Appendix A

FDEP Drinking Water Facility Plan Review Checklist

Florida Department of Environmental Protection

FACILITY PLAN REVIEW CHECKLIST

1) This checklist is used to evaluate the completeness of planning documents. The questions below are used to verify that the planning requirements of rules 62-503 and 62-552, F.A.C. have been met. Complete the questions by checking the appropriate response or providing the requested information.

SECTION I. GENERAL

2) Project Number: TBD

3) Name of Sponsor City of Hollywood

4) Type of Planning Document
☒ Drinking Water, ☐ Nonpoint Source, ☐ Stormwater, ☐ Wastewater

5) List below the title, date and author of all major reports, sources of information, documents, and correspondence that comprise the complete planning document. These documents may be referenced by section or page number on the "source" line in subsequent questions.

Arcadis, Inc. authored the report and all associated tables, exhibits and figures with information provided by the City of Hollywood Department of Public Utilities (DPU).

6) Briefly describe the major components of the proposed project.

Sodium Hypochlorite Feed System
Ammonia Feed System
Chemical Analyzers
Chemical Storage Tanks

7) Is there sufficient illustrative detail of the local area to identify the project location to include service area, city, and county boundary and location maps?

☒ Yes, ☐ No
Sources/Comments:
See Section 1

8) Does the planning document include a description of the existing and recommended facilities, estimated capital costs, estimated operation and maintenance costs, proposed and existing service areas, and repair and replacement costs, if applicable?

☒ Yes, ☐ No
Sources/Comments:
See Section 1.2 - Existing System and Section 2

9) What is the need or justification for the project and what are the environmental and economic impacts and benefits of the project? Describe any problems with the current system.

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 proposed modifications include the replacement of pipes and tanks that are reaching the end of their useful life, as well as concrete pads that need to be replaced due to cracking and corrosion, and several pumps showing signs of corrosion.

10) Is there a description of the O&M program and the capacity (both managerial and technical) of the existing system? ☐ Yes, ☒ No, ☐ N/A
Sources/Comments:

11) Is the project sponsor seeking interest rate reductions based on specifics of the project?

☐ Yes, ☐ No, ☐ N/A
Sources/Comments:

Drinking Water projects only:

12) Is a projection of population and water demand (minimum 20-years) and present and historic usage provided? ■ Yes, ☐ No, ☐ N/A
Sources/Comments:

See Facilities Plan pages 2-3

Wastewater projects only:

13) For projects that include new collection areas, is the number of existing septic tanks to be eliminated documented? ☐ Yes, ☐ No, ■ N/A
If so, how many? _____
Sources/Comments:

14) For reuse projects, is the quantity of water to be conserved provided? ☐ Yes, ☐ No, ■ N/A
If so, how much annually? _____
Sources/Comments:

SECTION II. COST COMPARISON AND SELECTED ALTERNATIVE

1) Is a cost comparison of at least three alternatives documented using life cycle costs?

☐ Yes, ■ No, ☐ N/A
Sources/Comments:
The project alternatives considered the need for improved disinfection vs either not implementing or implementing part. As such, life cycle cost comparisons were not considered.

2) Do the planning documents discuss the various factors that affect the decision-making process that led to the "selected alternative" and was a rationale for selecting that alternative given. ■ Yes, ☐ No, ☐ N/A
Sources/Comments:

3) In the alternative analysis, is a project cost breakdown given and does the total cost reflect the data used in the cost comparison? ■ Yes, ☐ No, ☐ N/A
Sources/Comments:

4) In the alternative analysis, was the useful life identified for each major component in the project and used in the life cycle cost analysis given in Section II. 1)? ☐ Yes, ■ No, ☐ N/A
Sources/Comments:

If yes, has the Useful Life Certification been submitted? ☐Yes, ☐ No, ■ N/A
Sources/Comments:

5) If this project involves multiple phases, are the capital costs for each phase and the total project costs presented? ☐Yes, ☐ No, ■ N/A
Sources/Comments:
Project anticipated to be completed in one phase.

6) Does the analysis given in Section II 1) include the expected operation and maintenance costs, and changes to the technical and managerial costs needed to implement the proposed alternatives, and repair/replacement costs if applicable? ☐Yes, ■ No, ☐ N/A
Sources/Comments:
Project is largely a process change, post-construction no major change to technical, O&M costs anticipated.

7) For the selected alternative, have all of the industrial control systems being or proposed to be used by the project identified? (An "industrial control system" is an information system used to control industrial processes such as manufacturing, product handling, production, and distribution. ICSs include supervisory control and data acquisition systems, used to control geographically dispersed assets, as well as distributed control systems and smaller control systems using programmable logic controllers to control localized processes.)

☐Yes, ☐ No, ■ N/A
Sources/Comments:

If yes, has the CyberSecurity Certification been submitted? ☐Yes, ☐ No, ■ N/A
Sources/Comments:

SECTION III. COST AND EFFECTIVENESS ANALYSIS (CW Projects Only)

1) Did the planning document include a cost and effectiveness analysis of the processes, materials, techniques, and technologies for carrying out the proposed project?

☐Yes, ☐ No, ■ N/A
Sources/Comments:

2) Does the selected alternative maximize the potential for water and energy efficiency considering the cost of constructing, operating and maintaining, and replacing the project or activity, as necessary? ☐Yes, ☐ No, ■ N/A
Sources/Comments:

If not, has a certification been provided by the project sponsor that states a cost and effectiveness analysis has been conducted for the project? ☐Yes, ☐ No, ■ N/A
Sources/Comments:

_____

SECTION IV. ENVIRONMENTAL REVIEW

An environmental review is required for each project to be funded. This review includes the preparation and publication of an Environmental Information Document (EID) by DEP staff.

1) Select below the type of EID issued and provide the date of publication?
☐ FCEN, ☐ FFONSI, ☐ FEIS/FROD, ☐ FRAN Date of Publication:_____

2) If a FCEN was issued, what categorical exclusion(s) criteria have been met? ☐N/A

Clean Water Projects

- ☐ Rehabilitation of existing water pollution control system components or replacement of structures, materials or equipment.
- ☐ Water pollution control systems that do not change the existing discharge point or permitted pollutant concentration limits and that do not involve acquisition of undisturbed land.
- ☐ Water pollution control systems that serve less than 10,000 people in unsewered communities that involve self-contained individual or cluster systems providing both treatment and disposal of wastewater that will take place near the buildings from which the wastewater is to be discharged.
- ☐ Water pollution control systems in areas where streets have been established, underground utilities installed, or building sites excavated.
- ☐ Treatment plant upgrades that are solely to enable public access reuse.

Drinking Water Projects

- ■ Rehabilitation of existing facilities or replacement of structures, wells, waterlines, or Facilities that will not result in more than a 50% increase of existing public water system capacity and there is no acquisition of land other than easements and rights-of-way where streets have been established, underground utilities installed, building sites excavated, or where such lands have otherwise been disturbed from their natural condition.
- ■ Facilities for the disinfection of public water supplies.
- ☐ Back-up supply wells where, after disinfection, existing water quality meets drinking water standards and there is no acquisition of land.
- ☐ Facilities that will result solely in the provision of adequate public water system pressure.

3) If a FFONSI was issued, what finding of no significant impact criteria(s) have been met?

- [■] N/A
- [ ] New or relocated discharges to surface or ground water.
- [ ] Will result in the substantial increase in the volume or the loading of pollutant to the receiving water.
- [ ] Will provide capacity to serve a population 30% greater than the existing population.
- [ ] Not supported by the state, or other regional growth plan or strategy.
- [ ] Directly or indirectly involve or relate to upgrading or extending infrastructure systems primarily for the purposes of future development.
- [ ] Other: _____

4) If a FFONSI was issued, has the project been sent to FDEP and/or Dept. of Agriculture for review? [ ]Yes, [ ] No, [■] N/A

If yes, have the comments been issued and resolved? [ ]Yes
Date of Comments: _____
Sources/Comments:

_____

5) Have any comments been received for the published EID? [ ]Yes, [ ] No, [■] N/A
If yes, have the comments been issued and resolved? [ ]Yes
Date of Comments: _____
Sources/Comments:

_____

6) Does the planning document include a list (obtained from U.S. Fish &Wildlife Service) of threatened, endangered, proposed, and candidate species and designated critical habitats that may be present in the project area?

[ ]Yes, [ ] No, [■] N/A
Sources/Comments:

_____

7) Has the proposed project been sent to U.S. Fish &Wildlife Service for review and comments? [ ]Yes, [ ] No, [■] N/A
Sources/Comments:

_____

If yes, has the U.S. Fish & Wildlife Service issued comments and resolved? ☐Yes
Date of Comments: _____
Sources/Comments:

8) Does the planning document provide justification that the proposed project will not have any significant adverse effects upon flora, fauna,threatened or endangered plant or animal species, surface water bodies, prime agricultural lands, wetlands, or undisturbed natural areas? ☐Yes, ☐ No, ■ N/A
Sources/Comments:

9) Does the planning document provide justification that the proposed project will not have any significant adverse human health or environmental effects on minority or low-income communities? ■Yes, ☐ No, ☐ N/A
Sources/Comments:

See Facility Plan Page # 12

10) Will the proposed project introduce any significant adverse environmental effects? ☐Yes, ■ No, ☐ N/A
If yes, what project features will mitigate such effects?
Sources/Comments:

See Facility Plan Page # 12

11) Has the project received state clearinghouse review and approval? ☐Yes, ■ No, ☐ N/A
If yes, date of approval: _____
Sources/Comments:

12) If the project involves source water protection or capacity development, has the FDEP Source and Drinking Water Program approval been obtained? ☐Yes, ☐ No, ■ N/A
Sources/Comments:

SECTION V. FEDERAL FLOOD RISK MANAGEMENT STANDARD

1) Does the planning document determine if the proposed project is a "substantial improvement" (i.e., the project is worth more than 50% of the market value or replacement cost of the facility). ☐Yes, ☐ No, ■ N/A
If the project is not a substantial improvement, then skip the remainder of Section V.
Sources/Comments:

2) Does the planning document provide maps/and or justification to determine if the project is in a floodplain? ☐Yes, ☐ No, ■ N/A
If yes, what method was used to make this determination?

- ☐ The 0.2-percent-annual-chance flood elevation (also known as the 500-year flood elevation).
- ☐ Freeboard Value Approach using the Base Flood Elevation (or 1-percent-annual-chance flood determined using best available data) and an additional height of 2' for non-critical or 3' for critical actions to calculate the freeboard value.
- ☐ Climate-informed Science Approach using the best available, actionable hydrologic and hydrologic data and methods that integrate current and future changes in flooding based on climate science and other factors or changes affecting flood risk to determine the vertical flood elevation and corresponding horizontal floodplain in a manner appropriate to policies, practices, criticality, and consequences.

Sources/Comments:

_____

3) Does the planning document determine if moving the project out of the floodplain is a viable option? ☐Yes, ☐ No, ■ N/A
If yes, and this new location is the selected alternative for the project, then skip the remainder of section V.
If no, then goto 4)
Sources/Comments:

_____

4) Does the planning document identify the utility assets that are vulnerable to flooding? Each utility asset of the project should obtain the following information a) elevation, b) flooding consequences based on replacement costs, c) impact of failure to utility operations, and the priority need for mitigation (from low, moderate, to high). ☐Yes, ☐ No, ■ N/A
Sources/Comments:

_____

5) Does the planning document identify and evaluate the mitigation measures to prevent damage to each utility asset with the intent to prevent disruptions to critical operations?
☐Yes, ☐ No, ■ N/A
Sources/Comments:

_____

6) Does the planning document discuss the various factors that affect the decision-making process that led to the selection and implementation into the project scope/design of the mitigative options chosen to prevent damage to each utility asset with the intention to prevent disruptions to critical operations?
☐Yes, ☐ No, ■ N/A
Sources/Comments:

_____

7) Has a notice been given to allow the involve the public in the decision-making process for the selected floodplain mitigation actions? ☐ Yes
Date of Publication: _____

8) Have any comments been received for the floodplain mitigation actions? ☐ Yes
If yes, have the comments been issued and resolved? ☐ Yes
Date of Comments: _____
Sources/Comments:

_____

SECTION V. PUBLIC PARTICIPATION

1) Was a public meeting held to explain the proposed project, the capital cost and the long-term financial impact on the customers; and was the public able to participate in evaluating project alternatives? ☐ Yes, ■ No, ☐ N/A
Sources/Comments:
A public meeting is scheduled for May 8 2025

2) Date of Public Meeting: May 8, 2025

3) Have copies of the Notice and minutes of the public meeting been provided and was the notice published in accordance with the local requirements, or 14 days, whichever is greater?
☐ Yes, ■ No, ☐ N/A
Sources/Comments:
A copy of the notice and minutes of the public meeting will be provided once available

4) Did the public meeting address all of the following items?
☒ Alternative analysis and selection.
☒ Environmental impact.
☒ Monetary cost to the public/user
☐ Floodplain mitigative actions (if applicable)

■ Yes, ☐ No, ☐ N/A
Sources/Comments:

_____

SECTION VI. FINANCIAL FEASIBILITY

1) Does the financial information demonstrate the ability to repay the loan including the 1.15coverage factor? ■ Yes, ☐ No, ☐ N/A
Sources/Comments:

_____

2) Does the planning document include a capital financing plan for clean water projects and/or a business plan for drinking water projects signed by the chief financial officer or the authorized representative? ■ Yes, ☐ No, ☐ N/A
Sources/Comments:

3) Does the planning document include the proposed system of charges, rates, fees, and other collections that will generate the revenues to be dedicated to loan repayment (e.g. user charge rates)? ■ Yes, ☐ No, ☐ N/A
Sources/Comments:
Current Rate system approved November 11, 2024. See Appendix G

4) For Clean Water projects, has a Fiscal Sustainability Plan or Asset Management Plan been developed? ☐ Yes, ☐ No, ☐ N/A
If yes, which plan? ☐ Fiscal Sustainability Plan, ☐ Asset Management Plan

5) If not, has a certification been provided by the project sponsor that states a fiscal sustainability plan will be developed and implemented, and the plan will be provided for review before the project's final disbursement? ☐ Yes, ☐ No, ■ N/A

6) For Clean Water projects competing for grants or principal forgiveness, are the proposed projects listed in the updated Asset Management Plan and are these projects top priority in the plan and have been addressed with the regulatory district?
☐ Yes, ☐ No, ■ N/A

SECTION VII. UPDATED REQUEST FOR INCLUSION

1) Does the planning document include an updated request for inclusion that includes an updated schedule and project costs? ■ Yes, ☐ No, ☐ N/A
Sources/Comments:
See Appendix H

2) Are there sufficiently detailed maps of the local area to confirm the service area census tracts? ■ Yes, ☐ No, ☐ N/A
Sources/Comments:

3) If the planning period exceeds 5 years, has project phasing been considered; and if so, has an implementation schedule been presented for each phase of the planning period?
☐ Yes, ☐ No, ■ N/A
If no Source/Comment:

SECTION VIII. PROJECT AUTHORIZATION

1) Does the planning document include an adopting resolution or other action establishing a commitment to implement the planning recommendations? ☐ Yes, ☐ No, ☐ N/A
Date of adopting resolution: _____
Sources/Comments:
_____

SECTION IX. PROJECT IMPLEMENTATION

1) Is there anything about the proposed project that appears questionable from an engineering, environmental or financial perspective and therefore requires resolution?
☒ No, ☐ N/A
Sources/Comments:
_____

2) List any proposed service agreements or local contracts necessary to implement the selected alternative. Also describe the status of each agreement or contract. ☒ N/A

Sources/Comments:
_____

3) List any DEP permits (other than a construction permit) needed to implement the selected plan. ☒ N/A
Sources/Comments:
_____

SECTION X. GREEN PROJECT DESIGNATION

1) Is this project to be listed as "Green" project? ☐ Yes, ☒ No, ☐ N/A

2) If yes, does the planning document include documentation of how the project is categorically green and determination made what percentage of the project is categorically green? ☐ Yes, ☐ No, ☒ N/A
Categorically Green Percentage: _____
Sources/Comments:
_____

SECTION XI. PLANNING DOCUMENT COMPLETION

1) Is the planning document signed and sealed by a professional engineer? ☐Yes

2) Have all of the planning related approval dates been entered into the database?

Clearinghouse Approval	☐Yes
U. S. Fish & Wildlife Acceptance	☐Yes
Capital Financing/Business Plan Acceptance	☐Yes
Date of Public Meeting	☐Yes
Date of Adopting Resolution	☐Yes
EID Publication Date	☐Yes
Facilities Plan Acceptance Date	☐Yes

3) Is the planning document approval letter included with this checklist? ☐Yes

4) Have all of the planning related approval dates been entered into the database? ☐Yes

ACCEPTANCE

Project Manager_____ _____
Effective Date

Program Administrator_____

Appendix B

Four-Log Disinfection Implementation Basis of Design Report

ARCADIS Design & Consultancy for natural and built assets

City of Hollywood – Department of Public Utilities

CHLORINE AND AMMONIA FEED SYSTEM ASSESSMENT FOR IMPLEMENTATION OF FOUR-LOG DISINFECTION

Basis of Design Report Final

February 21st , 2024

CHLORINE AND AMMONIA FEED SYSTEM ASSESSMENT FOR IMPLEMENTATION OF FOUR-LOG DISINFECTION

Basis of Design Report

Prepared for:

Wilhelmina Montero, PE

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Our Ref:

30041027

Date:

February 21, 2024

TABLE OF CONTENTS

TABLES

FIGURES

ACRONYMS AND ABBREVIATIONS

BODR	Basis of Design Report
FDEP	Florida Department of Environmental Protection
FRP	fiber reinforced plastic
gpm	gallons per minute
HMI	human machine interface
HSPS	High-Service Pump Station
HST	hypochlorite storage tank
lbs/day	pounds per day
LS	Lime Softening
mg/L	milligrams per liter
MS	Membrane Softening
MGD	million gallons per day
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
OSG	on-site hypochlorite generation
PLC	programmable logic controller
PVC	polyvinyl chloride
RO	reverse osmosis
SCADA	Supervisory Control and Data Acquisition
V	volt
VFD	variable frequency drive
WTP	water treatment plant

EXECUTIVE SUMMARY

The City of Hollywood currently treats raw water from multiple wellfields in the Biscayne and Floridan aquifers using three major treatment processes: lime softening, membrane softening (MS), and reverse osmosis. Treated water from each process is blended, disinfected, stored in one of several clear wells, and then pumped into the service area. In November 2016, the City of Hollywood obtained conditional approval for conversion to four-log virus inactivation using free chlorine based on a conceptual design submitted to the Florida Department of Health, provided that:

- Modifications proposed in the conceptual design are completed.
- Any needed improvements to satisfy four-log virus treatment and requirements of *Florida Statute (F.S.) 62-555.320 for Water Treatment Facilities* are implemented.
- Compliance monitoring, operating, recordkeeping, and other administrative requirements are met.

This Basis of Design Report documents the condition of the existing disinfection system at the water treatment plant (WTP) and required modifications needed for the system. The key improvements and supporting activities required for conversion to four-log virus treatment at the WTP include:

- Replace existing sodium hypochlorite tanks in the Chlorine Storage Building and Membrane Building.
- Demolish the on-site generation equipment and brine tank at the Chlorine Storage Building and repair concrete elements.
- Demolish the existing sodium hypochlorite system including tanks, metering pumps, piping and appurtenances in the LS CL2/HEX Chemical Storage/Feed Area, (Rehabilitation of floors and concrete elements is being performed under a separate project.)
- Install new metering pumps sized for 12% sodium hypochlorite solution in the Chlorine Storage Building. Additional pumps will be added to handle the injection points currently supplied by the LS/HEX Chemical Storage/Area that is being removed.
- Install three (3) new transfer pumps to deliver back-up bulk storage from Chlorine Storage Building to Membrane Building Storage.
- Demolish the existing three (3) sodium hypochlorite metering pumps at the Membrane Building Chemical Storage Area and replace with 5 (five) new metering pumps for 12% solution to serve the Blend Tank and Odor Control. In addition, two (2) new transfer pumps will be provided to transfer between tanks at this location and to the Chlorine Storage Building.
- The existing two (2) pumps at the Chlorine Shed will be demolished and the location will be repurposed as an instrument shed.
- Increase the sodium hypochlorite dose in the blend tank to create a free chlorine segment including the blend tank and 42-inch piping.
- Install permanent by-pass for blended water from Blend Tank to GST-5 for the installation of new ammonia feed system.
- Install an ammonia injection point and static wafer mixer at the 42-inch pipe upstream of the ground storage tanks.
- Install new ammonia tanks and new feed system with a pressure feed and a mass flow meter/controller at new location between the 3.5MG ground storage tanks.

- Demolish the existing ammonia feed system.

All proposed upgrades are in compliance with the most recent version of the National Electric Code, National Fire Protection Association requirements, Florida Building Code, and Broward County Building Department codes. In addition, the proposed facility upgrades address pertinent requirements of the Florida Department of Environmental Protection as they pertain to treatment plant operations and redundancy.

1 INTRODUCTION

The City of Hollywood (City) operates the City of Hollywood Water Treatment Plant (WTP), which is permitted for a total flow of 59.5 million gallons per day (MGD). Three treatment trains (reverse osmosis [RO], membrane filtration [MF], and lime softening [LS]) receive water from wells in the Biscayne and Floridan aquifers.

The City currently uses chloramines to achieve four-log virus disinfection at the WTP and has received conditional approval from the Florida Department of Environmental Protection (FDEP) to utilize a free chlorine segment to achieve four-log virus deactivation. Conditions of the approval include a review of the plantwide disinfection system.

- Modifications proposed in the conceptual design are completed.
- Any needed improvements to satisfy four-log virus treatment and requirements of *Florida Statute (F.S.) 62-555.320 for Water Treatment Facilities* are implemented.
- Compliance monitoring, operating, recordkeeping, and other administrative requirements are met.

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 Basis of Design Report (BODR) provides an assessment of the current sodium hypochlorite and ammonia systems and summarizes the modifications required to implement four-log virus disinfection, including additional chemicals required to achieve the free chlorine segment.

2 ASSESSMENT OF EXISTING DISINFECTION SYSTEM

The purpose of the assessment of the sodium hypochlorite and ammonia systems is to document the locations, sizes, conditions, and operating status of the various system components such as chemical storage tanks, pumping equipment, and supporting systems. Existing equipment and storage areas are assessed for reuse or replacement, as necessary. For the purpose of the assessment, the disinfection system is divided into the following major areas:

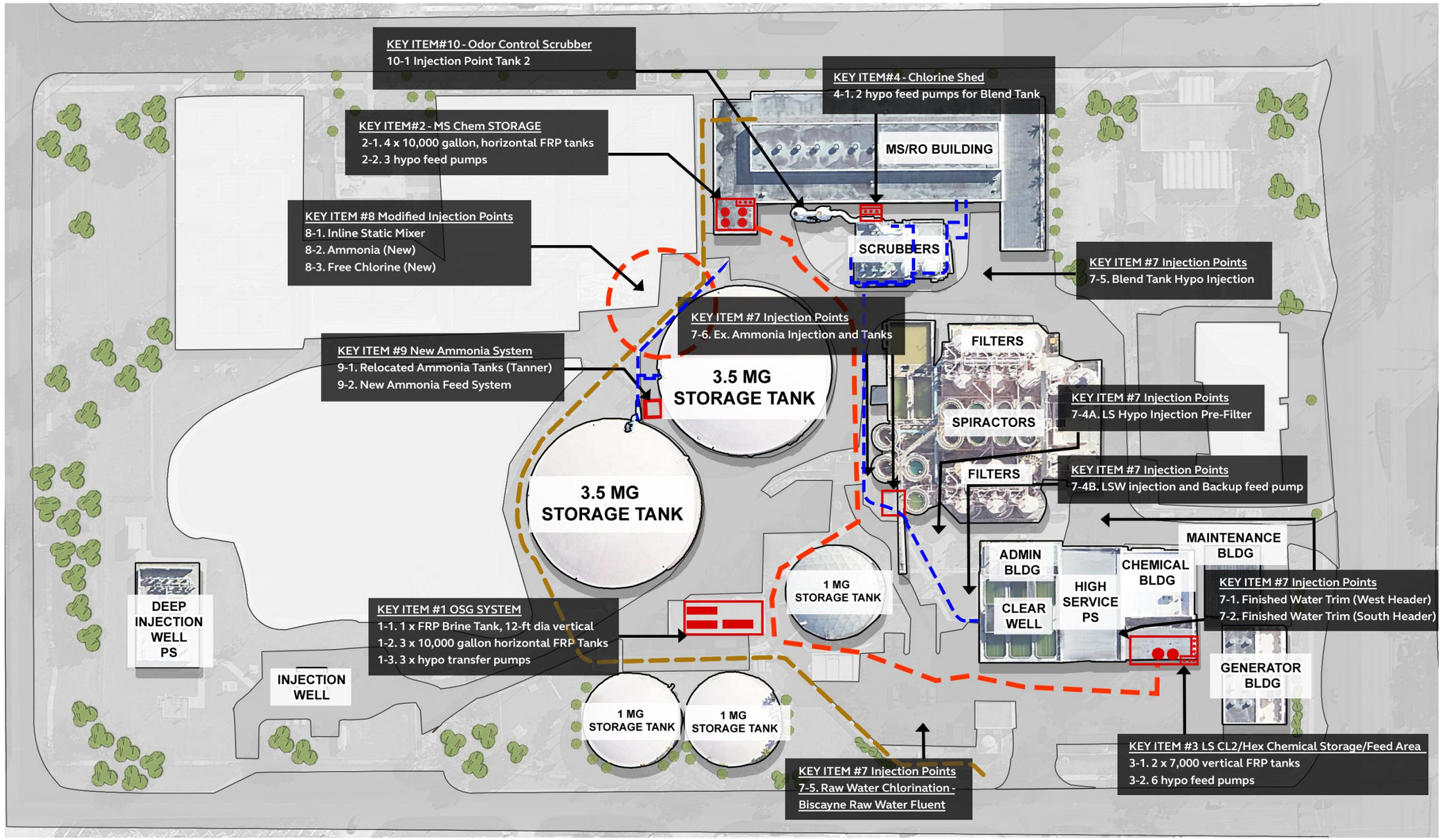
1. Chlorine Storage Building
2. Membrane Building Chemical Storage Area
3. LS CL2/Hex Chemical Storage/Feed Area
4. Chlorine Shed
5. Ammonia Storage and Feed Area

Within each area, equipment and system components are further divided into the following categories:

1. Chemical Storage Tanks and Piping
2. Chemical Feed Pumps and Equipment
3. Electrical and Controls
4. Building, Containment, and Supports

A WTP disinfection system site plan is presented as Figure 1-1. For an equipment inventory schedule, refer to Appendix A.

Figure 1. Water Treatment Plant Disinfection System Site Plan



2.1 Chlorine Storage Locations

The Chlorine Storage Building receives, stores, dilutes, and distributes sodium hypochlorite to other areas of the plant. The OSG system, which includes generation, storage, pumping, and piping equipment, is split between several locations at the plant. The system was manufactured by ClorTec and was originally installed in 2003. The generators, blowers, water softeners, three storage tanks, brine tank, and three transfer pumps are located at the Chlorine Storage Building. The system was manufactured by ClorTec and was originally installed in 2003. The OSG system includes two electrolytic cells, each with a capacity of 1,500 pounds per day (lbs/day), which are currently not in service. 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 Membrane Building Chemical Storage Area includes four storage tanks and three metering pumps. Tanks No. 6 and 8 stores 12% sodium hypochlorite and Tanks No. 7 and 9 stores 0.8% respectively.

The LS CL2/HEX Storage Chemical Feed Area includes two 0.8% storage tanks and six metering pumps. The pumps serve the following injection points Raw Water (South wells), LS Pre-filters (Spiractors 7-12), LS Post-Filter (Filter 1-6) backup or CL2 burn, and West and South header distribution mains.

The Chlorine Shed contains three metering pumps (only two are operational). These pumps serve the Blend Tank and is the primary disinfection feed point.

2.1.1 Chemical Storage Tanks and Piping

The Chlorine Storage Building has three 10,000-gallon horizontal fiber reinforced plastic (FRP) sodium hypochlorite storage tanks (HSTs) mounted on concrete saddles (HST-1, HST-2, HST-3). Each of the tanks has an 8.5-foot-diameter and 24-foot straight shell length. Top and side manways are provided on each tank. Access to the top of the tank is limited by the proximity to the ceiling and support beams. The City indicated that Tanks No.1 and 2 have been relined. Tanks HST-2 and HST-3 store diluted 0.8% sodium hypochlorite for use in the treatment process. Tank HST-3 receives and stores bulk 12% sodium hypochlorite. An 8-inch-high curb is located at the north and south ends of the building and provides containment for the tanks.

Schedule 80 polyvinyl chloride (PVC) piping and manual ball valves are used to interconnect the tanks and the transfer pumps. The tanks, piping, and pumps are not in secondary containment.

Figure 2. Chlorination Building Storage Tanks

An 80-ton brine tank is located directly to the north of the building and is protected with bollards. The FRP tank has a 12-foot-diameter and a 20-foot straight shell height. The brine tank was about 70% full and has not been in operation since the on-site generators have been offline. As of June 2020, the brine tank has been emptied and cleaned.

Figure 3. Brine Tank

2.1.2 Chemical Feed Pumps and Equipment, and Electrical and Controls

Three transfer pumps are located outside on a concrete pad along the south wall of the Chlorine Storage Building. The pumps are 3-horsepower centrifugal magnetic drive units with a capacity of 100 gallons per minute (gpm) at a total dynamic head of 50 feet. Figure 6 shows the centrifugal magnetic drive transfer pumps. Corrosion is visible on the motor of two of the pumps, which are located on concrete pads that show signs of cracking and corrosion. No cover is provided for the transfer pumps. The transfer pumps convey the 0.8% sodium hypochlorite solution to storage tanks at the Membrane Building Chemical Storage and the LS CL2/HEX Chemical Storage/Feed Area.

Figure 4. Transfer and Control Hardware Outside of the Chlorine Storage Building

The control panels are in working order and show minimal corrosion. The LCD screens need to be replaced soon due to exposure to the environment. The electrical components for these units appear to be in good working order with no conduit compromised or wiring exposed. The south exterior wall of the building has control panels: power shutoff, a manual transfer switch for the three tanks, and connections to the supervisory control and data acquisition (SCADA) system in a stainless steel panel located adjacent to the pump control panel.

The OSG has not been operated for several years. Control panels for the regenerative blowers and OSG are also not in service. An emergency eyewash/shower fixture is located outside the building on the south side next to the exit and is supplied by potable water. No emergency eyewash/shower fixture was observed inside the building.

Figure 5. OSG LCP Panel (Human Machine Interface)

Figure 6. ChlorTec Rectifier Panel

Figure 7. On-site Sodium Hypochlorite Generators

2.1.3 Building, Containment, and Supports

The Chlorine Storage Building was built to house the chlorine gas system. In 2003, the chlorine gas equipment was removed and the OSG system was installed. The building is open at the north end with chain link fencing and gates providing ventilation and access. It is concrete block construction with two doors for access and louvered windows providing ventilation through the building. The three horizontal FRP sodium hypochlorite storage tanks are supported on concrete saddles. A concrete containment curb approximately 8 inches high is located at the north and south ends of the building. Cracks were observed in the concrete saddles for the FRP tanks and were evident in the concrete floor. No coating was observed on the concrete saddles or floor. The concrete equipment pads that support the on-site generators, rectifiers, and blowers are cracked and in some places crumbling.

Figure 8. Concrete Saddle of Storage Tank in Chlorine Storage Building

Sodium hypochlorite piping inside the building is Schedule 80 PVC. Piping leaving the containment area has secondary containment piping, which is 3-inch Schedule 80 PVC.

Chlorine Storage Building equipment and features are summarized in Table 1.

Table 1. Chorine Storage Building Equipment and Features

Description	Quantity	Capacity/Type	Installed	In Use
Brine Tank	1	80 tons	2003	No
On-site Generators	2	1,500 lbs/day	2003	No
FRP Storage Tanks	3	10,000 gallons	2003	Yes
Dilution Blowers	3	2,000 standard cubic feet per minute (backup unit in MS Bldg)	2003	No
Regenerative Blower	1	210 standard cubic feet per minute	2003	No
Water Softeners	3	Dual tank	2003	Yes
Transfer Pumps	3	100 gpm @ 50 ft TDH	2003	Yes

Description	Quantity	Capacity/Type	Installed	In Use
Variable Frequency Drives	3	Local control and SCADA connected	2003	Yes
Tank Level Transmitters	3	Local indicator and SCADA connected	2003	Yes

2.2 Chemical Storage Area at Membrane Building

The sodium hypochlorite area is in the northeast corner of the Membrane Building, which was constructed in 1995. The sodium hypochlorite area is covered by a roof and open on the sides. There are four 10,000-gallon horizontal FRP storage tanks and three metering pumps, which were installed in 2013.

2.2.1 Chemical Storage Tanks and Piping

The four 10,000-gallon horizontal FRP storage tanks (HST-6, HST-7, HST-8, and HST-9) are mounted on concrete saddles and have a 12-foot diameter and a 10.5-foot straight shell height. The tanks have top and side manways. Schedule 80 PVC piping and manual ball valves are used to interconnect the tanks and provide suction piping to the metering pumps.

Figure 9. Two of Four Membrane Building Area Hypochlorite Tanks

2.2.2 Chemical Feed Pumps and Equipment

The three metering pumps (7, 8, and 9) were installed as replacement pumps during the 2013 refurbishment of the odor control system. The pumps are diaphragm type and show corrosion on the pump body and motor. All discharge piping is Schedule 80 PVC and transitions into secondary containment piping as it exits the concrete containment wall and travels up to the blend tank and odor scrubber. This piping was replaced as part of the 2013 refurbishment as well. Inter-tank connections leading to the pump feeds are 3-inch Schedule 80 PVC. An emergency eyewash/shower fixture is located inside the containment area and is supplied by potable water.

Figure 10. Membrane Building Chemical Storage Area Hypochlorite Metering Pumps

2.2.3 Electrical and Controls

The wiring/conduit is secured and shows no sign of corrosion or compromise. Control panels are stainless steel and appear to be in working order. They contain local and SCADA access, variable frequency drive (VFD) controls with stop/start buttons and indicator lights for mode of operation or VFD failure. Remaining controls are tank level sensors with indicators and connection to the SCADA system, which was installed in 2003 and is in working order.

Membrane Building equipment and features are summarized in Table 2.

Table 2. Membrane Building Chemical Storage Area Major Equipment and Features

Description	Quantity	Capacity/Type	Installed	In Use
FRP Storage Tanks	4	10,000 gallons	2003	Yes
Metering Pumps	3	3.4 gpm	2013	Yes
VFD Panels	3	Local control and SCADA connected	2013	Yes
Tank Level Transmitters	4	Local indicator and SCADA connected	2003	Yes

2.2.4 Building, Containment, and Supports

The sodium hypochlorite storage area in the Membrane Building Chemical Storage Area is open on three sides with the fourth side being a block wall. A 2-foot-high containment wall surrounds the tank and pump area. Concrete saddles and the interior of containment walls appear to be coated/painted. Upon visual inspection, no visual evidence of deterioration was observed.

2.3 Chlorine Shed

The Chlorine Shed consists of a prefabricated FRP building that was installed in 1991 to contain the chlorinators and was modified in 2003 to house two of the sodium hypochlorite metering pumps, VFDs, and analyzers (Hach CL17 chlorine analyzer and Hach 5500sc monochloramine/ammonia analyzer).

Chlorine Shed equipment and features are summarized in Table 3.

Table 3. Chlorine Shed Major Equipment and Features

Description	Quantity	Type	Installed	In Use
Metering Pumps	2	Peristaltic	2003	Yes
Metering Pumps (Trial Unit)	1	Diaphragm	2019	Pending
Chlorine Analyzer	1	In line	Unknown	Yes
Monochloramine and Ammonia Analyzer	1	In line	Unknown	Yes

2.3.1 Chemical Storage Tanks and Piping

No storage tanks are located in the Odor Control Chlorine Shed; however, Schedule 80 PVC suction piping from the Membrane Building Chemical Storage Area is routed in containment piping into the Chemical Storage Building to the metering pumps.

2.3.2 Chemical Feed Pumps and Equipment

Two of the metering pumps are peristaltic hose pumps from the 2003 installation, while a third diaphragm pump has recently been installed as a test/pilot pump. All piping is Schedule 80 PVC from the 2003 installation, and secondary containment piping is used outside the building.

Figure 11. View of Odor Control Chlorination Building from Entrance

2.3.3 Electrical and Controls

Electrical wiring and controls are secured, and conduit shows no sign of compromise. All controls (VFDs, power supply, and analyzers) are in working order.

2.3.4 Building, Containment, and Supports

The fiberglass building was installed in 1991. Stains are visible on the concrete floor. The concrete equipment pads under the two peristaltic pumps are cracked. A small sump with a float switch is located near the door of the building.

An eyewash/shower station is located outside the building and is supplied by potable water. No eyewash/shower station is located inside the building.

2.4 LS CL2/HEX Storage Chemical Storage/Feed Area

The LS CL2/HEX Storage Chemical Feed Area contains two (2), 7,000 gallon, FRP tanks and six metering pumps for the sodium hypochlorite system.

2.4.1 Chemical Storage Tanks and Piping

Two vertical FRP storage tanks (HST-4 and HST-5) receive sodium hypochlorite from the transfer pumps at the Chlorine Storage Building and feed the six adjacent metering pumps. Both 7,000-gallon tanks were installed in 2003 and have an 11-foot diameter and 10-foot straight shell height. Each tank has a top manway only. All piping interconnecting the tanks is Schedule 80 PVC.

Figure 12. View of HST-4 and HST-5

2.4.2 Chemical Feed Pumps and Equipment

The six peristaltic metering pumps (1 through 6) have a capacity of 6.2 gpm each. The pumps, which were installed in 2003, show signs of corrosion. The piping is arranged to allow any pump to serve as backup for any other pump. Pump 4 is currently out of service. Pump No. 6 is backup to all pumps in this area and back up for the Chlorine Shed pumps (HFP- 10, 11) feeding the Blend Tank.

Figure 13. LS CL2/HEX Storage Chemical Feed Area LS CL2/HEX Storage Chemical Feed Area Pumps

Pump piping is Schedule 80 PVC and was installed in 2003. The PVC piping is 1.25 inches and enters secondary containment piping as it exits the building. The secondary containment piping was also constructed in 2003 during the conversion from chlorine gas to sodium hypochlorite service.

2.4.3 Electrical and Controls

Electrical service to the pumps shows visible evidence of corrosion. Conduit is secured and no frayed or exposed wiring was noted.

VFDs control the rate of flow of each pump and are in working order. The VFDs were installed with the metering pumps in 2003. They are encased in plastic housing and are in good working order except for the Pump 4 VFD, which has been removed and associated wiring properly enclosed. Level transmitters/indicators installed in 2003 for the two storage tanks are in working order and connect to the plant SCADA system.

2.4.4 Building, Containment, and Supports

The concrete block building was finished in 1973. There is a door from the high-service pump room and a single garage door to the outside with no provision for containment. The concrete bases for the pumps show signs of corrosion. The walls and floor are not coated or painted. The concrete tank pads are unpainted but are in relatively good condition. A piping trench with grating is seen adjacent to the tanks.

As part of the 40-year Structural Recertification, the building and concrete components are currently scheduled for repair by others. No equipment modification was made as part of the structural repair and rehabilitation.

LS CL2/HEX Storage Chemical Feed Area LS CL2/HEX Storage Chemical Feed Area equipment and features are summarized in Table 4.

Table 4. LS CL2/HEX Storage Chemical Feed Area Major Equipment and Features Summary

Description	Quantity	Capacity/Type	Installed	In Use
Metering Pumps	6 (1 non-operational)	6.2 gpm/peristaltic	2003	Yes
Tanks	2	7,000 gallon/FRP	2003	Yes
VFDs	6 (1 non-operational)	Local control and SCADA connected individual	2003	Yes
Tank Level Transmitters	2	Local indicator and SCADA connected 2 in 1 panel	2003	Yes

2.5 Ammonia Storage and Feed System

The City uses anhydrous ammonia to form chloramines for disinfection. Two 1,000-gallon horizontal carbon steel tanks leased from Tanner Industries are located in a chain link-fenced area east of the parking area (Figure 16). Tanner Industries recommends a cover/roof for the tanks, and while a cover is not currently in place, the proximity to the Spiractor treatment train equipment provides extended shade from the sun. Anhydrous ammonia is applied using an ammoniator housed in a prefabricated FRP building. The feed system is manually operated. Threaded and flanged painted steel piping transports ammonia to the injection site approximately 30 feet from the tanks. Pipe is secured to cast-in-place concrete blocks. Operations indicated that the system is in working order; however, the City is interested in upgrading the system during the chlorine conversion and ammonia injection point relocation.

Figure 14. Ammonia Tanks

2.6 Chemical Injection Points

Metering pumps in the LS CL2/HEX Chemical Storage/Feed Area, Membrane Building Chemical Storage Area, and Chlorine Shed are manually controlled (i.e., not paced) to pump to the sodium hypochlorite injection points. All piping is Schedule 80 PVC, most of which was installed in 2003 except connections from the Membrane Building pumps, which were replaced in 2013. All isolation valves on the discharge piping are manual.

The main sodium hypochlorite injection point are at the Blend Tank, Pre-Filter, and Raw Water. Other injection points are used only during a breakpoint chlorination event and are not in normal use. Intermittent feeding of sodium hypochlorite is also available at the scrubbers.

There is only one ammonia injection point on the existing 30” water main from the lime softening portion of the plant prior to the blend tank.

2.6.1 Finished Water Disinfection – Blend Tank

Pumps HFP-10 and HFP-11 (located in the Chlorine Shed), which are connected at the pump discharge with 1-inch chlorinated PVC piping, are the main disinfection feed units and feed to the Blend tank. Pumps HFP-7 and HFP-8 are the feeds for the Odor Control Scrubber. HFP-9 is back-up feed for HFP-7, 8, 10 and 11 but will only feed 12% sodium hypochlorite. The 1-inch piping enters 2-inch Schedule 80 PVC piping before exiting the limit of containment for the Membrane Building Chemical Storage Area and travels to the Blend Tank to inject in the mixing area at the beginning of the tank. The dose is manually set by staff at the metering pump and is approximately 4.3 milligrams per liter (mg/L).

Figure 15. Blend Tank Injection Point

2.6.2 Finished Water Chlorination Trim Points – HSPS Header West and South

The West and South header injector locations are used only during breakpoint chlorination. Pump 1 Pump 5 are used to feed either header. Injection piping is routed to the high-service pump room with another non-retractable injection point on the 42-inch discharge header, east main, from the high-service

pumps. Both injection points are accessible below the grating in the high-service pump room. The injection points consist of 2-inch Schedule 80 PVC pipe connected to the tap in the header with a ball valve to turn off flow. No evidence of leaking was observed at these locations. Flow to this injection point is controlled at the metering pump, and the dose is approximately 0.7 mg/L.

Figure 16. Injection Point at West Header

2.6.3 LS Pre-Filter (Spiractor 7-12)

Sodium hypochlorite is injected after Spiractors 7 through 12 and before Filters 1 through 6. The dose is approximately 3.1 mg/L and is used continuously. This pipe has secondary containment pipe up to the injection point. Flow to this location is controlled at the metering pump.

Figure 17. Lime-Softened Water from Spiractors 7 to 12 (Beige Pipe)

2.6.4 LS Post Filters 1 through 6

Sodium hypochlorite injection to the effluent of Filters 1 through 6 is used only during breakpoint chlorination. This injection point also serves as back-up for HFP-10 or 11 located in the Chlorine Shed. The dose is approximately 2.4 mg/L, and flow to this location is controlled at the metering pump. This pipe has secondary containment pipe up to the injection point. The filters are in the building shown on Figure 20. The blue 30-inch lime-softened filter effluent pipe is also shown.

Figure 18. Post Filters 1 to 6

2.6.5 Raw Water Chlorination – 36-inch Biscayne Raw Water

Pump 3 feeds the Biscayne raw water chlorination injection point prior to the lime treatment process. A maintenance dose of less than 1 mg/L is injected into the 36-inch pipe prior to the spiractors. The injection pipe is 2-inch Schedule 80 PVC and is located west of the parking lot and before 35th Street. No leaks were observed at the connection. There is a ball valve to turn off and on flow, although flow is controlled at the metering pump.

Figure 19. Chlorine Injection into Biscayne Raw Water to Lime Softener

2.6.6 Injection at Scrubbers

Metering pump HFP-9 serves as back-up for the injection of sodium hypochlorite from the tanks at the Membrane Building Chemical Storage Storage/Area to the odor scrubbers (HFP-7 and 8) and for feed to

the Blend Tank (HFP-10 and 11). This injection point is used intermittently, and the dose applied at this location is manually set at the metering pumps and is less than 1.0 mg/L.

2.6.7 Ammonia Injection Point

Anhydrous ammonia is applied using an ammoniator housed in a prefabricated FRP building. The feed system is manually operated. Threaded and flanged painted steel piping transports ammonia to the injection site approximately 30 feet from the tanks. Pipe is secured to cast-in-place concrete blocks. Operations indicates that the system is in working order; however, the City is interested in upgrading the system during the chlorine conversion and ammonia injection point relocation.

Figure 20. Existing Ammonia Injection Point

2.7 Chemical Yard Piping and Conveyance

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. The pipe is Schedule 80 PVC with secondary containment piping. There is evidence of a leak behind two 3.5-million-gallon tanks that has been repaired.

Piping connecting the buildings and tanks is 3-inch Schedule 80 PVC.

3 PROPOSED WATER TREATMENT PLANT MODIFICATIONS

The results of the assessment of the sodium hypochlorite and anhydrous ammonia systems were used to develop recommendations for conversion to four-log virus inactivation using free chlorine for disinfection. The proposed modifications and upgrades include conversion from 0.8% sodium hypochlorite to 12% sodium hypochlorite.

To create a free chlorine segment, the current practice in which ammonia is dosed prior to the blend tank will be abandoned. Instead, ammonia will be injected after the free chlorine segment that includes the blend tank and the following 140 feet of 42-inch pipe. Sodium hypochlorite required for breakpoint chlorination reactions plus additional sodium hypochlorite required for contact time will be applied at the blend tank. The proposed free chlorine segment is depicted on Figure 17.

3.1 Water Treatment Plant Data

Plant flow data and chemical usage for 2019 and additional information regarding existing doses at injection points were provided by the City and reviewed. Results from bench-scale testing performed by Arcadis were also used to determine required modifications to the sodium hypochlorite and ammonia doses when providing a free chlorine segment. These factors were considered to determine the requirements for chemical storage and feed equipment.

Average plant flow and proposed average chemical dose were used to assess storage needs. The 2019 average raw water flow at the plant was 24.5 MGD (one-year average of daily flows). The maximum flow is based on the permitted 59.5 MGD flow. Proposed design plant flows are presented in Table 5.

Table 5. Design Plant Flows

Description	Flow (MGD)
RO Train 2019 Average Flow (20%)	4.9
MF Train 2019 Average Flow (40%)	9.8
LS Train 2019 Average Flow (40%)	9.8
Total WTP 2019 Average Flow	24.5
Total WTP Permitted Maximum Flow	59.5

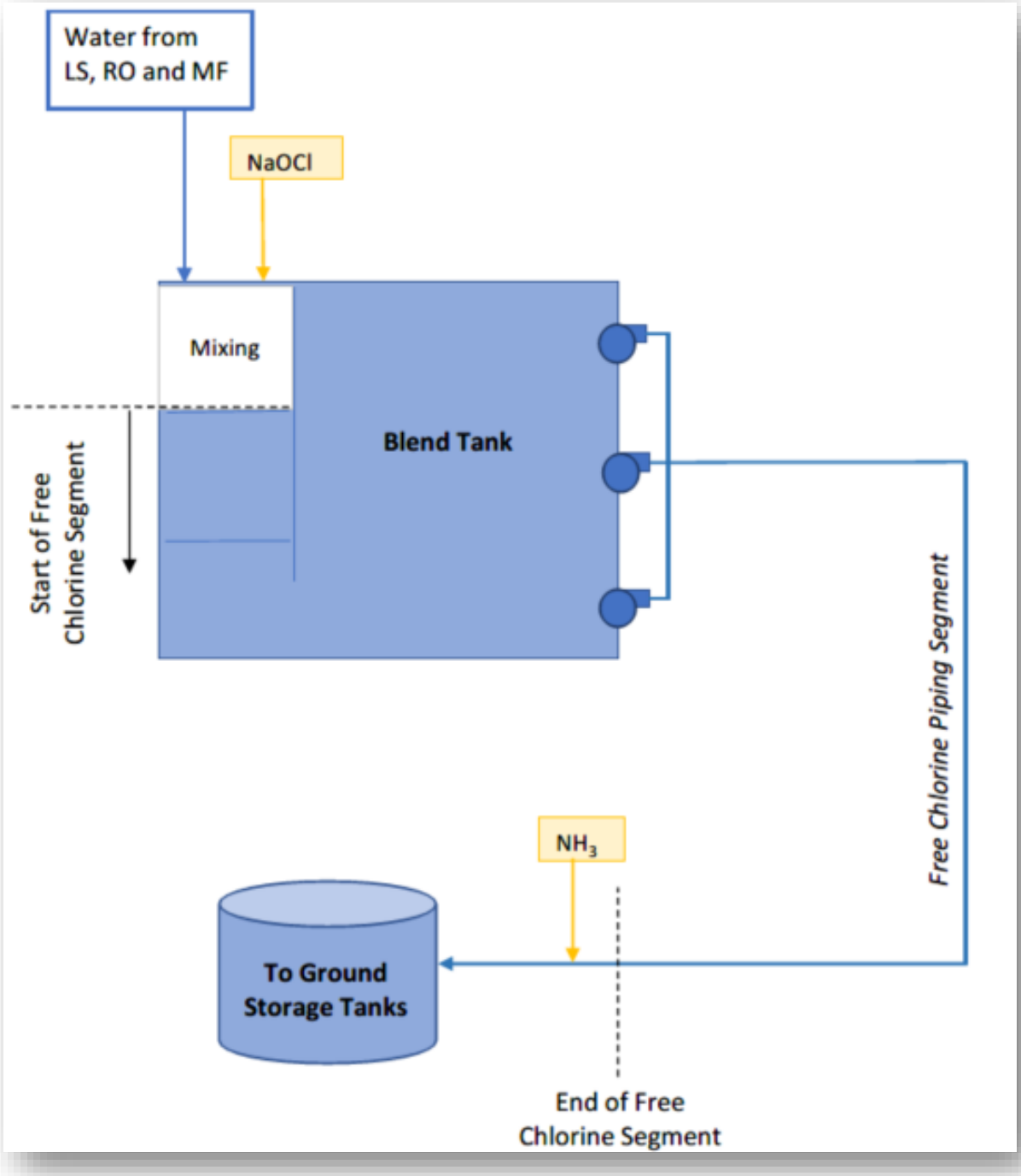


Figure 21. Proposed Free Chlorine Segment to Accomplish Four-Log Disinfection

3.2 Sodium Hypochlorite System

3.2.1 Sodium Hypochlorite Dose Modifications

Arcadis performed bench-scale testing to determine the change in the sodium hypochlorite dose required to overcome the background ammonia in the raw water and achieve free chlorine. Field bench testing was conducted on July 2, 2020 for the chlorine breakpoint indicated that minimization of monochloramine occurs at 4.5 mg/L of added free chlorine. According to the data and breakpoint analysis, a dose of 7.5 mg/L of free chlorine will produce approximately 3.5 mg/L of free chlorine post breakpoint for the production of monochloramine at the new downstream ammonia injection point.

The WTP also provided sodium hypochlorite usage data during breakpoint chlorination events when ammonia is not used. Table 6 indicates the sodium hypochlorite injection points that are in use at the plant continuously or during breakpoint chlorination and the proposed dosage for normal operation. Sodium hypochlorite is also used for odor control at the scrubbers. This dose is normally less than 1 mg/L and the injection point is used intermittently and would have negligible impacts to the storage requirements.

Table 6. Sodium Hypochlorite Injection Points

Injection Point	Existing Average Dose (mg/L)	Existing Breakpoint Average Dose (mg/L)	Proposed Average Dose (mg/L)
Biscayne Raw Water to LS	1.6	1.6	1.6
LS Filters 7-12 Discharge Pipe	3.1	3.1	3.1
LS Filters 13-18 Discharge Pipe			
LS Post-Filters 1-6	-	2.4	-
Post Spirators 7-12 Filter Influent			3.1
Blend Tank	4.3	5.5	8.0
HSPS Discharge West Header (North Pipe – West Side of HSPS)	-	0.7	-
HSPS Discharge South Header (North Pipe – East Side of HSPS)		0.7	
RO Odor Scrubbers (North Scrubber)	**N/A**	**N/A**	**N/A**
Total	**8.8**	**13.3**	**12.2**

3.2.2 Sodium Hypochlorite Storage System Modifications

Three separate locations house a total of nine (9) sodium hypochlorite storage tanks at the WTP. Their sizes, locations, and conditions are discussed in detail in Section 2.

Table 7 summarizes the bulk storage requirements for 12% sodium hypochlorite required to achieve the free chlorine segment and form chloramines for disinfection in the distribution system. The capacities of the existing storage tanks at each location are also shown along with the days of storage provided under average flow and dose.

Table 7. Projected Sodium Hypochlorite Bulk Storage Requirements

Parameter	Value
Average Plant Flow Rate (MGD)	24.5
Average Sodium Hypochlorite Dose (mg/L)	12.2
Sodium Hypochlorite Average Usage (gallons/day)	2,270
Sodium Hypochlorite Average Usage for 15 days (gallons)	34,050
Chlorine Storage Building Total Tank Capacity (gallons)	30,000
Chlorine Storage Building Total Tank Storage (days)	13
Membrane Building Chemical Storage Area Total Tank Capacity (gallons)	40,000
Membrane Building Chemical Storage Area Total Tank Storage (days)	17

Note: Hex Area tanks are proposed to be removed.

Based on a site visit and staff interviews, it was determined that reconditioning/relining has been performed on HST-1 and HST-2 but none of the other tanks. All of the tanks are 17 years old, while the useful life of FRP tanks is generally 15 to 20 years. To better determine the remaining useful life of the tanks, and prior to increasing the solution strength from 0.8% to 12% sodium hypochlorite, an interior inspection was performed. Relining of an existing tank can typically add years of useful life to the tank for a cost savings as opposed to purchasing a new tank. Based on the results of the tank inspections, it was decided to replace the tanks.

The Membrane Building Chemical Storage Area has four 10,000-gallon horizontal FRP storage tanks that will provide more than 17 days of storage for 12% sodium hypochlorite. The containment area is sized for 110% containment of the largest tank. New sodium hypochlorite tanks will be the same size as the existing tanks and include new support saddles. This location will be rehabilitated (concrete and coatings) and will continue to serve the Blend Tank and Odor Control. Two (2) new transfer pumps will be installed to allow for transfer between tanks and to the Chlorine Storage Building.

The LS CL2/HEX Storage Chemical Storage/Feed Area has no containment and has trenches and floor drains in the area. There are two 7,000 gallon, vertical FRP tanks for a total storage volume of 14,000 gallons. The two storage tanks will be repurposed temporarily, for the duration of the Chlorine Storage Building rehabilitation, to receive 12% sodium hypochlorite solution in one tank and dilute to 0.8% in the

other tank. This allows for all three of the storage tanks (HST-1, HST-2 and HST-3) in the Chlorine Storage Building to be replaced simultaneously. HST-4 and HST-5 and all pumps and piping related to the sodium hypochlorite system in the LS CL2/HEX area will be removed once the work at the Chlorine Storage Building is complete.

The Chlorine Storage Building has three 10,000-gallon horizontal FRP storage tanks that will provide approximately 13 days of storage for 12% sodium hypochlorite and will serve as a back-up to bulk storage at the Membrane Building Chemical Storage Area. New sodium hypochlorite tanks were recommended to replace all three existing storage tanks based on the tank inspection report; they will be the same size as the existing tanks (8 feet in diameter by 24 feet long) to account for the limited height of the Chlorine Storage Building. The existing 8-inch secondary containment curb provides 110% containment of the largest tank. Structural repairs to the floor and new concrete tank saddles were also recommended and this work will be performed during the storage tank replacement. Two (2) new transfer pumps will also be installed inside the Chlorine Storage Building.

Each tank will be supplied with ultrasonic level transmitters due to the corrosive nature of the 12% sodium hypochlorite solution. No day tanks are proposed for the sodium hypochlorite system. Residual analyzers with alarms and monitoring of tank levels through the SCADA system will provide protection from overdosing of sodium hypochlorite.

3.2.3 Sodium Hypochlorite Chemical Feed System Modifications

The pumps in the LS CL2/HEX Chemical Storage/Feed Area were installed in 2003 and are at the end of their useful lives. The pumps at the Membrane Building Chemical Storage Area and Chlorine Shed are also approaching the end of their useful lives. In addition, all of the existing metering pumps are sized for the larger flows required for 0.8% solution and cannot be reused for 12% sodium hypochlorite. The following are the recommended modifications for chemical feed equipment:

As discussed in earlier sections, all sodium hypochlorite pumps and piping will be removed at the LS CL2/Hex Chemical Storage/Feed Area.

New feed pumps will be installed at the Chlorine Storage Building to serve the critical injection points on the Raw Water and LS Pre-Filter that were previously provided by the LS CL2/Hex area feed pumps. This will require specific limitations of construction sequencing and work at the CL2/HEX area that must be completed outside of May-June periods when the plant is operating in the free chlorine mode. The existing chemical feed pumps, and equipment will be replaced with three triplex skids and one duplex skid, for a total of eleven (11) new pumps.

The installation of five (4) new metering pumps is recommended at the Membrane Building Chemical Storage Area to serve the Blend Tank and Odor Control Scrubber.

All current pump concrete pads should be demolished, and smaller positive displacement metering pumps installed approximately 1 foot above the floor. At this height, the centerline of the pumps will be below the centerline of the lowest tank feed elevation. This will keep suction lines to the tanks short, minimize the effect of off-gassing, facilitate greater suction head and flooding characteristics, and provide more piping/valving options. In the Chlorine Storage Building, the existing on-site generators, rectifiers, and blowers will be demolished along with their concrete pads to make room for the proposed metering pumps.

Adequate mixing is available at the blend tank, odor scrubbers, and degasser, which will allow the 12% sodium hypochlorite solution to be fed neat, without carrier water. The metering pumps for odor control will be manually operated by plant staff.

Based on maximum and minimum flows reported at each injection point and estimated maximum and minimum dosages reported by Operations (no records are maintained for individual site dosing), minimum and maximum flows required at each injection point are indicated in Table 8.

Table 8. Projected Sodium Hypochlorite Metering Pumps

Parameter	Value
Biscayne Raw Water to LS *	
Minimum Plant Flow Rate (MGD)	8.2
Minimum Dose (mg/L)	0.5
Minimum Usage (gallons per hour)	1.3
Maximum Plant Flow Rate (MGD)	23.8
Maximum Dose (mg/L)	2.0
Maximum Usage (gallons per hour)	15.1
LS Filters 7-12 Discharge Pipe *	
Minimum Plant Flow Rate (MGD)	8.2
Minimum Dose (mg/L)	1.0
Minimum Usage (gallons per hour)	2.6
Maximum Plant Flow Rate (MGD)	23.8
Maximum Dose (mg/L)	4.0
Maximum Usage (gallons per hour)	30.1
LS Post Filters 1 through 6 *	
Minimum Plant Flow Rate (MGD)	8.2
Minimum Dose (mg/L)	1.0
Minimum Usage (gallons per hour)	2.6
Maximum Plant Flow Rate (MGD)	23.8
Maximum Dose (mg/L)	3.0
Maximum Usage (gallons per hour)	22.6
RO Odor Scrubbers	
Minimum Plant Flow Rate (MGD)	8.2
Minimum Dose (mg/L)	0.5
Minimum Usage (gallons per hour)	1.3
Maximum Plant Flow Rate (MGD)	23.8
Maximum Dose (mg/L)	3.0
Maximum Usage (gallons per hour)	22.6
Blend Tank **	

Parameter	Value
Minimum Plant Flow Rate (MGD)	20.6
Minimum Dose (mg/L)	4.0
Minimum Usage (gallons per hour)	26.1
Maximum Plant Flow Rate (MGD)	59.5
Maximum Dose (mg/L)	10
Maximum Usage (gallons per hour)	188.3
HSPS West and South Headers*	
Minimum Plant Flow Rate (MGD)	20.6
Minimum Dose (mg/L)	0.5
Minimum Usage (gallons per hour)	3.3
Maximum Plant Flow Rate (MGD)	59.5
Maximum Dose (mg/L)	1.0
Maximum Usage (gallons per hour)	18.8

* Doses and resulting metering pump flow are estimates based on 12% sodium hypochlorite solution.

** Based on chlorine treatment requirements plus 4.5 mg/L for breakpoint.

The main sodium hypochlorite injection point will remain at the blend tank. The mixing area of the blend tank will provide adequate mixing of the 12% hypochlorite solution being injected at the beginning of the blend tank. A chlorine analyzer located in the Chlorine Shed adjacent to the blend tank will monitor the chlorine residual in the free chlorine segment. The blend tank sodium hypochlorite injection feed rate will be paced by the treated water flow meter on the 42-inch line downstream of the blend tank and trimmed by the reading from the existing chlorine analyzer (a compound loop). A manual control mode will also be included.

Two additional sodium hypochlorite injection points will be added as for emergency ground storage mode on the Filters 7-12 discharge pipe and Filters 13-18 discharge pipe.

3.2.4 Electrical

The locations of the existing and proposed chemical pumps are close to existing electrical rooms or distribution panels. The new pumps will be smaller because of the higher chlorine concentration. Additional pumps can be added as necessary for future redundancy or capacity. Variable speed control integral to the pumps will be provided. Separate disconnect switches will be mounted near each pump for maintenance and safety. All electrical devices will be National Electrical Manufacturers Association (NEMA) 4X 316 stainless steel whether indoors or outdoors.

The extent of the electrical demolition in the Chlorine Storage Building will be discussed with City staff. Currently there is an 800 amp service powered from the transformer installed during the Deep Injection Well Pump Station Project in 2011. Power distribution design will be coordinated with the Aeration Building PS modification project which is underway since the AB PS will require a second feeder source as well.

3.2.5 Instrumentation and Controls

The sodium hypochlorite bulk storage tank levels will be monitored continuously with alarm setpoints for high and low levels via an ultrasonic level transmitter. The transmitter will be IP62 for corrosive rated, capable of outputting a continuous analog signal of level, and have relay setpoints for alarming. It can also have a remote display of level if warranted, that can be mounted at or near each tank. In addition, a manual site tube similar to existing will be retained.

Hach CL-17sc chlorine analyzers will be used to monitor the free chlorine upstream and downstream of the blend tank injection point. The analyzers will be IP62 rated for outdoor mounting and will be mounted in an aluminum three-sided sunshield enclosure if exposed to the sun. The analyzers will be capable of providing a continuous analog signal and have relay setpoints that can also be used for alarming purposes.

Sodium hypochlorite pump control will use the existing plant flow meter on the 42-inch line leaving the Blend Tanks as its process variable. This analog signal will control pump speed through photoionization detector logic in the existing chemical feed programmable logic controller (PLC) located in the reverse osmosis building.

This logic will vary the chemical injection volume by varying speed, based on ratio of water flow. This ratio of chemical volume per gallons of water will use the chlorine analyzer output to maintain a free chlorine residual setpoint and adjust the speed of the pumps. Further adjustment can be from the pump stoke based on the range of chemical flow needed. It is a manual adjustment that causes the pump to speed up or slow down based on length of pump stroke to maintain chemical/water ratio, thus providing a smoother dosing by avoiding slugs of chemical. This can aid in mixing of the chemical and water. Optimization of this process will be performed during startup.

As part of monitoring the status of pumps and storage tanks, the following signals will be incorporated into the plant SCADA system:

Tank Status and Alarms:

- Continuous Level Indication
- Bulk Storage Tanks (7 total)
    - High/High, High, Low, Low/Low Shutoff Levels
- High Containment Area Sump Liquid Level

Pump Status and Alarms:

- Pump – Not in Auto
- Pump Speed (in % or gpm)
- Pump Fail (General)
- Pump Leak

Chlorine Analyzer Status and Alarms:

- Free Chlorine Level

- Total Chlorine Level
- pH Level and Temperature
- Low/High Chlorine Residual Levels
- Low Reagent Level

3.3 Ammonia System

Based on the addition of the free chlorine segment and moving the ammonia injection point to the end of that segment, the existing and proposed average ammonia doses are shown in Table 9. The blend tank free chlorine usage versus 2019 ammonia usage produces a chlorine to nitrogen mass ratio of approximately 5 to 1. This ratio was used with proposed blend tank free chlorine usage to determine the proposed ammonia usage as shown in the table.

Table 9. Anhydrous Ammonia Injection Points

Injection Point	Existing Average Dose (mg/L)	Proposed Average Dose (mg/L)
Existing LS (Pre-Blend Tank)	0.8	-
Post-Free Chlorine Segment	-	0.7

3.3.1 Ammonia Storage Tanks

The ammonia system consists of two 1,000-gallon tanks working in tandem utilizing anhydrous ammonia. Their current location is shaded for the whole day and is well ventilated. Use of ammonia based on 2019 records indicates that more than 60 days of storage are available on site on average. Based on the proposed average ammonia dose and average plant flow, there is no change proposed in the storage provided by the two 1,000-gallon tanks.

Tanner Industries leases the tanks to the City and is responsible for their condition. The City is satisfied with the service provided by Tanner Industries and has no plans to change the tanks in the foreseeable future.

The existing ammonia tanks are approximately 300 feet from the location of the new injection site. The proposed location that would be accessible for delivery is adjacent to the blend tank and approximately 120 feet from the proposed new injection point. Relocating the ammonia system to this position will place the tanks in sunlight during most of the day.

3.3.2 Ammonia Feed Equipment

A new pressure feed system with a mass flow meter/controller is proposed to replace the manual feed system. The feed system includes a two-phased pressure reduction from the ammonia tanks to the injection point to prevent reliquification. Stainless steel tubing and stainless steel vented ball valves will be used in the feed system. There will be a duty and two standby controller to allow for maintenance and

ensure there is reliable flow control under all scenarios. The equipment should be in an enclosure and protected from the sun.

Welded Schedule 40 or threaded Schedule 80 carbon steel pipe is the material of construction suggested for ammonia piping. An inline static wafer mixer will be installed on the 42-inch line just upstream of the relocated ammonia injection point to ensure mixing prior to the ground storage tanks.

3.3.3 Chemical Injection

The new ammonia injection point will be moved to downstream point located after the four-log virus CT has been met. See Figure 18 below. Here it will combine with free chlorine and be converted to monochloramine for distribution system disinfection.

Prior to the installation of the new ammonia injection feed equipment, a by-pass for the blended water line from the Blend Tank to the ground storage tank is required. Three alternatives were discussed with the City including allowing limited shutdown during construction, temporary or permanent by-pass, and LS by-pass operations (ground storage mode). The City elected to proceed with the permanent by-pass, modifying the existing 36-inch raw water as a permanent solution for the by-pass/redundant line from the Blend Tank to GST-6. A 42-inch butterfly valve will also be installed on the existing 42-inch finished water line via a line stop. The 36-inch by-pass and new 42-inch butterfly valve allows for the temporary shutdown of the existing 42-inch finished water line for the installation of the static wafer mixer at the new ammonia injection and for future isolation for maintenance.

Downstream of the blend tank and the 42-inch piping where the ammonia injection will be moved, a static wafer mixer will be installed to provide mixing prior to the ground storage tanks. Injectors should extend to one-third of the pipe diameter to maximize turbulence to provide mixing. A new total chlorine residual analyzer will be installed downstream of the injection point where chloramines are formed. The existing monochloramine/ammonia analyzer will also be relocated from the end of the blend tank to this point on the 42-inch piping.

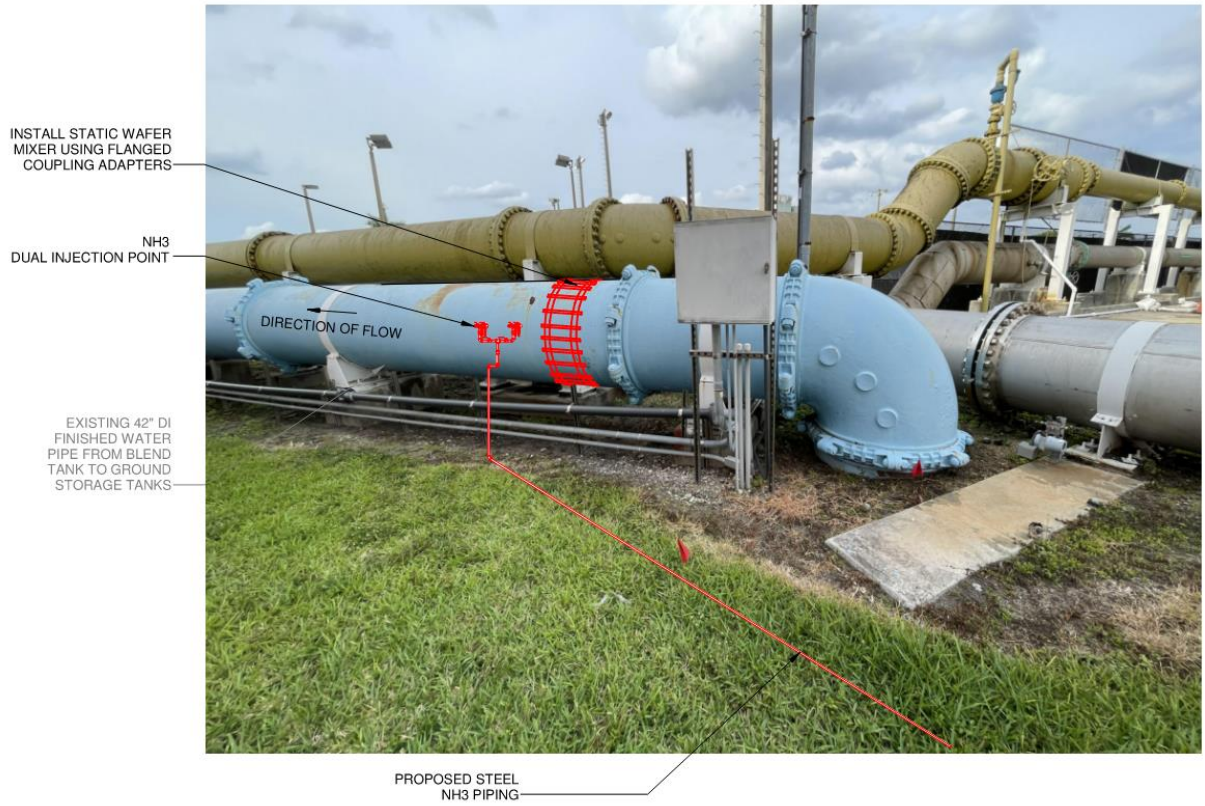


Figure 22: Proposed Ammonia Injection Point

3.3.4 Instrumentation and Controls

The existing manual ammonia dosing system and pipework will be removed and replaced with an automated ammonia dosing system. Each ammoniator unit will have a new mass flow controller/flow meter to feed ammonia proportionally to flow and residual trimming. The mass flow controller/flow meter will provide local indication of gas flow and dose rate. Isolation valves and a visual rotameter will provide the ability for manual control.

The plant PLC will calculate the required ammonia feed rate based on a flow rate from the existing flow meter on the 42-inch line leaving the blend tank and the chlorine residual from the analyzer located downstream of the blend tank. The gas flow control valve will receive the feed rate signal and respond to achieve that setpoint. The monochloramine analyzer located on the pipeline prior to the ground storage tanks will be monitored for a free ammonia residual to verify the monochloramine zone has been reached.

The following new monochloramine analyzer status and alarms will be provided:

- Total Ammonia Level
- Monochloramine Level
- Free Ammonia Level
- Low/High Monochloramine Residual Levels

- Low Reagent Level

Refer to Drawings for P&IDs.

3.4 Electrical Design Requirements

The existing and proposed pumping equipment is a combination of 120-volt (V) single-phase (1ph) or 208V three-phase (3ph) motors. The area of the pumps and instrumentation is corrosive; therefore, all conduit and fittings will be PVC, and all support hardware 316 stainless steel. Any new electrical design will conform to the 2017 National Electrical Code (NEC).

3.4.1 SCADA and Controls

The existing SCADA system will be used with modifications to the human machine interface (HMI) screens for any added functionality, including status and alarm monitoring. New or replacement instrumentation will also be reflected. Any additional modifications to the HMI screens can be discussed for content and effect on the project. Existing PLCs will be used to connect instrumentation or analyzers.

3.4.2 Fire Protection

The 12% sodium hypochlorite storage areas will be classified as an H-4 occupancy. The Florida Building Code requires an automatic fire detection system and an automatic sprinkler system to be installed throughout an H-4 occupancy area. The fire alarm and detection system will be designed and installed in accordance with the NEC, National Fire Protection Association (NFPA) 72, National Fire Alarm and Signaling Code, Florida Building Code, and federal/state/local codes and standards. The current facilities for storage chemical at the WTP do not have sprinklers. During design, a discussion with AHJ will be scheduled to seek waivers and/or clarification on whether sprinklers will be required under this rehabilitation project.

3.5 Structural Design Requirements

3.5.1 Design and Building Code Provisions

The following Design and Building Code will govern the design of this project:

1. The 2017 Florida Building Code
2. ACI Concrete Repair Manual, American Concrete Institute, Farmington Hills, MI.
3. ACI 318. Building Code Requirements for Structural Concrete, 2014, American Concrete Institute, Farmington Hills, MI.
4. ACI 350. Code Requirements for Environmental Engineering Concrete Structures, 2006, American Concrete Institute, Farmington Hills, MI.
5. AISC/ASD. Manual of Steel Construction Allowable Stress Design, Fourteenth Edition, 2011, American Institute of Steel Construction, Inc., Chicago, IL.
6. ASCE 7-10, Minimum Design Loads For Buildings and Other Structures, 2010, American Society of Civil Engineers, Reston, VA.

3.5.2 Chemical Containment Modifications

Where new equipment pads are to be provided, they will be connected to existing concrete with drilled epoxy bonded reinforcing dowels and new concrete bonded to the existing by use of an epoxy bonding agent. If new equipment imposes a higher load than the existing equipment, the capacity of the existing structure will be evaluated.

Where new openings are needed in existing concrete, the impact on the structural capacity of the member affected will be evaluated. The opening will be detailed to minimize the impact on the structure and to seal any exposed reinforcement against corrosion.

3.5.3 Structural and Surface Concrete Repairs

Concrete design for support structures for water and wastewater treatment, storage, collection, and distribution should meet the requirements of ACI 350. Concrete in structures not retaining water shall meet the requirements of ACI 318.

ARCADIS Design & Consultancy for natural and built assets

Arcadis U.S., Inc.

8201 Peters Road

Suite 3200

Plantation, Florida 33324

Tel 954 761 3460

Fax 954 761 7939

www.arcadis.com

Appendix C

Engineer's Opinion of Probable Construction Cost

Water Treatment Plant 4-Log Virus Treatment Implementation
Engineer's Opinion of Probable Cost

Item No.	Item Description	Qty	Unit	Material Unit Cost	Total Installed Cost
	Division 00 - Procurement and Contracting Requirements				
1A	General Conditions & Mobilization	1	LS	$ 230,000	$ 230,000
1B	Bonds and Insurance	1	LS	$ 150,000	$ 150,000
1C	Demobilization	1	LS	$ 20,000	$ 20,000
2	Permitting Allowance	1	Allowance	$ 180,000	$ 180,000
3	Owner Contingency	1	Allowance	$ 400,000	$ 400,000
					$ 980,000
	Division 02 - Existing Conditions				
4	Chlorine System Building - Demolish NaOCl tanks, piping, equipment, pads	1	LS	$ 100,000	$ 100,000
5	LS CL2/Hex Area - Demolish NaOCl tanks, piping, equipment, pads	1	LS	$ 50,000	$ 50,000
6	Membrane Bldg - Demolish NaOCl tanks, piping, equipment, pads	1	LS	$ 100,000	$ 100,000
7	Demolish Ammonia feed equipment and pad	1	LS	$ 20,000	$ 20,000
8	Excavation	64	CY	$ 50	$ 3,200
9	Dewatering	1	LS	$ 10,000	$ 10,000
					$ 283,200
	Division 03 - Concrete				
10	Concrete Repair	1	LS	$ 98,000	$ 98,000
11	Miscellanous Concrete	10	CY	$ 2,000	$ 20,000
12	Pedestals Chlorine Storage Tanks	13	CY	$ 2,000	$ 26,000
13	Pedestals Ammonia Tanks	2	CY	$ 2,000	$ 4,000
14	Ammonia Feed System Pad	8	CY	$ 2,000	$ 16,000
15	Ammonia Tanks Pad	17	CY	$ 2,000	$ 34,000
16	Ammonia Pad Containment Wall	4	CY	$ 2,000	$ 8,000
17	Pedestals Membrane Tanks	33	CY	$ 2,000	$ 66,000
18	Concrete Injection Vault	29	CY	$ 2,000	$ 58,000
					$ 330,000
	Division 05 - Metals				
19	Access hatch 3'x3', H20	1	EA	$ 3,000	$ 3,000
20	Aluminum Ladder	1	EA	$ 3,000	$ 3,000
21	SS316 4"X1/4" Strap	171	LF	$ 20	$ 3,420
					$ 9,420
	Division 07 - Thermal and Moisture Protection				
22	Vapor Retarder	169	SF	$ 1	$ 169
					$ 169
	Division 09 - Finishes				
23	Protective Coating	9388	SF	$ 30	$ 281,640
24	Waterproof coating	616	SF	$ 6	$ 3,696
					$ 285,336
	Division 26 - Electrical				
25	General Provisions for Electrical	1	LS	$ 95,800	$ 95,800
26	Low-Voltage Electrical Power Conductors and Cables	1	LS	$ 161,300	$ 161,300
27	Instrumentation and Communication Cables	1	LS	$ 18,700	$ 18,700
28	Grounding and Bonding for Electrical Systems	1	LS	$ 2,320	$ 2,320
29	Hangers and Supports for Electrical Systems	1	LS	$ 53,360	$ 53,360
30	Rigid Conduits	1	LS	$ 233,960	$ 233,960
31	Flexible Conduits	1	LS	$ 34,880	$ 34,880
32	Pull, Junction, and Terminal Boxes	1	LS	$ 19,200	$ 19,200
33	Outlet Boxes	1	LS	$ 25,480	$ 25,480
34	Integrated Power Center	1	LS	$ 16,480	$ 16,480
35	Low-Voltage Transformers	1	LS	$ 40,780	$ 40,780
36	Panelboards	1	LS	$ 74,500	$ 74,500
37	Low-Voltage Receptacles	1	LS	$ 4,300	$ 4,300
38	Snap Switches	1	LS	$ 1,800	$ 1,800
39	Disconnect Switches	1	LS	$ 78,880	$ 78,880
40	Portable Generator Connection	1	LS	$ 51,400	$ 51,400
41	Surge Protection Devices	1	LS	$ 36,800	$ 36,800
					$ 949,940
	Division 31 - Earthwork				
42	Temporary Shoring	1	LS	$ 150,000	$ 150,000
43	Dewatering	1	LS	$ 200,000	$ 200,000
44	Excavation Considering 2ft extension	145	CY	$ 50	$ 7,250
45	Compacted Backfill	150	CY	$ 20	$ 3,000
46	12" Crushed stone	14	CY	$ 40	$ 560
					$ 360,810

Water Treatment Plant 4-Log Virus Treatment Implementation
Engineer's Opinion of Probable Cost

	Division 40 - Process Interconnections				
47	Chemical PVC Piping, Valves	1	LS	$ 3,047,933	$ 3,047,933
48	Chemical SS Piping, Valves	1	LS	$ 40,000	$ 40,000
49	42" Wafer Static Mixer	1	LS	$ 100,000	$ 100,000
50	Emergency Eyewash Station	5	EA	$ 4,000	$ 20,000
51	Chemical Flow Meter	12	EA	$ 2,000	$ 24,000
52	Hach Free Chlorine Analyzer	2	EA	$ 15,000	$ 30,000
53	Hach Ammonia Monochloramine Analyzer	1	EA	$ 59,000	$ 59,000
54	Eyewash Station Flow Switch	8	EA	$ 2,800	$ 22,400
55	Containment Area Leak Detection System	4	EA	$ 300	$ 1,200
56	High Pressure Switches	2	EA	$ 2,300	$ 4,600
57	Tank Level Sensors	7	EA	$ 7,543	$ 52,801
58	Pressure Gauges	24	EA	$ 1,100	$ 26,400
59	PLC-11	1	LS	$ 69,000	$ 69,000
60	PLC-12	1	LS	$ 61,400	$ 61,400
61	Membrane PLC Mods	1	LS	$ 31,000	$ 31,000
62	Programming	1	LS	$ 58,100	$ 58,100
63	36" DIP Pipe	46	LF	$ 400	$ 18,400
64	36" Fitting and Valves	1	LS	$ 200,000	$ 200,000
65	42" Butterfly Valve	1	LS	$ 20,000	$ 20,000
66	42" Double Line Stop w/24" Bypass	1	LS	$ 150,000	$ 150,000
					$ 4,036,234
	Division 43 - Process Gas and Liquid Handling, Purification and Storage Equipment				
67	Sump Pumps	2	EA	$ 10,000	$ 20,000
68	Transfer pumps	4	EA	$ 11,000	$ 44,000
69	10,000 gal 8'x24' Horizontal Bulk Hypo Storage Tank, FRP	3	EA	$ 150,000	$ 450,000
70	Tank Freight for 10,000 gal 8'x24' Hypo Storage Tank, FRP	1	LS	$ 30,000	$ 30,000
71	10,000 gal 12'x9.5' Horizontal Bulk Hypo Storage Tank, FRP	4	EA	$ 175,000	$ 700,000
72	Tank Freight for 10,000 gal 12'x9.5' Hypo Storage Tank, FRP	1	LS	$ 30,000	$ 30,000
73	Modification to Crom Tank (includes supports)	1	LS	$ 166,000	$ 166,000
					$ 1,440,000
	Division 46 - Water and Wastewater Equipment				
74	Skid Mounted Diaphragm metering pumps and appurtenances	1	LS	$ 200,000	$ 200,000
75	Ammonia Feed System w/FRP Building	1	LS	$ 300,000	$ 300,000
76	Relocate Ammonia Tanks	1	LS	$ 10,000	$ 10,000
					$ 510,000
	Cost Summary				
	Subtotal, Divisions 00				**$ 980,000**
	Subtotal, Divisions 02 - 50				**$ 8,205,109**
	Construction Cost Total (nearest $1,000)				**$ 9,185,109**
					$ 8,266,598
					$ 10,562,875

Appendix D

Determination of Four-Log Virus Treatment of Groundwater (Conceptual)

Florida Department of Health

City of Hollywood WTP
PWS ID No.4060642
November 29, 2017

Department of Public Utilities
Hollywood-ECSD
Attn: Ms. Wilhelmina Montero, M.S., P.E.
P.O. Box 229045
Hollywood, FL 33020-9045

DETERMINATION OF FOUR-LOG VIRUS TREATMENT OF GROUND WATER
(CONCEPTUAL)

Dear Ms. Montero,

The Florida Department of Health in Broward County determines, based on the information identified in (1.), that the referenced water treatment plant (WTP) will achieve four-log virus treatment of source water by using the treatment technologies identified in (2.) below, provided the WTP modifications identified in (3.) are completed, and that compliance monitoring, operating, recordkeeping, and other requirements in (4.) below are met.

1. Virus treatment information submitted by the referenced WTP:
a. Conceptual Demonstration of Four-Log Virus Treatment of Ground Water signed and sealed by Wilhelmina V. Montero, P.E., on November 21st, 2016 and additional information received by this office on October 19th, 2017.
2. Treatment technologies being used by the referenced WTP to achieve four-log virus treatment:

Treatment Technology	Virus Removal/Inactivation Credit
Chemical disinfection using free chlorine	4-log virus inactivation

3. Proposed modifications at the water treatment plant include: *relocation of ammonia injection points downstream of the end of the disinfection segment, installation of an online free chlorine analyzer and sampling port at the end of the proposed disinfection segment, installation of an online free ammonia, monochloramine, and total chlorine analyzer after ammonia feeding and before the entrance to the storage tanks, addition of low free chlorine residual alarms to SCADA dependent on peak flow readings from the blend tank, and evaluation of chlorine feed and storage system capacity along with the implementation of any needed improvements to satisfy four-log virus treatment and requirements of 62-555.320.* The current proposed modifications will not require a permit from this Department.

4. Compliance monitoring, operating, and record keeping requirements after the proposed WTP modifications stated in (3) above are permitted, constructed, and cleared:

	Monitoring Requirements	**Operating Requirements[a]**	**Recordkeeping Requirements[b]**
I	Monitor free chlorine residual concentrations at the beginning of the disinfection segment by collecting grab samples at least every 4 hours. Free chlorine residuals must be analyzed using an EPA approved method.	Free chlorine residual concentration at the specified location must be maintained at a concentration ≥ 2.05 mg/L for flows up to 49 MGD and ≥ 2.70 mg/L for flows up to 59.5 MGD (See note c below).	Record the daily lowest free chlorine residual concentration at the specified monitoring location.
II	Monitor free chlorine residual concentrations continuously at the end of the disinfection segment and before the ammonia injection point using an EPA approved method.	Free chlorine residual concentration at the specified location must be maintained at a concentration ≥ 2.05 mg/L for flows up to 49 MGD and ≥ 2.70 mg/L for flows up to 59.5 MGD (See note c below).	Record the daily lowest free chlorine residual concentration at the specified monitoring location.
III	Monitor free chlorine residual concentrations by collecting grab samples at the end of the disinfection segment at least every 4 hours. Free chlorine residuals must be analyzed using an EPA approved method. If on-line free chlorine analyzer reading and grab sample analysis result differ by more than 15%, grab sample collection frequency must be increased to at least every hour.	Free chlorine residual concentration at the specified location must be maintained at a concentration ≥ 2.05 mg/L for flows up to 49 MGD and ≥ 2.70 mg/L for flows up to 59.5 MGD (See note c below). NOTE: An SOP to be provided prior to provisional approval.	Record the daily lowest free chlorine residual concentration at the specified monitoring location.
IV	Monitor pH and temperature at the blend tank.	pH ≥ 7.0 and ≤ 9.0 s.u. Temperature ≥ 24°C	Record the daily minimum/maximum pH and the minimum temperature at the specified monitoring location(s).
V	Monitor raw water ammonia concentration by collecting a grab sample at each well and at the RO and MS treatment train permeate at least quarterly for a year.	N/A	Record ammonia concentration for each raw water well and permeate stream. Format data in tabular form and submit upon completing one year of monitoring.

[a] Failure to meet the operating requirements for a period of time longer than four (4) hours constitutes failure to maintain four-log virus treatment and it is considered a treatment technique violation under 40 CFR §141.404(c) as adopted and incorporated by Rule 62-550.828 (FAC). Such violations must be reported to the Florida Department of Health in Broward County, Environmental Engineering Office, as soon as possible but not later than the end of the next business day after the occurrence of the violation. Please be advised that treatment technique violations must be reported to the public within 30 days and such public notices must comply with the requirements of Rule 62-560.410, (FAC).

[b] The information in this column shall be recorded and submitted on or with the monthly operation report (MOR) for the referenced WTP. Also, record on the MOR the duration of any failure to meet operating requirements.

[c] The minimum free chlorine residual concentration of 2.05 and 2.70 mg/L were computed using the range of peak flows for the blend tank between 45 and 59.5 MGD.

The Department will consider granting a provisional approval once the stated WTP modifications are put in effect by the City of Hollywood. A final determination will be considered after all data has been submitted to this Office and evaluated to ascertain if the proposed operational values are still acceptable or need to be adjusted.

Rafael Reyes
Environmental Engineering Director
FDOH-Broward

CC.
Steve Joseph, P.E., Director, Public Utilities, City of Hollywood
Clece Aurelus, P.E., Engineering Manager-ECSD, City of Hollywood

Appendix E

Public Meeting Notice and Minutes

Appendix F

Executed Business Plan

Appendix G

City of Hollywood User Charge System

City of Hollywood, FL
Utility Rates and Charges for Water, Irrigation and Sewer Service Inside the City
Effective date: 11/01/2024

Water Rates and Charges

Monthly Base Charges

Residential - Charged Per Unit

Single Family	$9.14
Multi Family	$6.94

Non Residential - Charged by Meter Size

Meter Size	
5/8 Inch	$9.14
1 Inch	$22.86
1 ½ Inch	$45.70
2 Inch	$73.14
3 Inch	$137.12
4 Inch	$228.54
6 Inch	$457.06
8 Inch	$731.31

Usage Rates & Charges - Water

Flow Rate Per 100 Cubic Feet (CCF)

Single Family Residential

Cubic Feet

From:	To:	Flow Rate per CCF:
0	500	$2.92
501	1500	$5.84
1501	Over	$11.69

Multi-Family Residential (per unit)

Cubic Feet

From:	To:	Flow Rate per CCF:
0	400	$2.92
401	1100	$5.84
1101	Over	$11.69

Non Residential - All Meter Sizes

From:	To:	Flow Rate per CCF:
All Flow (CCF)		$5.84

Irrigation Rates and Charges

Monthly Base Charges

Residential - Charged Per Unit

Single Family	$9.14
Multi Family	$6.94

Non Residential - Charged by Meter Size

Meter Size	
5/8 Inch	$9.14
1 Inch	$22.86
1 ½ Inch	$45.70
2 Inch	$73.14
3 Inch	$137.12
4 Inch	$228.54
6 Inch	$457.06
8 Inch	$731.31

Usage Rates & Charges - Irrigation

Flow Rate Per 100 Cubic Feet (CCF)

Single Family Residential

Cubic Feet

From:	To:	Flow Rate per CCF:
All Flow (CCF)		$11.69

Multi-Family Residential (per unit)

Cubic Feet

From:	To:	Flow Rate per CCF:
All Flow (CCF)		$11.69

Non Residential - All Meter Sizes

From:	To:	Flow Rate per CCF:
All Flow (CCF)		$11.69

Sewer Rates and Charges

Monthly Base Charges

Residential - Charged Per Unit

Single Family	$9.16
Multi Family	$6.95

Non Residential - Charged by Meter Size

Meter Size	
5/8 Inch	$9.16
1 Inch	$22.89
1 ½ Inch	$45.77
2 Inch	$73.22
3 Inch	$137.29
4 Inch	$228.83
6 Inch	$457.65
8 Inch	$732.25

Usage Rates & Charges - Sewer

Flow Rate Per 100 Cubic Feet (CCF)

Single Family Residential

Cubic Feet

From:	To:	Flow Rate per CCF:
0	1500	$8.48
1501	Over	No Charge

Multi-Family Residential (per unit)

Cubic Feet

From:	To:	Flow Rate per CCF:
0	1100	$8.48
1101	Over	No Charge

Non Residential - All Meter Sizes

From:	To:	Flow Rate per CCF:
All Flow (CCF)		$8.48

Storm water rate per ERU (Equivalent Residential Unit)

SF	$10.62	MF (Per Unit)	$5.63	NR	$10.62

* All rates shown are for inside-city customers. Outside-city customer rates are 1.25 times rates shown.

Rates (Pulled from https://hollywoodfl.org/238/Rates)

New Utility Rates

New Utility rates are in effect and will be reflected on November 2024 utility bills. The average single-family residential customer's monthly water usage is 600 cubic feet (approximately 4,500 gallons). This means the average water customer will now pay $29.58, an increase of $0.92 a month. The average water and wastewater customer will pay $89.62, an increase of $2.83 a month.

The City of Hollywood is committed to optimizing treatment efficiency to manage costs while maintaining the highest standards of drinking water production, wastewater treatment, and stormwater management. However, as costs for goods and services rise, we must increase our rates accordingly to ensure the sustainability of these systems. Taxes do not fund water services, those costs must be recovered through utility billing. Our rate adjustments are based on a cost-of-service analysis to ensure that each utility customer pays a proportionate share of the cost to provide services. These increases will allow us to replace aging infrastructure, meet state and federal regulatory requirements, and continue to ensure the safety and reliability of our utility services. We also continue to offer a volume-tier structure to incentivize water conservation.

Changes to Water and Wastewater Rates

Beginning October 1, 2019, the City o Hollywood implemented a simplified tiered rate structure or water and wastewater customers. Previously, the City had a 15-tier structure. The modified three-tier structure is designed to reward customers who conserve water and create an incentive or those who currently do not. This allows customers greater control over their monthly bill. The charges or water increase as usage increases. Simply put, the more water a customer consumes, the higher the rate they are charged. Most common rates or customers located inside the City are shown below, or a comprehensive list o rates please click here. Please note rates or utility customers located outside the city are 1.25 times the rates shown.

Water Rates

WATER RATES	OLD	NEW
Base Residential Per Unit		
Single Family	$8.85	$9.14
Multi-Family	$6.72	$6.94
Usage Single Family Residential (CCF)		
0 - 500	$2.83	$2.92
501 - 1,500	$5.66	$5.84
1,501+	$11.32	$11.69
Usage Multi Family Residential (CCF) ranges adjusted by unit		
0 - 400	$2.83	$2.92
401 - 1,100	$5.66	$5.84
1,101+	$11.32	$11.69

Wastewater Rates

WASTEWATER RATES	OLD	NEW
Base Residential (per unit)		
Single Family	$8.87	$9.16
Multi-Family	$6.73	$6.95
Usage Single Family Residential (CCF)		
0-1,500	$8.21	$8.48
1,501+	No Charge	No Charge
Usage Multi-Family Residential (CCF) ranges adjusted by unit		
0 - 1,100	$8.21	$8.48
1,101+	No Charge	No Charge

Changes to Stormwater Rates

The City's stormwater rates are designed to provide storm water transport and other flood mitigation services. Stormwater fees will not increase in 2024; they remain stable at $10.62 per month.

Stormwater Rates

STORMWATER RATES	OLD	NEW
Stormwater per ERU (Equivalent Residential Unit)	$10.62	$10.62

Additional changes to your utility bill:

- Florida Public Service Commission Annual Price Index adjustments to applicable water and sewer rates, charges, and fees
- Base charges applied to all customer accounts, regardless of account status or usage
- Market adjustments for new service connection charges
- Sanitation rates will not increase this year and remain stable at $47.00 per month. The monthly City sanitation fee pays for the collection, disposal, and processing of garbage, recycling, bulk waste, and yard waste. These fees also cover the costs of household hazardous waste disposal and the free recycled paint give-a-way program. For questions related to the garbage fee please contact 954.967.4526.

Sanitation Rates	OLD	NEW
Garbage	$47.00	$47.00

FAQs on New Water, Wastewater & Stormwater Rates

Why was a rate increase necessary?
To fund capital projects so the City can continue to provide safe drinking water and meet regulatory requirements for water and wastewater treatment. Additionally, the South Florida Water Management District requires the City to continue to employ a rate structure that promotes water conservation.

How much of an increase will an average single-family residential customer see on their bill?
The average single-family residential customer's monthly water usage is 600 cubic feet (approximately 4,500 gallons). This means the average water customer will pay $29.58 per month, an increase of $0.92. The average water and wastewater customer will pay $89.62 per month, an increase of $2.83.

If I use water in the higher tiers, will all my water be charged at that amount?
No. Bills will be calculated so that water consumed in each tier is charged at that tier rate. Only the amount of water consumed in a higher tier will be charged at that corresponding higher tier rate.

How much of an increase will there be to the stormwater rate?
The stormwater rate remains stable at $10.62 per month, the same as last year.

How can I save money on my monthly utility bill?
The less water you use, the more you save on your bill. The City offers a number of programs that are designed to help you conserve water, thereby lowering your utility bill. Learn more about conservation here.

Convert Usage from Cubic Feet to Gallons

The City reads and bills the usage on your meters in cubic feet. To convert this usage to gallons, please multiply your usage by 7.48. Example: If your usage is 100 cubic feet, you used 748 gallons.

Garbage & Recycling Services

For inquiries regarding garbage and recycling services, as well as disposal of hard junk, please call 954.967.4200.

Appendix H

Request for Inclusion on the Drinking Water Priority List

Florida Department of Environmental Protection

REQUEST FOR INCLUSION ON THE DRINKING WATER PRIORITY LIST

Drinking Water State Revolving Fund Program
Douglas Building, 3900 Commonwealth Blvd, Tallahassee, Florida 32399-3000

The information in this Request for Inclusion (RFI) application is used to determine project eligibility and priority scoring. The priority score is used to rank projects for placement on the State Revolving Fund (SRF) priority list. Only projects placed on the fundable portion of the priority list receive consideration for a loan. Please note that costs incurred before the adoption of the project on the fundable or waiting portion of the priority list are not eligible for reimbursement.

1. Applicant's Name and Address.

Project Sponsor: City of Hollywood Contact Person: Phyllis Shaw Title: Deputy Director-Finance

P.O.Box 229045 (1621 N. 14th Avenue)
(street address)

Hollywood (city) Broward (county) 33020 (zip code)

(954) 967-4455 (telephone) 3596 (ext.) pshaw@hollywoodfl.org (e-mail)

Contact Person Address (if different): _____
(street address) (city) (state) (zip code)

2. Name and Address of Applicant's Consultant (if any).

Firm: Arcadis Contact Person: Jose Custodio Title: _____

150 South Pine Island Road Suite 300
(street address)

Plantation (city) 33324 (zip code)

954-414-9016 (telephone) _____ (ext.) jose.custodiohernandez@arcadis.com (e-mail)

3. Type of Loan Requested in this Application. (select only one loan category and project type)

Planning Loan ☐	Design Loan ☐	Planning and Design Loan ☐	Construction Loan ■

Project Type: Design/Bid/Build ■ Design/Build (D/B) ☐ Construction Manager at Risk (CMR) ☐

Note: Procurement of professional services must meet the requirements of the Consultants' Competitive Negotiation Act, Section 287.055, F.S.

Eligibility for a Loan. In order to be considered for a priority listing, the following conditions must be met:

- The respondent to this solicitation must qualify as a "project sponsor" as defined in subsection 62-552.200(27), F.A.C.
- The minimum construction loan amount is $75,000.
- The project sponsor must agree to submit biddable plans and specifications within 1-year after execution of the loan agreement to qualify for a combined planning and design loan.
- The project is part of a public water system as defined in subsection 62-552.200(28), F.A.C., and may include drinking water supply, storage, transmission, treatment, disinfection, distribution, residuals management, and appurtenant facilities.

REQUEST FOR INCLUSION ON THE DRINKING WATER PRIORITY LIST

4. Median Household Income, Population and Principal Forgiveness Percentage (PF%). (complete a. through e. below)

a. Median household income (MHI): 65359 (current U.S. Census data or verifiable estimates)

b. State median household income (SMHI): 67917 (current U.S. Census data)

c. Population (P) served 149750 = number of service connections 42000 times 2.5 persons per connection to include proposed connections.

d. Is the project sponsor applying for a planning and/or design loan with principal forgiveness? Yes ☐ No ■. If yes, then PF is 50%. *Only a sponsor that qualifies as a financially disadvantaged small community is eligible for a planning/ design loan with PF.*

e. Is the project sponsor applying for a construction loan with principal forgiveness? Yes ☐ No ■. If yes, then PF% is calculated using the formula: *PF% = 1760/9 – 160 x (MHI/SMHI) – 7/4500 x P.*

Calculate PF% for a construction loan using the above formula: _____ (minimum 20% and maximum 90%).
If the sponsor is connecting a financially disadvantaged small community as defined below, a maximum 50% PF is available.

Please note that the calculated PF% is an estimate and the actual percentage will be determined by the Department. The amount of loan available with principal forgiveness for a project is dependent upon the amount of funds allocated for the fiscal year.

Eligibility for a loan with principal forgiveness. In order to be considered for a loan with principal forgiveness, the following conditions must be met:

- The project sponsor must qualify as a financially disadvantaged small community public water system as defined in Rule 62-552.200, F.A.C., unless the sponsor is specifically exempted from this requirement.
- The median household income (MHI) of the sponsor's service area must be less than the state median household income (SMHI) as reported from the current U.S. Census data or from verifiable estimates, unless the sponsor is specifically exempted from this requirement.
- The population (P) of the sponsor's service area must be less than 10,000 (to include the population from the project's proposed future connections), unless the sponsor is specifically exempted from this requirement.
- The project sponsor is allowed only one open loan with principal forgiveness. A loan is deemed open until the final disbursement of the project has been paid by the department.
- A project sponsor is eligible for a construction loan with principal forgiveness (maximum 50%) if connecting a community with less than 250 residential wells; an existing public water system with less than 250 service connections; or a separate, non-interconnected public water system owned by the sponsor. The project area must qualify as a financially disadvantaged small community.
- A financially disadvantaged community with a population of 10,000 or more is eligible for a construction loan with 20% principal forgiveness if dollars are available after funding all eligible financially disadvantaged small communities.
- A project sponsor that is a for-profit entity is not eligible for principal forgiveness.
- A construction project for a financially disadvantaged small community that uses a Construction Manager at Risk delivery method is ineligible for principal forgiveness.

5. Interest Rate Percentage.

The interest rate for a loan with the Department is determined using the following formula:

% of MR = 40 x (MHI/SMHI) + 15 % of MR = Percentage of Market Rate.

Calculate and enter the % of MR below:

% of MR for a loan: 51.46 (35% ≤ % of MR ≤ 75%)

Please note that the calculated % of MR is an estimate and the actual interest rate will be determined by the Department. The interest rate for a loan shall not be less than 0.2 percent.

6. Base Priority Score. Each project shall receive a base priority score (BPS) dependent on the weighted average of its components. The BPS shall be determined using the below formula where CPS means the component priority score and CCC means component construction cost.

$BPS = [CPS_1 \times CCC_1 + \ldots + CPS_n \times CCC_n]/Total\ Construction\ Cost$

Select each component and component score in Table 1 below that apply to the project, enter the estimated construction costs, and calculate the base priority score.

- Component priority scores that are based on contaminant levels must be justified by sample analytical data (see exception in notes at bottom of Table 1). The date of sample collection must be less than 24-months from the submittal date of the Request for Inclusion.
- The project sponsor must provide documentation demonstrating that contaminant levels (e.g. disinfection byproducts) cannot be reduced by adjusting system operations, if applicable.

REQUEST FOR INCLUSION ON THE DRINKING WATER PRIORITY LIST

- A compliance-1 category component score of 400 points, if selected in Table 1, must be supported by documentation demonstrating the need for the project; otherwise, a component score of 300 points shall be assigned.

Table 1

Project Component (*select all components that apply)*	**Component Priority Score**	**Component Construction Cost**
Acute Public Health Risk ☐ **1a.** E-Coli or Fecal Coliform Exceed MCL (62-550.310(5), F.A.C.) ☐ **1b.** Nitrate, Nitrite, or Total Nitrogen Exceed MCL (62-550.310(1), F.A.C., Table 1) ☐ **1c.** Lead or Copper Exceed Action Level (62-550.800, F.A.C) ■ **1d.** Surface Water Filtration/Disinfection Noncompliance (62-550.817(2), F.A.C.)	800 points ■	$10,000,000
Potential Acute Public Health Risk ☐ **2a.** Nitrate, Nitrite, or Total Nitrogen 50% of MCL (62-550.310(1), F.A.C., Table 1) ☐ **2b.** Microbiologicals Exceed MCL (62-550.310(5), F.A.C.) ☐ **2c.** Surface Water Enhanced Filtration/Disinfection Noncompliance (62-550.817(3), F.A.C.) ☐ **2d.** State Health Certification of Acute Health Risk, Unregulated Microbiological Contaminant ☐ **2e.** Violation of Disinfection Requirements (62-555.320(12), F.A.C.)	700 points ☐	
Chronic Public Health Risk ☐ **3a.** Inorganic/Organic Contaminant Exceed MCL (62-550.310(1) & (4), F.A.C., Tables 1,4,5) ☐ **3b.** Disinfection Byproducts Exceed MCL (62-550.310(3), F.A.C., Table 3) ☐ **3c.** Radionuclides Exceed MCL (62-550.310(6), F.A.C)	600 points ☐	
Potential Chronic Public Health Risk ☐ **4a.** Inorganic/Organic Contaminant 50% of MCL (62-550.310(1) & (4), F.A.C., Tables 1,4,5) ☐ **4b.** Disinfection Byproducts 80% of MCL (62-550.310(3), F.A.C., Table 3) ☐ **4c.** State Health Certification of Chronic Health Risk, Unregulated Chemical Contaminant	500 points ☐	
Compliance-1 Projects ***(documentation must be attached or default to Compliance-2 score)*** ☐ **5a.** Infrastructure upgrades to facilities undersized, exceed useful life, or with equipment failures ☐ **5b.** Insufficient water supply source, treatment capacity, or storage ☐ **5c.** Water distribution system pressure less than 20 psi ☐ **5d.** Eliminate dead ends and provide adequate looping in a distribution system ☐ **5e.** Replace distribution mains to correct continual leaks, pipe breaks, and water outages ☐ **5f.** New water system or extension of existing system to replace contaminated or low yield wells ☐ **5g.** Lack of significant safety measures (e.g. chemical containment) ☐ **5h.** Secondary Contaminant MCL Exceedance (62-550.320, F.A.C.) ☐ **5i.** Drinking water supply project as defined in 403.8532(9)(a), F.S.	400 points ☐	
Compliance-2 Projects ☐ **6a.** Treatment, Storage, Power, and Distribution Requirements (62-555.320, F.A.C) ☐ **6b.** Minimum Required Number of Wells (62-555.315(2), F.A.C) ☐ **6c.** Well Set-back and Construction Requirements (62-555.312 and 62-555.315, F.A.C) ☐ **6d.** Cross-Connection Control Requirements (62-555.360, F.A.C) ☐ **6e.** Physical Security Project Documented in a Vulnerability Analysis ☐ **6f.** Consolidation or regionalization of public water systems ☐ **6g.** Water or Energy Conservation Project	300 points ☐	
☐ **7. All Other Projects** ***(including land or public water system acquisition projects)***	100 points ☐	

Note: Item 2d. and 4c. of Table 1 requires a State Health Officer to complete the form "Certification of a Public Health Risk". If 50% or more of wells meet contaminant levels from Table 1 above, then select the appropriate health risk category in Table 1. Flooded wells and wells under the direct influence of surface water are considered an unregulated microbiological potential acute public health risk and require documentation of occurrence in lieu of sampling data.

7. Affordability Score. The extent of affordability existing in a small community to be served by the project shall be reflected in the priority score. Points shall be awarded based upon two affordability criteria: median household income (MHI) and population (P) served. These points are to be added to the base priority score. Calculate the affordability score using the following formulas:

Affordability Score = (MHI Score + Population Score)

MHI Score = 100 x (1.00 – MHI/SMHI), zero $\leq$ MHI score $\leq$ 75, rounded to nearest whole number

*Population Score = 50.0 - (P/200), p*opulation score $\geq$ zero, rounded to nearest whole number

REQUEST FOR INCLUSION ON THE DRINKING WATER PRIORITY LIST

8. Water Conservation Score. A project sponsor with a qualifying water conservation project is eligible to receive an additional 100 points added to their base priority score if the sponsor provides a water conservation plan in accordance with EPA's Water Conservation Plan Guidelines document number EPA-832-D-98-001, August 6, 1998.

9. Total Priority Score. Total priority score equals the base priority score plus the affordability score. (complete a. through d. below)

a. Base priority score: 800 points.
b. Affordability score: 9 points (> zero).
c. Water Conservation score: _____ points.
d. Total priority score: 809 points (sum of items a. and c.)

10. Estimated Project Cost. (complete a. through i. below)
(enter $0 if activity is not applicable)

Project Activity	*Cost*
a. Planning.	
b. Design (not applicable if a D/B project).	
c. Eligible land (necessary land divided by total land times purchase price).	
d. Constr., equip., material, demo. & related procurement (include design if D/B project).	$10,000,000
e. Construction contingency (10% of 'd', only applicable for Design/Bid/Build projects).	$1,000,000
f. Technical services during construction and after bid opening.	$800,000
g. Asset management plan per 62-552.700(7), F.A.C.	$250,000
h. *Total project costs* (sum of a. through g.).	$12,050,000
i. *Loan amount requested* by the sponsor in this RFI (assume no principal forgiveness).	$12,050,000

List all funding sources (including grants for this project): _____

11. Project Schedule. (complete a. through d. below)

Project Activity	*(M/D/YY)*
a. Submit planning documents.	5/16/25
b. Submit design/bid documents or RFQ/RFP for CMR & D/B projects.	1/9/25
c. Start construction.	1/26/26
d. Complete construction.	5/18/27

12. Project Information. Provide the following information, if applicable.
(select all items below that are attached to this RFI)

- ☒ Project description, location with lat/long (degrees), water system PWS ID, and project need *(this is a required attachment)*.
- ☒ Map of city and county limits, existing and proposed service area, and project area *(this is a required attachment)*.
- ☐ Lab data, lab data with operational records, or substantiated documentation in lieu of lab data for public health risk projects.
- ☐ Certification of a Public Health Risk form completed by a State Health Officer.
- ☐ Supporting documentation for projects identified under the Compliance-1 project categories from Table 1 above.
- ☐ Project schedule showing plans and specs completion within 1-year of the execution date of a planning/design loan.
- ☐ Supporting documentation if MHI not taken from current U.S. Census data.
- ☐ Water Conservation Plan in accordance with EPA guidelines.

13. Certification by an Authorized Representative. I certify that this form and attachments have been completed by me or at my direction and that the information presented herein is, to the best of my knowledge, accurate and true.

DocuSigned by: Phyllis Shaw for Vin Morello — E885ADC4F1F44E9... (signature)
5/20/2025 (date)
VMORELLO@HOLLYWOODFL.ORG (e-mail)

VINCENT MORELLO (print name)
DIRECTOR, PUBLIC UTILITIES (print title)

Email the completed RFI form with attachments to SRFRFI@FloridaDEP.gov *or mail to the Florida Department of Environmental Protection, State Revolving Fund Program*, 3900 Commonwealth Blvd, Tallahassee, Florida 32399-3000.

Appendix I

Project Planning Authorization