

Annual Water Main Improvements Plan Report

January 9

2014

Annual report on evaluating and recommending the replacement of existing water mains and/or proposed construction of new water mains within the City's utility service area.



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Plan Summary

The City of St. Augustine's Public Works Department has been working to identify water main improvements that shall be designed and constructed using bond monies acquired in 2011 and 2012. The push for increased water main improvements in 2012/2013 was generated by recurring "red water" complaints throughout the City. At first, a solution to the "red water" problem was focused at the City's Water Treatment Plant finished water product, however, over a period of time it became apparent that the "red water" solution requires a multiple step approach with an emphasis on the replacement of the City's potable water infrastructure that is mainly composed of cast iron (CI) and galvanized steel (GS) pipes. The City has implemented the following three step approach to solve the City's "red water" problem:

1. Water main replacement;
2. Unidirectional flushing; and
3. Corrosion control of the finished water product.

The water main replacement step is a long term plan that increases the annual water main improvements constructed in a year by the City. The following table describes the long term water main replacement catch up analysis:

Water Main Inventory & Replacement (Catch-Up) Analysis (Table 01)

Materials	Inventory (miles)	Material Breakdown of Inventory (%)	Proposed Replacement	Preliminary Cost Estimate	Updated Inventory (miles) 12/16/2013	Updated Material Breakdown of Inventory (%) 12/16/2013
PVC	134	67%	-	-	136.2	68.4%
Cast Iron (CI)	55	28%	-	-	53.26	26.8%
CI < 6"	10	18%	100%	\$5,170,176	9.41	17.7%
CI = 6"	28	51%	50%	\$7,096,320	27.32	51.3%
Galvanized Steel (GS)	9	4%	100%	\$4,352,072	8.55	4.3%
Ductile Iron (DI)	1	1%	-	-	1	0.5%
			Total	\$16,618,568	199.01	
	1% Annual:	\$1.6 million				
	5-Year Catch-Up:	\$3.3 million/yr				
	10-Year Catch-Up:	\$1.6 million/yr				

This report focuses on the first step and phase in the City's approach to solve the "red water" problem. Since funding is limited not all of the CI and GS pipes in the City can be replaced at once and therefore the Public Works Department needed to set criteria in order to select pipes for replacement. The following set of criteria was used to review and identify pipes for replacement:

1. Pipe material is cast iron (CI) or galvanized steel (GS).
2. "Red water" complaints were recorded in the vicinity of the pipe.
3. Is there a clean water source for the pipe?
4. Is there inadequate fire flow (< 500gpm @ 20 psi)?
5. Is the pipe routinely maintained due to leaks or breaks?

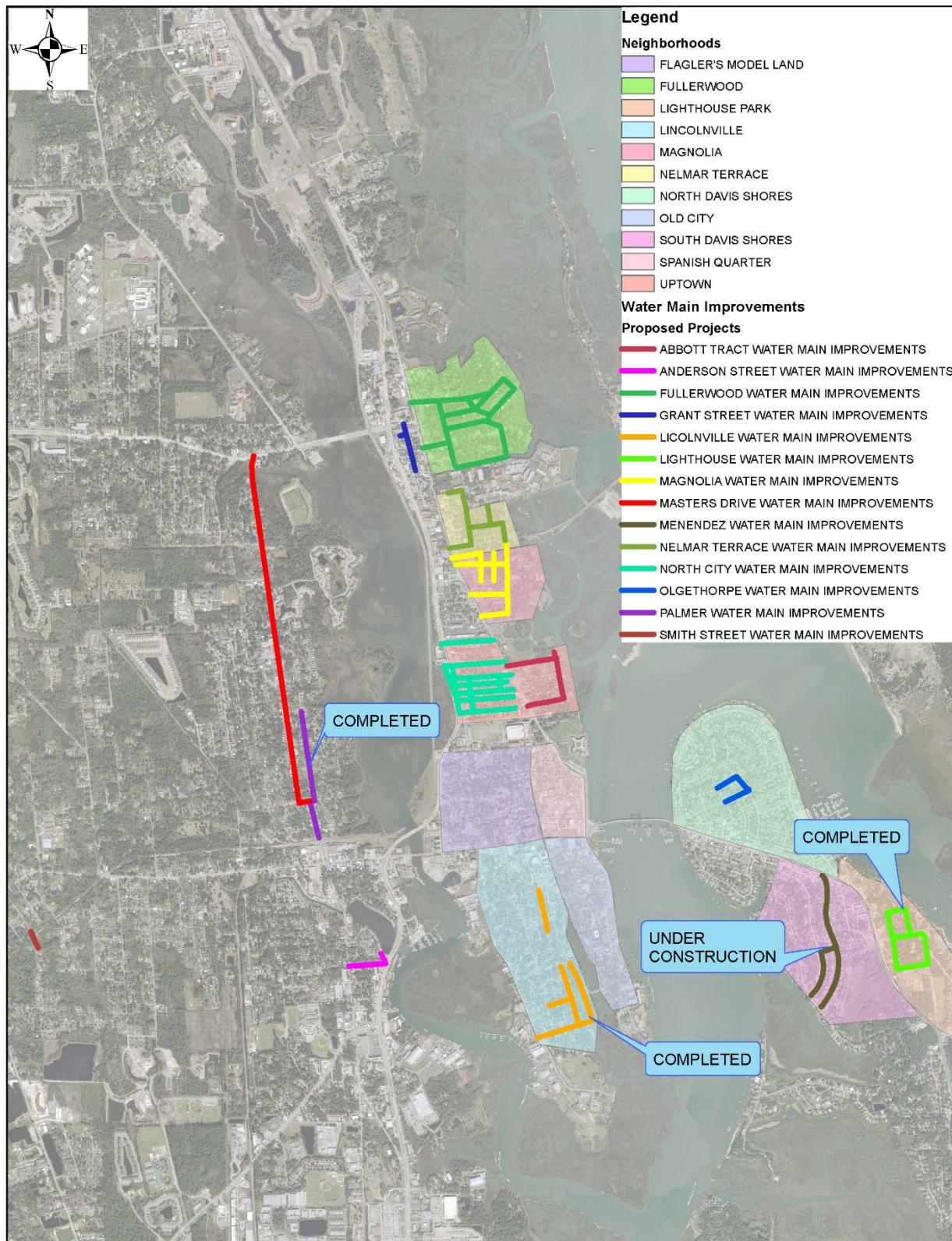
The water main improvement projects contained in this report were developed using the above listed criteria. Once these improvements are constructed there should be a dramatic improvement to the City's aesthetic water quality, fire flow and maintenance. Additionally, once these improvements are implemented the City shall be in a favorable position to continue tracking and isolating the remaining areas with "red water" complaints.

The allocated bond budget for this first phase of the water main improvements is \$1,841,600.00 for 2011 and \$4,530,000.00 for 2012, totaling \$6,371,600.00. This means that in order to complete the long term water main improvements an investment of approximately \$10, 246,968.00 is required in the upcoming 5 to 10 years.

In addition to bond funded water main improvements, the City's operating utility fund has budgeted for Anderson Street, Olgethorpe and Smith Street improvements scheduled to be designed and constructed in-house during 2014.

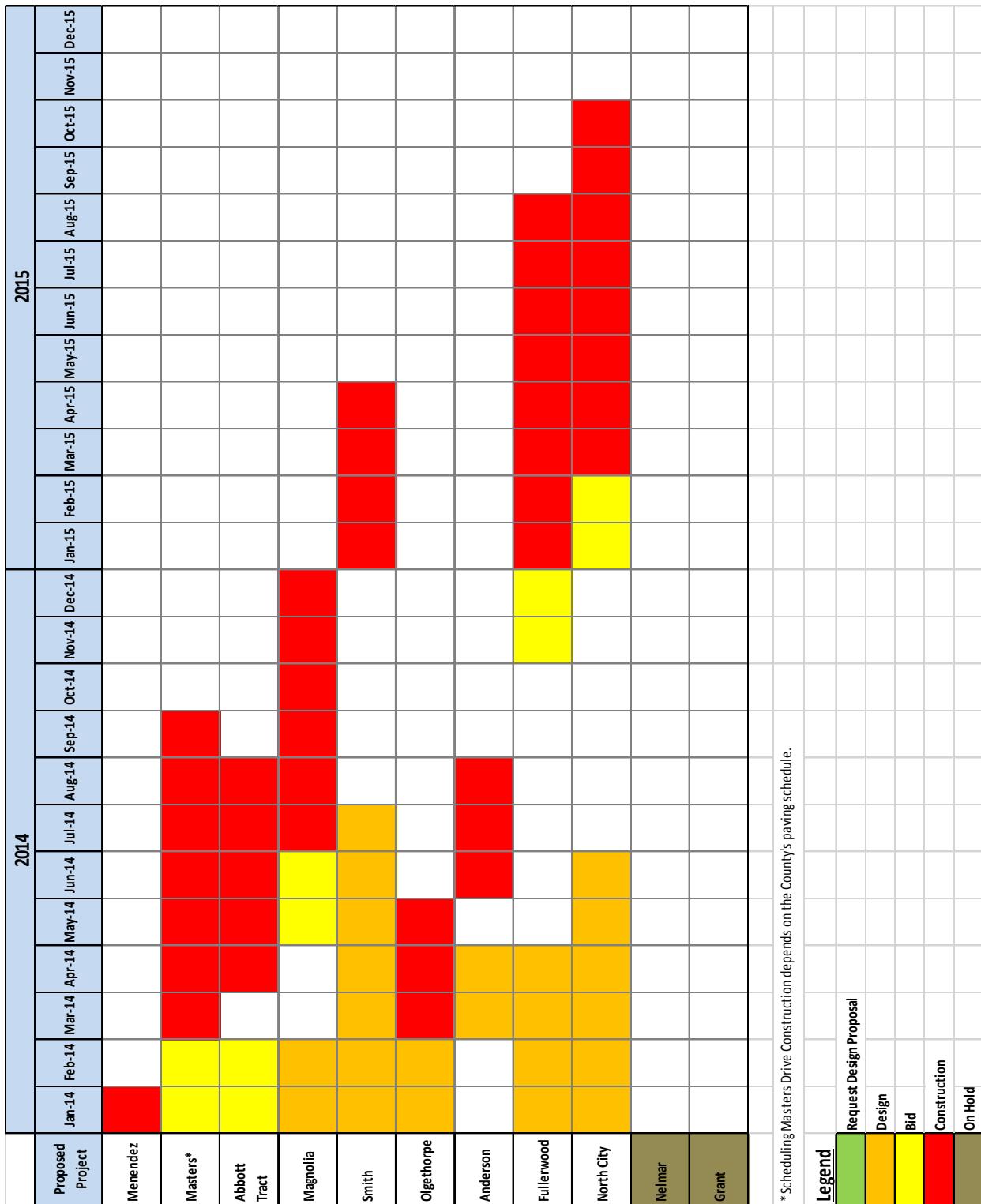
In 2013, Lincolnville, Lighthouse and Palmer Street water main improvements were completed. The following figure provides an overall project location map for the proposed, under construction and completed water main improvements:

Overall Project Location Map (Figure 01)



The following table provides an overall implementation schedule for the proposed water main improvements:

Implementation Schedule (Table 02)



Proposed Water Main Improvement Projects

Abbott Tract Water Main Improvements

Scope of Work

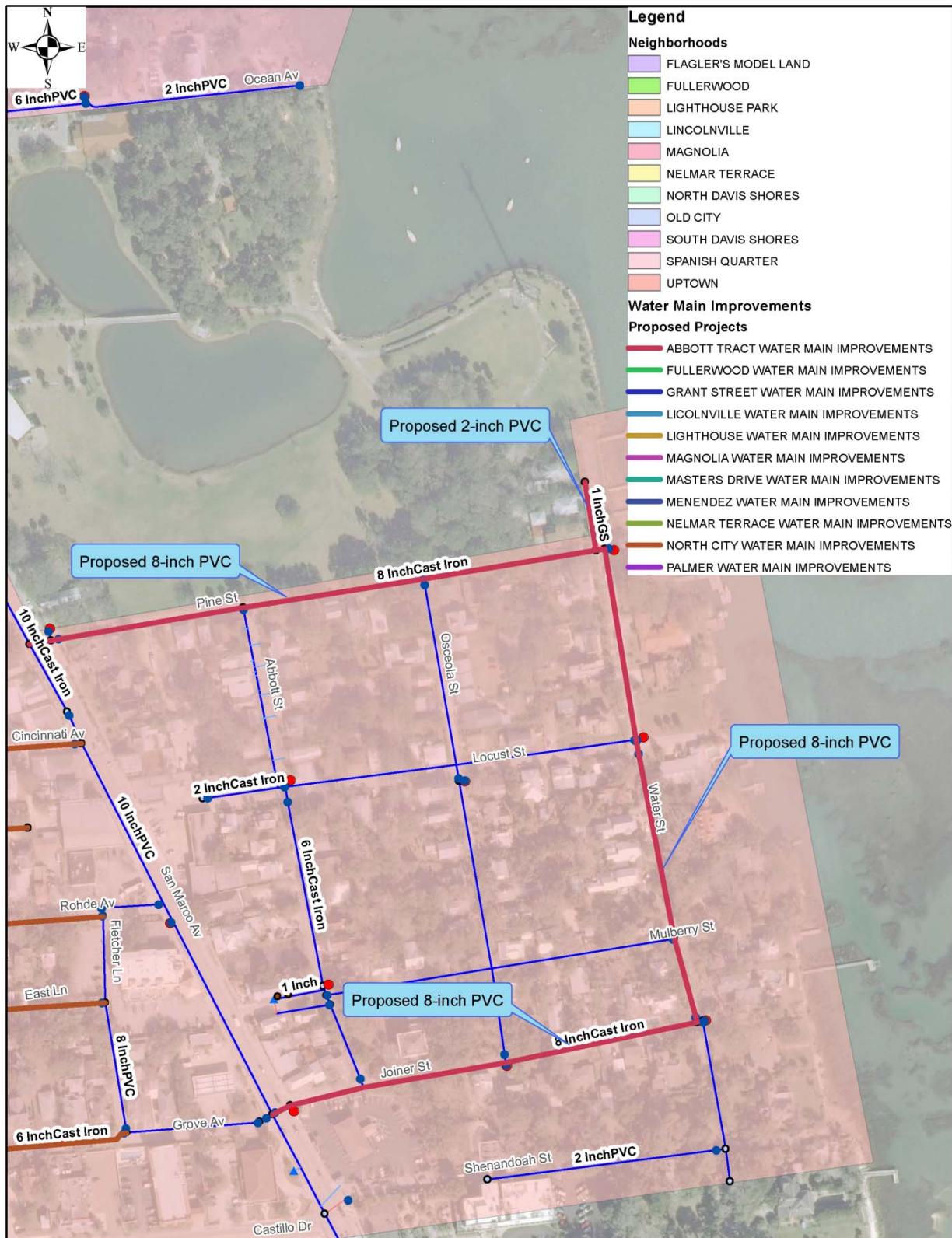
Replace approximately 900 linear feet (LF) of existing 6-inch CI pipe on Water Street, 1,100 LF of existing 8-inch CI pipe on Pine Street and 900 LF of existing 8-inch CI pipe on Joiner Street with a total of 2,900 LF of 8-inch PVC pipe. Replace approximately 130 LF of existing 1-inch GS pipe with 2-inch PVC pipe. A FDOT utility permit will be required for the two water main connections on San Marco Avenue.

In addition to the proposed water main improvements, an inflow and infiltration (I&I) for the sanitary sewer system and stormwater assessment shall be conducted for Abbott Tract. All work identified in the assessments should be incorporated into the construction plan set for the water main improvements.

The I&I assessment has been completed and the project is currently finishing design.

Replacement of sewer laterals has been added to the scope of work.

Project Location Map (Figure 02)



Anderson Street Water Main Improvements

Scope of Work

Replace approximately 402 linear feet (LF) of existing 6-inch CI pipe on Anderson Street beginning at South Dixie Highway and heading east, replace approximately 654 linear feet (LF) of 2-inch CI pipe along Anderson Street and on north Rio Vista Drive connecting to Spencer Street.

This project will be designed and constructed by the City.

Project Location Map (Figure 03)



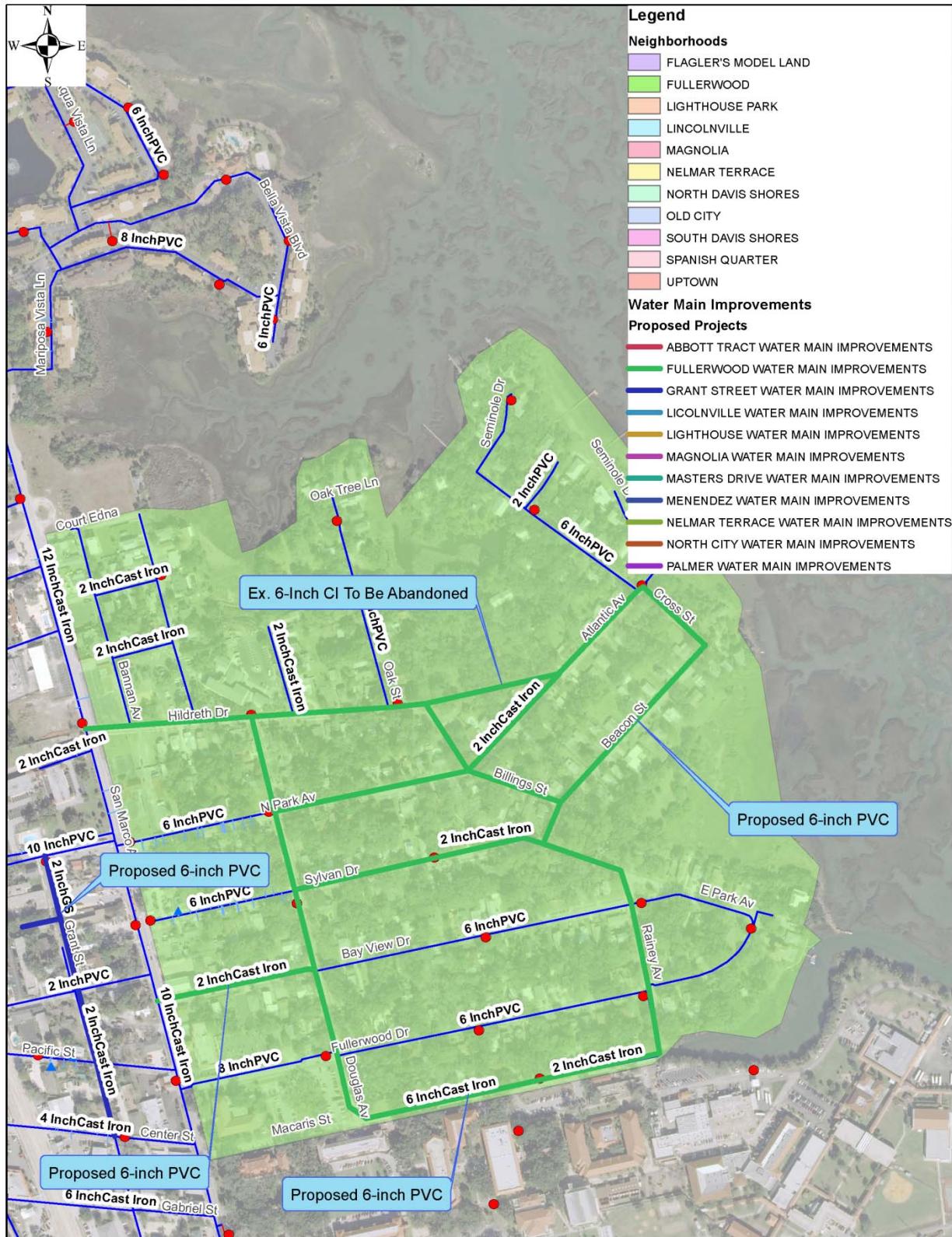
Fullerwood Water Main Improvements

Scope of Work

In the Fullerwood neighborhood replace approximately 2,800 linear feet (LF) of existing 2-inch CI pipe and 6,500 LF of existing 6-inch CI pipe with a total of 9,300 LF of 6-inch PVC pipe. Install 700 LF of 6-inch PVC pipe along North Park Avenue between Douglas Avenue and Barbour Place. Abandon in place approximately 500 LF of 6-inch CI pipe between Hildreth Drive and Atlantic Avenue. A FDOT utility permit will be required for the two water main connections on San Marco Avenue.

Project is currently under design.

Project Location Map (Figure 04)



Grant Street Water Main Improvements

Scope of Work

Replace approximately 1,200 LF of 2-inch CI pipe with 6-inch PVC pipe between Picolata Drive and Center Street.

Project is on hold.

Project Location Map (Figure 05)



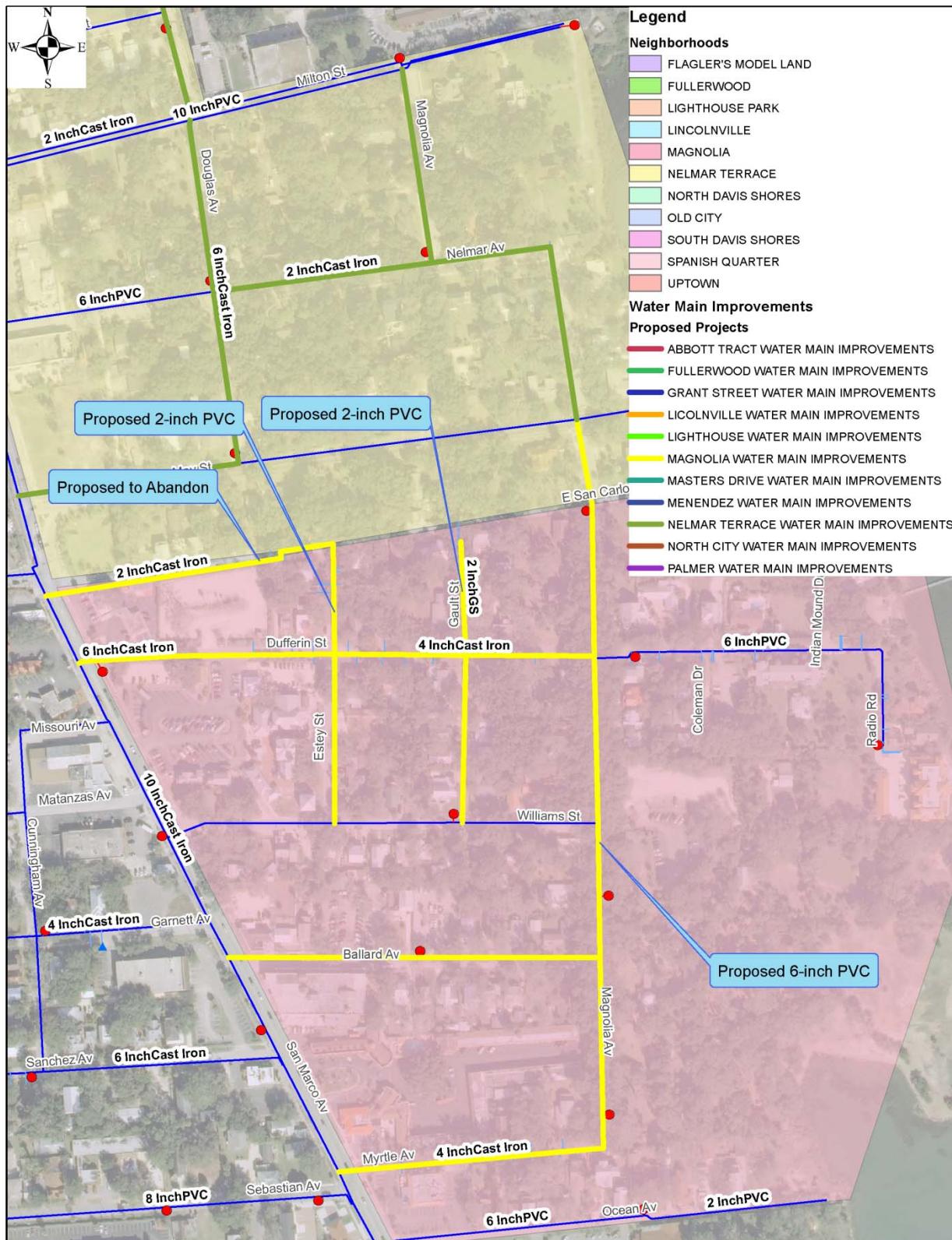
Magnolia Water Main Improvements

Scope of Work

Replace 4,844 LF of existing 2-inch and 6-inch CI with 6-inch PVC pipe along Dufferin Street between San Marco Avenue and Magnolia Avenue, Estey Street between Dufferin Street and Williams Street, Gault Street between Dufferin Street and Williams Street, Magnolia Avenue between May Street and Myrtle Avenue, Ballard Avenue between San Marco Avenue and Magnolia Avenue and Myrtle Avenue between San Marco Avenue and Magnolia Avenue. Replace 2-inch GS with 2-inch PVC pipe on Gault Street north of Dufferin Street and 2-inch CI with 2-inch PVC on Estey Street north of Dufferin Street. Abandon the 2-inch CI pipe along East San Carlos between San Marco Avenue and Estey Street. A FDOT utility permit will be required for proposed water main connections along San Marco Avenue.

Project is currently under design.

Project Location Map (Figure 06)



Masters Drive Water Main Improvements

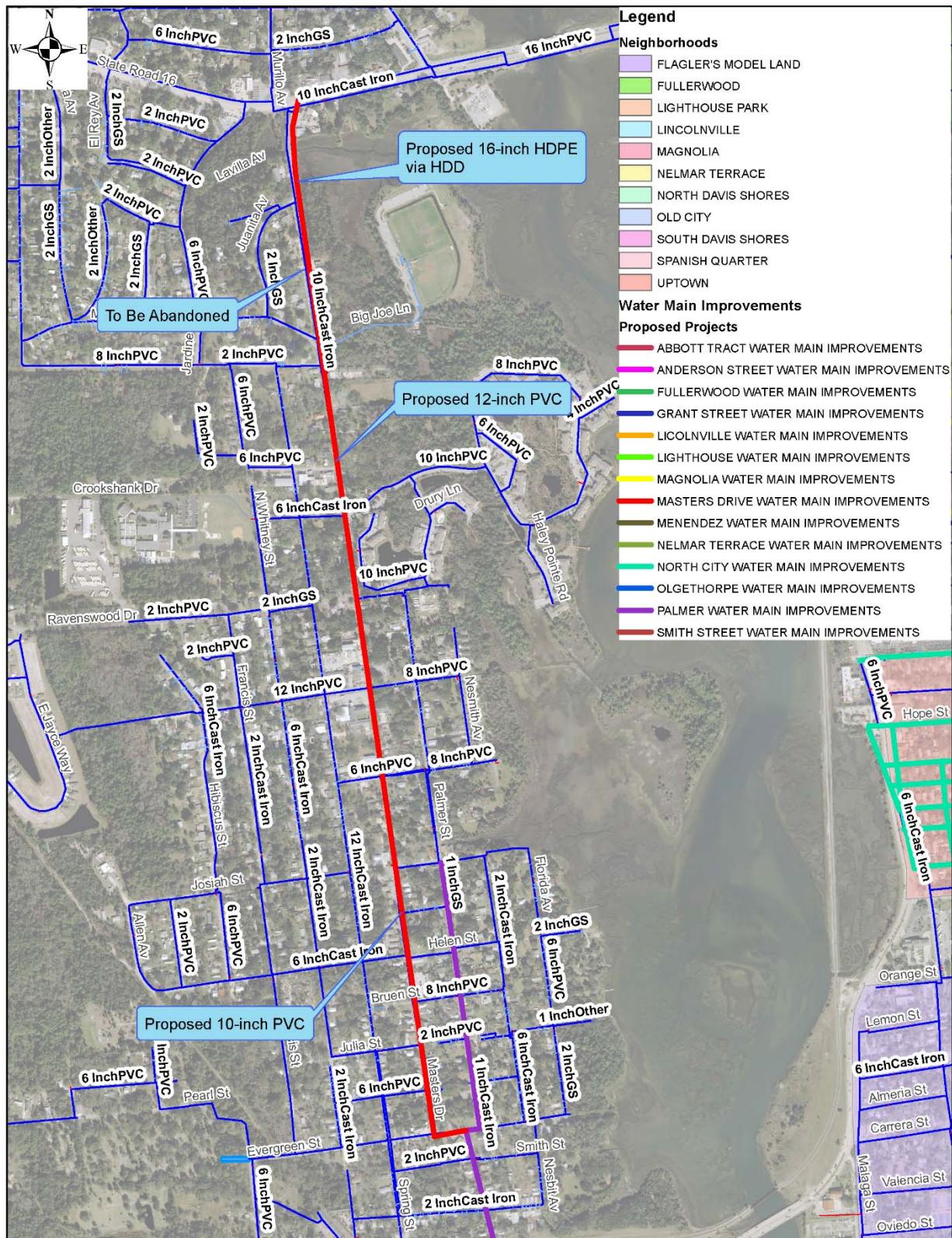
Scope of Work

Install 3,170 LF of 12-inch PVC pipe along Masters Drive from S.R. 16 to Ravenswood Drive.

Install 460 LF of 16-inch HDPE pipe by directional drill under a stream near the intersection of Masters Drive and S.R. 16. Abandon in place the existing 10 and 12-inch CI pipe along Masters Drive.

Project scope of work was increased to include water main and sewer lateral replacement from Ravenswood Drive to Palmer Street. The additional work includes installation of 4,200 LF 10-inch PVC pipe.

Project Location Map (Figure 07)



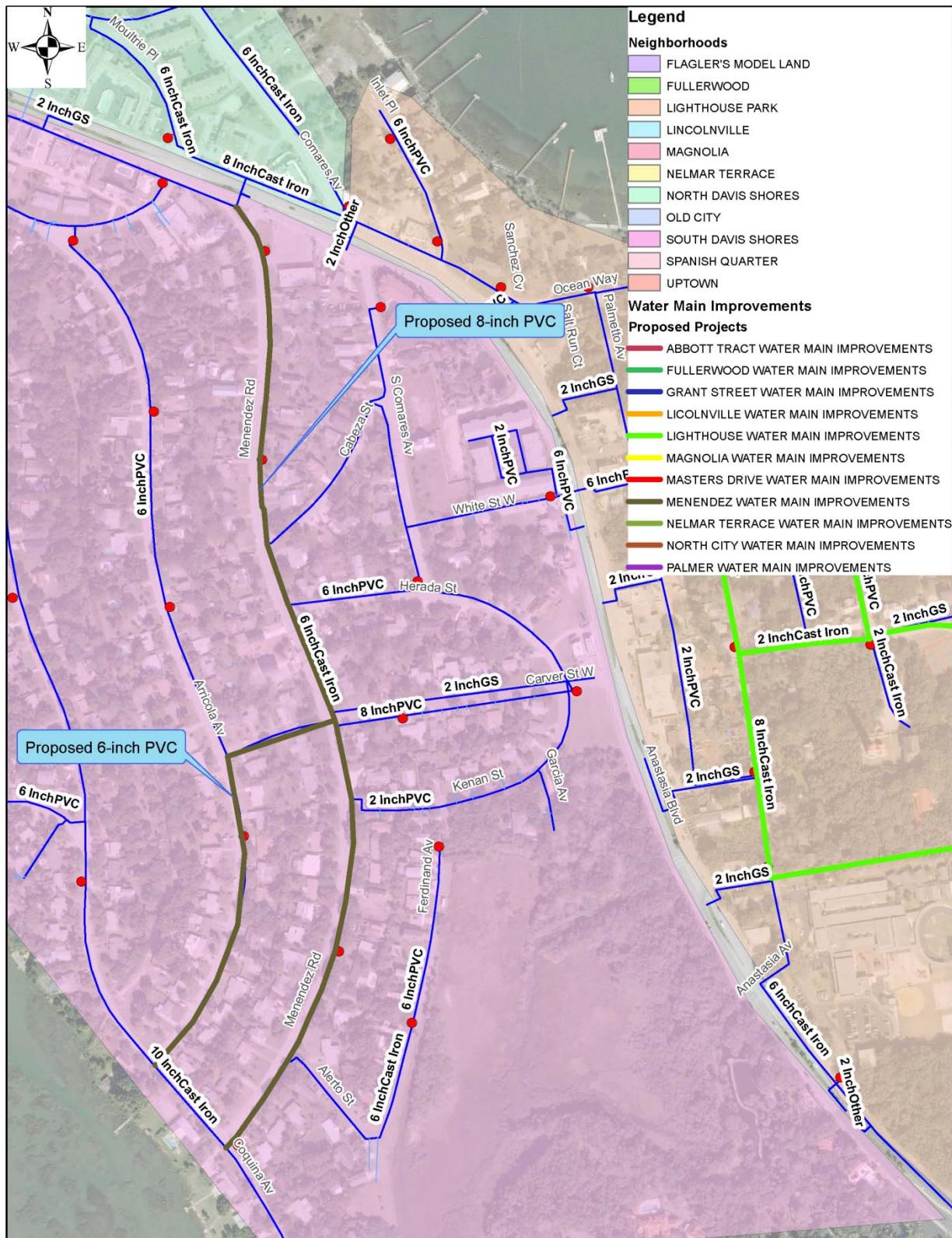
Menendez Water Main Improvements

Scope of Work

Replace 3,035 LF of existing 6-inch CI with 8-inch PVC pipe along Menendez Road between Anastasia Boulevard and Coquina Avenue. Replace 1,025 LF of existing 6-inch CI with 6-inch PVC along Arricola Avenue from Carver Street to Coquina Avenue. Replace 350 LF of existing 6-inch CI with 6-inch PVC pipe along Carver Street between Arricola Avenue and Menendez Road.

Project is under construction.

Project Location Map (Figure 08)



Nelmar Water Main Improvements

Scope of Work

Install 511 LF of 6-inch PVC pipe connecting to the existing 10-inch PVC pipe on Genopoly Street and running to the intersection of Douglas Avenue and Alfred Street. Abandon the existing 3/4 inch service line on Genopoly Street. Replace existing 3,049 LF of 6-inch CI with 6-inch PVC pipe along Douglas Avenue between Alfred Street and May Street, Magnolia Avenue between Milton Street and Nelmar Avenue, Nelmar Avenue between Douglas Avenue and Magnolia Avenue, Magnolia Avenue between Nelmar Avenue and May Street and May Street between San Marco Avenue and Douglas Avenue. A FDOT utility permit will be required for replacing the water main along May Street.

Project is on hold.

Project Location Map (Figure 9)



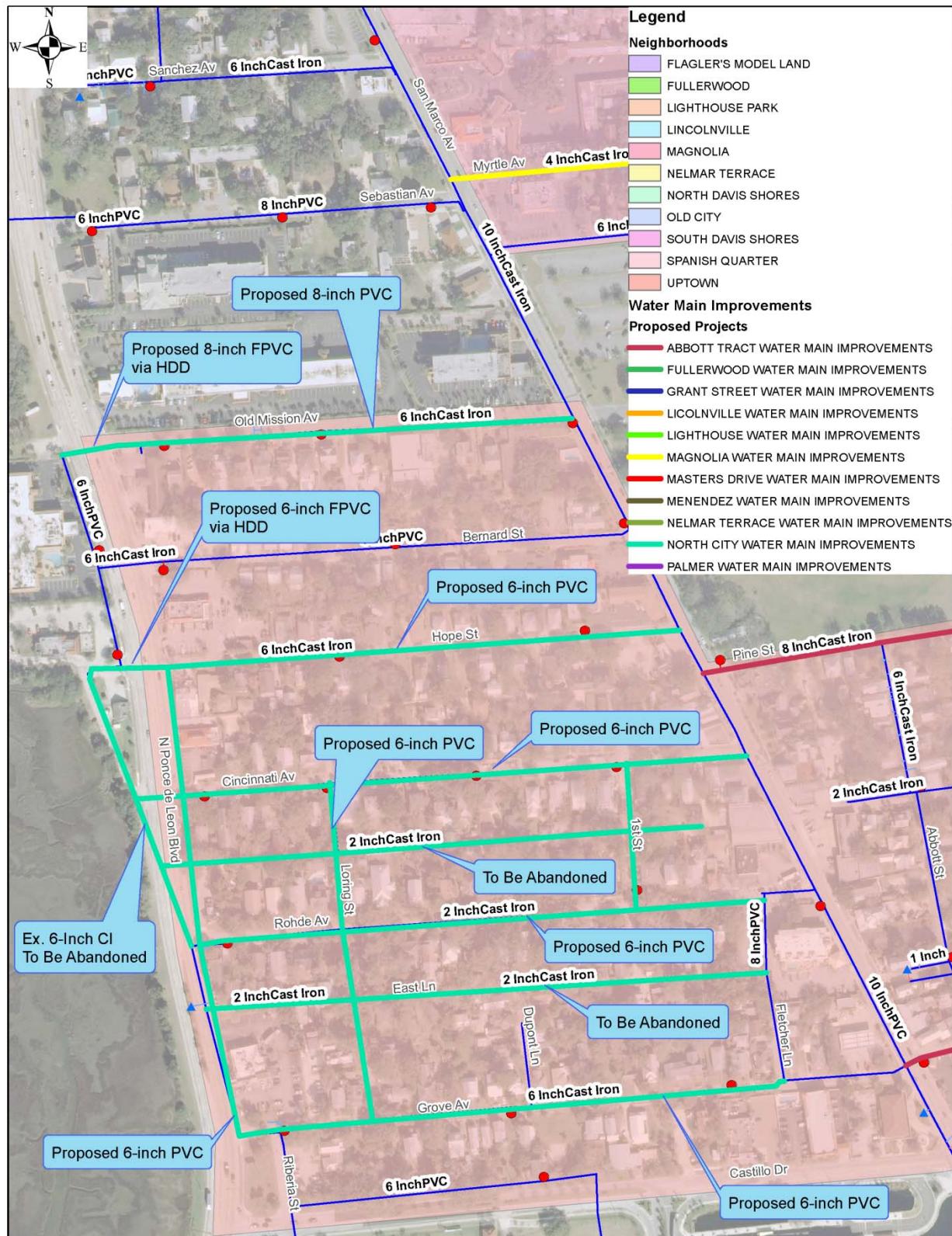
North City Water Main Improvements

Scope of Work

Replace 1,142 LF of existing 6-inch CI with 8-inch PVC pipe from San Marco Avenue to the west side of U.S. 1. Replace 1,260 LF of existing 6-inch CI with 6-inch PVC pipe along Cincinnati Avenue between San Marco Avenue and U.S. 1. Replace existing 2 and 6-inch CI with 6-inch PVC pipe along Loring Street between Cincinnati Avenue and Grove Avenue. Replace 330 LF of existing 6-inch CI with 6-inch PVC pipe along 1st Street between Cincinnati Avenue and Rohde Avenue. Replace 1,265 LF of existing 2-inch CI with 6-inch PVC pipe along Rohde between Fletcher Lane and U.S. 1. Replace 1,230 LF of existing 6-inch CI with 6-inch PVC pipe along Grove Avenue between Fletcher Lane and U.S. 1. Replace 430 LF of existing 6-inch CI with 6-inch PVC pipe along U.S. 1 between Grove Avenue and Rohde Avenue. Install 620 LF of 6-inch PVC pipe along U.S. 1 between Rohde Avenue and Hope Street. Abandon existing 2-inch CI pipes along East Lane alley and alley between Cincinnati Avenue and Rohde. Special attention is to be paid to transferring the residential and commercial water services from the alleys to Cincinnati Avenue and Rohde Avenue. The existing 6-inch CI pipe crossing U.S. 1 diagonally is to be abandoned. A FDOT utility permit is required for the work proposed at San Marco Avenue and U.S. 1.

Project is under design.

Project Location Map (Figure 10)



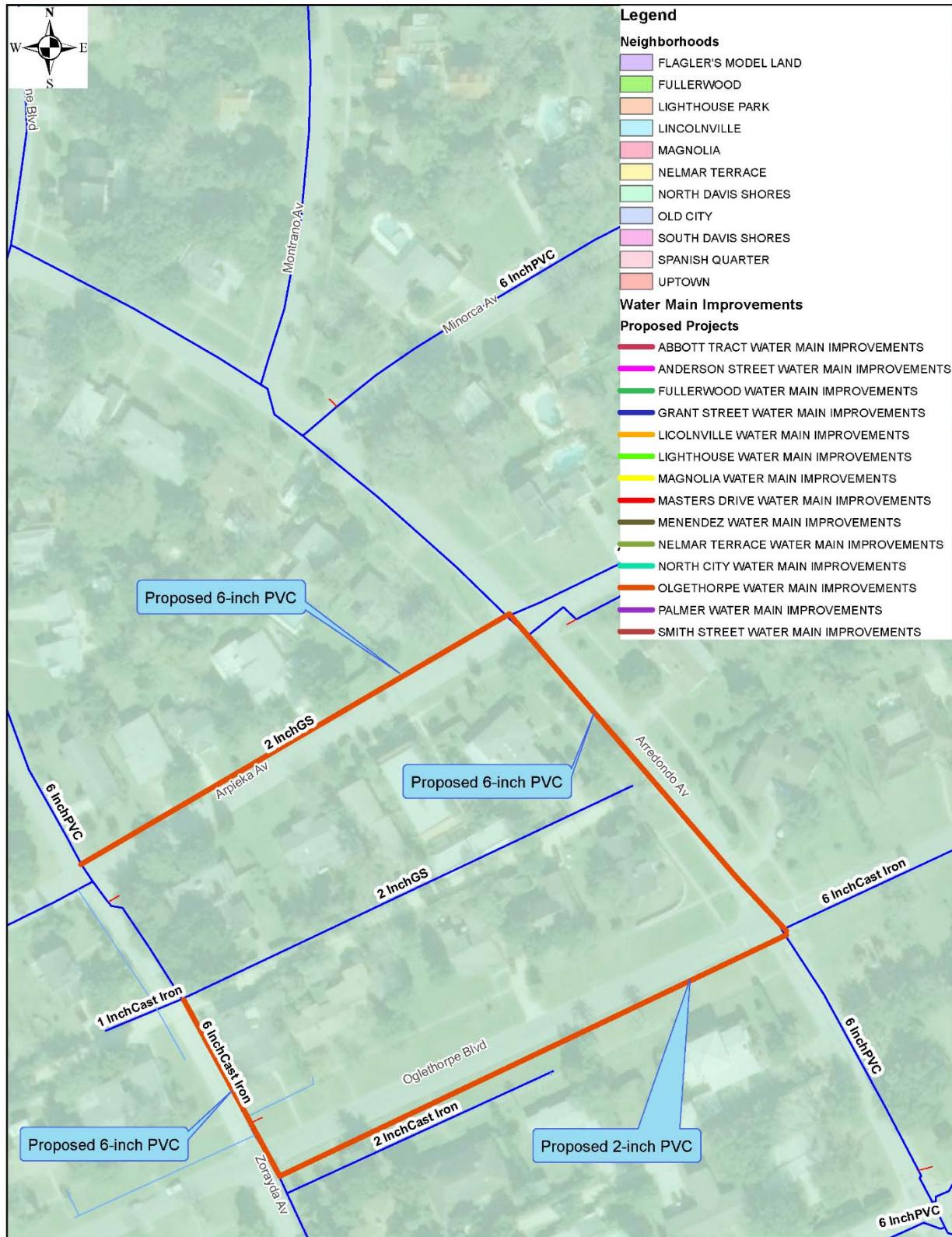
Olgethorpe Water Main Improvements

Scope of Work

Install approximately 210 LF of 6-inch PVC pipe along Zorayda Avenue, 375 LF of 6-inch PVC pipe along Arrendondo Avenue from Arpieka to Olgethorpe, 475 LF of 6-inch PVC pipe along Arpieka Avenue from Arrendondo to Zorayda and 540 LF of 2-inch PVC pipe along Olgethorpe Boulevard from Zorayda to Arrendondo. This project will be designed and constructed by the City.

Project is under design.

Project Location Map (Figure 11)



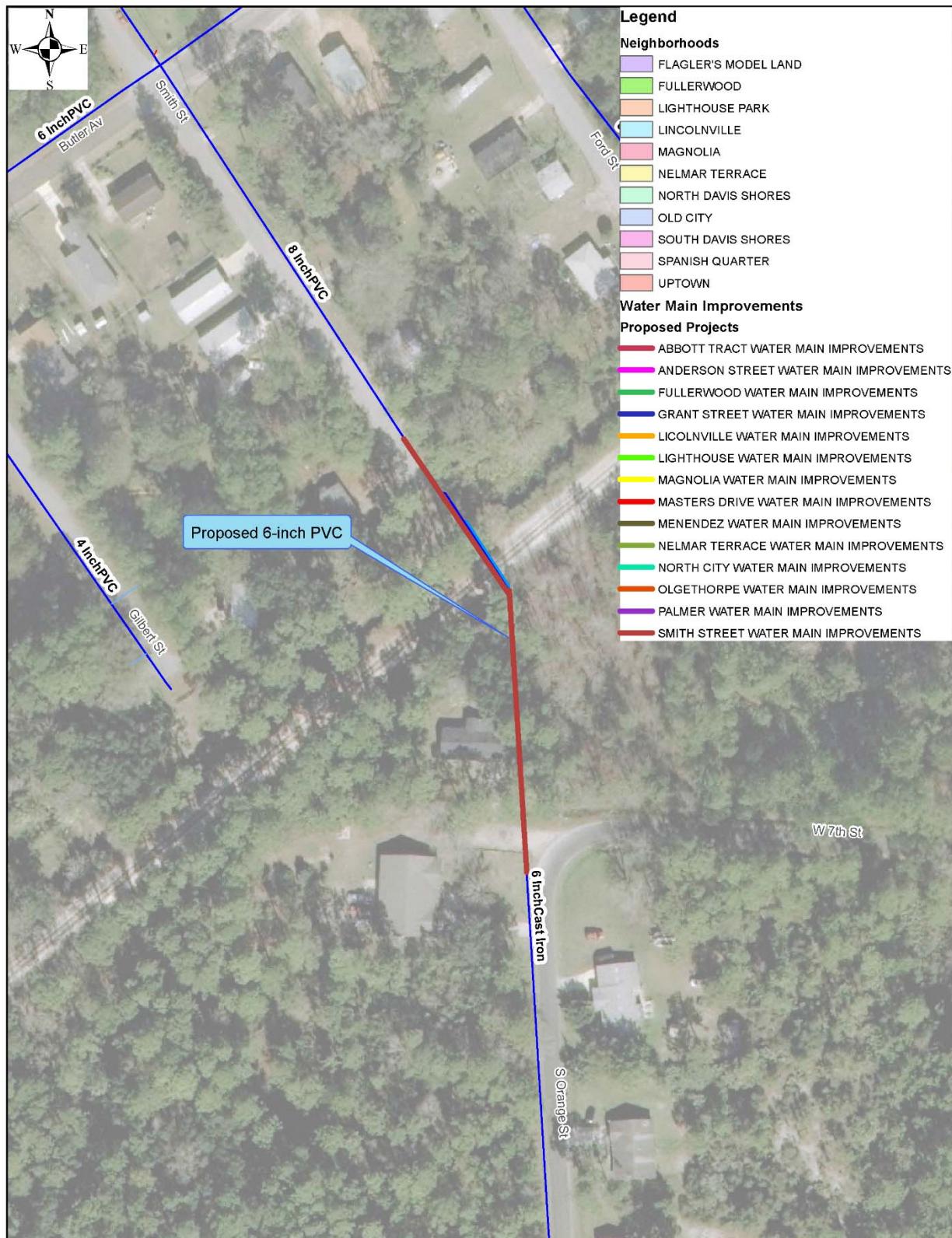
Smith Street Water Main Improvements

Scope of Work

Design, permit and construct the replacement of approximately 350 LF of existing 6-inch water main along the south end of Smith Street, across F.E.C. railroad tracks and along the north end of South Orange Street from the railroad tracks to 7th Street. Design and construction will be performed by the City.

Project is under design.

Project Location Map (Figure 12)



Preliminary Archaeological Considerations

Carl Halbirt, City Archaeologist provided the following preliminary considerations regarding archaeology in reference to the proposed projects:

Most of the project areas are within archaeological zones or are in areas that may contain significant deposits, but aren't within an actual zone. The following provides you with a brief narrative of each project area, whether it occurs within an archaeological zone, and what deposits may be encountered. Determining archaeological resources that may be affected during construction is based on historical documents and archaeological investigations that have occurred in the immediate project area.

Probably the least likely project areas to contain archaeological deposits are the Palmer and Masters Drive water main improvements. Both are situated on the west side of the San Sebastian River and both are probably slightly inland from where the historical marsh boundary would have occurred based on overlaying the 1860 Dorr Map on top of the 1900s U.S.G.S Quad Map. Even so, the possibility cannot be ruled out that prehistoric sites (ca. 4,000 to 500 years ago) may occur. The St. Johns Country cultural resources map has identified estuary zones as having a high probability for archaeological deposits. Moreover, there is evidence of an early historical mission site somewhere along the west bank of the San Sebastian River somewhere near the north end of the Palmer project or at the south end of the Maters Drive project. According to the Hernando Mestas Map of 1593, this mission site was known as San Sebastian de Yaocos, and contained seven structures. These structures had crosses at the top of the roof indicating a Christianized community.

The other two project locations which also are unlikely to contain archaeological deposits are Menendez and Lighthouse project areas. Of the two, the Menendez project area is the least likely as it is within marshland reclaimed in the early 20th century with the development of Davis Shores. The Lighthouse project is within Archaeological IIIB and most of the archaeological remains date to the construction of the current lighthouse and subsequent development of the neighborhood. Nice trash deposits have been found near the lighthouse. Some prehistoric deposits also have been found in this zone near White Street. Most city archaeological projects that have occurred in this zone have turned up little (if any) archaeological remains.

One other project area, which is not within archaeological zones, but has the potential for containing a significant archaeological resource is the North City area. Some of the streets within this zone may bisect the historic 18th century Horneque Line: a defensive line that extended from Hospital Creek to the San Sebastian River. This line consisted of an earthen

berm and an accompanying moat. Soil sediments associated with the moat would still be present. Streets that may bisect this line are Cincinnati Ave. and Rhode Ave.

Excluding the Lincolnville project, the remaining projects areas are within Archaeological Zone IIA: a zone that covers the western shoreline of the intercoastal waterway, or North River. This zone is known to contain a diverse assortment of archaeological sites dating from the prehistoric era to the recent past. Archaeological remains present in the Abbott Tract consist of 18th-century deposits associated with the mission community of Nombre de Dios and mid- to late 19th century deposits associated with the development of the Abbott Tract—St. Augustine's first suburban neighborhood. Archaeological remains present in the Magnolia project area date consist of Native American sites dating from 4,000 to 500 years ago, the 16th to 17th century mission site of Nombre de Dios (the original location), and late colonial farm sites. The Nelmar Terrace area is essentially a continuation of the Magnolia area containing late prehistoric to colonial era deposits (circa A.D. 1000 to A.D. 1800). Locations along the eastern side of the Fullerwood project area are known to contain late prehistoric Native American deposits. Between 25 to 50 percent of the archaeological projects conducted at residential units within these respective areas contained archaeological artifacts and/or features indicating the likelihood that archaeological deposits will be unearthed when ground-penetration construction occurs.

The Lincolnville project area, which is complete, is in Archaeological Zone IIC, which is known to contain deposits associated with the 18th century mission community of Pocolataca and 19th century urban farmsteads and/or plantations. Monitoring has occurred along Oneida Street and Washington Street, with archaeological features being documented in the construction trench profiles and artifacts collected from the spoil piles associated with mechanical digging. The Lincolnville project area clearly illustrates the importance of working in tandem with construction contractors in both those areas that occur within archaeological zones to insure that St. Augustine's non-renewable archaeological heritage is documented, as specified in the City's Archaeological Preservation Ordinance. Project areas that occur outside archaeological zones—while not protected under the ordinance—should be monitored if it is suspected that significant archaeological resources may be exposed and disturbed (e.g., the North City area).

It is recommended that archaeological monitoring be a component of those improvement projects that occur within archaeological zones, as well as those zones suspected to contain archaeological deposits. Those project areas requiring monitoring for all or most of the construction activities are: Abbott Tract, Magnolia, Nelmar, and Fullerwood. It is recommended that spot monitoring be implemented for Palmer, Masters, and Lighthouse project areas. Only the Menendez project area is outside this recommendation. Because 5 of the 9 project areas will require extensive presence of the City Archaeologist and/or assistant, it

is strongly suggested that a schedule be worked out such that there is no conflict with other projects the City's archaeology program is engaged in for 2014 and 2015.

Plan Recommendations

Coordinate with the City's archaeology program and continue to move forward with the proposed water main improvements using bond and operating utility funds. Planning for the second phase of water main improvements is anticipated to begin late-2014.