

# LOWER ST. JOHNS RIVER MAIN STEM & TRIBUTARY BMAP PLAN

City of Atlantic Beach

Duval County, Florida



NPDES Wastewater Facility ID FL0038776

NPDES MS4 Facility ID FLS266183

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January 2024

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## 1.0 Introduction

This plan has been prepared by the City of Atlantic Beach to comply with the requirements of HB 1379 and the Clean Waterways Act relating to nutrient load reductions to the Lower St. Johns River and tributaries. This Plan covers the City's proposed projects related to nutrient load reductions from the City's wastewater treatment facility (WWTF), wastewater collection system and privately owned septic systems otherwise known as onsite treatment and disposal systems (OSTDS). Nutrient loads are tracked for the purpose of estimating nutrient load reductions to meet nutrient loading criteria established by the Florida Department of Environmental Protection (FDEP).

The City's WWTF currently meets advanced wastewater treatment criteria and is meeting all nutrient load reductions currently required by FDEP under the Basin Management Action Plan (BMAP) adopted for the Lower St. Johns River and its tributaries. Because the City is meeting its nutrient reduction requirements, mandated OSTDS removal projects are not required by HB 1379. However, the City's long-term intention is to eliminate OSTDS in its service area and there are several projects in the design phase to help meet this objective.

The City will be evaluating additional treatment that will be required beyond advanced wastewater treatment considering the potential use of deep well injection to meet the requirements of Chapter 403.064, FS, commonly known as Senate Bill 64, which requires elimination of surface water discharge of treated wastewater effluent by 2032.



## 2.0 Wastewater Treatment Plan

### 2.1 Permitted Capacity

The operation of the City of Atlantic Beach Wastewater Treatment Facility (WWTF) is authorized by FDEP permit No. FL0038776 with a permitted capacity of 3.5 million gallons per day (MGD) annual average daily flow. The WWTF achieves advanced wastewater treatment criteria. The WWTF is also permitted for 0.5 MGD of reuse for irrigation of the Atlantic Beach Country Club golf course and residential areas.

### 2.2 Permitted Total Nitrogen & Total Phosphorus Limits

Total nitrogen (TN) and total phosphorus (TP) loads are governed by FDEP adopted Lower St. Johns River Basin Management Action Plan (BMAP). The permitted annual TN load allocated to the WWTF is 46,614 lbs/year. The permitted annual TP load allocated to the WWTF is 16,060 lbs/year. The WWTF meets both annual loading criteria.

### 2.3 Annual Total Nitrogen & Total Phosphorus Loads

The rolling 12-month annual TN and TP loads for 2018 through mid-2023 are depicted in the Figures 1 & 2 below.

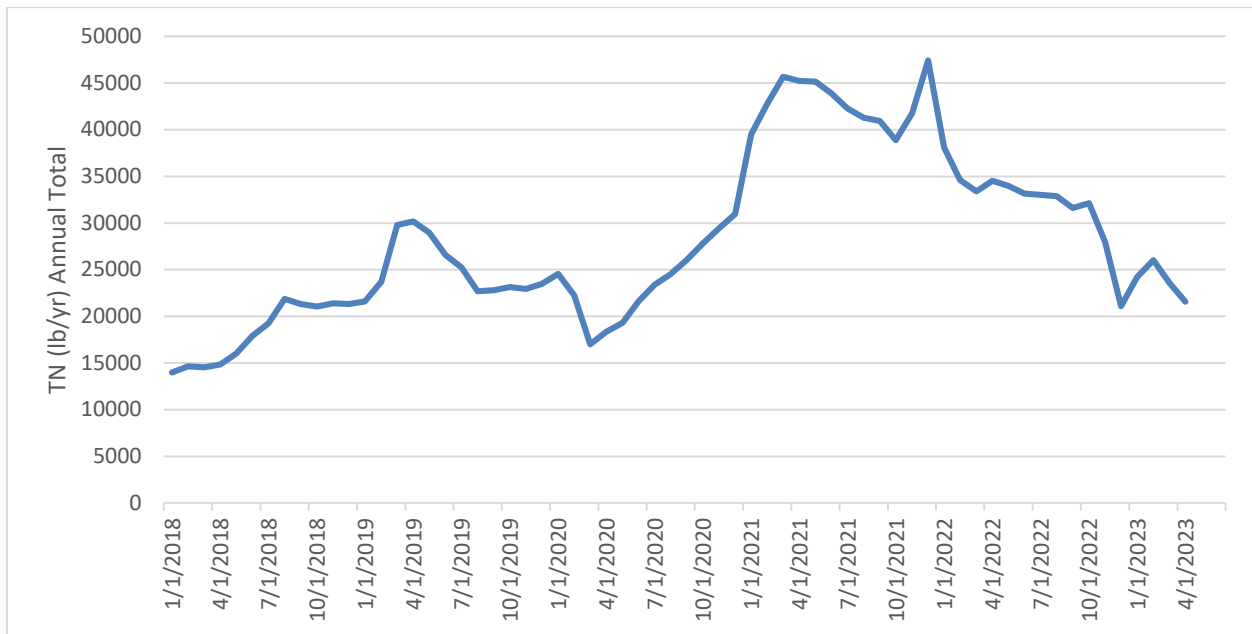
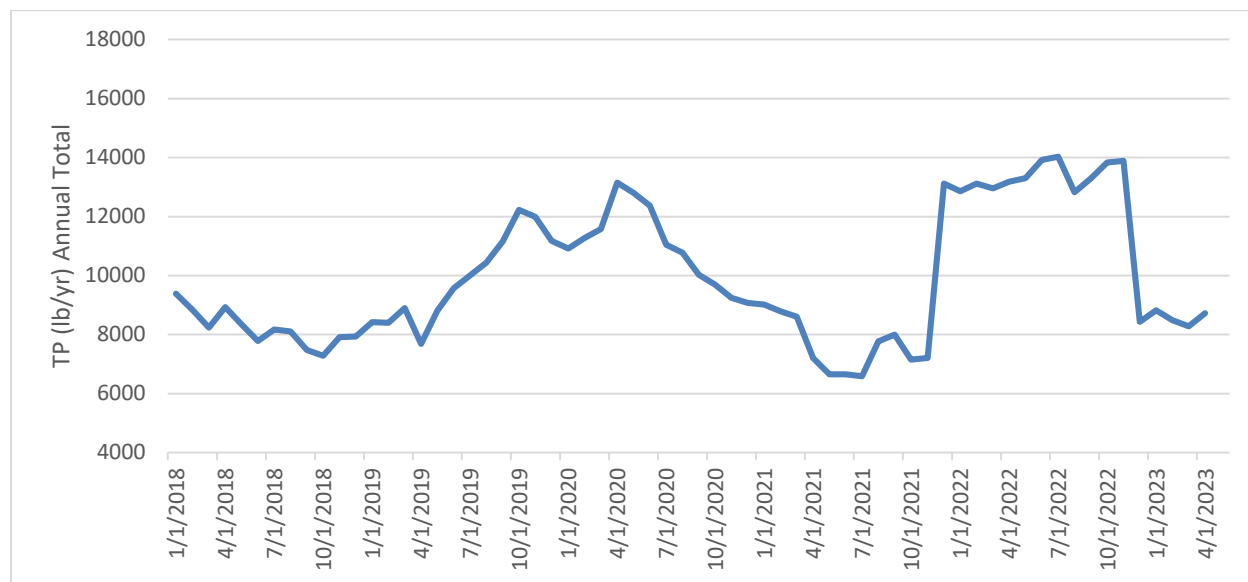


Figure 1 - City of Atlantic Beach Annual Effluent TN (lbs/yr)



Over the past five years, other than a brief transitory spike in TN in late 2022 due to a plant upset, effluent from the WWTF has consistently met the annual average TN load limit of 46,614 lbs/yr.



**Figure 2 - City of Atlantic Beach Annual Effluent TP (lbs/yr)**

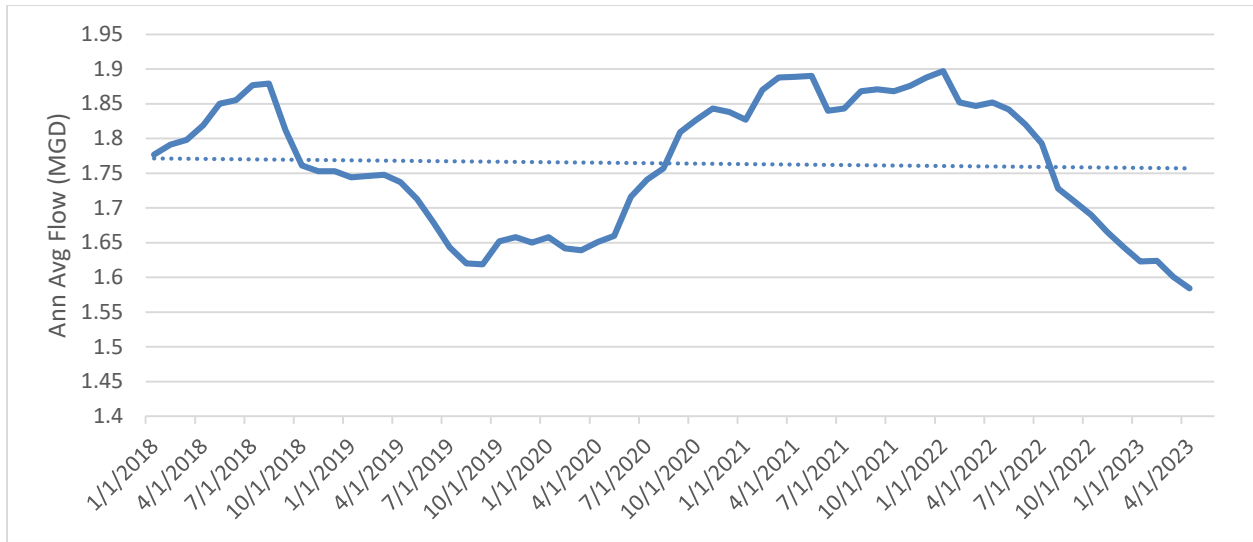
Treated effluent from the WWTF has remained well below the permitted annual average TP load of 16,060 lbs/yr over the past five years. The annual average TN for 2023 was 4.58 mg/L and for TP the 2023 annual average was <2 mg/L.

## 2.4 Capacity Analysis

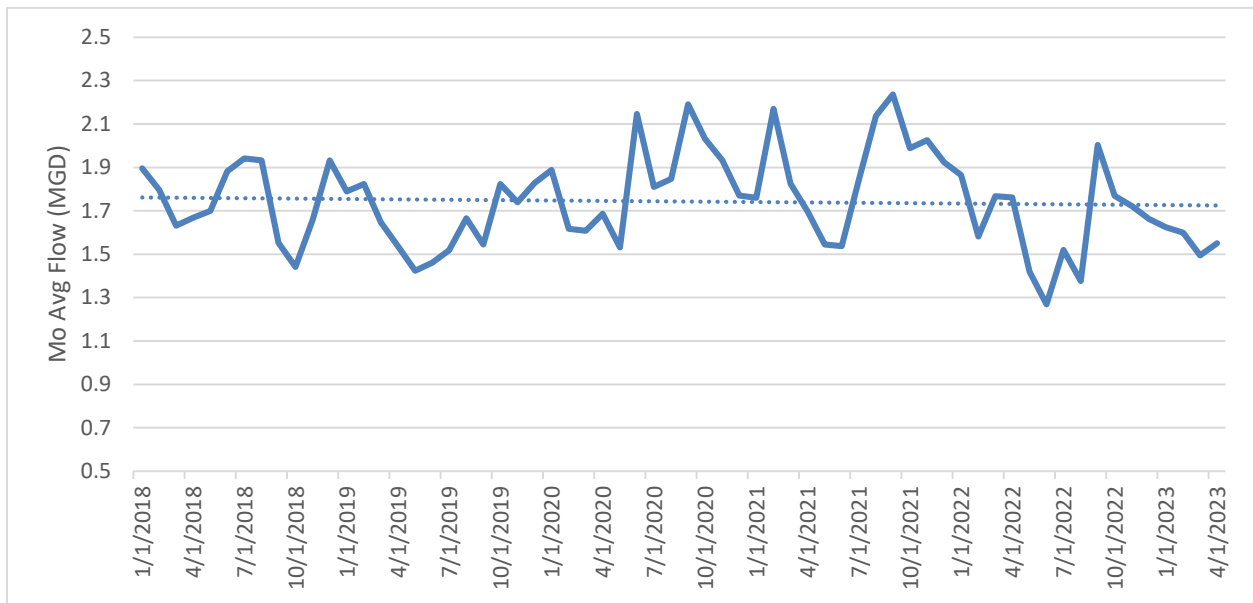
The monthly, three month, and annual average daily flows and the percent of permitted WWTF capacity based on the three-month average daily flow were calculated for the period January 2018 through April 2023. The flow data summarized in Figures 3, 4 and 5 for historical annual average daily, monthly average and 3-month average daily flows.

As illustrated in Figures 3, 4 and 5, there has been a slight downward trend in flow, the WWTF operated at the end of April 2023 at 1.584 MGD Annual Average Daily Flow (AADF), 1.551 MGD Monthly Average Daily Flow (ADF) and 1.546 MGD 3 Month ADF or at about 45% of the permitted capacity. As shown in Figure 4, except for a few spikes, the wastewater flows over the past five years were stable with a slight decreasing trend. The spikes, some of them with significant magnitudes, were associated with severe rainfall events, tropical storms and hurricane related events. Figure 6 depicts historical flows as a percent of permitted capacity.



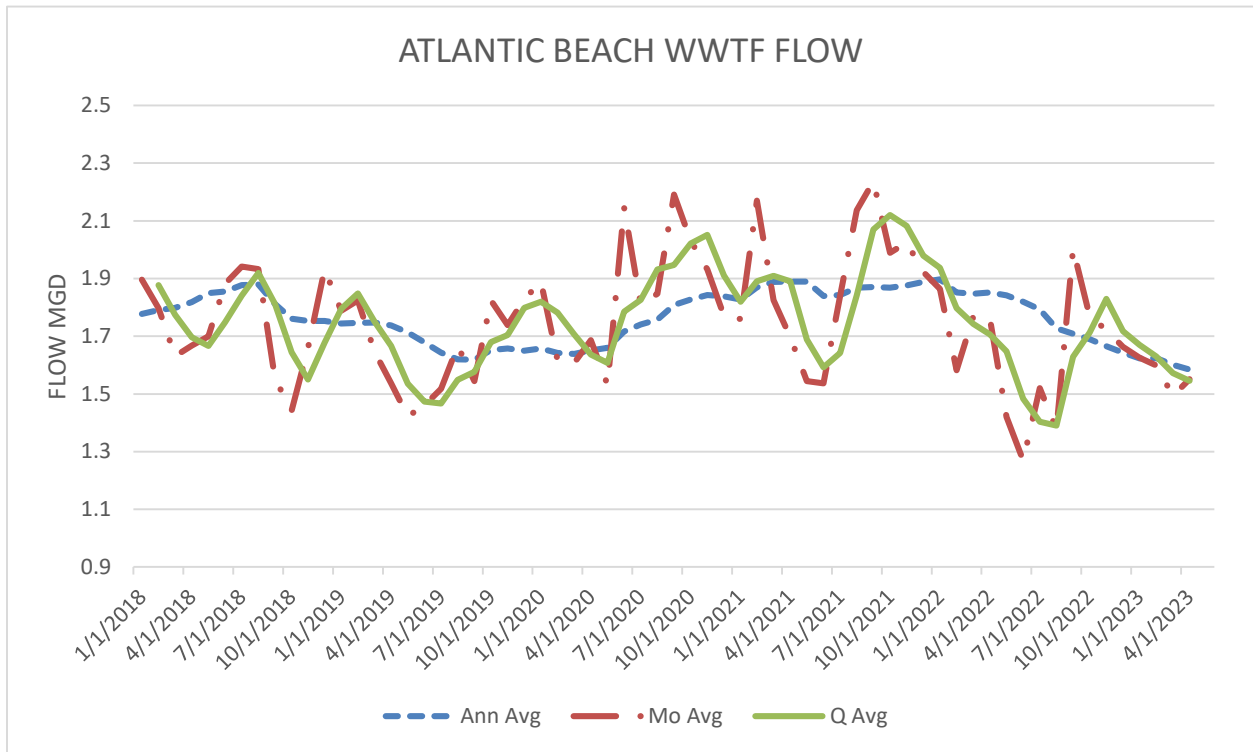


**Figure 3 - City of Atlantic Beach WWTF Average Annual Daily Flow**

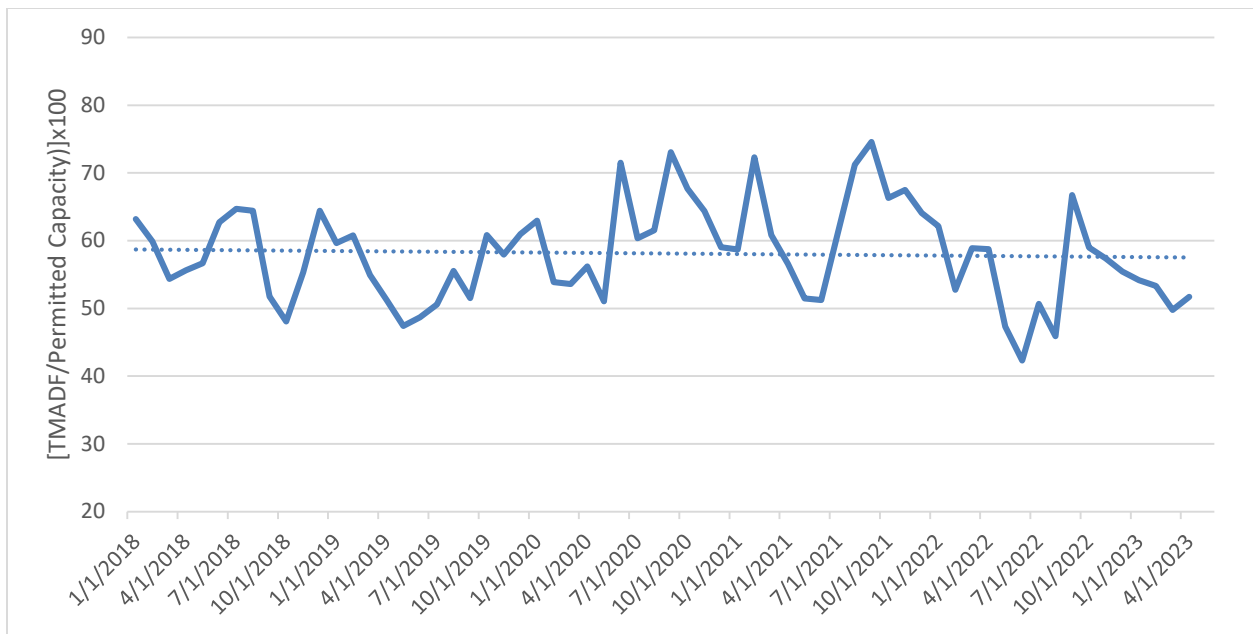


**Figure 4 - City of Atlantic Beach WWTF Monthly Average Flow**





**Figure 5 - City of Atlantic Beach WWTF AADF, Mo Avg and 3Mo Average Flow**



**Figure 6 - City of Atlantic Beach WWTF Flow vs. Permitted Capacity**



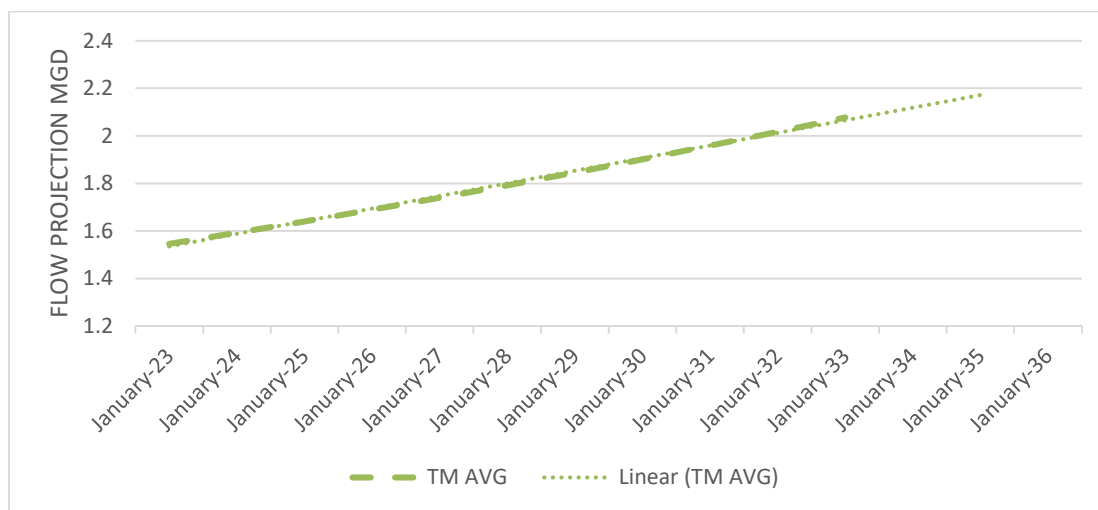
The City of Atlantic Beach recently renewed its Consumptive Use Permit. Population projections in the City's service area utilized to predict future water withdrawals were based on BEBR medium level population growth for the service area and 94 gallons per capita per day residential water use. Population projections and water demand are provided in Table 1.

**Table 1 - City of Atlantic Beach Population & Residential Water Demand Projections**

| Year | Projected Population | Projected Residential Water Use (Million Gal/Day) |
|------|----------------------|---------------------------------------------------|
| 2025 | 27,474               | 2.58                                              |
| 2030 | 29,055               | 2.73                                              |
| 2035 | 30,509               | 2.87                                              |
| 2040 | 31,857               | 3.00                                              |

Residential water demand has always significantly exceeded WWTF flows and is a useful indicator of future maximum expected flows. The flow data presented above from the past five years coupled with projected future increases indicates that the WWTF will not exceed permitted capacity within the next 20 years.

Alternately, utilizing BEBR population data and a 3% conservative estimate of population growth in the utility service area results in the chart depicted in Figure 7. Extrapolating this linear correlation indicates that WWTF flows would be at ~84% of permitted capacity by 2036, thus no expansion of capacity is projected within the next 20 years.



**Figure 7 - City of Atlantic Beach WWTF - 3 Month Average Flow w/ 3% Growth**





## 2.5 Required Facility Improvements

No upgrades or modifications to the WWTF are required to meet current applicable water quality standards since BMAP load limitations are currently being achieved. However, if the requirements of SB 64 do not change, the City will be required to remove the discharge of treated effluent from the St. Johns River by January 2032. The City has begun the planning process to identify the most feasible and economical means to eliminate the surface water discharge.

The City has identified several options for complying with SB 64, see Table 2. Over the course of 2024, the City will evaluate each option and determine the optimum approach for compliance. Ultimately a combination of options may prove to be the most viable option.

*Table 2 - SB 64 Compliance Options*

| <b>Effluent Diversion Option</b>                      | <b>Est. Capital Cost</b> | <b>Est. Annual O&amp;M</b> |
|-------------------------------------------------------|--------------------------|----------------------------|
| Reuse System Expansion<br>(Neighborhoods, NS Mayport) | \$30M                    | \$6M                       |
| Reuse System Expansion<br>(Send to JEA)               | \$15M                    | \$6M                       |
| Deep Well Injection                                   | \$32M                    | \$6M                       |
| Bulk Wastewater Transfer to JEA                       | \$50M                    | \$4M                       |
| JEA Franchise Agreement                               | Limited                  | \$0M                       |

The cost data provide in Table 2 is a rough order of magnitude estimate. The City will continually work to sharpen the projected costs as regulatory requirements become clearer and as the evaluations of each option progress.



## **2.6 Facility Improvement Timeline**

The City is currently in the planning phases to meet the January 2032 deadline mandated by SB 64 to remove the discharge of treated effluent from the St. Johns River. The WWTF already meets advanced waste treatment standards as well as annual average nutrient limits.

A projected timeline has not been established to meet the January 2032 surface water discharge prohibition. As more information becomes available and deep well injection water quality criteria are better understood, a more detailed timeline will be established.



## 3.0 Onsite Sewage Treatment & Disposal System Remediation Plan

### 3.1 OSTDS Inventory

The Atlantic Beach Public Utilities service area encompasses all of Atlantic Beach plus an area within the City of Jacksonville north of Atlantic Beach and east of the Atlantic Intracoastal Waterway. There are very few onsite treatment and disposal systems (OSTDS) remaining within the city limits of Atlantic Beach. There are several clusters of OSTDS outside of the city limits. The known OSTDS are provide in Figure 7.

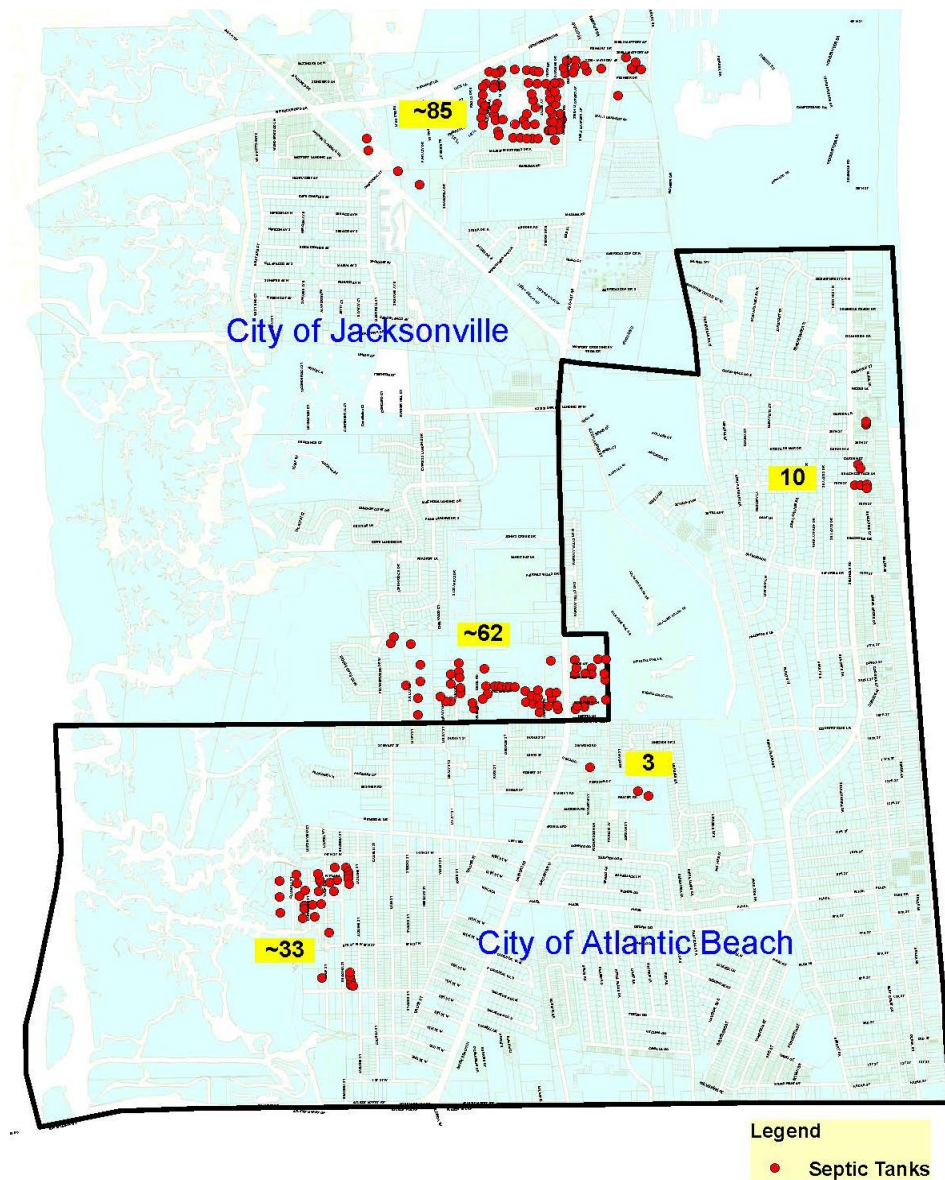


Figure 8 - OSTDS in Atlantic Beach Public Utilities Service Area



The location of the OSTDS shown in Figure 6 are available in a GIS shapefile submitted with this report.

### **3.2 OSTDS Future Growth**

The Atlantic Beach Public Utilities service area is essentially built out with few exceptions. Future growth is primarily expected to come through in-fill and redevelopment. Areas suitable for in-fill development are generally located where sewer service is available. An exception is the Begonia Street/West Plaza area in the City of Atlantic Beach. There are a number of undeveloped lots in this area that do not have the ability to connect to the public sewer system. However, the City of Atlantic Beach intends to extend sewer lines to these areas in the near future as discussed below. Redevelopment of areas that currently contain OSTDS will require connection to sewer service.

Undeveloped areas that are available for development are expected to be developed with a density that will require connection to the public sewer as a condition of development. The City of Atlantic Beach expects very limited future OSTDS growth.

### **3.3 Inventory of OSTDS Expected to be Eliminated**

The City of Atlantic Beach currently meets BMAP requirements with respect to nutrient reduction. Therefore, mandated OSTDS elimination is not required. However, the City's long-term intention is to remove OSTDS within the Public Utilities service area and expects that almost all OSTDS will be eliminated within 20 years.

### **3.4 Planning, Design & Construction Deadlines**

The City of Atlantic Beach has a completed design for sewer service extension to the ~33 OSTDS located within the city limits adjacent to marsh areas. This project is currently in the 10-Year Capital Improvement Plan and slated for construction in FY25 & FY26. The City is actively seeking grants to aid in funding of this project.

There are two clusters of OSTDS outside of the City of Atlantic Beach city limits that are within the boundaries of the City of Jacksonville. The City of Atlantic Beach will continue ongoing discussions with the City of Jacksonville's Environmental Quality Division (EQD) to identify feasible and economic means of connecting these areas to the public sewer system. EQD has



initiated a septic tank vulnerability assessment that is anticipated to be complete by 2025. The results of this work will be utilized to assess the priority of these two OSTDS clusters.

### **3.5 Estimated Costs**

The estimated cost of eliminating the OSTDS cluster within the City of Atlantic Beach city limits is \$750,000. Costs for eliminating the two clusters of OSTDS within the City of Jacksonville have not been determined.

### **3.6 OSTDS Requiring Upgrades**

Although not required to meet BMAP nutrient reductions, the City expects that all OSTDS, with potentially several exceptions where connections cannot be economically or feasibly made, within the Public Utilities service area will be eliminated within the next 20 years.

### **3.7 Upgrade Costs**

Not applicable since almost all OSTDS are expected to be eliminated within 20 years.

### **3.8 Other Projects Required to meet Nutrient Load Reductions**

No additional projects are planned to meet nutrient load reductions since BMAP requirements for the City of Atlantic Beach are being met. However, the City plans to continue to pursue low impact development projects as they arise. The City also plans to install two additional baffle boxes in our storm sewer system over the next several years. Ideal locations for additional baffle box locations have not been identified yet.

