

FDEP DRINKING WATER STATE REVOLVING FUND LOAN APPLICATION

**City of Hollywood, Florida
Four-Log Virus Treatment of Groundwater
Facility Plan**

May 12, 2025

Contents

Acronyms and Abbreviations.....	iv
Section 1 – General	1
Section 2 – Cost Comparison and Development of Alternatives	9
Section 3 – Environmental Review	12
Section 4 – Public Participation Process	13
Section 5 – Financial Feasibility	13
Section 6 – Updated Request for Inclusion	13
Section 7 – Project Authorization	13
Section 8 - Project Schedule	14

Tables

Table 1 BEBR Population Projections by Area	2
Table 2 SFWMD Projected Water Supply and Demand (2020-2040).....	3
Table 3 Anticipated Project Schedule	14

Exhibits

Exhibit 1 Water Treatment Plant Disinfection System Site Plan	8
---	---

Figures

Figure 1 Historical Water Demand	5
Figure 2 Water Facilities Overview	6
Figure 3 City of Hollywood WTP Location Relative to neighbourhood	8

Appendices

FDEP Drinking Water Facility Plan Review Checklist

Four-Log Disinfection Implementation Basis of Design Report

Engineer's Opinion of Probable Construction Cost

Florida Department of Health - Determination of Four-Log Virus Treatment of Groundwater (Conceptual)

Public Meeting Notice and Minutes

Executed Business Plan

City of Hollywood User Charge System

Request for Inclusion on the Drinking Water Priority List

Project Planning Authorization

Acronyms and Abbreviations

4Log	Four-Log Disinfection	SFWMD	South Florida Water Management District
AC	Asbestos Cement	SRF	State Revolving Fund
BCWWS	Broward County Water and Wastewater Services	USEPA	United States Environmental Protection Agency
BODR	Basis of Design Report	WTP	Water Treatment Plant
CE	Categorical Exclusion		
CI	Cast Iron		
CY	Cubic Yards		
DI	Ductile Iron		
DPU	Department of Public Utilities		
DWSRF	Drinking Water State Revolving Fund		
EPA	Environmental Protection Agency		
ETR	Encoder Type Registers		
FDEP	Florida Department of Environmental Protection		
FGUA	Florida Governmental Utility Authority		
FRP	Fiber Reinforced Plastic		
GPM	Gallon per Minute		
GS	Galvanized Steel		
HST	Hypochlorite Storage Tanks		
LF	Linear Feet		
LS	Lime Softening		
MG	Million Gallons		
MGD	Million Gallons per Day		
MS	Membrane Softening		
OSG	On-Site Generation		
PVC	Polyvinyl Chloride		
RFP	Request for Proposals		
RO	Reverse Osmosis		
ROM	Rough Order of Magnitude		
SCADA	Supervisory Control and Data Acquisition		
SDWA	Safe Drinking Water Act		

Section 1 – General

The City of Hollywood (City) has prepared this Facilities Plan as part of the requirements for the Florida Department of Environmental Protection (FDEP), Drinking Water State Revolving Fund (DWSRF). The City intends to pursue loans for its upcoming WTP Implementation of Four-Log Disinfection (also referred to as “4Log”) in order to maintain and improve its water disinfection infrastructure.

The City will coordinate with FDEP to best utilize available funding for the Project throughout the procurement and construction phases and will provide updates on the anticipated timing of said activities.

The following narrative addresses each item required in the FDEP Drinking Water Facility Plan Review Checklist and DWSRF Planning Requirements, which is executed and provided in **Appendix A**.

Section 1.1 - Loan Applicant

The City of Hollywood (PWDSID 4060642) is located in the southeastern portion of Broward County. It is bordered on the north by the City of Dania Beach, the City of Fort Lauderdale, and unincorporated portions of Broward County, on the east by the Atlantic Ocean, on the south by the City of Miramar, the City of Pembroke Park, and the City of Hallandale Beach, and on the west by the City of Pembroke Pines and the Conservation area (Everglades). As an Enterprise Fund, the City owns and operates a regional sewer system and a potable water system to supply safe and reliable drinking water to its water customers.

As a Commission-Manager form of government, the City Commission is a legislative body that governs Hollywood and has a fiduciary responsibility to its residents. As set by the City Charter, the Commission is made up of an executive at-large Mayor and six representatives who are popularly elected to four-year terms.

The City’s Department of Public Utilities (DPU) is one of nine major departments within the City. The DPU is charged with providing water, wastewater, and stormwater management services to the City’s residents and several other Governmental entities referred to as “Large Users”. The DPU has the sole responsibility and authority to build, operate, and maintain the potable water system that supplies reliable, cost-effective and safe drinking water to its retail and wholesale customers while meeting local, state, and federal regulations.

The City’s water retail service area includes most of the City’s geographic area. The City provides retail water service to residents of the City and small portions of the Town of Davie, the City of Dania Beach, and the Seminole Tribe of Florida reservation. Approximately 300 acres in the Town of Davie, 50 acres in the City of Dania Beach, and 100 acres in the Seminole reservation are also served as retail customers. The City currently serves over 40,000 retail water connections. The water retail customers are generally defined as residential or non-residential.

The City provides wholesale potable water service to Broward County through pipelines that serve the County’s retail water customers located in Districts 3A and 3B/C. District 3A serves residents and businesses in portions of the Town of Davie, the City of Dania Beach, the City of Hollywood, the City of Fort Lauderdale, and unincorporated Broward County. District 3B/C serves residents and businesses in the City of West Park, the Town of Pembroke Park, and portions of the City of Hollywood, the City of Pembroke Pines, and the City of Miramar. The City’s WTP is the sole source of treated water to these customers. Although a portion of Port Everglades is in the City’s jurisdiction, it receives water service from the City of Fort Lauderdale. The City currently has no plans to provide raw or finished water to any other retail or wholesale customer outside of its existing water service area.

Broward County Water and Wastewater Services (BCWWS) District 3A covers approximately eight square miles containing portions of the cities of Dania Beach and Fort Lauderdale, the Town of Davie, the Fort Lauderdale-Hollywood International Airport, and unincorporated Broward County. BCWWS District 3A has two wholesale interconnects with the City. Districts 3B and 3C are interconnected and connect to the City’s system via two wholesale interconnects each. Like District 3A, they are supplied solely by the City. BCWWS District 3B covers approximately four square miles and includes the cities of West Park and Pembroke Park. BCWWS District 3C covers approximately two square miles containing portions of the cities of Hollywood, Miramar, and Pembroke Pines. These BCWWS districts fall mainly outside the City’s jurisdiction except for the 400-acre southwest corner of the City located south of Hollywood Boulevard and west of State Road 7, which is served by BCWWS District 3C. Small areas in the City’s jurisdiction are served by BCWWS District 3A.

Between the 2010 and 2020 Censuses, the City experienced a population growth of approximately 8.7%. The University of Florida Bureau of Economic and Business Research Data (BEBR) provides annual population estimates and projections for the State of Florida and its local jurisdictions. BEBR uses the housing unit method, which encompasses a wide variety of data sources including occupied housing units, number of active electric utility meters, building permits, and the estimated average population per household. Population projections from the Year 2025 through the Year 2045 are provided in Table 1 BEBR Population Projections by Area.

Figure 1 and Table 2 below present the City water system’s historical demand through 2020 and the projected supply and demand through 2040 respectively. The historic water demands were gathered from the City’s monthly operating reports, which are used to submit to the South Florida Water Management District (SFWMD) for yearly summary of consumption information. The SFWMD’s demand projections are developed separately by SFWMD and calculated independent of population growth projections; factors such as potential changes in developmental patterns, market conditions, and technological changes in water use will affect water use projections.

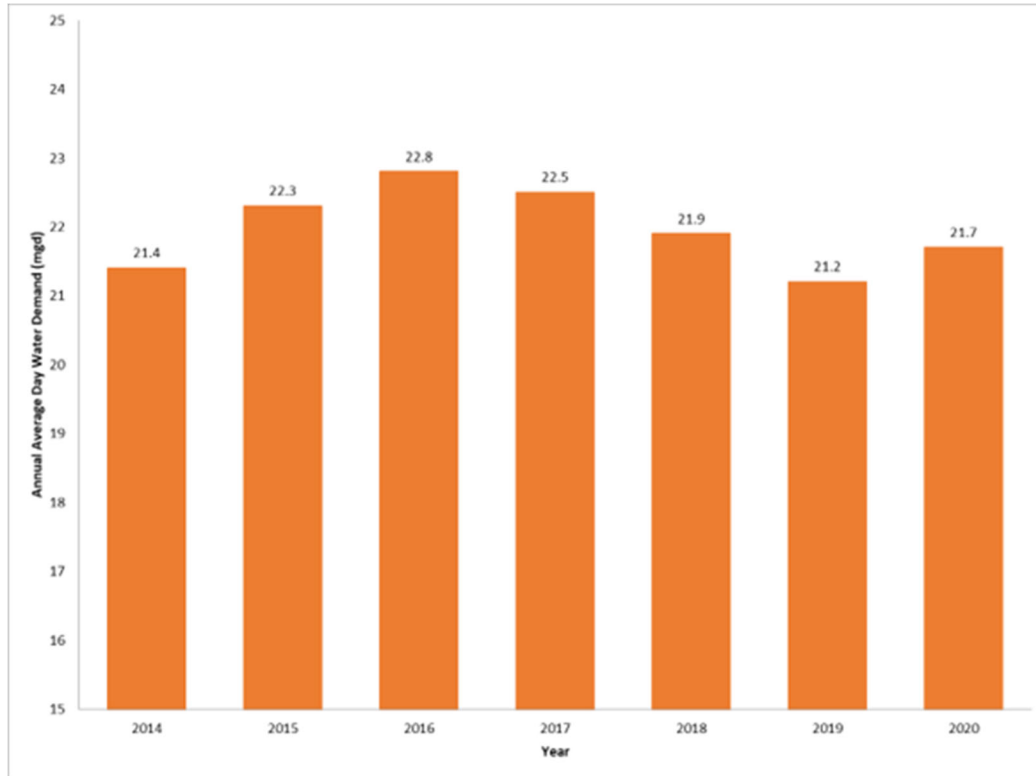
Further discussion on Population and Demand Projections are available in the City’s Water Master Plan (WMP), published December 2024.

Table 1 BEBR Population Projections by Area

YEAR	Population				
	Total Hollywood Service Area	Total City of Hollywood	Total 3A, 3B, & 3C	Increase, City	Increase, 3A, 3B, & 3C
2025	215,201	158,229	56,972	6,411	2,578
2030	223,950	163,729	60,221	5,500	3,249
2035	230,650	168,325	62,325	4,596	2,104
2040	236,019	172,285	63,734	3,960	1,409
2045	241,067	175,832	65,235	3,547	1,501
TOTAL				24,014	10,841

Source: City of Hollywood Water Master Plan, City of Hollywood and Arcadis (December 2024)

Figure 1 Historical Water Demand



Source: City of Hollywood WTP Monthly Operating Reports

Table 2 SFWMD Projected Water Supply and Demand (2020-2040)

Year	Annual Average Day Water Supply and Demand (MGD)				
	2020	2025	2030	2035	2040
City of Hollywood Projected Water Supply	25.31	26.63	27.70	28.59	29.35
City of Hollywood Projected Water Demand	23.22	24.43	25.41	26.23	26.93

Source: South Florida Water Management District Water Supply Plan

Section 1.2 - Existing System

The City water system provides treated drinking water to its customers, with a service area covering 41.2 square miles and includes over 700 miles of pipeline. The City's Water Treatment Plant is located at 3441 Hollywood Blvd. The average daily demand of the WTP is 22 million gallons per day (MGD) with a design capacity of 59.5 MGD.

Source water is pumped to the City's WTP from raw water supply wells located at the City's Biscayne Aquifer and Floridan Aquifer wellfields and from Broward County's Biscayne Aquifer wells at the South Regional Wellfield.

Groundwater from the Biscayne Aquifer is accessed by the City's South Wellfield (eight wells) and Western Wellfield (six wells), and the County's South Regional Wellfield (eight wells).

Raw water from the Biscayne Aquifer wells serves as the primary source water to the WTP and is treated using lime softening (LS) and membrane softening (MS) treatment processes. Raw water supply to the WTP is supplemented by brackish water from the Floridan Aquifer wells, which is treated at the WTP through the reverse osmosis (RO) system. Treated water from the LS, MS, and RO treatment processes undergo disinfection, degasification, and post-treatment at the WTP before being transferred to the on-site ground storage tanks (10 million gallons (MG) total storage). Water then flows from the storage tanks to one of the two high service pumping clearwells (1 MG total storage). Finished water is pumped from the clearwells by six 8,000 gallon per minute (GPM) high service pumps into the City's distribution system. Figure 2 presents an overview of the Water Distribution System and Figure 3 shows a boundary map for the WTP.

The WTP has three discharge mains that supply water into the distribution system transmission lines: a 24-inch water main (south header), a 30-inch water main (west header), and a 20-inch water main (by-pass header). The City's water service area distribution system consists of over 700 miles of pipe with diameters ranging from 2-inch to 30-inch, two elevated 1 MG storage tanks, approximately 40,000 connections, over 2,900 fire hydrants, and over 13,000 valves. The majority of these facilities are over 40 years old. There are currently 30 miles of transmission mains of 16-inch to 30-inch in diameter, approximately 480 miles of distribution mains of 6 inch to 14 inch in diameter, and approximately 200 miles of distribution pipe of 4 inch and less in diameter. The distribution system piping is composed of various materials such as cast iron (CI), galvanized steel (GS), polyvinyl chloride (PVC), ductile iron (DI), and asbestos cement (AC).

As some of the components of the WTP system have been in operation for more than 90 years, DPU regularly assesses the system processes and equipment to perform operational adjustments and maintenance activities to ensure consistent treatment efficacy. Such activities include the implementation of necessary upgrades, enhancements, repairs, and rehabilitation projects throughout the system.

Figure 2 Water Facilities Overview

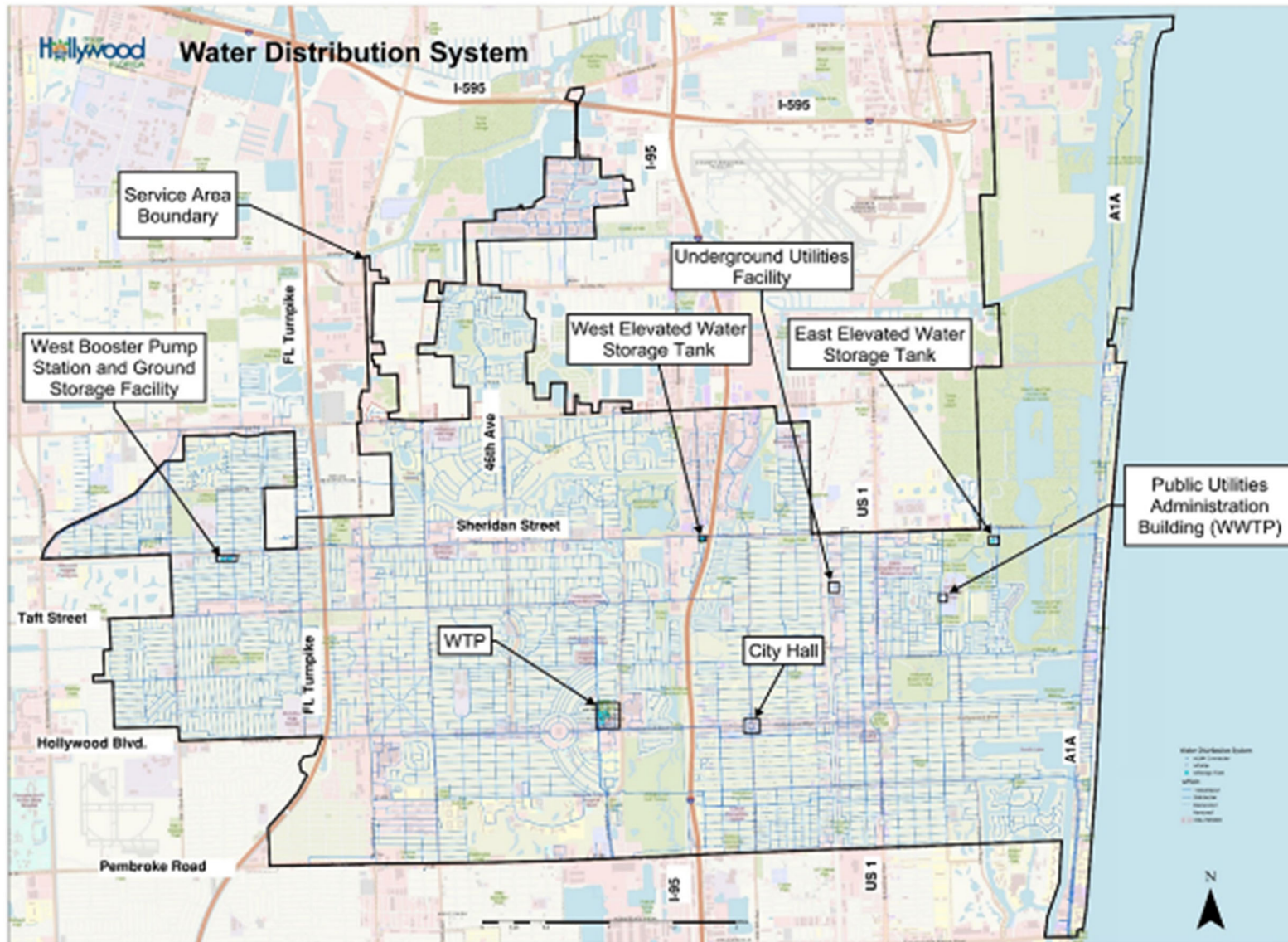
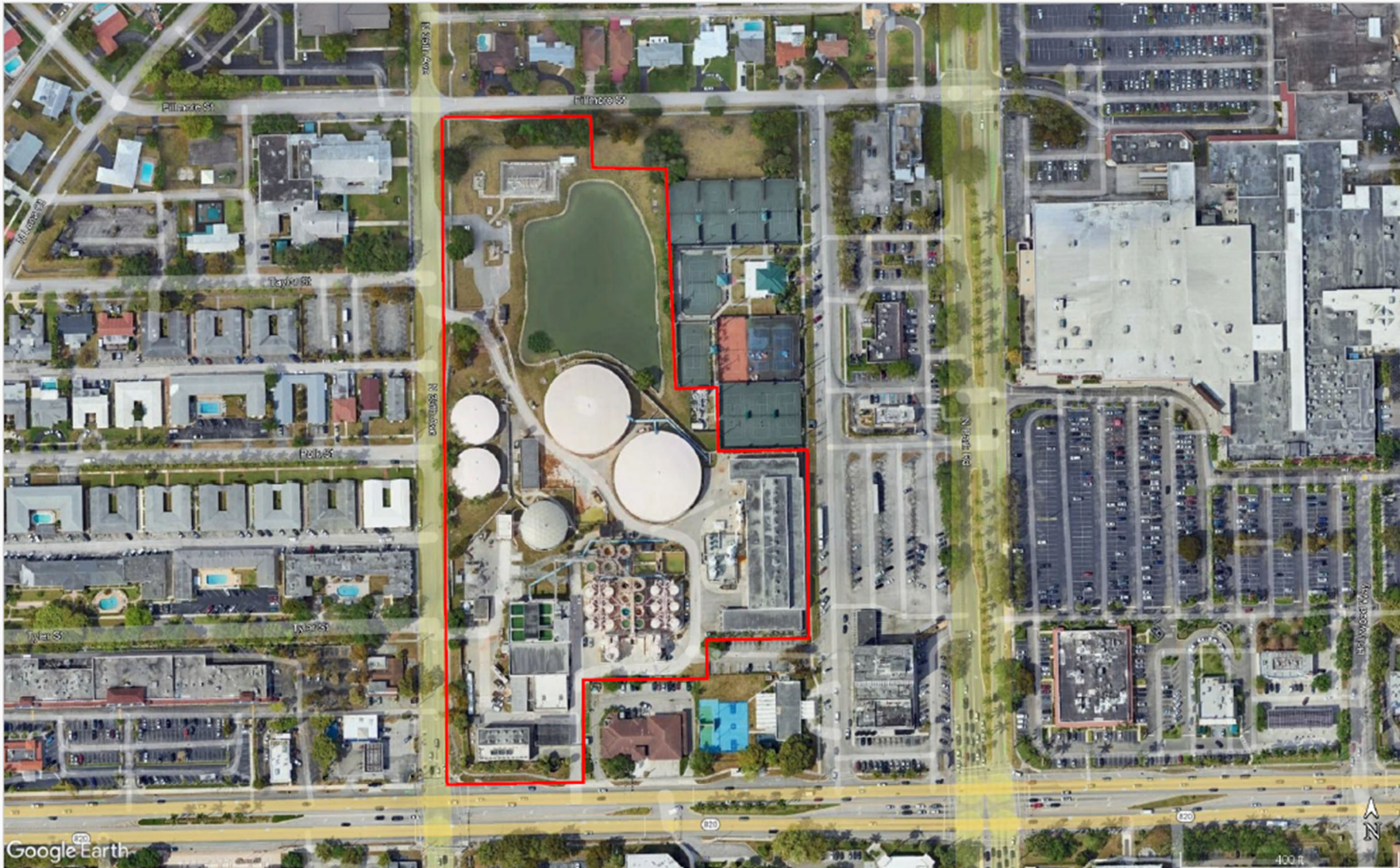


Figure 3 City of Hollywood WTP Location Relative to neighbourhood



Section 1.3 – Existing Chemical Treatment at the WTP

The City's WTP provides chloramination treatment to inactivate pathogens. Chloramines are the preferred distribution system's disinfectant agent in South Florida area because of their lower potential for disinfection by-products formation and longer lifetime in the distribution system.

In 2003, chlorine gas for disinfection was replaced with an on-site sodium hypochlorite generation system that included bulk storage tanks as a back-up. Presently, the WTP is using the bulk storage system to store deliveries of 12% sodium hypochlorite and dilutes it to 0.8% for disinfection. The City also has an anhydrous ammonia system, which is used in combination with sodium hypochlorite for finished water chloramination.

The existing disinfection system is divided into the following major areas, Exhibit 1 below shows the WTP disinfection systems site plan:

1. Chlorine Storage Building / On-site generation (OSG)
2. Membrane Building Chemical Storage Area
3. LS CL2/Hex Chemical Storage/Feed Area
4. Chlorine Shed
5. Ammonia Storage and Feed Area

The WTP has an OSG system which has not been in operation for several years, includes two electrolytic cells, each with a capacity of 1,500 pounds per day (lbs/day). A solution of 12% sodium hypochlorite is delivered to one tank at the Chlorine Storage Building and is diluted with softened water to 0.8% sodium hypochlorite. The diluted 0.8% solution is stored in the other two tanks at the Chlorine Storage Building.

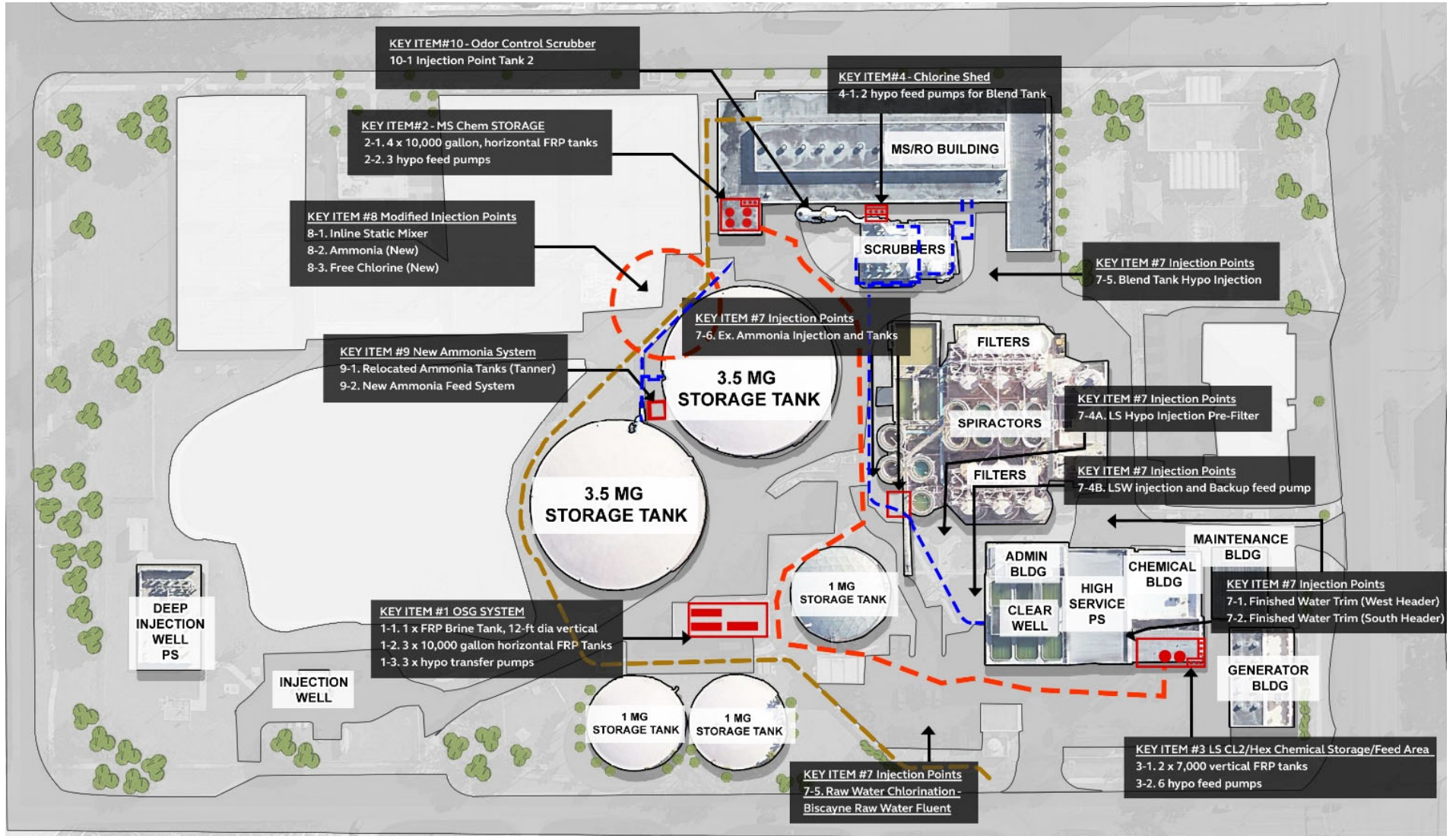
The Chlorine Storage Building receives, stores, dilutes, and distributes sodium hypochlorite to other areas of the plant. The building has three 10,000-gallon horizontal fiber reinforced plastic (FRP) sodium hypochlorite storage tanks (HSTs) mounted on concrete saddles. An 80-ton FRP brine tank is located directly to the north of the building. This tank has not been in operation as the on-site generators have been offline. As of June 2020 the brine tank has been emptied and cleaned.

The Membrane Building Chemical Storage Area, constructed in 1995, includes four storage tanks and three metering pumps installed in 2013. Two storage tanks store 12% sodium hypochlorite and two store 0.8% respectively. The LS CL2/HEX Storage Chemical Feed Area includes two 0.8% storage tanks and six metering pumps. The Chlorine Shed is a prefabricated FRP building installed in 1991 that contains three metering pumps (only two are operational). These pumps serve the Blend Tank which is the primary disinfection feed point.

The City uses anhydrous ammonia to form chloramines for disinfection. Two 1,000-gallon horizontal carbon steel tanks are located in a chain link-fenced area east of the parking area. Anhydrous ammonia is applied using an ammoniator housed in a prefabricated FRP building. The feed system is manually operated.

Yard piping consists of transfer pump piping from the Chlorine Storage Building to the Membrane Building Chemical Storage Area and the LS CL2/HEX Storage/Feed Area and metering pump discharge piping from the Membrane Building Chemical Storage Area, LS CL2/HEX Storage/Feed Area, and Chlorine Shed. The majority of the piping was installed during the 2003 installation of the sodium hypochlorite system and is reaching the end of its useful life.

Exhibit 1 Water Treatment Plant Disinfection System Site Plan



Section 2 – Cost Comparison and Development of Alternatives

Successful operation of a WTP requires regular maintenance, replacement and repair of the majority of its internal components. While modifying the processes of a WTP can have significant operational, financial and logistical impacts to the plant and the system at large, it is often beneficial to consider making targeted changes to address future operational issues. Much of the process, electrical and instrumentation equipment have been in operation at the City water system for 20 or more years and is approaching the end of its useful life. Furthermore, cracking, corrosion and leaking have been observed at several locations across the plant.

The City's WTP currently provides chloramination treatment to inactivate pathogens. While chloramines are the preferred distribution system's disinfectant agent in South Florida area because of their lower potential for disinfection by-products formation and longer lifetime in the distribution system, they are a weaker disinfectant agent than hypochlorite ion and hypochlorous acid (commonly referred to as "free chlorine").

In the past, the City was made subject to a boil water order requirement due to a fecal indicator. These requirements cause significant complications to City operations and can cause significant unease in residents that the City serves. To avoid future occurrences, DPU determined to pursue 4-Log Virus Treatment certification, a higher standard for WTP promoted by the Ground Water Rule promulgated by the Environmental Protection Agency (EPA). With this certification, the City water system would not be subject to a boil water order requirement in the event a fecal indicator is detected in the raw water since WTP system would be demonstrated to reliably achieve 4-Log (99.99%) inactivation or removal of viruses.

Prior to the preparation of this Facility Plan, the City received provisional approval from the Florida Department of Environmental Protection (FDEP) to utilize a free chlorine segment to achieve 4Log virus deactivation. Conditions of the approval included a review of the plantwide disinfection system.

A Basis of Design Report (BODR) was finalized in February 2021 to provide an assessment of the current sodium hypochlorite and ammonia systems and summarizes the modifications required to implement 4Log virus disinfection, including additional chemicals required to achieve the free chlorine segment. The BODR is included in **Appendix B**

Following review of the BODR, the City considered three possible alternatives:

1. Do nothing – Continue using the system as-is
2. Perform only necessary improvements to maintain WTP operations
3. Implement 4-Log using free chlorine at the WTP

Section 2.1 – Alternative #1

While Alternative 1 is the option with the lowest theoretical capital cost, the existing process equipment is either not in operation, reaching the end of its useful life, or demonstrating issues and complications. If left unresolved, these conditions will likely result in increased operational and maintenance costs, downtime in the system with increased repair frequency, as well as imprecise measurement and metering of the treatment chemicals.

Section 2.2 – Alternative #2

This second alternative consists of performing only necessary maintenance and repair identified during the assessments of the existing system. These modifications would generally consist of decommissioning long-offline equipment, addressing areas with visible corrosion and cracking and replacing process equipment and piping that is approaching the end of its useful life. Furthermore, the storage tanks and equipment related to the existing sodium hypochlorite system have been in service for over 20 years and are in need of upgrading.

While addressing these items would allow the WTP to continue operating at capacity, it would not do anything to address the system's resilience. The system would remain sensitive to any issues arising from the source water and potential boil water orders. Future regulatory action would likely necessitate further improvements resulting in potential repeated investments by the City.

Section 2.3 – Alternative #3

As mentioned above, 4-Log Virus Treatment certification is a higher treatment standard for City's WTP. With this certification, the City's WTP would be more resilient to issues deriving from its source water. The implementation would enhance the protection of public health in the service area, guarantee that the WTP meets or exceeds regulator breakpoints, which would in turn lessen the potential instances and impacts of boil water orders.

The project consists of demolition and replacement of the storage/feed systems for sodium hypochlorite and ammonia for conversion to 4Log virus inactivation using free chlorine for disinfection, and other improvements in the treatment system to achieve sufficient chlorine contact /disinfection time.

To achieve the 4Log virus treatment of the water using free chlorine, the following modifications would be implemented at the WTP in addition to the repairs mentioned in Alternative #2:

- Relocation of ammonia injection points downstream of the disinfection segment.
- Installation of an online free chlorine analyzer and sampling port at the end of the disinfection segment.
- Installation of an online free ammonia, monochloramine, and total chlorine analyzer after ammonia injection and before entrance to the storage tanks.
- Addition of low free chlorine residual alarms to SCADA dependent on peak flow readings from blend tank.

Section 2.4 – The Selected Plan

After consideration of the options available and the near and medium-term regulatory outlook. The City decided to move forward with Alternative 3. In order to facilitate the process improvements listed above, the following modifications and improvements will be performed at the WTP as part of the project:

- Replacement of the existing sodium hypochlorite tanks in the Chlorine Storage Building and Membrane Building
- Demolition of the on-site generation equipment and brine tank including concrete element repairs
- Demolition of the metering pumps, piping and appurtenances in the LS CL2/HEX Chemical Storage/Feed Area
- Installation of new metering pumps in the Chlorine Storage Building as well as the pumps required for LS/HEX chemical Storage/Area and new transfer pumps
- Demolition of the existing sodium hypochlorite metering pumps as well as the pumps located in the Chlorine Shed
- Installation of a permanent by-pass for blended water
- Installation of ammonia injection point and static wafer mixer
- Installation of new ammonia tanks and new feed system
- Demolition of the existing ammonia feed system

An Engineer's Opinion of Probable Construction Cost for this alternative is included in **Appendix C**

The Florida Department of Health provided agreement that the proposed treatment technologies would achieve 4log disinfection along with a provisional approval once the modifications are put into effect. Once in operation a final determination will ascertain if the proposed values are acceptable or need to be adjusted.

A copy of this approval is provided in **Appendix D**.

Section 3 – Environmental Review

The water system operates under a regulatory framework of Federal, State, and local laws intended to protect public health and promote aesthetic quality. These regulations govern the operations of the water system including supply, treatment, disposal of residuals, and the handling and storage of chemicals used by the City. The principal agencies that regulate the City's water system are the United States EPA, FDEP, the SFWMD, and Broward County. The EPA delegates authority and enforcement to FDEP. The SFWMD controls groundwater withdrawals and has mandated reuse of wastewater to reduce water use. At the local level, the Broward County Department of Environmental Protection and Growth Management (EPGM) has its own licensing system for sewer systems.

The Safe Drinking Water Act (SDWA) is the primary federal legislation governing public water systems and sets primary and secondary drinking water standards as well as monitoring requirements. The State passed the Florida SDWA that adopted the SDWA requirements and is enforced by FDEP.

The City will coordinate with the FDEP to provide a copy of this Facility Plan to all necessary governmental agencies for review. In addition to the FDEP, agencies that might provide comment on the environmental impact of this project include, but are not limited to:

- Florida Department of Health
- South Florida Water Management District
- U. S. Environmental Protection Agency
- Department of Community Affairs, State Clearinghouse

The work associated with the implementation of the 4Log disinfection system will take place in land, rights of ways or easements, owned, held or possessed by WTP, which were previously disturbed and developed as part of the initial development of the chemical storage area at the membrane building constructed in 1995.

As the project activities will be fully contained within the WTP fence-line, it is unlikely that any threatened, endangered, proposed, and candidate species would be present in or affected by the project. Similarly, no designated critical habitats are present within the WTP, nor will the project present adverse effects to flora, fauna, threatened or endangered plant or animal species, surface water bodies, prime agricultural lands, wetlands, or undisturbed natural areas.

Construction contractors will be required to obtain all necessary state and local permits for construction and follow all regulations pertaining to construction safety, means and methods, traffic, noise, landscape, sediment and erosion control, throughout the implementation of the new disinfection system.

Section 4 – Public Participation Process

The City plans to hold a public meeting regarding the project on June 23, 2025 to discuss the details of the project and the anticipated financial impact to service area residents. The public meeting will be structured to satisfy the requirements of 40 CFR 25.5 as well as those of the FDEP DWRSF Program. The meeting will be open and accessible to members of the public and will discuss at a minimum:

- The details of the project, including a discussion of the alternatives and selected plan.
- The anticipated project cost and schedule.
- The intent to have the project funded by the FDEP Drinking Water SRF and what that program entails
- Any potential financial, environmental and health impacts to the community.

The meeting was advertised via a public notice in the Sun Sentinel on May 8, 2025.

The affidavit of publication for the advertised public notice is provided in **Appendix E**. Copies of the meeting minutes and any comments will be included in **Appendix E** once available.

Section 5 – Financial Feasibility

The completed financial business plan is included in **Appendix F**.

Revenue from water service charges is the dedicated source of revenue for repayment of the SRF loan and provides the revenue for operation, maintenance, replacement, capital expenditures, and debt service for existing and future infrastructure and public services.

A copy of the current user charge system is provided in **Appendix G**. No rate increase is anticipated as related to this project.

Section 6 – Updated Request for Inclusion

A Request for Inclusion on the Drinking Water Priority List is included in **Appendix H**. The project planning period is not expected to exceed 5 years as the project is anticipated to be completed in a single phase.

Section 7 – Project Authorization

The City is currently reviewing an adopting resolution or other action relating to the SRF program establishing a commitment to implement the planning recommendations resulting from coordination with the City, the FDEP and all relevant agencies.

In particular, the Deputy Director of Public Utilities is authorized to provide assurances and commitments required by the loan application, and the Mayor and Deputy Director of Finance are designated as authorized representatives to execute the loan agreement.

Once available, copies of the executed action will be included in **Appendix I**.

Section 8 - Project Schedule

Table 3 Anticipated Project Schedule below presents a preliminary schedule associated with Alternative 3 assuming the Project's inclusion in the August 2025 DWSRF Priority List.

Table 3 Anticipated Project Schedule

Project Activity	Finish	Notes
Submission of plans, specifications and contract front-end documents	1/9/2025	Submitted by DUP PM.
Facilities Plan and Plans and Specs submission to FDEP	5/16/2025	
Facilities Plan Approval / RFI Submission	6/15/2025	Assumed approx. 30-day review
Priority List Public Meeting	8/13/2025	RFI submission min. 45 days before meeting
Loan Application Submitted	9/12/2025	
RFPs Advertised	10/1/2025	Start of CoH Fiscal Year
Loan Agreements	10/27/2025	
Bids Open	11/10/2025	45 days advertised
Project Award	12/25/2025	
Construction Start	1/26/2026	
Construction Finish	5/18/2027	Approx 68 weeks from NTP to completion