several conversations with Veolia staff, Wade Trim has evaluated the existing system and found the following.

3.1 Physical System

A UV disinfection system generally consists of the following main components:

- **UV Intensity Sensor.** Each bank of UV modules incorporates a UV intensity sensor that continually monitors UV lamp output.
- **Module Removal Mechanisms (MRM).** The MRM lifts modules out of the channel to allow for access and maintenance of the UV modules.
- **Power Distribution Center (PDC).** The PDC provides power to each bank of modules and monitors data from the module (including UV intensity signals), cleaning system control and status, hydraulic systems, and effluent level signals.
- **Electronic Ballasts.** The electronic ballasts, one per lamp, regulate the power to the UV lamps.
- **UV Modules.** UV lamps are mounted on stainless steel modules that are submerged in the effluent channel. The lamps are enclosed in quartz sleeves, positioned horizontally and parallel to the water flow. Modules consist of multiple lamps and are mounted in parallel to form a bank. Ballasts are mounted inside the modules, and all ballast and lamp wiring runs inside the stainless steel module frame to protect it from exposure to UV light and effluent.
- **Cleaning System.** A chemical/mechanical cleaning system prevents fouling of the UV lamp sleeves. Hydraulically-driven wiper collars filled with a cleaning solution surround the quartz sleeves.
- **UV Control Panel.** A control panel for the DUWA system is mounted in the southeast corner of the Disinfection Room and contains a programmable logic controller (PLC) that monitors and stores data regarding the system, including status of lamps, intensity, flow rates, and hours of lamp usage.

The following sections provide a summary of the existing conditions noted for each of these components with regard to DUWA's existing UV disinfection system.

3.1.1 UV Intensity Sensor

The UV Intensity Sensors are functional, and no issues were noted by Veolia staff at the time of our site visits.

3.1.2 Module Removal Mechanism (MRM)

The MRMs for each channel are functional, and they have not had any major issues with them since the system was originally brought online.

3.1.3 Power Distribution Center (PDC)

The PDCs are functional, and no issues were noted by Veolia staff at the time of our site visits.

3.1.4 Electronic Ballasts

The electronic ballasts are one of the items that Veolia staff have replaced on a regular basis. While Trojan supplied these parts, Veolia staff purchased and installed original OEM parts. However, since Trojan has ceased manufacturing electronic ballasts for the UV4000 systems, Veolia staff has had to purchase and use non-OEM ballasts. At the time of our June 29, 2022 site visit, staff reported that there were "getting low on ballasts" and had sent out 30 of them to be rebuilt at a cost of $400 per ballast, which is substantially less that the cost for new ballasts (i.e., $2,500 to $3,000 each).

3.1.5 UV Modules

The modules themselves are comprised of a framework, the UV lamps and the quartz sleeves that house each lamp. While the framework for the modules themselves are in good condition, the UV lamps and quartz sleeves that are installed in the modules are replaced on a regular basis by Veolia staff.

Since Trojan has ceased manufacturing both the lamps and sleeves for the UV4000 systems, Veolia staff has tried to use third-party (non-OEM) lamps and sleeves, which did result in some cost savings. However, staff related that the non-OEM parts have been noting "nothing but problems," and they have gone back to OEM parts. The problem with this, however, is that costs have gone up for the OEM parts, and eventually Trojan will run out of what parts they still have in stock. At the time of our site visit, Veolia staff indicated that they had recently ordered 100 sleeves from Trojan, but did not yet have the final price. Staff was hopeful that Trojan would "sharpen their pencil" and DUWA could obtain the sleeves for $600 each, but the final cost per sleeve could be more than that.

3.1.6 Cleaning System

Per discussions with Veolia staff, they discontinued the use of the original cleaning system that was provided with the UV4000 system due to micro-scratches that developed on the quartz sleeves. Instead, modules are power-washed on a weekly basis by Veolia staff. If staff notices that the sleeves have ferric deposits developing on them in between scheduled power washings, staff will handwipe the sleeves with a nonabrasive.

3.1.7 UV Control Panel

The UV Control Panel is functional, but is at risk for potential future electrical equipment failures that will be difficult to troubleshoot and maintain due to the unavailability of technical support and spare parts from the manufacturer.

3.2 Ability of Existing System to Meet NPDES Permit

Monthly Operator Reports demonstrate disinfection compliance is achieved. As climatological factors continue to change, larger, more intense wet weather events could occur. The existing system is sized flow flows up to 225 mgd during wet weather events.

3.3 Likelihood of Failure

It is likely that system failure would be caused by either (1) predictable deterioration of lamps/ sleeves/ballasts, or (2) mechanical breakage or failure of electrical/electronic components.

3.3.1 Lamp Failure

Periodic lamp replacement is considered a normal maintenance requirement of UV disinfection systems, but requires an adequate inventory and availability of spare parts to sustain the operations. The germicidal UV lamps do not "burn out" the way conventional incandescent bulbs used to, rather the output of light intensity at the germicidal frequency deteriorates at a somewhat predictable rate (affected by temperature, number of starts, and reduced output "dimmer" settings). Eventually the lamps can no longer produce sufficient energy to effect disinfection. The existing system lamps were expected to provide sufficient output for 10,000 to 12,000 hours. Staff reports that they have experienced useful lamp life of up to 16,000 to 18,000 hours. An informal look at the UV control panel during a site visit on August 25, 2022, indicated the following lamp hours on the modules in service:

- Module 2A – 6,874 hours
- Module 2B – 21,058 hours
- Module 4A – 7,146 hours
- Module 4B – 18,560 hours

If it is assumed that **lamps have a useful life of 18,000 hours and, that all lamps are new at the time this document is written, then in about 20 months the system will no longer be able to function per original design criteria**. This prediction should be tempered with the fact that it assumes a 175 mgd flow rate, light transmittance is usually better than 45%, and staff does have some onsite inventory of replacement lamps.

If the data above concerning lamp hours is typical of the entire system, then approximately three-quarters lamp life for those lamps currently installed has been spent. From a second site visit on August 25, 2022, we understand that the spare parts DUWA currently has on-hand consists of 49 Trojan lamps and 112 UV Doctor (non-OEM) lamps, which are not enough to replace the spent lamps in Channels 2 and 4. Operating staff is now, and has been, negotiating the purchase of additional lamps. The status at the time of writing this report is unknown.

If Trojan lamps are not available, third-party non-OEM lamps are available, but operating staff reports that this creates other issues, such as the sleeves developing leaks.

3.3.2 Mechanical Breakage and/or Electrical Failure

The second mode of failure, mechanical breakage, and failure of electrical system components cannot be predicted except by recent experience. Based on reports of operating staff, failures of electrical components are increasing in frequency, something that is not unexpected given the system is over 20 years old. Currently, staff reports a control component failure frequency of one per month.

Obviously, exactly what fails determines what impacts said failure has on the system. Some failures affect a single lamp, some an entire bank. Spare parts are kept onsite for components that experience has shown may experience "typical" failure such as lamps, quartz sleeves, and ballasts. However, anecdotal information from staff during our June 29, 2022 site visit, also indicated that alarms and failures have been occurring that cannot be traced to any particular system fault, making troubleshooting and subsequent repairs unachievable. These faults are electrical in nature and have been investigated by Veolia electrical staff and Trojan's field service providers.

Due to the redundancy built into the system, and the fact that the design flows are so much greater than average dry weather flows, it is likely that the system can continue to disinfect dry weather for some months, since parts can be taken from one module to keep another in service. However, failure of a critical component now would deprive the system of wet weather capacity.

4.0 OTHER CONSIDERATIONS

4.1 Availability and Costs of Spare Parts

Due to age of the existing system, changes and improvements in technology, and the availability of newer products, the manufacturer of the current system, Trojan Technologies, Inc., is discontinuing support of the current system. This is documented in their Bulletin included in this report as **Appendix A**.

The availability of expendable and spare parts is a moving target. Trojan has on hand some inventory of parts that they have used to support their customers over the years.

Since this inventory is no longer being replenished, availability of these parts depends on how fast other customers purchase specific parts. As of the writing of this report, it is no longer possible to assume Trojan has any specific needed part on hand. The current costs of available parts are listed in **Appendix B**.

4.2 Unforeseen Failures

Just prior to our June 29, 2022 site visit, Veolia staff made note that they had a catastrophic failure when a bank of lights remained on while the gates in the channel were closed. This failure should have been prevented by protections built into the system.

However, the built-in protections failed to work and, as a result, the module overheated and melted lamps, sleeves, and other critical system components. At the time, Veolia staff were still investigating the root cause of the failure, and Wade Trim is unaware if the reason(s) for the failure has been determined. The damage was estimated at $110,000 and would consume 90 lamps and sleeves, which represented a substantial amount of their reserve.

4.3 Risks of Existing System Failure

Existing system failures may lead to three main areas of risk:

1. **Ability To Meet Permit.** Given lamp life limitations and electronic failures in the last year, it is possible the existing system could fail to meet disinfection requirements during larger wet weather events. Due to the relatively large capacity of the UV system compared to average dry weather flow, we anticipate the system life to be measured in months, rather than years.

2. **Staff Safety.** Since the energy behind all UV systems is electrical, failure of system components does entail some risk to maintenance staff.

3. **Economic**. Skilled staff have kept DUWA's UV system in operation by repairing failed components and replacing expendable parts such a lamp with non-OEM parts. The experience of this is that non-OEM parts exhibit faster failure rates than OEM parts and cause other issues with the system due to subtle electronic compatibility. The ultimate effect is that operation and maintenance costs increase.

5.0 RECOMMENDATIONS

Based on our site visits to assess the condition of the UV disinfection system, as well as information provided by Veolia staff, the existing system appears to be experiencing more frequent failures that may ultimately affect DUWA's ability to safely and effectively meet its permit requirements. **It is therefore our recommendation that that DUWA commence planning activities for replacement of the UV disinfection system immediately.**

Further, since various manufacturers' equipment require different channel sizes and depths, it is usually not possible to design a "one size fits all" structure that can accommodate any UV system. A new UV disinfection system is a substantial investment, and we strongly encourage DUWA to begin investigating possible replacement systems as soon as possible.

As part of this investigation, we recommend that DUWA conduct water testing (collimated beam and transmittance) for sizing a new system. In addition, DUWA may also want to conduct site visits to other treatment facilities to view real-world examples and talk with staff from the other facilities to better understand system operation and maintenance.

Appendix A – TrojanUV4000 Parts Availability Bulletin

TROJAN UV

TROJAN technologies

BULLETIN

March 2022

TrojanUV4000: Parts Availability

While we remain committed to helping you keep your system operating efficiently for as long as possible, we will be reducing the parts available and offering a **last purchase date of September 1, 2022 on select items.**

Below is a list of the parts included in the last-day-of-purchase date of September 1, 2022. After this date, these parts will only be available while supplies last.

Consumable parts, such as lamps, sleeves, ballasts, and fluids will continue to be stocked and available.

Part Number	Description
Sealing Components For Lamps & Sleeves	
442048	Machined Sleeve Nut
Module Components	
Ballast Enclosue	
Ballast Enclosure - Model: UV4000	
800145	XFMR, Ballast 575V
800137	Ballast With Caps 480V
800136	XFMR Ballast 220-480V
442807	Heat Exchanger
490255	Heat Exchanger Cooling Fans
431044	Hose, 5/8" ID
431019	Hose, 1/4" ID PV
442440	Chill Plate, 10 W/HS
442436	Chill Plate, 8
442437	Chill Plate, 10
442438	Chill Plate, 12
442439	Chill Plate, 8 W/HS
442441	Chill Plate, 12 W/HS
442804g	Chill Plate
917538	Module Control Board (MCB)*
912362	IC Transceiver Chip
901206	Desiccant Pak (Desi Pak)
907130	Hydraulic Solenoid Valve
Wire Harness Ballast to MCB Board - 35", 66" & 96" Still Available	
903345-017	17 inch
903345-023	23 inch
903345-027	27 inch
903345-031	31 inch
903345-044	44 inch
903345-051	51 inch

Part Number	Description
903345-055	55 inch
903345-072	72 inch
903345-084	84 inch
903361	MCB to CCB Interconnect Cable
903392	MCB to CCB Interconnect Cable
The Below Items Are Replacement Parts For Module Cover	
442783-201	Low Flow Replacement Cover
442783-202	Small Module Replacement Cover
442783-402	Small Module Replacement Cover
442783-203	Large Module Replacement Cover
442783-403	Large Module Replacement Cover
442782-001	Low Flow Module Cover Seal
442782-002	Small Module Cover Seal
442782-003	Large Module Cover Seal
442171P	Snap Fit Spacer (Blue)
010089P	Screw
442178	Hook Assembly 316 SST
Module Leg	
Model: UV4000	
The Below Items Are Replacement Parts For Module Cover	
441055-001	11 ft.
441055-002	14 ft.
441055-003	15 ft.
The Below Items Are Replacement Parts For Module Hydraulics	
907133	Red Nylon Tubing
907132	Blue Nylon Tubing
907131	Brass Connector Fitting
907317-004P	Tube Insert (Used With 907131)
Ballast Enclosure	
Model: UV4000Plus	
912269	Replacement Fan For Fan Shroud Assembly
912362	IC Transceiver Chip
931142-012	Module Control Board (MCB)*
931142-024	Module Control Board (MCB)*
901206	Desiccant Pak (Desi Pak)
907130	Hydraulic Solenoid Valve
Wire Harness Ballast To MCB Board - 35", 66" & 96" Still Available	
903345-017	17 inch
903345-023	23 inch
903345-027	27 inch
903345-031	31 inch
903345-044	44 inch
903345-051	51 inch
903345-055	55 inch
903345-072	72 inch
903345-084	84 inch
903361	MCB to CCB Interconnect Cable in PDC
903392	MCB to CCB Interconnect Cable in PDC
The Below Items Are Replacement Parts For Module Cover	
418187	Cover Assembly, Large Module UV4T

Part Number	Description
418186	Cover Assembly, Small Module
442793-001	Large Module Seal Kit
442793-002	Small Module Seal Kit
442795	Captive Screw Replacement Kit
013132	Module Cover Captive Screw
901553	Captive Flaring Tool
901656	Arch Punch Tool
013132	Screw, Captive 1/4-20X.72 Float
Module Leg	
Model: UV4000Plus	
Lamp Plug Assembly - 18ft and 24ft still available	
441055-006	14 ft.
441055-007	16 ft.
441055-009	20 ft.
441055-010	22 ft.
907133	Red Nylon Tubing
907132	Blue Nylon Tubing
907131	Brass Connector Fitting
907317-004P	Tube Insert (Used With 907131)
Wiper System	
Model: UV4000	
442645 Hydraulic Cylinder Replacment Kits Still Avaialble	
013037	Module Frame Boot Clamp
013038	Cylinder Body Boot Clamp
442045	Cylinder Snap Ring
442044	Cylinder Mounting Nut
442077	Rubber Cylinder Boot
445033-050	Wiper Collar Assy 5.0 inch Lamp Spacing
445033-055	Wiper Collar Assy 5.5 inch Lamp Spacing
901742	Wiper Seal Kit Replacement Tool
445024	Wiper Tool
445054	ActiClean Pressure Injector*
445061	Pressure Injector tubing (price per inch)
445060	Pressure Injector Fitting
Model: UV4000Plus	
445037-050	Wiper Collar Assy 5.0 inch Lamp Spacing
445037-055	Wiper Collar Assy 5.5 inch Lamp Spacing
445037-060	Wiper Collar Assy 6.0 inch Lamp Spacing
445054	ActiClean Pressure Injector*
445053	Pressure Injector Adaptor
UV Intensity Sensors	
Model: UV4000	
Sensor Probe Assembly	
415041-003	64 inch
415041-001	93 inch
415041-008	98 inch
415041-006	103 inch
415041-007	116 inch
415041-002	124 inch
415041-005	132.5 inch

Part Number	Description
Model: UV4000Plus	
Sensor Probe Assembly	
415041-003	64 inch
415041-001	93 inch
415041-008	98 inch
415041-006	103 inch
415041-007	116 inch
415041-002	124 inch
415041-005	132.5 inch
Power Distribution Centre (PDC)	
Model: UV4000	
431049	CCB Ground Wire Kit
903817	Communication Control Board (CCB)*
912519	Isolated Maxim Chip
915728-GFI	Breaker, EG Frame, 125A, 4P
903326	Digital Input 24V
903327	Digital Output 120V
Model: UV4000Plus	
912395	Communication Control Board (7PT)*
912530	Fuse, 3A 250V PCB Time Delay
912519	Isolated Maxim Chip
903805	Digital Output Module
Hydraulic System Centre (HSC)	
Model: UV4000	
444948-001	Coolant Pressure Switch Assembly
444948-002	Hydraulic Pressure Switch Assembly 100-420 PSI
444948-010	Hydraulic Pressure Switch Assembly 100-275 PSI
907158	Hydraulic Pressure Gauge
431018	Coolant Pressure Gauge
901253	Coolant Propylene Glycol
907384	Hydraulic Filter
Hydraulic Pumps	
444883	Hydraulic Pump 1HP/115/230V 60Hz
444881	Hydraulic Pump 1.5HP/110/230V 60Hz
Coolant Pumps	
444283	Coolant Pump 2HP/460V/3PH 60Hz
444289	Coolant Pump 3HP/460V/3PH 60Hz
Model: UV4000Plus	
907342	Coolant Pressure Gauge
907343	Hydraulic Pressure Gauge
Systems Built Before February 2004	
444948-001	Coolant Pressure Switch Assembly
444948-002	Hydraulic Pressure Switch Assembly 100-420 PSI
Systems Built After February 2004	
444948-003	Coolant Pressure Switch Assembly
444948-004	Coolant Pressure Switch Assembly
444948-005	Hydraulic Pressure Switch Assembly
444948-006	Hydraulic Pressure Switch Assembly

Part Number	Description
Hydraulic Pumps	
444905-115	Hydraulic Pump 1.0HP/115V/60Hz
Coolant Pumps	
444393	Coolant Pump 3HP/460V/3PH 60Hz
444394	Coolant Pump 3HP/208-230/460V 60Hz
444823	Coolant Pump 3HP/380V/3PH 60Hz
912908-203	Connector & Cable For Solenoid Valve
901253	Coolant Propylene Glycol
907384	Hydraulic Filter
System Control Centre (SCC)	
Model: UV4000	
Type M Controller is no longer available, contact your Account Manager for PLC upgrade details	
Model: UV4000Plus	
Contact Your Account Manager for PLC upgrade details	
Level Sensors	
Model: UV4000	
903242	Level Sensor, 240V
903543	Level Sensor, 120V
912179	Low Level Relay Board, 120VAC
912222	High Level Relay Board, 120VAC
903957-004	Level Sensor Electrode w/Sheath, 4 ft.
903957-006	Level Sensor Electrode w/Sheath, 6 ft.
903957-008	Level Sensor Electrode w/Sheath, 8 ft.
903957-010	Level Sensor Electrode w/Sheath, 10 ft.
Model: UV4000Plus	
903242	Level Sensor, 240V
903543	Level Sensor, 120V
912179	Low Level Relay Board, 120VAC
912222	High Level Relay Board, 120VAC
903957-004	Level Sensor Electrode w/Sheath, 4 ft.
903957-006	Level Sensor Electrode w/Sheath, 6 ft.
903957-008	Level Sensor Electrode w/Sheath, 8 ft.
903957-010	Level Sensor Electrode w/Sheath, 10 ft.

*Part available upon request, however market pressures may lead to lack of supply.

We're Here To Help

If you have questions or are ready to start planning your UV system replacement, simply call us at **1-888-220-6118**, visit **trojantechnologies.com/TrojanUV4000-Retirement**, or contact your local representative.

To learn more about the brands and affiliates of Trojan Technologies, please visit www.trojantechnologies.com

TROJAN technologies*

Appendix B – TrojanUV4000 Quotation

QUOTATION
QO0000753

TROJAN TECHNOLOGIES
3020 GORE ROAD
LONDON, ON N5V 4T7
CANADA
T. 519-457-3400
www.trojantechnologies.com

Sold to
VEOLIA NORTH AMERICA, LLC - DUWA
797 CENTRAL AVENUE
Wyandotte MI 48192-7307
UNITED STATES

Ship to
VEOLIA NORTH AMERICA, LLC - DUWA
797 CENTRAL AVENUE
Wyandotte MI 48192-7307
UNITED STATES

Customer Service Contact : tuvcustomerservice@trojantechnologies.com
Payment Terms : 0% / 00 / 30 net
Delivery Terms :
Carrier/LSP :

Internal Sales Rep : Austin Folck
Customer No. : 100002917
Reference :
Quote Date : 08-18-2022
Quote Expiry Date : 09-17-2022

Line	Project / Item / Description	Quantity	Price / Discount %		Unit Net Price / Net Amount	Tax Rate / Tax Amount	Amount
		1.00	126.00/	EA	126.00	6.00%	
1	442048				126.00	7.56	133.56
	SLEEVE NUT, MACHINED UV4000						
		1.00	2,866.50/	EA	2,866.50	6.00%	
2	800145				2,866.50	171.99	3,038.49
	XFMR, BALLAST 575V 60HZ 2LP						
		1.00	11,340.00/	EA	11,340.00	6.00%	
3	800137				11,340.00	680.40	12,020.40
	BALLAST W/CAPS ASSY, 480V 60Hz						
		1.00	8,205.00/	EA	8,205.00	6.00%	
4	800136				8,205.00	492.30	8,697.30
	XFMR, BALLAST 220-480V 60HZ 2L						
		1.00	2,406.00/	EA	2,406.00	6.00%	
5	442807				2,406.00	144.36	2,550.36
	HEAT EXCHANGER, FIELD REPL KIT						
		1.00	282.50/	EA	282.50	6.00%	
6	490255				282.50	16.95	299.45
	HEAT EX, UV4E REPLACE FAN						
		1.00	5.00/	FT	5.00	6.00%	
7	431044				5.00	0.30	5.30
	HOSE, 5/8" ID, PUSH-LOC						
		1.00	1.00/	IN	1.00	6.00%	
8	431019				1.00	0.06	1.06
	HOSE, 1/4"ID PVC NYLON REINF						
		1.00	11,367.00/	EA	11,367.00	6.00%	
9	442440				11,367.00	682.02	12,049.02
	CHILL PLATE, 10 BALLASTS W/HS						
		1.00	6,181.50/	EA	6,181.50	6.00%	
15	917538				6,181.50	370.89	6,552.39
	BOARD KIT, UV4 MCB						
		1.00	18.50/	EA	18.50	6.00%	
16	912362				18.50	1.11	19.61
	IC, RS485 TRANSCEIVER						

TROJAN TECHNOLOGIES
3020 GORE ROAD
LONDON, ON N5V 4T7
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T. 519-457-3400
www.trojantechnologies.com

QUOTATION
QO0000753

Line	Project / Item / Description	Quantity	Price / Discount %		Unit Net Price / Net Amount	Tax Rate / Tax Amount	Amount
		1.00	16.50/	EA	16.50	6.00%	
17	901206				16.50	0.99	17.49
	DESICCANT, HUMIDISORB HXC 4X4						
		1.00	188.50/	EA	188.50	6.00%	
18	907130				188.50	11.31	199.81
	VALVE, HYDR 2WY SOL NC 24VDC						
		1.00	82.50/	EA	82.50	6.00%	
27	903345-084				82.50	4.95	87.45
	WIRE HARNESS, BALLAST-MCB 84						
		1.00	178.50/	EA	178.50	6.00%	
29	903392				178.50	10.71	189.21
	WIRE HARN, UV4E PDC-MDL 16.75'						
		1.00	7,707.50/	EA	7,707.50	6.00%	
30	442783-201				7,707.50	462.45	8,169.95
	MDL COV KIT, UV4 LF REPL 2						
		1.00	3,394.50/	EA	3,394.50	6.00%	
35	442782-001				3,394.50	203.67	3,598.17
	COVER, MDL ABS/SEAL UV4 LF						
		1.00	1.00/	EA	1.00	6.00%	
39	010089P				1.00	0.06	1.06
	SET SCREW, HEX SOC 1/4-20 X3/8						
		1.00	1.50/	FT	1.50	6.00%	
44	907133				1.50	0.09	1.59
	TUBING, NYLON 1/4 x 0.18 RED						
		1.00	1.50/	FT	1.50	6.00%	
45	907132				1.50	0.09	1.59
	TUBING, NYLON 1/4 x 0.18 BLUE						
		1.00	2.00/	EA	2.00	6.00%	
46	907131				2.00	0.12	2.12
	CONNECTOR, 1/4TBGx1/8NPTF BRS						
		1.00	1.50/	EA	1.50	6.00%	
47	907317-004P				1.50	0.09	1.59
	FITTING, TUBE INSERT ¼						
		1.00	4.00/	EA	4.00	6.00%	
48	013037				4.00	0.24	4.24
	CLAMP, STEPLESS EAR 1-43/64						
		1.00	2.50/	EA	2.50	6.00%	
49	013038				2.50	0.15	2.65
	CLAMP, STEPLESS EAR 1-7/8						
		1.00	7.00/	EA	7.00	6.00%	
50	442045				7.00	0.42	7.42
	SNAP RING, CYLINDER NUT UV4000						
		1.00	14.00/	EA	14.00	6.00%	
51	442044				14.00	0.84	14.84
	NUT, MOUNTING CYLINDER UV4E						
		1.00	15.00/	EA	15.00	6.00%	
52	442077				15.00	0.90	15.90
	BOOT, RUBBER CYLINDER						

QUOTATION
QO0000753

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Line	Project / Item / Description	Quantity	Price / Discount %		Unit Net Price / Net Amount	Tax Rate / Tax Amount	Amount
		1.00	1,220.50/	EA	1,220.50	6.00%	
53	445033-050 WIPER ASSY, UCUP SEAL 5.0				1,220.50	73.23	1,293.73
		1.00	1,436.00/	EA	1,436.00	6.00%	
54	445033-055 WIPER ASSY, UCUP SEAL 5.5				1,436.00	86.16	1,522.16
		1.00	492.50/	EA	492.50	6.00%	
55	901742 KIT, WIPER SEAL REPL TOOL UV4				492.50	29.55	522.05
		1.00	416.50/	EA	416.50	6.00%	
56	445024 TOOL, WIPER ASSY UV4				416.50	24.99	441.49
		1.00	109.50/	EA	109.50	6.00%	
57	445054 PRESSURE INJECTOR, GEL UV4				109.50	6.57	116.07
		1.00	1.00/	IN	1.00	6.00%	
58	445061 TUBE, PRESSURE INJECTOR				1.00	0.06	1.06
		1.00	2.50/	EA	2.50	6.00%	
59	445060 FITTING, PRESSURE INJECTOR				2.50	0.15	2.65
		1.00	12,664.00/	EA	12,664.00	6.00%	
62	415041-008 PROBE ASSY, 98" LG				12,664.00	759.84	13,423.84
		1.00	12,707.00/	EA	12,707.00	6.00%	
66	415041-005 PROBE ASSY, 132.5" LG				12,707.00	762.42	13,469.42
		1.00	35.50/	EA	35.50	6.00%	
67	431049 GROUND WIRE KIT,UV4E CCB				35.50	2.13	37.63
		1.00	9,822.00/	EA	9,822.00	6.00%	
68	903817 BOARD, UV4E CCB 16PT 24VAC				9,822.00	589.32	10,411.32
		1.00	75.50/	EA	75.50	6.00%	
69	912519 IC, ISOLATED RS485/422 MAXIM				75.50	4.53	80.03
		1.00	623.50/	EA	623.50	6.00%	
70	915728-GFI BREAKER, EG FRAME GFI				623.50	37.41	660.91
		1.00	55.00/	EA	55.00	6.00%	
71	903326 MODULE, DGTL IN 24V/5V LOGIC				55.00	3.30	58.30
		1.00	48.00/	EA	48.00	6.00%	
72	903327 MODULE, DGTL OUT 120V/5V LOGIC				48.00	2.88	50.88
		1.00	702.50/	EA	702.50	6.00%	
73	444948-001 SWITCH, CAL COOL 10-MAX				702.50	42.15	744.65

QUOTATION
QO0000753

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Line	Project / Item / Description	Quantity	Price / Discount %		Unit Net Price / Net Amount	Tax Rate / Tax Amount	Amount
		1.00	717.00/	EA	717.00	6.00%	
74	444948-002 SWITCH, CAL HYD 100-420				717.00	43.02	760.02
		1.00	53.50/	EA	53.50	6.00%	
75	907158 GAUGE, PRESSURE, 0-600 PSI				53.50	3.21	56.71
		1.00	50.50/	EA	50.50	6.00%	
76	431018 GAUGE, PRESS 0-60PSI/0-400KPA				50.50	3.03	53.53
		1.00	400.50/	CNT	400.50	6.00%	
77	901253 COOLANT, PROPYLENE GLYCOL 20L				400.50	24.03	424.53
		1.00	49.00/	EA	49.00	6.00%	
78	907384 FLTR ELEM, 10MICRON ABS SYNTH				49.00	2.94	51.94
		1.00	5,015.50/	EA	5,015.50	6.00%	
79	444883 SRV PUMP, HYD 1/115-230/60 B				5,015.50	300.93	5,316.43
		1.00	884.50/	EA	884.50	6.00%	
80	444948-010 SWITCH, CAL HYD 100-275				884.50	53.07	937.57
		1.00	1,926.00/	EA	1,926.00	6.00%	
81	444881 SRV PUMP,HYD 1.5/110-230/60				1,926.00	115.56	2,041.56
		1.00	1,538.00/	EA	1,538.00	6.00%	
82	444283 PUMP, COOL 2HP/460V/60HZ/3PH				1,538.00	92.28	1,630.28
		1.00	1,804.00/	EA	1,804.00	6.00%	
83	444289 PUMP, COOL 3HP/460V/60Hz/3PH				1,804.00	108.24	1,912.24
		1.00	1,273.00/	EA	1,273.00	6.00%	
84	903242 LEVEL SENSOR, LOW/HIGH 240V				1,273.00	76.38	1,349.38
		1.00	1,273.00/	EA	1,273.00	6.00%	
85	903543 LEVEL SENSOR, 120V 8FT ELCTD				1,273.00	76.38	1,349.38
		1.00	324.00/	EA	324.00	6.00%	
86	912179 BOARD, LOW LEVEL RELAY 120VAC				324.00	19.44	343.44
		1.00	316.50/	EA	316.50	6.00%	
87	912222 BOARD, HIGH LEVEL RELAY 120VAC				316.50	18.99	335.49
		1.00	194.50/	EA	194.50	6.00%	
91	903957-010 ELECTRODE,LVL SNSR W/SHTH 10'				194.50	11.67	206.17

QUOTATION
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Goods	110,648.00	Discount	0.00	Tax Amount	Total	USD
Costs	0.00	Subtotal	110,648.00	6,638.88	117,286.88	

QUOTATION
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Appendix E. NPDES Permit

PERMIT NO. MI0021156

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Water Pollution Control Act (33 U.S.C. 1251 *et seq*., as amended; the "Federal Act"); Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA); Part 41, Sewerage Systems, of the NREPA; and Michigan Executive Order 2011-1,

Downriver Utility Wastewater Authority
25605 Northline Road
Taylor, MI 48180

is authorized to discharge from the **Downriver Wastewater Treatment Facility** located at

797 Central Avenue
Wyandotte, Michigan 48192

designated as **Downriver WTF**

to the receiving water named the Trenton Channel of the Detroit River in accordance with effluent limitations, monitoring requirements, and other conditions set forth in this permit.

This permit is based on a complete application submitted on July 17, 2012, a complete modification request submitted on August 28, 2018, and a Department action initiated on November 16, 2018.

This permit took effect on November 1, 2017; the previously modified permit took effect on November 1, 2018; this modified permit takes effect on January 1, 2019. The provisions of this permit are severable. After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term in accordance with applicable laws and rules. On its original effective date, this permit superseded National Pollutant Discharge Elimination System (NPDES) Permit No. MI0021156 (expiring October 1, 2012).

This permit and the authorization to discharge shall expire at midnight, **October 1, 2021**. In order to receive authorization to discharge beyond the date of expiration, the permittee shall submit an application which contains such information, forms, and fees as are required by the Department of Environmental Quality (Department) by **April 4, 2021**.

Issued: May 1, 2017; **Previously Modified (minor):** October 23, 2018; **Modified (minor):** December 17, 2018.

Original signed by Christine Alexander
Christine Alexander, Manager
Permits Section
Water Resources Division

PERMIT FEE REQUIREMENTS

In accordance with Section 324.3120 of the NREPA, the permittee shall make payment of an annual permit fee to the Department for each October 1 the permit is in effect regardless of occurrence of discharge. The permittee shall submit the fee in response to the Department's annual notice. The fee shall be postmarked by January 15 for notices mailed by December 1. The fee is due no later than 45 days after receiving the notice for notices mailed after December 1.

Annual Permit Fee Classification: Municipal Major, 50 MGD to less than 500 MGD (Individual Permit)

In accordance with Section 324.3132 of the NREPA, the permittee shall make payment of an annual biosolids land application fee to the Department if the permittee land applies biosolids. In response to the Department's annual notice, the permittee shall submit the fee, which shall be postmarked no later than January 31 of each year.

CONTACT INFORMATION

Unless specified otherwise, all contact with the Department required by this permit shall be made to the Southeast Michigan District Supervisor of the Water Resources Division. The Southeast Michigan District Office is located at 27700 Donald Court, Warren, Michigan 48092-2793, Telephone: 586-753-3700, Fax: 586-751-3751.

CONTESTED CASE INFORMATION

Any person who is aggrieved by this permit may file a sworn petition with the Michigan Administrative Hearing System within the Michigan Department of Licensing and Regulatory Affairs, c/o the Michigan Department of Environmental Quality, setting forth the conditions of the permit which are being challenged and specifying the grounds for the challenge. The Department of Licensing and Regulatory Affairs may reject any petition filed more than 60 days after issuance as being untimely.

PART I

Section A. Limitations and Monitoring Requirements

1. Final Effluent Limitations, Monitoring Point 001A

During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittee is authorized to discharge treated municipal wastewater from Monitoring Point 001A through Outfall 001 and/or Outfall 002. Outfall 001 and Outfall 002 discharge to the Trenton Channel of the Detroit River. Such discharge shall be limited and monitored by the permittee as specified below.

	Maximum Limits for Quantity or Loading				Maximum Limits for Quality or Concentration				Monitoring	Sample
Parameter	Monthly	7-Day	Daily	Units	Monthly	7-Day	Daily	Units	Frequency	Type
Flow	(report)	---	(report)	MGD	---	---	---	---	Daily	Report Total Daily Flow
Carbonaceous Biochemical Oxygen Demand ($CBOD_5$)	26,100	42,000	(report)	lbs/day	25	40	(report)	mg/l	Daily	24-Hr Composite
Total Suspended Solids	31,300	47,000	(report)	lbs/day	30	45	(report)	mg/l	Daily	24-Hr Composite
Total Phosphorus (as P)										
Through Dec. 2019	1,040	---	(report)	lbs/day	1.0	---	(report)	mg/l	Daily	24-Hr Composite
Beginning Jan. 2020	730	---	(report)	lbs/day	0.7	---	(report)	mg/l	Daily	24-Hr Composite
	Six Month Average (April - Sept.)				**Six Month Average (April - Sept.)**					
Total Phosphorus (as P)										
Beginning Apr. 2020	4630	---	---	lbs/day	0.6	---	---	mg/l	Annually	Calculation
	Monthly				**Monthly**					
Ammonia Nitrogen (as N)	(report)	---	(report)	lbs/day	(report)	---	(report)	mg/l	Daily	24-Hr Composite
Fecal Coliform Bacteria	---	---	---	---	200	400	(report)	cts/100 ml	Daily	Grab
Oil and Grease	10,430	---	(report)	lbs/day	10	---	(report)	mg/l	Daily	Grab
Total Mercury										
– Corrected	(report)	---	(report)	lbs/day	(report)	---	(report)	ng/l	Monthly	Calculation
– Uncorrected	---	---	---		---	---	(report)	ng/l	Monthly	Grab
– Field Duplicate	---	---	---	---	---	---	(report)	ng/l	Monthly	Grab
– Field Blank	---	---	---	---	---	---	(report)	ng/l	Monthly	Preparation
– Laboratory Method Blank	---	---	---	---	---	---	(report)	ng/l	Monthly	Preparation
	12-Month Rolling Average				**12-Month Rolling Average**					
Total Mercury	0.0063	---	---	lbs/day	6.0	---	---	ng/l	Monthly	Calculation
					Minimum Monthly					
$CBOD_5$ Minimum % Removal	---	---	---	---	85	---	(report)	%	Monthly	Calculation
Total Suspended Solids Minimum % Removal	---	---	---	---	85	---	(report)	%	Monthly	Calculation
					Minimum Daily					
pH	---	---	---	---	6.0	---	9.0	S.U.	Daily	Grab
Dissolved Oxygen	---	---	---	---	4.0	---	---	mg/l	Daily	Grab

PART I

Section A. Limitations and Monitoring Requirements

The following design flow was used in determining the above limitations, but is not to be considered a limitation or actual capacity: 125 MGD. Should 25 MGD of additional secondary treatment capacity be added under Part I.A.7., this capacity will be adjusted to 150 MGD.

a. Narrative Standard
The receiving water shall contain no turbidity, color, oil films, floating solids, foams, settleable solids, or deposits as a result of this discharge in unnatural quantities which are or may become injurious to any designated use.

b. Sampling Locations
Samples for $CBOD_5$, Total Suspended Solids, Ammonia Nitrogen and Total Phosphorus shall be taken prior to disinfection. Samples for Dissolved Oxygen, Fecal Coliform Bacteria, Total Mercury, Oil & Grease, and pH shall be taken after disinfection. The Department may approve alternate sampling locations which are demonstrated by the permittee to be representative of the effluent.

c. Total Phosphorus Six Month Average Limit (April – September)
The six month average shall be determined by adding the six monthly average results from April through September and dividing the sum by six. For the purpose of reporting on the Discharge Monitoring Reports, the permittee shall calculate and report the Six Month Average on the October Discharge Monitoring Report.

d. Ultraviolet Disinfection
It is understood that ultraviolet light will be used to achieve compliance with the fecal coliform limitations. If disinfection other than ultraviolet light will be used, the permittee shall notify the Department in accordance with Part II.C.12. - Changes in Facility Operations.

e. Percent Removal Requirements
These requirements shall be calculated based on the monthly (30-day) effluent $CBOD_5$ and Total Suspended Solids concentrations and the monthly influent concentrations for approximately the same period.

f. Final Effluent Limitation for Total Mercury
The final limit for total mercury is the Discharge Specific Level Currently Achievable (LCA) based on a multiple discharger variance from the water quality-based effluent limit of 1.3 ng/l, pursuant to Rule 323.1103(9) of the Water Quality Standards. Compliance with the LCA shall be determined as a 12-month rolling average, the calculation of which may be done using blank-corrected sample results. The 12-month rolling average shall be determined by adding the present monthly average result to the preceding 11 monthly average results then dividing the sum by 12. For facilities with quarterly monitoring requirements for total mercury, quarterly monitoring shall be equivalent to 3 months of monitoring in calculating the 12-month rolling average. Facilities that monitor more frequently than monthly for total mercury must determine the monthly average result, which is the sum of the results of all data obtained in a given month divided by the total number of samples taken, in order to calculate the 12-month rolling average. If the 12-month rolling average for any month is less than or equal to the LCA, the permittee will be considered to be in compliance for total mercury for that month, provided the permittee is also in full compliance with the Pollutant Minimization Program for Total Mercury, set forth in Part I.A.9.

The permittee may choose to demonstrate that an alternate site-specific LCA is appropriate and request a permit modification. Such request and supporting documentation shall be submitted in writing to the Department. Supporting documentation shall include a minimum of 12 samples taken over a 12-month period in accordance with EPA Method 1631. If the Department determines the LCA to be appropriate, it would submit the proposed LCA to the USEPA for approval. Upon approval, this permit may be modified in accordance with applicable laws and rules to incorporate the alternate site-specific LCA as the effluent limitation for Total Mercury.

PART I

Section A. Limitations and Monitoring Requirements

g. Total Mercury Testing and Additional Reporting Requirements

The analytical protocol for total mercury shall be in accordance with EPA Method 1631, Revision E, "Mercury in Water by Oxidation, Purge and Trap, and Cold Vapor Atomic Fluorescence Spectrometry." The quantification level for total mercury shall be 0.5 ng/l, unless a higher level is appropriate because of sample matrix interference. Justification for higher quantification levels shall be submitted to the Department within 30 days of such determination.

The use of clean technique sampling procedures is required unless the permittee can demonstrate to the Department that an alternative sampling procedure is representative of the discharge. Guidance for clean technique sampling is contained in: EPA Method 1669, *Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels (Sampling Guidance)*, EPA-821-R96-001, July 1996. Information and data documenting the permittee's sampling and analytical protocols and data acceptability shall be submitted to the Department upon request.

In order to demonstrate compliance with EPA Method 1631E and EPA Method 1669, the permittee shall report, on the daily sheet, the analytical results of all field blanks and field duplicates collected in conjunction with each sampling event, as well as laboratory method blanks when used for blank correction. The permittee shall collect at least one (1) field blank and at least one (1) field duplicate per sampling event. If more than ten (10) samples are collected during a sampling event, the permittee shall collect at least one (1) additional field blank AND field duplicate for every ten (10) samples collected. Only field blanks or laboratory method blanks may be used to calculate a concentration lower than the actual sample analytical results (i.e. a blank correction). Only one (1) blank (field OR laboratory method) may be used for blank correction of a given sample result, and only if the blank meets the quality control acceptance criteria. If blank correction is not performed on a given sample analytical result, the permittee shall report under 'Total Mercury – Corrected' the same value reported under 'Total Mercury – Uncorrected.' The field duplicate is for quality control purposes only; its analytical result shall not be averaged with the sample result.

PART I

Section A. Limitations and Monitoring Requirements

2. Final Effluent Limitations, Monitoring Point 001B - Secondary Effluent Prior to Mixing with Secondary Bypass

During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittee is authorized to discharge secondary treated municipal wastewater, prior to mixing with flows from the secondary treatment bypass, from Monitoring Point 001B through Monitoring Point 001A and Outfall 001 and/or Outfall 002. Outfall 001 and Outfall 002 discharge to the Trenton Channel of the Detroit River. Such discharge shall be limited and monitored by the permittee as specified below.

	Maximum Limits for Quantity or Loading				Maximum Limits for Quality or Concentration				Monitoring	Sample
Parameter	**Monthly**	**7-Day**	**Daily**	**Units**	**Monthly**	**7-Day**	**Daily**	**Units**	**Frequency**	**Type**
Flow	(report)	---	(report)	MGD	---	---	---	---	Daily	Report Total Daily Flow
Carbonaceous Biochemical Oxygen Demand ($CBOD_5$)	---	---	---	---	25	40	(report)	mg/l	Daily	Calculation
Total Suspended Solids	---	---	---	---	30	45	(report)	mg/l	Daily	Calculation
Ammonia Nitrogen (as N)		---	---	---	(report)	---	(report)	mg/l	Daily	Calculation
Total Phosphorus (as P)										
Through Dec. 2019	---	---	---	---	1.0	---	(report)	mg/l	Daily	Calculation
Beginning Jan. 2020	---	---	---	---	0.7	---	(report)	mg/l	Daily	Calculation
					Six Month Average (April - Sept.)					
Total Phosphorus (as P)										
Beginning Apr. 2020	---	---	---	---	0.6	---	---	mg/l	Annually	Calculation
					Minimum Monthly					
$CBOD_5$ Minimum % Removal	---	---	---	---	(report)	---	(report)	%	Monthly	Calculation
Total Suspended Solids Minimum % Removal	---	---	---	---	(report)	---	(report)	%	Monthly	Calculation

PART I

Section A. Limitations and Monitoring Requirements

a. Frequency of Analysis
Calculations for Monitoring Point 001B shall be conducted daily during periods of secondary treatment bypass. In order to determine compliance with these effluent limitations, calculations for this monitoring point during wet weather periods may be averaged with monitoring from Monitoring Point 001A from dry weather periods. This may be done at this monitoring point to determine compliance with the 7-day and monthly average requirements for secondary treatment requirements.

During wet weather conditions when secondary treatment is bypassed, 3-portion composite samples representative of the discharge may be taken at Monitoring Point 001B and used in place of the calculations to determine compliance with the effluent limitations.

b. Percent Removal Requirements
These requirements shall be calculated based on the monthly (30-day) effluent $CBOD_5$ and Total Suspended Solids concentrations and the monthly influent concentrations for approximately the same period.

c. Total Phosphorus Six Month Average Limit (April – September)
The six month average shall be determined by adding the six monthly average results from April through September and dividing the sum by six. For the purpose of reporting on the Discharge Monitoring Reports, the permittee shall calculate and report the Six Month Average on the October Discharge Monitoring Report.

PART I

Section A. Limitations and Monitoring Requirements

3. Final Effluent Limitations, Monitoring Point 001C - Secondary Treatment Bypass

During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, for wet weather periods when the flow rate is greater than 125 MGD, the permittee is authorized to discharge primary treated municipal wastewater bypassing secondary treatment from Monitoring Point 001C through Monitoring Point 001A, and Outfall 001 and/or Outfall 002. Outfall 001 and Outfall 002 discharge to the Trenton Channel of the Detroit River. Such discharges are only authorized during wet weather conditions as described in Part I.A.6. of this permit and shall be monitored by the permittee as specified below.

	Maximum Limits for Quantity or Loading				Maximum Limits for Quality or Concentration					
Parameter	**Monthly**	**7-Day**	**Daily**	**Units**	**Monthly**	**7-Day**	**Daily**	**Units**	**Monitoring Frequency**	**Sample Type**
Flow	(report)	---	(report)	MGD	---	---	---	---	Daily	Calculate Total Daily Flow
$CBOD_5$	---	---	---	---	(report)	---	(report)	mg/l	Daily	Composite
Total Suspended Solids	---	---	---	---	(report)	---	(report)	mg/l	Daily	Composite
Ammonia Nitrogen (as N)		---	---	---	(report)	---	(report)	mg/l	Daily	Composite
Total Phosphorus (as P)		---	---	---	(report)	---	(report)	mg/l	Daily	Composite

a. Sampling Locations
Samples shall be taken of the primary treatment effluent prior to mixing with flows receiving secondary treatment. The Department may approve alternate sampling locations which are demonstrated by the permittee to be representative of the effluent.

b. Composite Samples
Samples shall be representative composites of the secondary treatment bypass flow through Monitoring Point 001C. The composites shall consist of samples, starting at the time of bypass, taken every half hour for the first hour and then every two hours thereafter.

c. Frequency of Analysis
Sampling at Monitoring Point 001C shall be conducted daily when the facility is bypassing around the secondary treatment processes.

PART I

Section A. Limitations and Monitoring Requirements

4. Final Effluent Limitations, Monitoring Point 001D - Primary Treatment Bypass

During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, for wet weather periods when the flow rate is greater than 150 MGD, the permittee is authorized to discharge preliminary treated municipal wastewater bypassing primary treatment from Monitoring Point 001D through Monitoring Points 001B and 001A, and Outfall 001 and/or Outfall 002. Outfall 001 and Outfall 002 discharge to the Trenton Channel of the Detroit River. Such discharges are only authorized during wet weather conditions as described in Part I.A.6. of this permit and shall be monitored by the permittee as specified below.

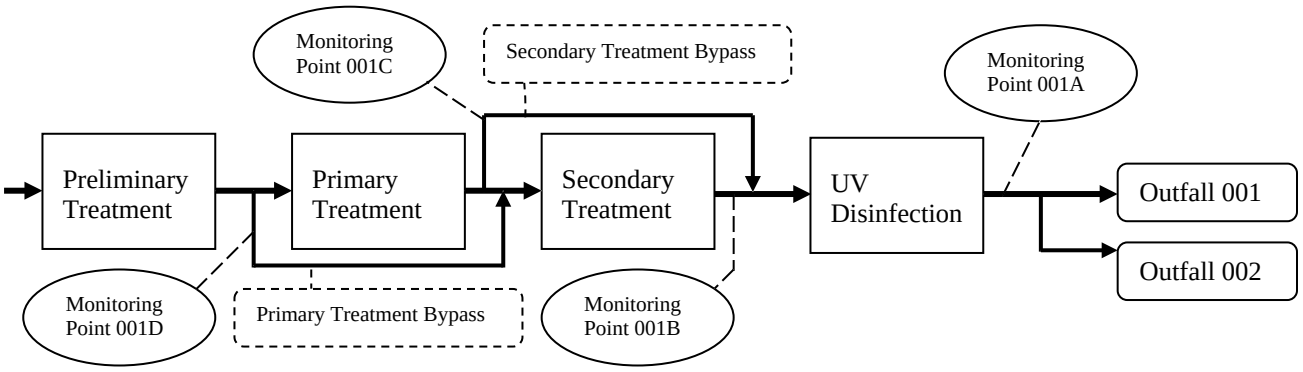
	Maximum Limits for Quantity or Loading				Maximum Limits for Quality or Concentration					
Parameter	**Monthly**	**7-Day**	**Daily**	**Units**	**Monthly**	**7-Day**	**Daily**	**Units**	**Monitoring Frequency**	**Sample Type**
Flow	(report)	---	(report)	MGD	---	---	---	---	Daily	Report Total Daily Flow

a. Sampling Locations
Samples shall be taken prior to mixing with flows receiving primary treatment. The Department may approve alternate sampling locations which are demonstrated by the permittee to be representative of the effluent.

b. Frequency of Analysis
Sampling at Monitoring Point 001D shall be conducted daily when the facility is bypassing around the primary treatment processes.

5. Flow Diagram

Outfall and monitoring point designations and bypass connections are shown for reference. Outfall 001 is the dedicated Downriver Wastewater Treatment Facility outfall. Outfall 002 is the connection to the Southgate Wyandotte Relief Drains Drainage District outfall.



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Section A. Limitations and Monitoring Requirements

6. Wet Weather Flows

During wet weather conditions when flows through the treatment plant exceed 125 MGD, the permittee is authorized to blend effluent from preliminary treatment and primary treatment with effluent receiving primary treatment and secondary treatment, respectively. The effluent must comply with all the effluent limitations and monitoring requirements in Parts I.A.1-4., except that when the flows through the wastewater treatment plant exceed the design flow rate of 125 MGD, the percent removal limitations for $CBOD_5$ and total suspended solids are waived at Monitoring Point 001A.

a. Preliminary Treatment
All dry weather and wet weather flows shall receive preliminary treatment (screening and grit removal) and disinfection.

b. Primary Treatment
All dry weather and wet weather flows up to and including a flow rate equivalent to 150 MGD shall receive primary treatment. During wet weather conditions, incremental flows greater than a flow rate equivalent to 150 MGD may bypass primary treatment with the stipulation that such flows shall receive secondary treatment.

c. Secondary Treatment
All dry weather flows up to and including the design flow rate of 125 MGD shall receive secondary treatment. During wet weather conditions, incremental flows greater than the design flow rate of 125 MGD may bypass secondary treatment with the stipulation that such flows shall receive preliminary and primary treatment and disinfection as stated in a. and b. above. Should 25 MGD of additional secondary treatment capacity be provided under Part I.A.7., this design flow rate will increase to 150 MGD.

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7. Program for Reduction of Treatment System Bypass or Blending

The Permittee shall implement a program to reduce secondary treatment system bypass or blending. The program may, at the discretion of the Permittee and with approval by the Department, include any or all of the following actions to reduce the average secondary bypasses and blending to an interim performance goal of no more than 4-6 per year (predicted):

a. Increase the hydraulic loading of the existing secondary treatment units with approval of the Department for a revised basis of design or full plant evaluation;

b. Utilize off-line primary clarifier tanks for wet weather storage assuming Part 41 redundancy requirements are met;

c. Optimize the wet weather storage capacity of the Downriver Regional Storage and Transport System ("Tunnel") by modulating the Divider Wall Gate that separates the Upper and Lower Tunnel Compartments;

d. Reduce or restrict the wet weather flow being conveyed into the Downriver Sewage Disposal System (DSDS) from excess sanitary sewage storage facilities owned and operated by local communities/agencies (e.g., the equalization basins owned by Lincoln Park, Allen Park and Ecorse Creek Pollution Abatement Drain No. 1 Drainage District), such that the sum of the discharges from the community's excess sanitary sewage storage facility(ies) and the discharges from all other outlets from the community to the DSDS during any given time period does not exceed the community's maximum allowable flow limit to the DSDS.

e. Reduce or restrict the wet weather flow being conveyed into the DSDS from the combined sewer systems owned and operated by the City of River Rouge and the Southgate-Wyandotte Relief Drains Drainage District, respectively during storm events when the combined sewer overflow (CSO) retention treatment facilities owned and operated by those entities are discharging provided adequate flow is transported to meet the USEPA's 1994 CSO Policy requirements;

f. Require reductions in infiltration and inflow (I/I) in select parts of the local community collection systems tributary to the DSDS with Department approved work plans;

g. Add an in-system control gate or weir upstream of the Tunnel Pump Station to optimize utilization of Tunnel storage capacity; and/or;

h. Add 25 MGD of secondary treatment capacity to the WWTF after Department review and approval per Part 41.

The following schedule shall be met:

i. On or before December 1, 2017, the Permittee shall prepare and submit an evaluation report that considers the options noted above, for Department review and approval. Recommendations shall be included in this report that identify those actions that the Permittee believes will be reasonably effective and achievable;

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Section A. Limitations and Monitoring Requirements

j. On or before September 1, 2018, the Permittee shall prepare and submit a Work Plan for Department review and approval, identifying the control measures selected to be undertaken initially to reduce the frequency of secondary treatment system bypass/blending as defined above. The Work Plan shall include a proposed schedule for implementing the control measures and an analysis showing the expected level of reduction in the frequency of secondary treatment bypass that is expected to be achieved through those measures. The Permittee shall implement the approved Work Plan upon approval. Note that individual control measures may require submittal of a Part 41 permit application along with complete plans and specifications;

k. The Permittee shall complete the initial control measures as specified in the approved work plan and commence an evaluation of performance of the System including an objective assessment as to the quantified reduction in frequency of secondary treatment system bypass/blending that has been achieved. The results of the performance evaluation shall be submitted to the Department for review and approval within 15 months following the completion of the initial control measures;

l. In the event that the initial control measures do not achieve the interim performance goal, the Permittee shall develop and submit a Work Plan, within six (6) months of notification by the Department, identifying the additional control measures to be undertaken to reduce the frequency of secondary treatment system bypass to meet the interim performance goal. The Work Plan shall include a proposed schedule for implementing the control measures and an analysis showing the expected level of reduction in the frequency of secondary treatment bypass that is expected to be achieved through those measures. The Permittee shall implement the approved Work Plan upon approval.

m. The Department may include additional requirements to further reduce secondary bypassing/blending as part of future NPDES permits that are reissued in accordance with applicable laws and rules.

8. Additional Monitoring Requirements

As a condition of this permit, the permittee shall monitor the discharge from monitoring point 001A for the constituents listed below. This monitoring is an application requirement of 40 CFR 122.21(j), effective December 2, 1999. Testing shall be conducted in May 2018, October 2018, March 2019, and August 2020. Grab samples shall be taken for total mercury, available cyanide, total phenols, and parameters listed under Volatile Organic Compounds. For all other parameters, 24-hour composite samples shall be taken.

Test species for whole effluent toxicity monitoring shall include fathead minnow **and** either *Daphnia magna, Daphnia pulex* or *Ceriodaphnia dubia*. If the permittee has received Department approval to conduct acute toxicity testing using the more sensitive species identified in the toxicity database, the first three (3) tests required above may be performed using the more sensitive species. The last (4^{th}) test shall be conducted using two (2) test species. Testing and reporting procedures shall follow procedures contained in EPA/600/4-90/027/F, "Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms (Fifth Edition)." When the effluent ammonia nitrogen (as N) concentration is greater than 5 mg/l, the pH of the toxicity test shall be maintained at the pH of the effluent at the time of sample collection. Toxicity test data acceptability is contingent upon the validation of the test method by the testing laboratory. Such validation shall be submitted to the Department upon request.

The results of such monitoring shall be submitted with the application for reissuance (see the cover page of this permit for the application due date). The permittee shall notify the Department within 14 days of completing the monitoring for each month specified above in accordance with Part II.C.5. Additional reporting requirements are specified in Part II.C.11. The permittee shall report to the Department any whole effluent toxicity test results greater than 1.0 TU_A or 1.0 TU_C within five (5) days of becoming aware of the result. If, upon review of the analysis, it is determined that additional requirements are needed to protect the receiving waters in accordance with applicable water quality standards, the permit may then be modified by the Department in accordance with applicable laws and rules. **Parameters that have been struck through are not required to be analyzed as part of this condition.**

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Section A. Limitations and Monitoring Requirements

Whole Effluent Toxicity
acute toxicity

Hardness
calcium carbonate

Metals (Total Recoverable), Cyanide and Total Phenols (Quantification levels in parentheses)

antimony (1 µg/l)	arsenic (1 µg/l)	available cyanide (2 µg/l) using Method OIA – 1677	
barium (5 µg/l)	beryllium (1 µg/l)	boron (20 µg/l)	cadmium (0.2 µg/l)
chromium (5 µg/l)	copper (1 µg/l)	lead (1 µg/l)	nickel (5 µg/l)
selenium (1 µg/l)	silver (0.5 µg/l)	thallium (1 µg/l)	zinc (5 µg/l)
~~mercury (0.5 ng/l) using Method 1631 Revision E~~		total phenolic compounds	

Volatile Organic Compounds

acrolein	acrylonitrile	benzene	bromoform
carbon tetrachloride	chlorobenzene	chlorodibromomethane	chloroethane
2-chloroethylvinyl ether	chloroform	dichlorobromomethane	1,1-dichloroethane
1,2-dichloroethane	trans-1,2-dichloroethylene	1,1-dichloroethylene	1,2-dichloropropane
1,3-dichloropropylene	ethylbenzene	methyl bromide	methyl chloride
methylene chloride	1,1,2,2,-tetrachloroethane	tetrachloroethylene	toluene
1,1,1-trichloroethane	1,1,2-trichloroethane	trichloroethylene	vinyl chloride

Acid-Extractable Compounds

p-chloro-m-cresol	2-chlorophenol	2,4-dichlorophenol	2,4-dimethylphenol
4,6-dinitro-o-cresol	2,4-dinitrophenol	2-nitrophenol	4-nitrophenol
Pentachlorophenol	phenol	2,4,6-trichlorophenol	

Base/Neutral Compounds

acenaphthene	acenaphthylene	anthracene	benzidine
benzo(a)anthracene	benzo(a)pyrene	3,4-benzofluoranthene	benzo(ghi)perylene
benzo(k)fluoranthene	bis(2-chloroethoxy)methane	bis(2-chloroethyl)ether	bis(2-chloroisopropyl)ether
bis(2-ethylhexyl)phthalate	4-bromophenyl phenyl ether	butyl benzyl phthalate	2-chloronaphthalene
4-chlorophenyl phenyl ether	chrysene	di-n-butyl phthalate	di-n-octyl phthalate
dibenzo(a,h)anthracene	1,2-dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene
3,3'-dichlorobenzidine	diethyl phthalate	dimethyl phthalate	2,4-dinitrotoluene
2,6-dinitrotoluene	1,2-diphenylhydrazine	fluoranthene	fluorene
Hexachlorobenzene	hexachlorobutadiene	hexachlorocyclo-pentadiene	hexachloroethane
indeno(1,2,3-cd)pyrene	isophorone	naphthalene	nitrobenzene
n-nitrosodi-n-propylamine	n-nitrosodimethylamine	n-nitrosodiphenylamine	phenanthrene
pyrene	1,2,4-trichlorobenzene		

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Section A. Limitations and Monitoring Requirements

Quantification Levels and Analytical Methods for Selected Parameters

Total Antimony .....1 µg/l
Total Arsenic .....1 µg/l
Total Barium.....5 µg/l
Total Beryllium .....1 µg/l
Total Boron.....20 µg/l
Total Cadmium.....0.2 µg/l
Hexavalent Chromium.....5 µg/l
Total Chromium.....10 µg/l
Total Copper .....1 µg/l
Available Cyanide .....2 µg/l (EPA Method OIA 1677)
Total Cyanide .....5 µg/l
Total Lead .....1 µg/l
Total Lithium.....10 µg/l
Total Mercury .....0.5 ηg/l (EPA Method 1631E)
Total Nickel .....5 µg/l
Total Selenium .....1.0 µg/l
Total Silver .....0.5 µg/l
Total Strontium.....1000 µg/l
Total Thallium.....1 µg/l
Total Zinc .....10 µg/l

1,2-Diphenylhydrazine.....3.0 µg/l
2,4,6-Trichlorophenol.....5.0 µg/l
2,4-Dinitrophenol .....19 µg/l
3,3'-Dichlorobenzidine .....1.5 µg/l (EPA Method 605)
Acrylonitrile .....1.0 µg/l
Benzidine.....0.1 µg/l
Bis (2-Chloroethyl) Ether .....1.0 µg/l
Di-N-Butyl Phthalate .....9.0 µg/l
Fluoranthene.....1.0 µg/l
Hexachlorobenzene.....0.01 µg/l (EPA Method 612)
Hexachlorobutadiene.....0.01 µg/l (EPA Method 612)
Hexachlorocyclopentadiene .....0.01 µg/l (EPA Method 612)
Hexachloroethane .....5.0 µg/l
Phenanthrene .....1.0 µg/l
Pentachlorophenol.....1.8 µg/l
Vinyl Chloride.....0.25 µg/l

9. Pollutant Minimization Program for Total Mercury

The goal of the Pollutant Minimization Program is to maintain the effluent concentration of total mercury at or below 1.3 ng/l. The permittee shall continue to implement the Pollutant Minimization Program approved on May 11, 2004, and modifications thereto, to proceed toward the goal. The Pollutant Minimization Program includes the following:

a. an annual review and semi-annual monitoring of potential sources of mercury entering the wastewater collection system;

b. a program for quarterly monitoring of influent and periodic monitoring of sludge for mercury; and

c. implementation of reasonable cost-effective control measures when sources of mercury are discovered. Factors to be considered include significance of sources, economic considerations, and technical and treatability considerations.

On or before March 31 of each year, the permittee shall submit a status report for the previous calendar year to the Department that includes 1) the monitoring results for the previous year, 2) an updated list of potential mercury sources, and 3) a summary of all actions taken to reduce or eliminate identified sources of mercury.

Any information generated as a result of the Pollutant Minimization Program set forth in this permit may be used to support a request to modify the approved program or to demonstrate that the Pollutant Minimization Program requirement has been completed satisfactorily.

A request for modification of the approved program and supporting documentation shall be submitted in writing to the Department for review and approval. The Department may approve modifications to the approved program (approval of a program modification does not require a permit modification), including a reduction in the frequency of the requirements under items a. & b.

This permit may be modified in accordance with applicable laws and rules to include additional mercury conditions and/or limitations as necessary.

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Section A. Limitations and Monitoring Requirements

10. Untreated or Partially Treated Sewage Discharge Reporting and Testing Requirements

In accordance with Section 324.3112a of the NREPA, if untreated sewage, including sanitary sewer overflows (SSO) and combined sewer overflows (CSO), or partially treated sewage is directly or indirectly discharged from a sewer system onto land or into the waters of the state, the entity responsible for the sewer system shall immediately, but not more than 24 hours after the discharge begins, notify, by telephone, the Department, local health departments, a daily newspaper of general circulation in the county in which the permittee is located, and a daily newspaper of general circulation in the county or counties in which the municipalities whose waters may be affected by the discharge are located that the discharge is occurring.

The permittee shall also annually contact municipalities, including the superintendent of a public drinking water supply with potentially affected intakes, whose waters may be affected by the permittee's discharge of combined sewage, and if those municipalities wish to be notified in the same manner as specified above, the permittee shall provide such notification. Such notification shall also include a daily newspaper in the county of the affected municipality.

At the conclusion of the discharge, written notification shall be submitted in accordance with and on the "Report of Discharge Form" available via the internet at: http://www.deq.state.mi.us/csosso/, or, alternatively for combined sewer overflow discharges, in accordance with notification procedures approved by the Department.

In addition, in accordance with Section 324.3112a of the NREPA, each time a discharge of untreated sewage or partially treated sewage occurs, the permittee shall test the affected waters for *Escherichia coli* to assess the risk to the public health as a result of the discharge and shall provide the test results to the affected local county health departments and to the Department. The testing shall be done at locations specified by each affected local county health department but shall not exceed 10 tests for each separate discharge event. The affected local county health department may waive this testing requirement, if it determines that such testing is not needed to assess the risk to the public health as a result of the discharge event. The results of this testing shall be submitted with the written notification required above, or, if the results are not yet available, submit them as soon as they become available. This testing is not required, if the testing has been waived by the local health department, or if the discharge(s) did not affect surface waters.

Permittees accepting sanitary or municipal sewage from other sewage collection systems are encouraged to notify the owners of those systems of the above reporting and testing requirements.

11. Facility Contact

The "Facility Contact" was specified in the application. The permittee may replace the facility contact at any time, and shall notify the Department in writing within 10 days after replacement (including the name, address and telephone number of the new facility contact).

a. The facility contact shall be (or a duly authorized representative of this person):
   - for a corporation, a principal executive officer of at least the level of vice president; or a designated representative if the representative is responsible for the overall operation of the facility from which the discharge originates, as described in the permit application or other NPDES form,
   - for a partnership, a general partner,
   - for a sole proprietorship, the proprietor, or
   - for a municipal, state, or other public facility, either a principal executive officer, the mayor, village president, city or village manager or other duly authorized employee.

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b. A person is a duly authorized representative only if:

- the authorization is made in writing to the Department by a person described in paragraph a. of this section; and
- the authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the facility (a duly authorized representative may thus be either a named individual or any individual occupying a named position).

Nothing in this section obviates the permittee from properly submitting reports and forms as required by law.

12. Monthly Operating Reports

Part 41 of Act 451 of 1994 as amended, specifically Section 324.4106 and associated Rule 299.2953, requires that the permittee file with the Department, on forms prescribed by the Department, reports showing the effectiveness of the treatment facility operation and the quantity and quality of liquid wastes discharged into waters of the state.

Since this permit includes modifications to the monitoring requirements in the previously-issued permit, the previously approved treatment facility monitoring program shall be revised. Within thirty (30) days of the effective date of this permit, the permittee shall submit to the Department a revised treatment facility monitoring program to meet this requirement. Upon approval by the Department the permittee shall implement the revised treatment facility monitoring program. The reporting forms and guidance are available on the DEQ web site at http://www.michigan.gov/deq/0,1607,7-135-3313_44117---,00.html. The permittee may use alternative operating forms if they are consistent with the approved monitoring program. These forms shall be maintained on site and shall be provided to the Department for review upon request. These treatment facility monitoring records shall be maintained for a minimum of three years.

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Section A. Limitations and Monitoring Requirements

13. Asset Management

The permittee shall at all times properly operate and maintain all facilities (i.e., the sewer system and treatment works as defined in Part 41 of the NREPA), and control systems installed or used by the permittee to operate the sewer system and treatment works and achieve and maintain compliance with the conditions of this permit (also see Part II.D.3 of this permit). The requirements of an Asset Management Program function to achieve the goals of effective performance, adequate funding, and adequate operator staffing and training. Asset management is a planning process for ensuring that optimum value is gained for each asset and that financial resources are available to rehabilitate and replace those assets when necessary. Asset management is centered on a framework of five (5) core elements: the current state of the assets; the required sustainable level of service; the assets critical to sustained performance; the minimum life-cycle costs; and the best long-term funding strategy.

a. Asset Management Program Requirements

On or before April 1, 2018, the permittee shall submit to the Department an Asset Management Plan for review and approval. An approvable Asset Management Plan shall contain a schedule for the development and implementation of an Asset Management Program that meets the requirements outlined below in 1) – 4). A copy of any Asset Management Program requirements already completed by the permittee should be submitted as part of the Asset Management Plan. Upon approval by the Department the permittee shall implement the Asset Management Plan. (The permittee may choose to include the Operation and Maintenance Manual required under Part II.C.14. of this permit as part of their Asset Management Program).

1) *Maintenance Staff.* The permittee shall provide an adequate staff to carry out the operation, maintenance, repair, and testing functions required to ensure compliance with the terms and conditions of this permit. The level of staffing needed shall be determined by taking into account the work involved in operating the sewer system and treatment works, planning for and conducting maintenance, and complying with this permit.

2) *Collection System Map.* The permittee shall complete a map of the sewer collection system it owns and operates. The map shall be of sufficient detail and at a scale to allow easy interpretation. The collection system information shown on the map shall be based on current conditions and shall be kept up-to-date and available for review by the Department. **Note: Items below referencing combined sewer systems are not applicable to separate sewer systems.** Such map(s) or accompanying documents shall include but not be limited to the following:

a) all sanitary sewer lines and related manholes;

b) all combined sewer lines, related manholes, catch basins and CSO regulators;

c) all known connections between the sanitary sewer or combined sewer and storm drain systems;

d) all outfalls, including the treatment plant outfall(s), combined sewer treatment facility outfalls, untreated CSOs, and any known SSOs;

e) all pump stations and force mains;

f) the wastewater treatment facility(ies);

g) all surface waters (labeled) that receive discharge from the treatment plant outfall(s);

h) other major appurtenances such as inverted siphons and air release valves;

i) a numbering system which uniquely identifies manholes, catch basins, overflow points, regulators and outfalls;

j) the scale and a north arrow;

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Section A. Limitations and Monitoring Requirements

k) the pipe diameter, date of installation, type of material, distance between manholes, and the direction of flow; and

l) the manhole interior material, rim elevation (optional), and invert elevations.

3) *Inventory and assessment of fixed assets.* The permittee shall complete an inventory and assessment of operations-related fixed assets. Fixed assets are assets that are normally stationary (e.g., pumps, blowers, and buildings). The inventory and assessment shall be based on current conditions and shall be kept up-to-date and available for review by the Department.

a) The fixed asset inventory shall include the following:

(1) a brief description of the fixed asset, its required design capacity (e.g., pump: 120 gallons per minute), its level of redundancy, and its tag number if applicable;

(2) the location of the fixed asset;

(3) the year the fixed asset was installed;

(4) the present condition of the fixed asset (e.g., excellent, good, fair, poor); and

(5) the current fixed asset (replacement) cost in dollars for year specified in accordance with approved schedules;

b) The fixed asset assessment shall include a “Business Risk Evaluation” that combines the probability of failure of the fixed asset and the criticality of the fixed asset, as follows:

(1) Rate the probability of failure of the fixed asset on a numerical scale (low to high) using criteria such as maintenance history, failure history, and remaining percentage of useful life (or years remaining);

(2) Rate the criticality of the fixed asset on a numerical scale (low to high) based on the consequence of failure versus the desired level of service for the facility; and

(3) Compute the Business Risk Factor of the fixed asset by multiplying the failure rating from (1) by the criticality rating from (2).

4) *Operation, Maintenance & Replacement (OM&R) Budget and Rate Sufficiency for the Sewer System and Treatment Works.* The permittee shall complete an assessment of its user rates and replacement fund, including the following:

a) beginning and end dates of fiscal year;

b) name of the department, committee, board, or other organization that sets rates for the operation of the sewer system and treatment works;

c) amount in the permittee’s replacement fund in dollars for year specified in accordance with approved schedules;

d) replacement fund strategy for all assets with a useful life of 20 years or less;

e) expenditures for maintenance, corrective action and capital improvement taken during the fiscal year;

f) OM&R budget for the fiscal year; and

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Section A. Limitations and Monitoring Requirements

g) rate calculation demonstrating sufficient revenues to cover OM&R expenses. If the rate calculation shows there are insufficient revenues to cover OM&R expenses, the permittee shall develop and implement a financial strategy, within three (3) fiscal years after submittal of the Asset Management Plan, to reduce the revenue gap by at least 10 percent. The permittee's financial strategy may include OM&R rate increases, long term debt financing, utilization of reserves, and/or other appropriate revenue generating mechanisms. The ultimate goal of the Asset Management Program is to ensure sufficient revenues to cover OM&R expenses.

b. Reporting

The permittee shall develop a written report that summarizes asset management activities completed during the previous year and planned for the upcoming year. The written report shall be submitted to the Department on or before October 30 of each year. The written report shall include:

1) a description of the staffing levels maintained during the budget year;

2) a description of inspections and maintenance activities conducted and corrective actions taken during the previous year;

3) the cumulative expenditures for collection system maintenance activities, treatment works maintenance activities, corrective actions, and capital improvement during the previous budget year;

4) a summary of assets/areas identified for inspection/action (including capital improvement) in the upcoming fiscal year based on the five (5) core elements and the Business Risk Factors;

5) a maintenance budget and capital improvement budget for the upcoming budget year that take into account implementation of an effective Asset Management Program that meets the five (5) core elements;

6) an updated asset inventory based on the original submission; and

7) an updated OM&R budget with updated rate schedule that includes the amount of insufficient revenues, if any.

14. Discharge Monitoring Report – Quality Assurance Study Program

The permittee shall participate in the Discharge Monitoring Report – Quality Assurance (DMR-QA) Study Program. The purpose of the DMR-QA Study Program is to annually evaluate the proficiency of all in-house and/or contract laboratory(ies) that perform, on behalf of the facility authorized to discharge under this permit, the analytical testing required under this permit. In accordance with Section 308 of the Clean Water Act (33 U.S.C. § 1318); and R 323.2138 and R 323.2154 of Part 21, Wastewater Discharge Permits, promulgated under Part 31 of the NREPA, participation in the DMR-QA Study Program is required for all major facilities, and for minor facilities selected for participation by the Department.

Annually and in accordance with DMR-QA Study Program requirements and submittal due dates, the permittee shall submit to the Michigan DMR-QA Study Program state coordinator all documentation required by the DMR-QA Study. DMR-QA Study Program participation is required only for the analytes required under this permit and only when those analytes are also identified in the DMR-QA Study.

If the permitted facility's status as a major facility should change, participation in the DMR-QA Study Program may be reevaluated. Questions concerning participation in the DMR-QA Study Program should be directed to the Michigan DMR-QA Study Program state coordinator.

All forms and instructions required for participation in the DMR-QA Study Program, including submittal due dates and state coordinator contact information, can be found at http://www.epa.gov/compliance/discharge-monitoring-report-quality-assurance-study-program.

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Section B. Storm Water Pollution Prevention

Section B. Storm Water Pollution Prevention is not required for this permit.

PART I

Section C. Industrial Waste Pretreatment Program

1. Federal Industrial Pretreatment Program

a. The permittee shall implement the Federal Industrial Pretreatment Program approved on November 19, 2018, and any subsequent modifications approved up to the issuance of this permit. Approval of substantial program modifications after the issuance of this permit shall be incorporated into this permit by minor modification in accordance with 40 CFR 122.63.

b. The permittee shall comply with Rules 323.2301 through 323.2317 of the Michigan Administrative Code (Part 23 Rules), the General Pretreatment Regulations for Existing and New Sources of Pollution (40 CFR Part 403), and the approved Federal Industrial Pretreatment Program.

c. The permittee shall have the legal authority and necessary interjurisdictional agreements that provide the basis for the implementation and enforcement of the approved Federal Industrial Pretreatment Program throughout the service area. The legal authority and necessary interjurisdictional agreements shall include, at a minimum, the authority to carry out the activities specified in Rule 323.2306(a).

d. The permittee shall develop procedures which describe, in sufficient detail, program commitments which enable implementation of the approved Federal Industrial Pretreatment Program, 40 CFR Part 403, and the Part 23 Rules in accordance with Rule 323.2306(c).

e. The permittee shall establish an interjurisdictional agreement (or comparable document) with all tributary governmental jurisdictions. Each interjurisdictional agreement shall contain, at a minimum, the following:

1) identification of the agency responsible for the implementation and enforcement of the approved Federal Industrial Pretreatment Program within the tributary governmental jurisdiction's boundaries; and

2) the provision of the legal authority which provides the basis for the implementation and enforcement of the approved Federal Industrial Pretreatment Program within the tributary governmental jurisdiction's boundaries.

f. The permittee shall prohibit discharges that:

1) cause, in whole or in part, the permittee's failure to comply with any condition of this permit or the NREPA;

2) restrict, in whole or in part, the permittee's management of biosolids;

3) cause, in whole or in part, operational problems at the treatment facility or in its collection system;

4) violate any of the general or specific prohibitions identified in Rule 323.2303(1) and (2);

5) violate categorical standards identified in Rule 323.2311; and

6) violate local limits established in accordance with Rule 323.2303(4).

g. The permittee shall maintain a list of its nondomestic users that meet the criteria of a significant industrial user as identified in Rule 323.2302(cc).

h. The permittee shall develop an enforcement response plan which describes, in sufficient detail, program commitments which will enable the enforcement of the approved Federal Industrial Pretreatment Program, 40 CFR Part 403, and the Part 23 Rules in accordance with Rule 323.2306(g).

PART I

Section C. Industrial Waste Pretreatment Program

i. The Department may require modifications to the approved Federal Industrial Pretreatment Program which are necessary to ensure compliance with 40 CFR Part 403 and the Part 23 Rules in accordance with Rule 323.2309.

j. The permittee shall not implement changes or modifications to the approved Federal Industrial Pretreatment Program without notification to the Department. Any substantial modification shall be subject to Department public noticing and approval in accordance with Rule 323.2309.

k. The permittee shall maintain an adequate revenue structure and staffing level for effective implementation of the approved Federal Industrial Pretreatment Program.

l. The permittee shall develop and maintain, for a minimum of three (3) years, all records and information necessary to determine nondomestic user compliance with 40 CFR Part 403, Part 23 Rules and the approved Federal Industrial Pretreatment Program. This period of retention shall be extended during the course of any unresolved enforcement action or litigation regarding a nondomestic user or when requested by the Department or the United States Environmental Protection Agency. All of the aforementioned records and information shall be made available upon request for inspection and copying by the Department and the United States Environmental Protection Agency.

m. The permittee shall evaluate the approved Federal Industrial Pretreatment Program for compliance with the 40 CFR Part 403, Part 23 Rules and the prohibitions stated in item f. (above). Based upon this evaluation, the permittee shall propose to the Department all necessary changes or modifications to the approved Federal Industrial Pretreatment Program no later than the next Industrial Pretreatment Program Annual Report due date (see item o. below).

n. The permittee shall develop and enforce local limits to implement the prohibitions listed in item f above. Local limits shall be based upon data representative of actual conditions demonstrated in a maximum allowable headworks loading analysis. An evaluation of whether the existing local limits need to be revised shall be submitted to the Department by December 1, 2018. The submittal shall provide a technical evaluation of the basis upon which this determination was made which includes information regarding the maximum allowable headworks loading, collection system protection criteria, and worker health and safety, based upon data collected since the last local limits review.

The following pollutants shall be evaluated:

1) Arsenic, Cadmium, Chromium, Copper, Cyanide, Lead, Mercury, Nickel, Silver, and Zinc;

2) Pollutants that are subject to limits or monitoring in this permit;

3) Pollutants that have an existing local limit; and,

4) Other pollutants of concern which would reasonably be expected to be discharged or transported by truck or rail or otherwise introduced into the POTW.

o. On or before April 1st of each year, the permittee shall submit to the Department, as required by Rule 323.2310(8), an Industrial Pretreatment Program Annual Report on the status of program implementation and enforcement activities. The reporting period shall begin on January 1st and end on December 31st. At a minimum, the Industrial Pretreatment Program Annual Report shall contain the following items:

1) additions, deletions, and any other modifications to the permittee's previously submitted nondomestic user inventory (Rule 323.2306(c)(i));

2) additions, deletions, and any other modifications to the permittee's approved Significant Industrial User List (Rule 323.2306(h));

PART I

Section C. Industrial Waste Pretreatment Program

3) a listing of the names of Significant Industrial Users not inspected by the permittee at least once during the reporting period or at the frequency committed to in the approved Federal Industrial Pretreatment Program;

4) a listing of the names of Significant Industrial Users not sampled for all required pollutants by the permittee at least once during the reporting period or at the frequency committed to in the approved Federal Industrial Pretreatment Program;

5) a listing of the names of Significant Industrial Users without a permit at any time during the reporting period;

6) a listing of the names of nondomestic industrial users in significant noncompliance for each of the criteria as defined in Rule 323.2302(dd)(i)-(viii);

7) proof of publication of all nondomestic users in significant noncompliance in the largest daily newspaper in the permittee's area;

8) a summary of the enforcement activities by the permittee during the report period. This Summary shall include:

a) a listing of the names of nondomestic users which were the subject of an enforcement action;

b) the enforcement action taken and the date the action was taken; and

c) whether the nondomestic user returned to compliance by the end of the reporting period (include date nondomestic user returned to compliance).

9) a listing of the names of Significant Industrial Users who did not submit pretreatment reports in accordance with requirements specified in their permit during the reporting period;

10) a listing of the names of Significant Industrial Users who did not self-monitor in accordance with requirements specified in their permit during the reporting period;

11) a summary of results of all the sampling and analyses performed of the wastewater treatment plant’s influent, effluent, and biosolids conducted in accordance with approved methods during the reporting period. The summary shall include the monthly average, daily maximum, quantification level, and number of samples analyzed for each pollutant. At a minimum, the results of analyses for all locally limited parameters for at least one monitoring event that tests influent, effluent and biosolids during the reporting period shall be submitted with each report, unless otherwise required by the Department. Sample collection shall be at intervals sufficient to provide pollutant removal rates, unless the pollutant is not measurable; and

12) any other relevant information as requested by the Department.

PART I

Section D. Residuals Management Program

1. Residuals Management Program for Land Application of Biosolids

A permittee seeking authorization to land-apply bulk biosolids or prepare bulk biosolids for land application shall develop and submit a Residuals Management Program (RMP) to the Department (see Part I.D.1.e) for approval. Effective upon Department approval of the permittee's RMP, the permittee is authorized to land-apply bulk biosolids or prepare bulk biosolids for land application in accordance with the requirements established in R 323.2401 through R 323.2418 of the Michigan Administrative Code (Part 24 Rules) which can be obtained via the internet (http://www.michigan.gov/deq/ and on the left side of the screen click on Water, Biosolids & Industrial Pretreatment, Biosolids, then click on Biosolids Laws and Rules Information which is under the Laws & Rules banner in the center of the screen). The permittee's approved RMP, and any approved modifications thereto, are enforceable requirements of this permit. Incineration, landfilling and other residual disposal activities shall be conducted in accordance with Part II.D.7. of this permit.

a. RMP Approval and Implementation
A permittee seeking approval of an RMP shall submit the RMP to the Department (see Part I.D.1.e) at least 180 days prior to the land application of biosolids. The permittee may utilize the RMP Electronic Form which can be obtained via the internet (http://www.michigan.gov/biosolids then click on RMP Electronic Form which is under the Downloads banner in the center of the screen) or obtain detailed requirements from the Department. The RMP shall become effective and shall be implemented by the permittee upon written approval by the Department.

b. Annual Report
On or before October 30 of each year, the permittee shall submit an annual report to the Department for the previous fiscal year of October 1 through September 30. The report shall be submitted electronically via the Department's MiWaters system at https://miwaters.deq.state.mi.us. At a minimum, the report shall contain:

1) a certification that current residuals management practices are in accordance with the approved RMP, or a proposal for modification to the approved RMP; and

2) a completed Biosolids Annual Report Form, available at https://miwaters.deq.state.mi.us.

c. Modifications to the Approved RMP
Prior to implementation of modifications to the RMP, the permittee shall submit proposed modifications to the Department (see Part I.D.1.e.) for approval. The approved modification shall become effective upon the date of approval. Upon written notification, the Department may impose additional requirements and/or limitations to the approved RMP as necessary to protect public health and the environment from any adverse effect of a pollutant in the biosolids.

d. Record Keeping
Records required by the Part 24 Rules shall be kept for a minimum of five years. However, the records documenting cumulative loading for sites subject to cumulative pollutant loading rates shall be kept as long as the site receives biosolids.

e. Contact Information
RMP-related submittals shall be made to the Department.

PART II

Part II may include terms and /or conditions not applicable to discharges covered under this permit.

Section A. Definitions

Acute toxic unit (TU_A) means $100/LC_{50}$ where the LC_{50} is determined from a whole effluent toxicity (WET) test which produces a result that is statistically or graphically estimated to be lethal to 50% of the test organisms.

Annual monitoring frequency refers to a calendar year beginning on January 1 and ending on December 31. When required by this permit, an analytical result, reading, value or observation shall be reported for that period if a discharge occurs during that period.

Authorized public agency means a state, local, or county agency that is designated pursuant to the provisions of section 9110 of Part 91 of the NREPA to implement soil erosion and sedimentation control requirements with regard to construction activities undertaken by that agency.

Best management practices (BMPs) means structural devices or nonstructural practices that are designed to prevent pollutants from entering into storm water, to direct the flow of storm water, or to treat polluted storm water.

Bioaccumulative chemical of concern (BCC) means a chemical which, upon entering the surface waters, by itself or as its toxic transformation product, accumulates in aquatic organisms by a human health bioaccumulation factor of more than 1000 after considering metabolism and other physiochemical properties that might enhance or inhibit bioaccumulation. The human health bioaccumulation factor shall be derived according to R 323.1057(5). Chemicals with half-lives of less than 8 weeks in the water column, sediment, and biota are not BCCs. The minimum bioaccumulation concentration factor (BAF) information needed to define an organic chemical as a BCC is either a field-measured BAF or a BAF derived using the biota-sediment accumulation factor (BSAF) methodology. The minimum BAF information needed to define an inorganic chemical as a BCC, including an organometal, is either a field-measured BAF or a laboratory-measured bioconcentration factor (BCF). The BCCs to which these rules apply are identified in Table 5 of R 323.1057 of the Water Quality Standards.

Biosolids are the solid, semisolid, or liquid residues generated during the treatment of sanitary sewage or domestic sewage in a treatment works. This includes, but is not limited to, scum or solids removed in primary, secondary, or advanced wastewater treatment processes and a derivative of the removed scum or solids.

Bulk biosolids means biosolids that are not sold or given away in a bag or other container for application to a lawn or home garden.

Certificate of Coverage (COC) is a document, issued by the Department, which authorizes a discharge under a general permit.

Chronic toxic unit (TU_C) means $100/MATC$ or $100/IC_{25}$, where the maximum acceptable toxicant concentration (MATC) and IC_{25} are expressed as a percent effluent in the test medium.

Class B biosolids refers to material that has met the Class B pathogen reduction requirements or equivalent treatment by a Process to Significantly Reduce Pathogens (PSRP) in accordance with the Part 24 Rules. Processes include aerobic digestion, composting, anaerobic digestion, lime stabilization and air drying.

Combined sewer system is a sewer system in which storm water runoff is combined with sanitary wastes.

PART II

Section A. Definitions

Daily concentration is the sum of the concentrations of the individual samples of a parameter divided by the number of samples taken during any calendar day. If the parameter concentration in any sample is less than the quantification limit, regard that value as zero when calculating the daily concentration. The daily concentration will be used to determine compliance with any maximum and minimum daily concentration limitations (except for pH and dissolved oxygen). When required by the permit, report the maximum calculated daily concentration for the month in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the Discharge Monitoring Reports (DMRs).

For pH, report the maximum value of any *individual* sample taken during the month in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs and the minimum value of any *individual* sample taken during the month in the "MINIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs. For dissolved oxygen, report the minimum concentration of any *individual* sample in the "MINIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs.

Daily loading is the total discharge by weight of a parameter discharged during any calendar day. This value is calculated by multiplying the daily concentration by the total daily flow and by the appropriate conversion factor. The daily loading will be used to determine compliance with any maximum daily loading limitations. When required by the permit, report the maximum calculated daily loading for the month in the "MAXIMUM" column under "QUANTITY OR LOADING" on the DMRs.

Daily monitoring frequency refers to a 24-hour day. When required by this permit, an analytical result, reading, value or observation shall be reported for that period if a discharge occurs during that period.

Department means the Michigan Department of Environmental Quality.

Detection level means the lowest concentration or amount of the target analyte that can be determined to be different from zero by a single measurement at a stated level of probability.

Discharge means the addition of any waste, waste effluent, wastewater, pollutant, or any combination thereof to any surface water of the state.

Discharge point is the location where the point source discharge is directed to surface waters of the state or to a separate storm sewer. It includes the location of all point source discharges where storm water exits the facility, including *outfalls* which discharge directly to surface waters of the state, and *points of discharge* which discharge directly into separate storm sewer systems.

EC_{50} means a statistically or graphically estimated concentration that is expected to cause 1 or more specified effects in 50% of a group of organisms under specified conditions.

Fecal coliform bacteria monthly
FOR WWSLs THAT COLLECT AND STORE WASTEWATER AND ARE AUTHORIZED TO DISCHARGE ONLY IN THE SPRING AND/OR FALL ON AN INTERMITTENT BASIS – Fecal coliform bacteria monthly is the geometric mean of all daily concentrations determined during a discharge event. Days on which no daily concentration is determined shall not be used to determine the calculated monthly value. The calculated monthly value will be used to determine compliance with the maximum monthly fecal coliform bacteria limitations. When required by the permit, report the calculated monthly value in the "AVERAGE" column under "QUALITY OR CONCENTRATION" on the DMR. If the period in which the discharge event occurred was partially in each of two months, the calculated monthly value shall be reported on the DMR of the month in which the last day of discharge occurred.

FOR ALL OTHER DISCHARGES – Fecal coliform bacteria monthly is the geometric mean of all daily concentrations determined during a reporting month. Days on which no daily concentration is determined shall not be used to determine the calculated monthly value. The calculated monthly value will be used to determine compliance with the maximum monthly fecal coliform bacteria limitations. When required by the permit, report the calculated monthly value in the "AVERAGE" column under "QUALITY OR CONCENTRATION" on the DMR.

PART II

Section A. Definitions

Fecal coliform bacteria 7-day
FOR WWSLs THAT COLLECT AND STORE WASTEWATER AND ARE AUTHORIZED TO DISCHARGE ONLY IN THE SPRING AND/OR FALL ON AN INTERMITTENT BASIS – Fecal coliform bacteria 7-day is the geometric mean of the daily concentrations determined during any 7 consecutive days of discharge during a discharge event. If the number of daily concentrations determined during the discharge event is less than 7 days, the number of actual daily concentrations determined shall be used for the calculation. Days on which no daily concentration is determined shall not be used to determine the value. The calculated 7-day value will be used to determine compliance with the maximum 7-day fecal coliform bacteria limitations. When required by the permit, report the maximum calculated 7-day geometric mean value for the month in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs. If the 7-day period was partially in each of two months, the value shall be reported on the DMR of the month in which the last day of discharge occurred.

FOR ALL OTHER DISCHARGES – Fecal coliform bacteria 7-day is the geometric mean of the daily concentrations determined during any 7 consecutive days in a reporting month. If the number of daily concentrations determined is less than 7, the actual number of daily concentrations determined shall be used for the calculation. Days on which no daily concentration is determined shall not be used to determine the value. The calculated 7-day value will be used to determine compliance with the maximum 7-day fecal coliform bacteria limitations. When required by the permit, report the maximum calculated 7-day geometric mean for the month in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs. The first calculation shall be made on day 7 of the reporting month, and the last calculation shall be made on the last day of the reporting month.

Flow-proportioned sample is a composite sample with the sample volume proportional to the effluent flow.

General permit means a National Pollutant Discharge Elimination System permit issued authorizing a category of similar discharges.

Geometric mean is the average of the logarithmic values of a base 10 data set, converted back to a base 10 number.

Grab sample is a single sample taken at neither a set time nor flow.

IC_{25} means the toxicant concentration that would cause a 25% reduction in a nonquantal biological measurement for the test population.

Illicit connection means a physical connection to a municipal separate storm sewer system that primarily conveys non-storm water discharges other than uncontaminated groundwater into the storm sewer; or a physical connection not authorized or permitted by the local authority, where a local authority requires authorization or a permit for physical connections.

Illicit discharge means any discharge to, or seepage into, a municipal separate storm sewer system that is not composed entirely of storm water or uncontaminated groundwater. Illicit discharges include non-storm water discharges through pipes or other physical connections; dumping of motor vehicle fluids, household hazardous wastes, domestic animal wastes, or litter; collection and intentional dumping of grass clippings or leaf litter; or unauthorized discharges of sewage, industrial waste, restaurant wastes, or any other non-storm water waste directly into a separate storm sewer.

Individual permit means a site-specific NPDES permit.

Inlet means a catch basin, roof drain, conduit, drain tile, retention pond riser pipe, sump pump, or other point where storm water or wastewater enters into a closed conveyance system prior to discharge off site or into waters of the state.

PART II

Section A. Definitions

Interference is a discharge which, alone or in conjunction with a discharge or discharges from other sources, both: 1) inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and 2) therefore, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or, of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent state or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including Title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including state regulations contained in any state sludge management plan prepared pursuant to Subtitle D of the SWDA), the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act. [This definition does not apply to sample matrix interference].

Land application means spraying or spreading biosolids or a biosolids derivative onto the land surface, injecting below the land surface, or incorporating into the soil so that the biosolids or biosolids derivative can either condition the soil or fertilize crops or vegetation grown in the soil.

LC_{50} means a statistically or graphically estimated concentration that is expected to be lethal to 50% of a group of organisms under specified conditions.

Maximum acceptable toxicant concentration (MATC) means the concentration obtained by calculating the geometric mean of the lower and upper chronic limits from a chronic test. A lower chronic limit is the highest tested concentration that did not cause the occurrence of a specific adverse effect. An upper chronic limit is the lowest tested concentration which did cause the occurrence of a specific adverse effect and above which all tested concentrations caused such an occurrence.

Maximum extent practicable means implementation of best management practices by a public body to comply with an approved storm water management program as required by a national permit for a municipal separate storm sewer system, in a manner that is environmentally beneficial, technically feasible, and within the public body's legal authority.

MGD means million gallons per day.

Monthly concentration is the sum of the daily concentrations determined during a reporting period divided by the number of daily concentrations determined. The calculated monthly concentration will be used to determine compliance with any maximum monthly concentration limitations. Days with no discharge shall not be used to determine the value. When required by the permit, report the calculated monthly concentration in the "AVERAGE" column under "QUALITY OR CONCENTRATION" on the DMR. If the seven day period was partially in each of two months, the monthly average shall be reported on the DMR of the month in which the last day of discharge occurred.

For minimum percent removal requirements, the monthly influent concentration and the monthly effluent concentration shall be determined. The calculated monthly percent removal, which is equal to 100 times the quantity [1 minus the quantity (monthly effluent concentration divided by the monthly influent concentration)], shall be reported in the "MINIMUM" column under "QUALITY OR CONCENTRATION" on the DMRs.

Monthly loading is the sum of the daily loadings of a parameter divided by the number of daily loadings determined during a reporting period. The calculated monthly loading will be used to determine compliance with any maximum monthly loading limitations. Days with no discharge shall not be used to determine the value. When required by the permit, report the calculated monthly loading in the "AVERAGE" column under "QUANTITY OR LOADING" on the DMR. If the seven day period was partially in each of two months, the monthly average shall be reported on the DMR of the month in which the last day of discharge occurred..

Monthly monitoring frequency refers to a calendar month. When required by this permit, an analytical result, reading, value or observation shall be reported for that period if a discharge occurs during that period.

Municipal separate storm sewer means a conveyance or system of conveyances designed or used for collecting or conveying storm water which is not a combined sewer and which is not part of a publicly-owned treatment works as defined in the Code of Federal Regulations at 40 CFR 122.2.

PART II

Section A. Definitions

Municipal separate storm sewer system (MS4) means all separate storm sewers that are owned or operated by the United States, a state, city, village, township, county, district, association, or other public body created by or pursuant to state law, having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under state law, such as a sewer district, flood control district, or drainage district, or similar entity, or a designated or approved management agency under Section 208 of the Federal Act that discharges to the waters of the state. This term includes systems similar to separate storm sewer systems in municipalities, such as systems at military bases, large hospital or prison complexes, and highways and other thoroughfares. The term does not include separate storm sewers in very discrete areas, such as individual buildings.

National Pretreatment Standards are the regulations promulgated by or to be promulgated by the Federal Environmental Protection Agency pursuant to Section 307(b) and (c) of the Federal Act. The standards establish nationwide limits for specific industrial categories for discharge to a POTW.

No observed adverse effect level (NOAEL) means the highest tested dose or concentration of a substance which results in no observed adverse effect in exposed test organisms where higher doses or concentrations result in an adverse effect.

Noncontact cooling water is water used for cooling which does not come into direct contact with any raw material, intermediate product, by-product, waste product or finished product.

Nondomestic user is any discharger to a POTW that discharges wastes other than or in addition to water-carried wastes from toilet, kitchen, laundry, bathing or other facilities used for household purposes.

Outfall is the location at which a point source discharge enters the surface waters of the state.

Part 91 agency means an agency that is designated by a county board of commissioners pursuant to the provisions of section 9105 of Part 91 of the NREPA; an agency that is designated by a city, village, or township in accordance with the provisions of section 9106 of Part 91 of the NREPA; or the Department for soil erosion and sedimentation activities under Part 615, Part 631, or Part 632 pursuant to the provisions of section 9115 of Part 91 of the NREPA.

Part 91 permit means a soil erosion and sedimentation control permit issued by a Part 91 agency pursuant to the provisions of Part 91 of the NREPA.

Partially treated sewage is any sewage, sewage and storm water, or sewage and wastewater, from domestic or industrial sources that is treated to a level less than that required by the permittee's National Pollutant Discharge Elimination System permit, or that is not treated to national secondary treatment standards for wastewater, including discharges to surface waters from retention treatment facilities.

Point of discharge is the location of a point source discharge where storm water is discharged directly into a separate storm sewer system.

Point source discharge means a discharge from any discernible, confined, discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, or rolling stock. Changing the surface of land or establishing grading patterns on land will result in a point source discharge where the runoff from the site is ultimately discharged to waters of the state.

Polluting material means any material, in solid or liquid form, identified as a polluting material under the Part 5 Rules (R 324.2001 through R 324.2009 of the Michigan Administrative Code).

POTW is a publicly owned treatment works.

Pretreatment is reducing the amount of pollutants, eliminating pollutants, or altering the nature of pollutant properties to a less harmful state prior to discharge into a public sewer. The reduction or alteration can be by physical, chemical, or biological processes, process changes, or by other means. Dilution is not considered pretreatment unless expressly authorized by an applicable National Pretreatment Standard for a particular industrial category.

PART II

Section A. Definitions

Public (as used in the MS4 individual permit) means all persons who potentially could affect the authorized storm water discharges, including, but not limited to, residents, visitors to the area, public employees, businesses, industries, and construction contractors and developers.

Public body means the United States; the state of Michigan; a city, village, township, county, school district, public college or university, or single-purpose governmental agency; or any other body which is created by federal or state statute or law.

Qualifying storm event means a storm event causing greater than 0.1 inch of rainfall and occurring at least 72 hours after the previous measurable storm event that also caused greater than 0.1 inch of rainfall.

Quantification level means the measurement of the concentration of a contaminant obtained by using a specified laboratory procedure calculated at a specified concentration above the detection level. It is considered the lowest concentration at which a particular contaminant can be quantitatively measured using a specified laboratory procedure for monitoring of the contaminant.

Quarterly monitoring frequency refers to a three month period, defined as January through March, April through June, July through September, and October through December. When required by this permit, an analytical result, reading, value or observation shall be reported for that period if a discharge occurs during that period.

Regional Administrator is the Region 5 Administrator, U.S. EPA, located at R-19J, 77 W. Jackson Blvd., Chicago, Illinois 60604.

Regulated area means the permittee's urbanized area, where urbanized area is defined as a place and its adjacent densely-populated territory that together have a minimum population of 50,000 people as defined by the United States Bureau of the Census and as determined by the latest available decennial census.

Secondary containment structure means a unit, other than the primary container, in which significant materials are packaged or held, which is required by State or Federal law to prevent the escape of significant materials by gravity into sewers, drains, or otherwise directly or indirectly into any sewer system or to the surface or ground waters of this state.

Separate storm sewer system means a system of drainage, including, but not limited to, roads, catch basins, curbs, gutters, parking lots, ditches, conduits, pumping devices, or man-made channels, which is not a combined sewer where storm water mixes with sanitary wastes, and is not part of a POTW.

Significant industrial user is a nondomestic user that: 1) is subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N; or 2) discharges an average of 25,000 gallons per day or more of process wastewater to a POTW (excluding sanitary, noncontact cooling and boiler blowdown wastewater); contributes a process waste stream which makes up five (5) percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the permittee as defined in 40 CFR 403.12(a) on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's treatment plant operation or violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Significant materials Significant Materials means any material which could degrade or impair water quality, including but not limited to: raw materials; fuels; solvents, detergents, and plastic pellets; finished materials such as metallic products; hazardous substances designated under Section 101(14) of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (see 40 CFR 372.65); any chemical the facility is required to report pursuant to Section 313 of Emergency Planning and Community Right-to-Know Act (EPCRA); polluting materials as identified under the Part 5 Rules (R 324.2001 through R 324.2009 of the Michigan Administrative Code); Hazardous Wastes as defined in Part 111 of the NREPA; fertilizers; pesticides; and waste products such as ashes, slag, and sludge that have the potential to be released with storm water discharges.

Significant spills and significant leaks means any release of a polluting material reportable under the Part 5 Rules (R 324.2001 through R 324.2009 of the Michigan Administrative Code).

PART II

Section A. Definitions

Special-use area means secondary containment structures required by state or federal law; lands on Michigan's List of Sites of Environmental Contamination pursuant to Part 201, Environmental Remediation, of the NREPA; and areas with other activities that may contribute pollutants to the storm water for which the Department determines monitoring is needed.

Stoichiometric means the quantity of a reagent calculated to be necessary and sufficient for a given chemical reaction.

Storm water means storm water runoff, snow melt runoff, surface runoff and drainage, and non-storm water included under the conditions of this permit.

SWPPP means the Storm Water Pollution Prevention Plan prepared in accordance with this permit.

Tier I value means a value for aquatic life, human health or wildlife calculated under R 323.1057 of the Water Quality Standards using a tier I toxicity database.

Tier II value means a value for aquatic life, human health or wildlife calculated under R 323.1057 of the Water Quality Standards using a tier II toxicity database.

Total maximum daily loads (TMDLs) are required by the Federal Act for waterbodies that do not meet Water Quality Standards. TMDLs represent the maximum daily load of a pollutant that a waterbody can assimilate and meet Water Quality Standards, and an allocation of that load among point sources, nonpoint sources, and a margin of safety.

Toxicity reduction evaluation (TRE) means a site-specific study conducted in a stepwise process designed to identify the causative agents of effluent toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in effluent toxicity.

Water Quality Standards means the Part 4 Water Quality Standards promulgated pursuant to Part 31 of the NREPA, being R 323.1041 through R 323.1117 of the Michigan Administrative Code.

Weekly monitoring frequency refers to a calendar week which begins on Sunday and ends on Saturday. When required by this permit, an analytical result, reading, value or observation shall be reported for that period if a discharge occurs during that period.

WWSL is a wastewater stabilization lagoon.

WWSL discharge event is a discrete occurrence during which effluent is discharged to the surface water up to 10 days of a consecutive 14 day period.

3-portion composite sample is a sample consisting of three equal-volume grab samples collected at equal intervals over an 8-hour period.

PART II

Section A. Definitions

7-day concentration
FOR WWSLs THAT COLLECT AND STORE WASTEWATER AND ARE AUTHORIZED TO DISCHARGE ONLY IN THE SPRING AND/OR FALL ON AN INTERMITTENT BASIS – The 7-day concentration is the sum of the daily concentrations determined during any 7 consecutive days of discharge during a WWSL discharge event divided by the number of daily concentrations determined. If the number of daily concentrations determined during the WWSL discharge event is less than 7 days, the number of actual daily concentrations determined shall be used for the calculation. The calculated 7-day concentration will be used to determine compliance with any maximum 7-day concentration limitations. When required by the permit, report the maximum calculated 7-day concentration for the WWSL discharge event in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the DMR. If the WWSL discharge event was partially in each of two months, the value shall be reported on the DMR of the month in which the last day of discharge occurred.

FOR ALL OTHER DISCHARGES – The 7-day concentration is the sum of the daily concentrations determined during any 7 consecutive days in a reporting month divided by the number of daily concentrations determined. If the number of daily concentrations determined is less than 7, the actual number of daily concentrations determined shall be used for the calculation. The calculated 7-day concentration will be used to determine compliance with any maximum 7-day concentration limitations in the reporting month. When required by the permit, report the maximum calculated 7-day concentration for the month in the "MAXIMUM" column under "QUALITY OR CONCENTRATION" on the DMR. The first 7-day calculation shall be made on day 7 of the reporting month, and the last calculation shall be made on the last day of the reporting month.

7-day loading
FOR WWSLs THAT COLLECT AND STORE WASTEWATER AND ARE AUTHORIZED TO DISCHARGE ONLY IN THE SPRING AND/OR FALL ON AN INTERMITTENT BASIS – The 7-day loading is the sum of the daily loadings determined during any 7 consecutive days of discharge during a WWSL discharge event divided by the number of daily loadings determined. If the number of daily loadings determined during the WWSL discharge event is less than 7 days, the number of actual daily loadings determined shall be used for the calculation. The calculated 7-day loading will be used to determine compliance with any maximum 7-day loading limitations. When required by the permit, report the maximum calculated 7-day loading for the WWSL discharge event in the "MAXIMUM" column under "QUANTITY OR LOADING" on the DMR. If the WWSL discharge event was partially in each of two months, the value shall be reported on the DMR of the month in which the last day of discharge occurred

FOR ALL OTHER DISCHARGES – The 7-day loading is the sum of the daily loadings determined during any 7 consecutive days in a reporting month divided by the number of daily loadings determined. If the number of daily loadings determined is less than 7, the actual number of daily loadings determined shall be used for the calculation. The calculated 7-day loading will be used to determine compliance with any maximum 7-day loading limitations in the reporting month. When required by the permit, report the maximum calculated 7-day loading for the month in the "MAXIMUM" column under "QUANTITY OR LOADING" on the DMR. The first 7-day calculation shall be made on day 7 of the reporting month, and the last calculation shall be made on the last day of the reporting month.

24-hour composite sample is a flow-proportioned composite sample consisting of hourly or more frequent portions that are taken over a 24-hour period. A time-proportioned composite sample may be used upon approval of the Department if the permittee demonstrates it is representative of the discharge.

PART II

Section B. Monitoring Procedures

1. Representative Samples

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge.

2. Test Procedures

Test procedures for the analysis of pollutants shall conform to regulations promulgated pursuant to Section 304(h) of the Federal Act (40 CFR Part 136 – Guidelines Establishing Test Procedures for the Analysis of Pollutants), unless specified otherwise in this permit. **Test procedures used shall be sufficiently sensitive to determine compliance with applicable effluent limitations**. Requests to use test procedures not promulgated under 40 CFR Part 136 for pollutant monitoring required by this permit shall be made in accordance with the Alternate Test Procedures regulations specified in 40 CFR 136.4. These requests shall be submitted to the Chief of the Permits Section, Water Resources Division, Michigan Department of Environmental Quality, P.O. Box 30273, Lansing, Michigan, 48909-7773. The permittee may use such procedures upon approval.

The permittee shall periodically calibrate and perform maintenance procedures on all analytical instrumentation at intervals to ensure accuracy of measurements. The calibration and maintenance shall be performed as part of the permittee's laboratory Quality Control/Quality Assurance program.

3. Instrumentation

The permittee shall periodically calibrate and perform maintenance procedures on all monitoring instrumentation at intervals to ensure accuracy of measurements.

4. Recording Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information: 1) the exact place, date, and time of measurement or sampling; 2) the person(s) who performed the measurement or sample collection; 3) the dates the analyses were performed; 4) the person(s) who performed the analyses; 5) the analytical techniques or methods used; 6) the date of and person responsible for equipment calibration; and 7) the results of all required analyses.

5. Records Retention

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation and recordings from continuous monitoring instrumentation shall be retained for a minimum of three (3) years, or longer if requested by the Regional Administrator or the Department.

PART II

Section C. Reporting Requirements

1. Start-up Notification

If the permittee will not discharge during the first 60 days following the effective date of this permit, the permittee shall notify the Department within 14 days following the effective date of this permit, and then 60 days prior to the commencement of the discharge.

2. Submittal Requirements for Self-Monitoring Data

Part 31 of the NREPA (specifically Section 324.3110(7)); and R 323.2155(2) of Part 21, Wastewater Discharge Permits, promulgated under Part 31 of the NREPA, allow the Department to specify the forms to be utilized for reporting the required self-monitoring data. Unless instructed on the effluent limitations page to conduct "Retained Self-Monitoring," the permittee shall submit self-monitoring data via the Department's MiWaters system.

The permittee shall utilize the information provided on the MiWaters website, located at https://miwaters.deq.state.mi.us, to access and submit the electronic forms. Both monthly summary and daily data shall be submitted to the Department no later than the 20th day of the month following each month of the authorized discharge period(s). The permittee may be allowed to submit the electronic forms after this date if the Department has granted an extension to the submittal date.

3. Retained Self-Monitoring Requirements

If instructed on the effluent limits page (or otherwise authorized by the Department in accordance with the provisions of this permit) to conduct retained self-monitoring, the permittee shall maintain a year-to-date log of retained self-monitoring results and, upon request, provide such log for inspection to the staff of the Department. Retained self-monitoring results are public information and shall be promptly provided to the public upon request.

The permittee shall certify, in writing, to the Department, on or before January 10th (April 1st for animal feeding operation facilities) of each year, that: 1) all retained self-monitoring requirements have been complied with and a year-to-date log has been maintained; and 2) the application on which this permit is based still accurately describes the discharge. With this annual certification, the permittee shall submit a summary of the previous year's monitoring data. The summary shall include maximum values for samples to be reported as daily maximums and/or monthly maximums and minimum values for any daily minimum samples.

Retained self-monitoring may be denied to a permittee by notification in writing from the Department. In such cases, the permittee shall submit self-monitoring data in accordance with Part II.C.2., above. Such a denial may be rescinded by the Department upon written notification to the permittee. Reissuance or modification of this permit or reissuance or modification of an individual permittee's authorization to discharge shall not affect previous approval or denial for retained self-monitoring unless the Department provides notification in writing to the permittee.

4. Additional Monitoring by Permittee

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Discharge Monitoring Report. Such increased frequency shall also be indicated.

Monitoring required pursuant to Part 41 of the NREPA or Rule 35 of the Mobile Home Park Commission Act (Act 96 of the Public Acts of 1987) for assurance of proper facility operation shall be submitted as required by the Department.

PART II

Section C. Reporting Requirements

5. Compliance Dates Notification

Within 14 days of every compliance date specified in this permit, the permittee shall submit a *written* notification to the Department indicating whether or not the particular requirement was accomplished. If the requirement was not accomplished, the notification shall include an explanation of the failure to accomplish the requirement, actions taken or planned by the permittee to correct the situation, and an estimate of when the requirement will be accomplished. If a written report is required to be submitted by a specified date and the permittee accomplishes this, a separate written notification is not required.

6. Noncompliance Notification

Compliance with all applicable requirements set forth in the Federal Act, Parts 31 and 41 of the NREPA, and related regulations and rules is required. All instances of noncompliance shall be reported as follows:

a. 24-Hour Reporting
Any noncompliance which may endanger health or the environment (including maximum and/or minimum daily concentration discharge limitation exceedances) shall be reported, verbally, within 24 hours from the time the permittee becomes aware of the noncompliance. A written submission shall also be provided within five (5) days.

b. Other Reporting
The permittee shall report, in writing, all other instances of noncompliance not described in a. above at the time monitoring reports are submitted; or, in the case of retained self-monitoring, within five (5) days from the time the permittee becomes aware of the noncompliance.

Written reporting shall include: 1) a description of the discharge and cause of noncompliance; and 2) the period of noncompliance, including exact dates and times, or, if not yet corrected, the anticipated time the noncompliance is expected to continue, and the steps taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

7. Spill Notification

The permittee shall immediately report any release of any polluting material which occurs to the surface waters or groundwaters of the state, unless the permittee has determined that the release is not in excess of the threshold reporting quantities specified in the Part 5 Rules (R 324.2001 through R 324.2009 of the Michigan Administrative Code), by calling the Department at the number indicated on the second page of this permit (or, if this is a general permit, on the COC); or, if the notice is provided after regular working hours, call the Department's 24-hour Pollution Emergency Alerting System telephone number, 1-800-292-4706 (calls from **out-of-state** dial 1-517-373-7660).

Within ten (10) days of the release, the permittee shall submit to the Department a full written explanation as to the cause of the release, the discovery of the release, response (clean-up and/or recovery) measures taken, and preventative measures taken or a schedule for completion of measures to be taken to prevent reoccurrence of similar releases.

PART II

Section C. Reporting Requirements

8. Upset Noncompliance Notification

If a process "upset" (defined as an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee) has occurred, the permittee who wishes to establish the affirmative defense of upset, shall notify the Department by telephone within 24 hours of becoming aware of such conditions; and within five (5) days, provide in writing, the following information:

a. that an upset occurred and that the permittee can identify the specific cause(s) of the upset;

b. that the permitted wastewater treatment facility was, at the time, being properly operated and maintained (note that an upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation); and

c. that the permittee has specified and taken action on all responsible steps to minimize or correct any adverse impact in the environment resulting from noncompliance with this permit.

No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

In any enforcement proceedings, the permittee, seeking to establish the occurrence of an upset, has the burden of proof.

9. Bypass Prohibition and Notification

a. Bypass Prohibition
Bypass is prohibited, and the Department may take an enforcement action, unless:

1) bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

2) there were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass; and

3) the permittee submitted notices as required under 9.b. or 9.c. below.

b. Notice of Anticipated Bypass
If the permittee knows in advance of the need for a bypass, it shall submit prior notice to the Department, if possible at least ten (10) days before the date of the bypass, and provide information about the anticipated bypass as required by the Department. The Department may approve an anticipated bypass, after considering its adverse effects, if it will meet the three (3) conditions listed in 9.a. above.

c. Notice of Unanticipated Bypass
The permittee shall submit notice to the Department of an unanticipated bypass by calling the Department at the number indicated on the second page of this permit (if the notice is provided after regular working hours, use the following number: 1-800-292-4706) as soon as possible, but no later than 24 hours from the time the permittee becomes aware of the circumstances.

PART II

Section C. Reporting Requirements

d. Written Report of Bypass
A written submission shall be provided within five (5) working days of commencing any bypass to the Department, and at additional times as directed by the Department. The written submission shall contain a description of the bypass and its cause; the period of bypass, including exact dates and times, and if the bypass has not been corrected, the anticipated time it is expected to continue; steps taken or planned to reduce, eliminate, and prevent reoccurrence of the bypass; and other information as required by the Department.

e. Bypass Not Exceeding Limitations
The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to ensure efficient operation. These bypasses are not subject to the provisions of 9.a., 9.b., 9.c., and 9.d., above. This provision does not relieve the permittee of any notification responsibilities under Part II.C.11. of this permit.

f. Definitions

1) Bypass means the intentional diversion of waste streams from any portion of a treatment facility.

2) Severe property damage means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

10. Bioaccumulative Chemicals of Concern (BCC)

Consistent with the requirements of R 323.1098 and R 323.1215 of the Michigan Administrative Code, the permittee is prohibited from undertaking any action that would result in a lowering of water quality from an increased loading of a BCC unless an increased use request and antidegradation demonstration have been submitted and approved by the Department.

11. Notification of Changes in Discharge

The permittee shall notify the Department, in writing, as soon as possible but no later than 10 days of knowing, or having reason to believe, that any activity or change has occurred or will occur which would result in the discharge of: 1) detectable levels of chemicals on the current Michigan Critical Materials Register, priority pollutants or hazardous substances set forth in 40 CFR 122.21, Appendix D, or the Pollutants of Initial Focus in the Great Lakes Water Quality Initiative specified in 40 CFR 132.6, Table 6, which were not acknowledged in the application or listed in the application at less than detectable levels; 2) detectable levels of any other chemical not listed in the application or listed at less than detection, for which the application specifically requested information; or 3) any chemical at levels greater than five times the average level reported in the complete application (see the first page of this permit, for the date(s) the complete application was submitted). Any other monitoring results obtained as a requirement of this permit shall be reported in accordance with the compliance schedules.

PART II

Section C. Reporting Requirements

12. Changes in Facility Operations

Any anticipated action or activity, including but not limited to facility expansion, production increases, or process modification, which will result in new or increased loadings of pollutants to the receiving waters must be reported to the Department by a) submission of an increased use request (application) and all information required under R 323.1098 (Antidegradation) of the Water Quality Standards or b) by notice if the following conditions are met: 1) the action or activity will not result in a change in the types of wastewater discharged or result in a greater quantity of wastewater than currently authorized by this permit; 2) the action or activity will not result in violations of the effluent limitations specified in this permit; 3) the action or activity is not prohibited by the requirements of Part II.C.10.; and 4) the action or activity will not require notification pursuant to Part II.C.11. Following such notice, the permit or, if applicable, the facility's COC may be modified according to applicable laws and rules to specify and limit any pollutant not previously limited.

13. Transfer of Ownership or Control

In the event of any change in control or ownership of facilities from which the authorized discharge emanates, the permittee shall submit to the Department 30 days prior to the actual transfer of ownership or control a written agreement between the current permittee and the new permittee containing: 1) the legal name and address of the new owner; 2) a specific date for the effective transfer of permit responsibility, coverage and liability; and 3) a certification of the continuity of or any changes in operations, wastewater discharge, or wastewater treatment.

If the new permittee is proposing changes in operations, wastewater discharge, or wastewater treatment, the Department may propose modification of this permit in accordance with applicable laws and rules.

14. Operations and Maintenance Manual

For wastewater treatment facilities that serve the public (and are thus subject to Part 41 of the NREPA), Section 4104 of Part 41 and associated Rule 2957 of the Michigan Administrative Code allow the Department to require an Operations and Maintenance (O&M) Manual from the facility. An up-to-date copy of the O&M Manual shall be kept at the facility and shall be provided to the Department upon request. The Department may review the O&M Manual in whole or in part at its discretion and require modifications to it if portions are determined to be inadequate.

At a minimum, the O&M Manual shall include the following information: permit standards; descriptions and operation information for all equipment; staffing information; laboratory requirements; record keeping requirements; a maintenance plan for equipment; an emergency operating plan; safety program information; and copies of all pertinent forms, as-built plans, and manufacturer's manuals.

Certification of the existence and accuracy of the O&M Manual shall be submitted to the Department at least sixty days prior to start-up of a new wastewater treatment facility. Recertification shall be submitted sixty days prior to start-up of any substantial improvements or modifications made to an existing wastewater treatment facility.

PART II

Section C. Reporting Requirements

15. Signatory Requirements

All applications, reports, or information submitted to the Department in accordance with the conditions of this permit and that require a signature shall be signed and certified as described in the Federal Act and the NREPA.

The Federal Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance, shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

The NREPA (Section 3115(2)) provides that a person who at the time of the violation knew or should have known that he or she discharged a substance contrary to this part, or contrary to a permit, COC, or order issued or rule promulgated under this part, or who intentionally makes a false statement, representation, or certification in an application for or form pertaining to a permit or COC or in a notice or report required by the terms and conditions of an issued permit or COC, or who intentionally renders inaccurate a monitoring device or record required to be maintained by the Department, is guilty of a felony and shall be fined not less than $2,500.00 or more than $25,000.00 for each violation. The court may impose an additional fine of not more than $25,000.00 for each day during which the unlawful discharge occurred. If the conviction is for a violation committed after a first conviction of the person under this subsection, the court shall impose a fine of not less than $25,000.00 per day and not more than $50,000.00 per day of violation. Upon conviction, in addition to a fine, the court in its discretion may sentence the defendant to imprisonment for not more than 2 years or impose probation upon a person for a violation of this part. With the exception of the issuance of criminal complaints, issuance of warrants, and the holding of an arraignment, the circuit court for the county in which the violation occurred has exclusive jurisdiction. However, the person shall not be subject to the penalties of this subsection if the discharge of the effluent is in conformance with and obedient to a rule, order, permit, or COC of the Department. In addition to a fine, the attorney general may file a civil suit in a court of competent jurisdiction to recover the full value of the injuries done to the natural resources of the state and the costs of surveillance and enforcement by the state resulting from the violation.

16. Electronic Reporting

Upon notice by the Department that electronic reporting tools are available for specific reports or notifications, the permittee shall submit electronically all such reports or notifications as required by this permit.

PART II

Section D. Management Responsibilities

1. Duty to Comply

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit, more frequently than, or at a level in excess of, that authorized, shall constitute a violation of the permit.

It is the duty of the permittee to comply with all the terms and conditions of this permit. Any noncompliance with the Effluent Limitations, Special Conditions, or terms of this permit constitutes a violation of the NREPA and/or the Federal Act and constitutes grounds for enforcement action; for permit or Certificate of Coverage (COC) termination, revocation and reissuance, or modification; or denial of an application for permit or COC renewal.

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

2. Operator Certification

The permittee shall have the waste treatment facilities under direct supervision of an operator certified at the appropriate level for the facility certification by the Department, as required by Sections 3110 and 4104 of the NREPA. Permittees authorized to discharge storm water shall have the storm water treatment and/or control measures under direct supervision of a storm water operator certified by the Department, as required by Section 3110 of the NREPA.

3. Facilities Operation

The permittee shall, at all times, properly operate and maintain all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit. Proper operation and maintenance includes adequate laboratory controls and appropriate quality assurance procedures.

4. Power Failures

In order to maintain compliance with the effluent limitations of this permit and prevent unauthorized discharges, the permittee shall either:

a. provide an alternative power source sufficient to operate facilities utilized by the permittee to maintain compliance with the effluent limitations and conditions of this permit; or

b. upon the reduction, loss, or failure of one or more of the primary sources of power to facilities utilized by the permittee to maintain compliance with the effluent limitations and conditions of this permit, the permittee shall halt, reduce or otherwise control production and/or all discharge in order to maintain compliance with the effluent limitations and conditions of this permit.

5. Adverse Impact

The permittee shall take all reasonable steps to minimize or prevent any adverse impact to the surface waters or groundwaters of the state resulting from noncompliance with any effluent limitation specified in this permit including, but not limited to, such accelerated or additional monitoring as necessary to determine the nature and impact of the discharge in noncompliance.

PART II

Section D. Management Responsibilities

6. Containment Facilities

The permittee shall provide facilities for containment of any accidental losses of polluting materials in accordance with the requirements of the Part 5 Rules (R 324.2001 through R 324.2009 of the Michigan Administrative Code). For a Publicly Owned Treatment Work (POTW), these facilities shall be approved under Part 41 of the NREPA.

7. Waste Treatment Residues

Residuals (i.e. solids, sludges, biosolids, filter backwash, scrubber water, ash, grit, or other pollutants or wastes) removed from or resulting from treatment or control of wastewaters, including those that are generated during treatment or left over after treatment or control has ceased, shall be disposed of in an environmentally compatible manner and according to applicable laws and rules. These laws may include, but are not limited to, the NREPA, Part 31 for protection of water resources, Part 55 for air pollution control, Part 111 for hazardous waste management, Part 115 for solid waste management, Part 121 for liquid industrial wastes, Part 301 for protection of inland lakes and streams, and Part 303 for wetlands protection. Such disposal shall not result in any unlawful pollution of the air, surface waters or groundwaters of the state.

8. Right of Entry

The permittee shall allow the Department, any agent appointed by the Department, or the Regional Administrator, upon the presentation of credentials and, for animal feeding operation facilities, following appropriate biosecurity protocols:

a. to enter upon the permittee's premises where an effluent source is located or any place in which records are required to be kept under the terms and conditions of this permit; and

b. at reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect process facilities, treatment works, monitoring methods and equipment regulated or required under this permit; and to sample any discharge of pollutants.

9. Availability of Reports

Except for data determined to be confidential under Section 308 of the Federal Act and Rule 2128 (R 323.2128 of the Michigan Administrative Code), all reports prepared in accordance with the terms of this permit, shall be available for public inspection at the offices of the Department and the Regional Administrator. As required by the Federal Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Federal Act and Sections 3112, 3115, 4106 and 4110 of the NREPA.

10. Duty to Provide Information

The permittee shall furnish to the Department, within a reasonable time, any information which the Department may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or the facility's COC, or to determine compliance with this permit. The permittee shall also furnish to the Department, upon request, copies of records required to be kept by this permit.

Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Department, it shall promptly submit such facts or information.

PART II

Section E. Activities Not Authorized by This Permit

1. Discharge to the Groundwaters

This permit does not authorize any discharge to the groundwaters. Such discharge may be authorized by a groundwater discharge permit issued pursuant to the NREPA.

2. POTW Construction

This permit does not authorize or approve the construction or modification of any physical structures or facilities at a POTW. Approval for the construction or modification of any physical structures or facilities at a POTW shall be by permit issued under Part 41 of the NREPA.

3. Civil and Criminal Liability

Except as provided in permit conditions on "Bypass" (Part II.C.9. pursuant to 40 CFR 122.41(m)), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance, whether or not such noncompliance is due to factors beyond the permittee's control, such as accidents, equipment breakdowns, or labor disputes.

4. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee may be subject under Section 311 of the Federal Act except as are exempted by federal regulations.

5. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by Section 510 of the Federal Act.

6. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize violation of any federal, state or local laws or regulations, nor does it obviate the necessity of obtaining such permits, including any other Department of Environmental Quality permits, or approvals from other units of government as may be required by law.

Appendix F. Figures

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Hard copy is intended to be 11"x17" when plotted. Scale(s) indicated and graphic quality may not be accurate for any other size.

Downriver Utility Wastewater Authority

Downriver Wastewater Treatment Facility UV Disinfection System Replacement

Clean Water State Revolving Fund (CWSRF) Project Plan

Legend

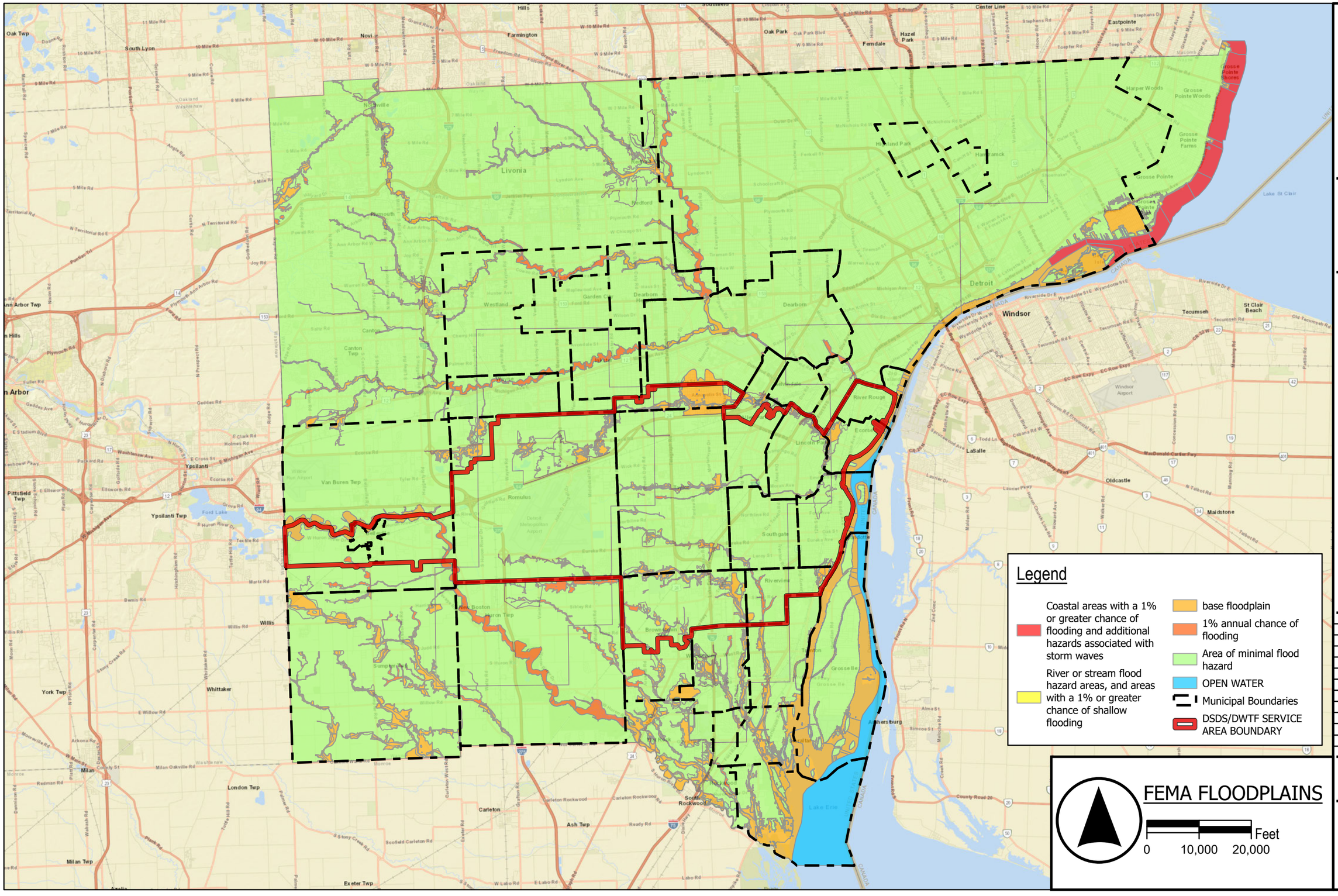
- Freshwater Emergent Wetland
- Freshwater Forested/ Shrub Wetland
- Freshwater Pond
- Lake
- Riverine
- Municipal Boundaries
- DSDS/DWTF SERVICE AREA BOUNDARY

WETLANDS AND MAJOR SURFACE WATERS

0 10,000 20,000 Feet

PROJECT NO. 415050

FIGURE NO. 1



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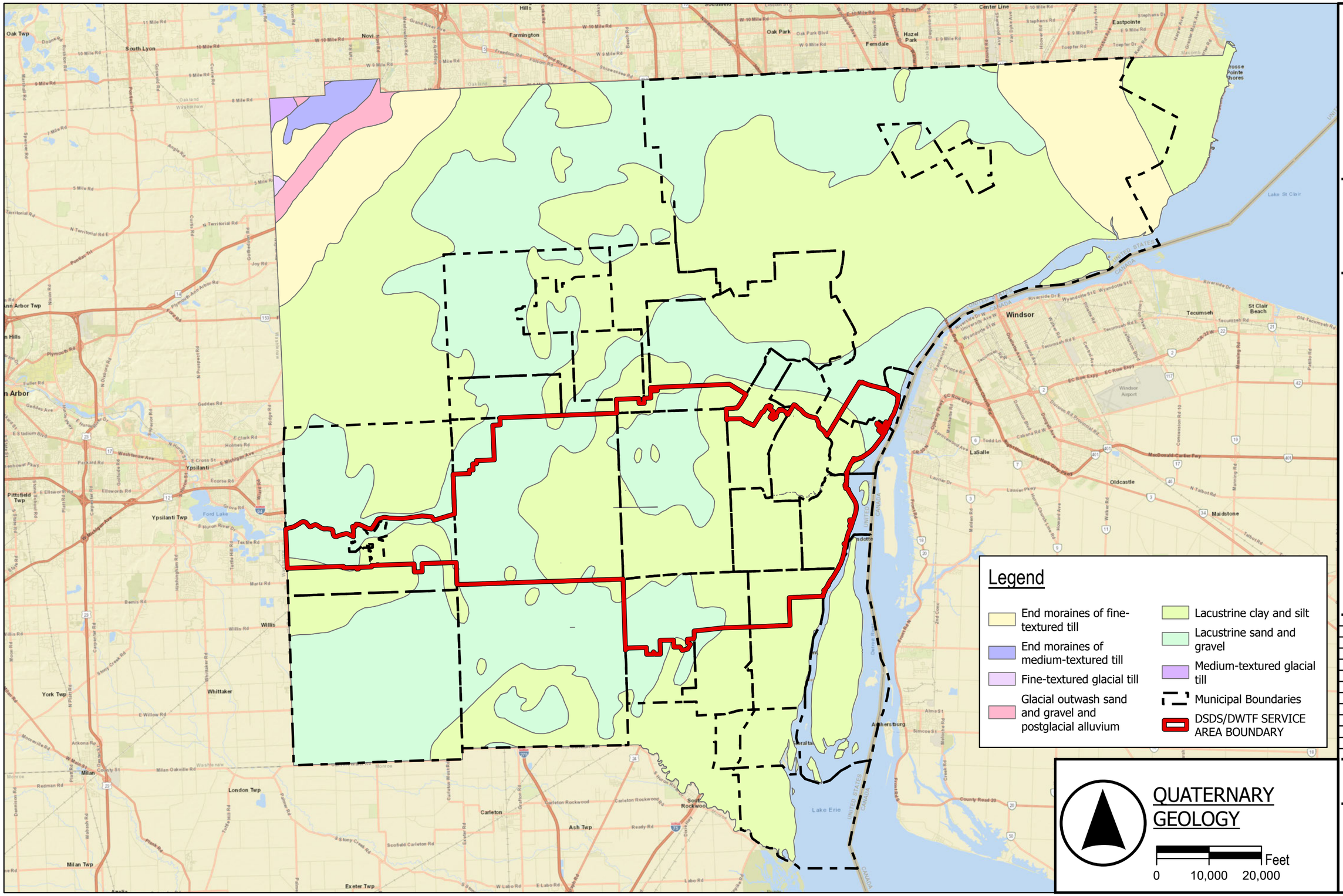
Downriver Utility Wastewater Authority

Downriver Wastewater Treatment Facility UV Disinfection System Replacement

Clean Water State Revolving Fund (CWSRF) Project Plan

PROJECT NO.
415050

FIGURE NO.
2



QUATERNARY GEOLOGY

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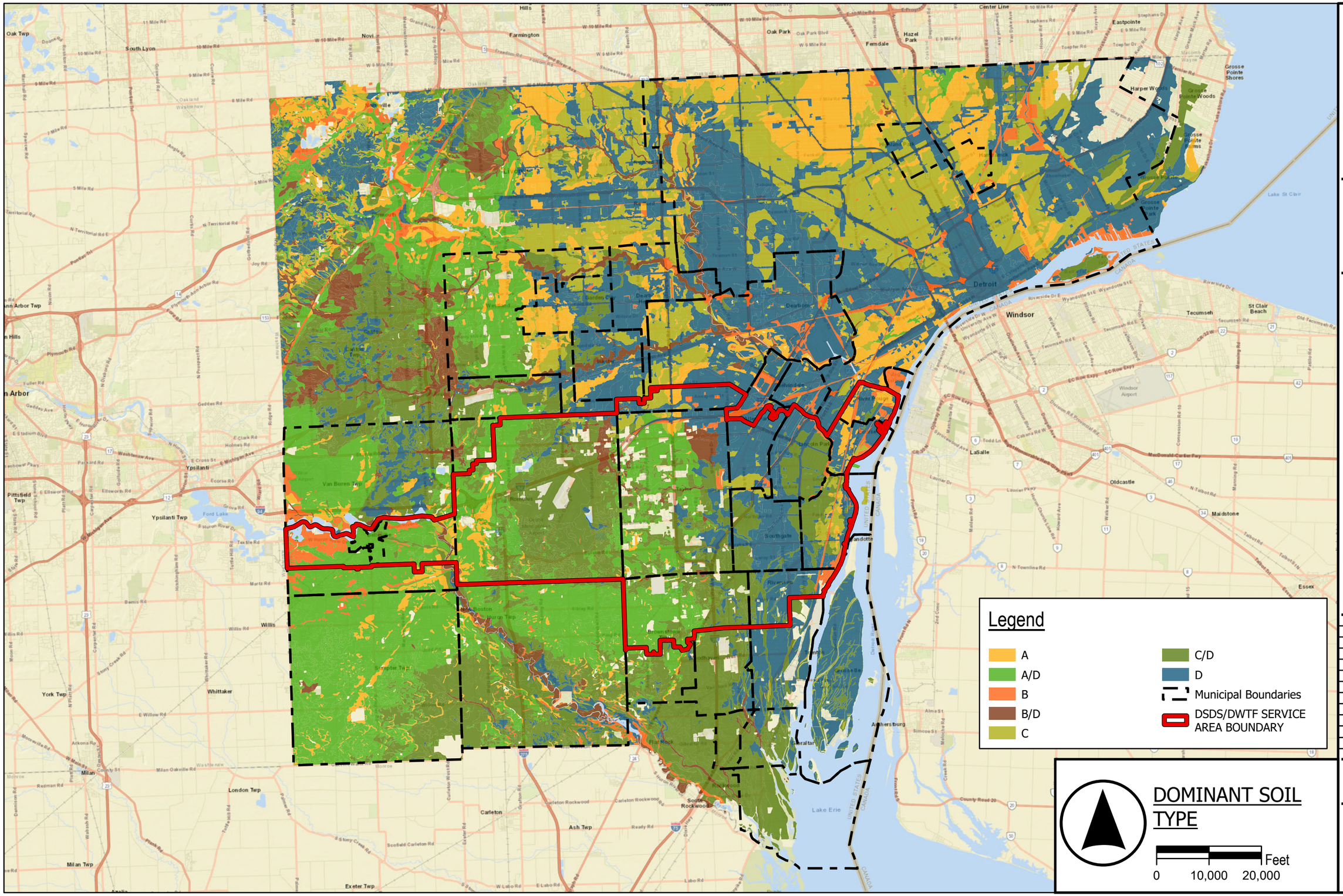
Downriver Utility Wastewater Authority

Downriver Wastewater Treatment Facility UV Disinfection System Replacement

Clean Water State Revolving Fund (CWSRF) Project Plan

PROJECT NO.
415050

FIGURE NO.
3



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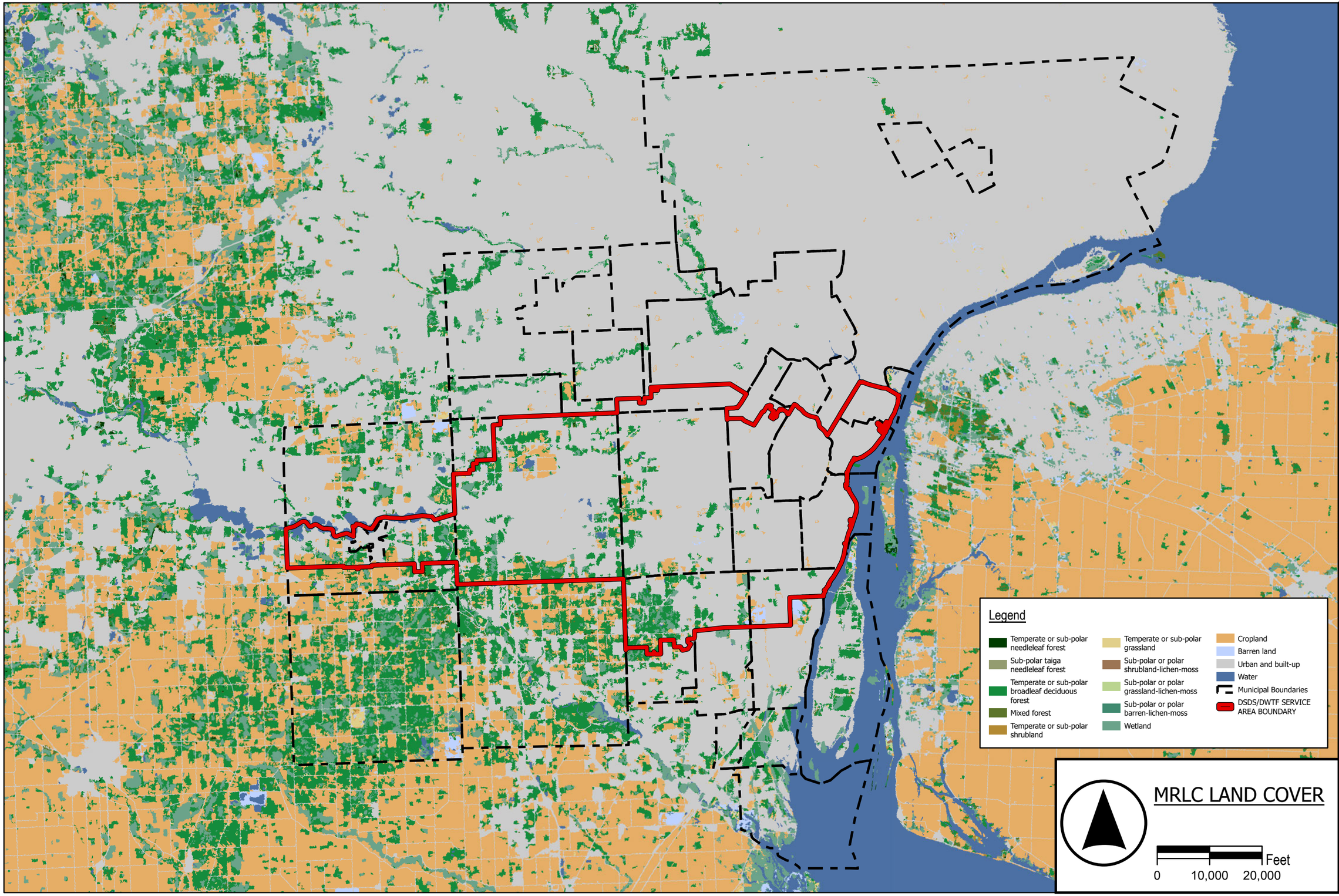
Downriver Utility Wastewater Authority

Downriver Wastewater Treatment Facility UV Disinfection System Replacement

Clean Water State Revolving Fund (CWSRF) Project Plan

PROJECT NO. 415050

FIGURE NO. 4



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Downriver Utility Wastewater Authority

Downriver Wastewater Treatment Facility UV Disinfection System Replacement

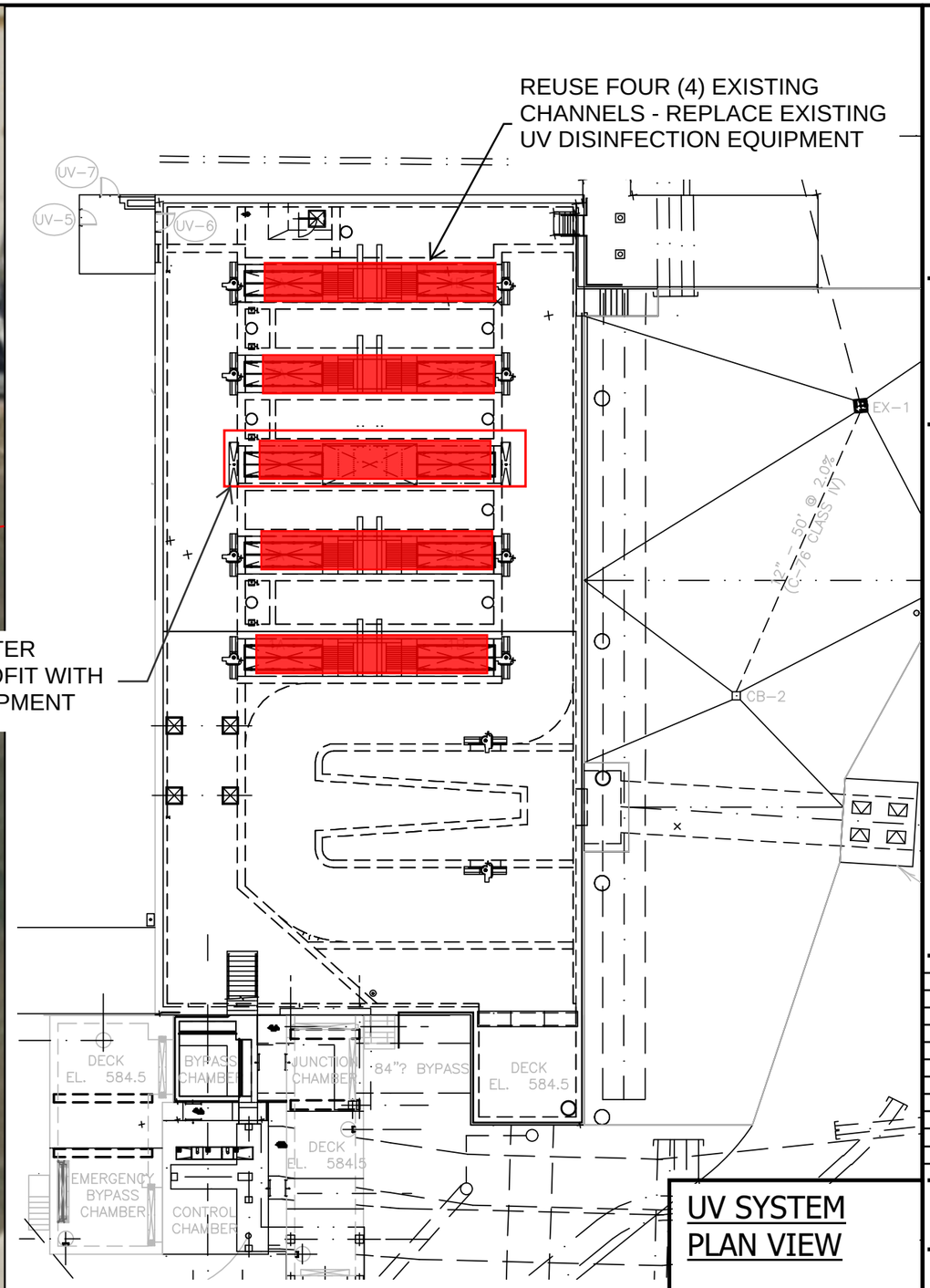
Clean Water State Revolving Fund (CWSRF) Project Plan

PROJECT NO.
415050

FIGURE NO.
5

UV SYSTEM
AERIAL VIEW

0 20 40 Feet



UV SYSTEM
PLAN VIEW

NOT TO SCALE

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Downriver Utility Wastewater Authority

Downriver Wastewater Treatment Facility UV Disinfection System Replacement

Clean Water State Revolving Fund (CWSRF) Project Plan

PROJECT NO.
415050

FIGURE NO.
6

Appendix G. Public Meeting Summary