

# Urban Infrastructure



## SECTION 9 – URBAN INFRASTRUCTURE

### Introduction

Infrastructure is the framework by which a city functions and consists of built facilities (under and above ground) that assist in the promotion of the public's health, safety, and welfare. In the City of Navasota, the water, wastewater, gas, solid waste, and storm water systems comprise the infrastructure for the community. The infrastructure systems and components are described in this section.

### Water System

The water system of the City of Navasota was initially constructed in the 1920's. Installation started in the Downtown area and spread outward as the City grew. Today, water lines are constructed as needed in developing areas and rehabilitated when needed in established areas. One project the City recently undertook was the replacement of water meters from dated technology to a new digital system that allows the meter reader to access information using a laptop computer.

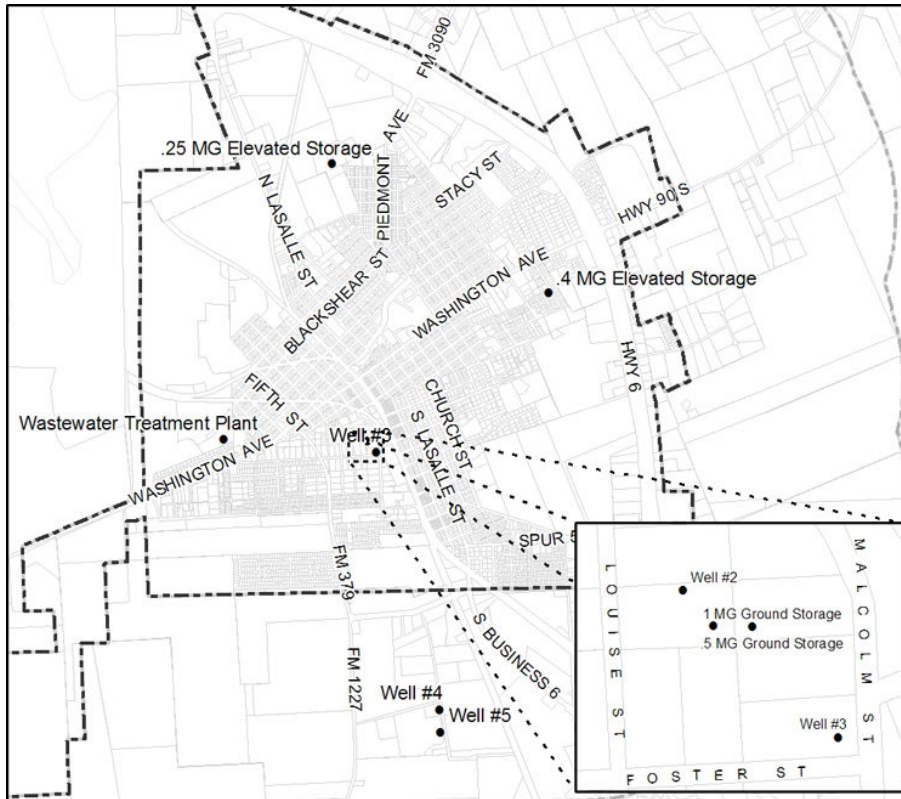
Navasota currently has six well sites located in various parts of the City. These wells draw water owned by the City as well as the Bluebonnet Water Conservation District. Map 9.1 displays well locations and Table 9.1 identifies individual well capacities. Two wells are located outside of the city limits.

**Table 9.1: Water Well Description**

---

Well	Established	Depth in Feet	Daily Capacity Gallons
2	1955	755 ft	856,800
3	1948	260 ft	439,200
4	1968	342 ft	433,200
5	1981	355 ft	607,680
6	1988	420 ft	849,600
7	1997	420 ft	1,298,880

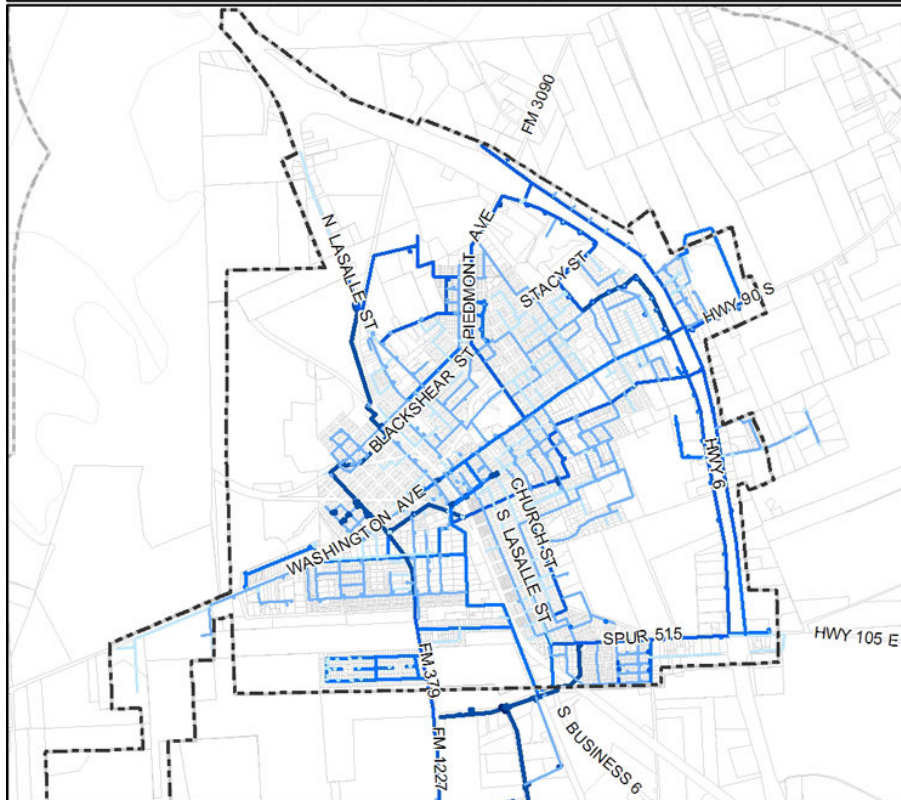
Texas Target Cities Team



**Map 9.1: Well and Storage Tank Locations**

**Water Wells & Tanks**

- Storage
- Well
- WWTP

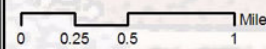


**Map 9.2: Water Infrastructure**

**Water Lines**

Diameter

- 14 inch
- 12 inch
- 10 inch
- 8 inch
- 6 inch
- 4 inch



Well, storage tank, and water lines were converted from AutoCAD files which are maintained by the Navasota Public Works Department. The GIS conversion represented in this map should not be considered highly accurate, particularly in the southern portion of the City. These converted files should be used merely for general location and size analysis, and where accuracy beyond the scope is needed, the official can files should be utilized.

Water is stored in one of four storage tanks. There are two ground and two elevated storage tanks. Map 9.1 identifies the storage tank locations and Table 9.3 provides the storage tank details. One elevated storage tank has a capacity of 250,000 gallons and the other has a 400,000-gallon capacity. The ground storage tanks are located adjacent to the water treatment plant and hold one million gallons and 500,000 gallons respectively.



0.4 MG Elevated Water Tower

**Table 9.2: Water Storage Tank Description**

Type	Year Built	Storage Capacity in Gallons
Elevated storage tank #1	1955	400,000
Elevated storage tank #2	1990	250,000
Ground Storage tank #1	1968	500,000
Ground Storage tank #2	1968	1,000,000

City of Navasota Staff

Water is pumped from the well sites through various pipes ranging in size from 6 to 8 inch, with 12 inch main trunk lines. According to officials, the water quality of Navasota is said to be very good. The water quality is not considered to be excellent because some of the water pipes are made of cast iron and lead. Navasota water is scale forming, implying that it has a high calcium, iron, and manganese content. Hydrogen sulphide is also present in the water, but is removed by aeration during the water treatment process. The capacity of the water treatment plant is 3.4 million gallons per day. The average daily production at present is about 1.0 million gallons per day, which is approximately 29% of the plant’s capacity.

Map 9.2 shows the existing water delivery system, including waterline diameters.

Table 9.2 shows the Water Analysis Metals Report from Texas Department of Health, which lists the Navasota water constituents.

**Table 9.2: Water Analysis Metals Report**

Constituent name		Result	Units
Aluminum	<	0.05	Mg/l
Arsenic	<	0.002	Mg/l
Barium		0.152	Mg/l
Cadmium	<	0.0012	Mg/l
Calcium		25.30	Mg/l
Chromium	<	0.02	Mg/l
Copper		0.006	Mg/l
Iron		0.79	Mg/l
Lead	<	0.0011	Mg/l
Magnesium		2.66	Mg/l
Manganese		0.024	Mg/l
Mercury	<	0.0004	Mg/l
Nickel	<	0.02	Mg/l
Selenium	<	0.0025	Mg/l
Silver	<	0.01	Mg/l
Sodium		213.00	Mg/l
Antimony	<	0.0040	Mg/l
Beryllium	<	0.001	Mg/l
Thallium	<	0.0010	Mg/l
Zinc	<	0.02	Mg/l
Total hardness as CaCO <sub>3</sub>		74.1	Mg/l

City of Navasota Staff

## Wastewater System

The majority of Navasota is served by a traditional centralized wastewater system, however, approximately 3% of the City utilizes septic systems. Wastewater collected from residential, commercial, and other land uses is collected utilizing wastewater lines and treated at the City's wastewater treatment plant. The treatment plant utilizes primary, secondary, and tertiary treatment. The wastewater treatment plant is currently operating at 50% capacity, treating approximately 1.8 million gallons per day.

Wastewater lines range in size from 6 inch, 8 inch, 10 inch, and 12 inches. There are two 18" trunk lines that directly feed into the wastewater treatment plant.

Forced main lines (pressurized wastewater lines) are installed in areas where gravity sewers cannot function. Map 9.3 displays the location and size of sewer lines. The City also has eleven lift stations to assist in the wastewater collection process where the topography does not allow for gravity flow. Once waste is collected, it undergoes several processes including chlorination, oxidation, and dechlorination. When the tertiary process is complete the liquid outflow is released into Cedar Creek. The solid waste, also known as “sludge” is removed from the cleaning units and hauled to the Brazos Valley Compost Center.

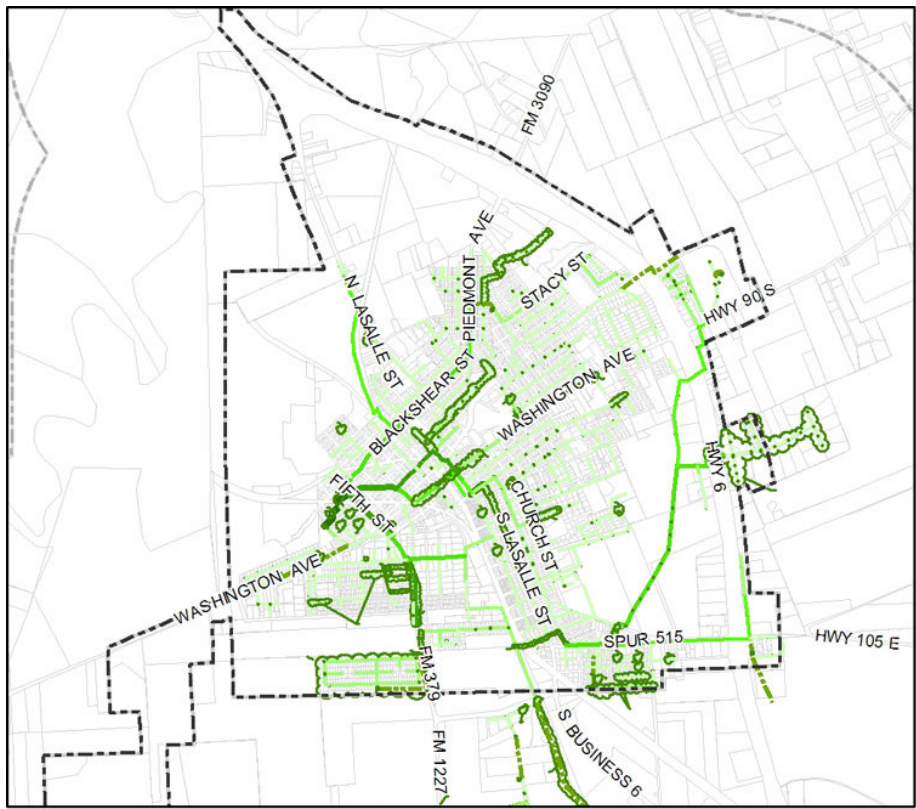
Most residential homes, commercial businesses, and industrial companies tie directly into the Navasota wastewater treatment system for processing. However, one company located in the industrial park, the International Paper Company pre-treats its wastewater before it is discharged into the City's wastewater system. This procedure ensures proper treatment of wastewater so as not to contaminate the City's system.

## **Natural Gas**

The City of Navasota owns the gas lines in the community and is involved in the installation, maintenance, and operations of all gas lines. The Celco Company is the City's natural gas supplier. Natural gas enters the City through a gas gate located in the southeastern section of Navasota where the natural gas provider monitors the volume. From that point the natural gas flows through pipes to service residential, commercial, and industrial users. Natural gas lines are mainly made of PVC. The meter and regulator station reduce the pressure from 175-275 psi to 56 psi, which is a more manageable level. The gas is then distributed to households and businesses. Map 9.4 displays the location and size of the gas lines.

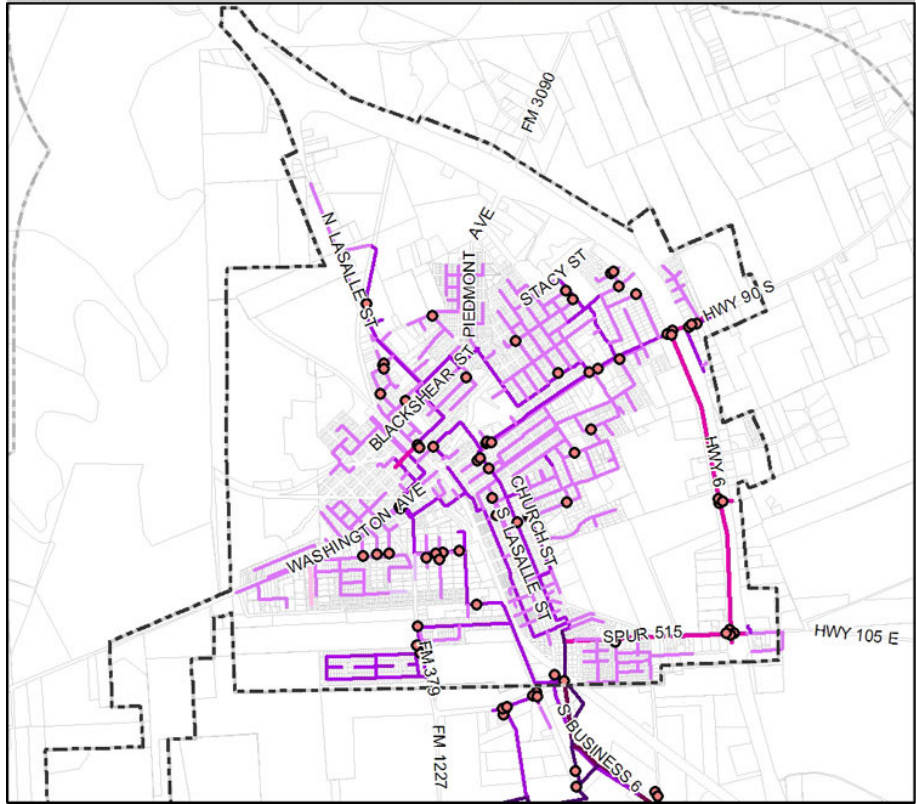
## **Solid Waste Management**

Prior to 1986, the City of Navasota operated a landfill in the southeast part of the City on county road 415. Navasota's landfill was closed in 1986 because it had reached its design capacity. The landfill was reclaimed and the land is currently being leased out to a hay farmer.



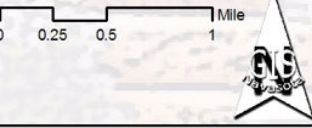
**Map 9.3:  
Wastewater  
System**

- Sewer Lines**
- Air Release Valve
  - 21 inch
  - 18 inch
  - 15 inch
  - 12 inch
  - 10 inch
  - 8 inch
  - 6 inch
  - Forced Main



**Map 9.4:  
Natural Gas**

- Gas Lines**
- Line Type
- 6 Inch Steel
  - 4 Inch Steel
  - 2 Inch Steel
  - 6 Inch Poly
  - 4 Inch Poly
  - 2 Inch Poly
  - 1 1/4 Inch Poly
  - 1 Inch Poly
  - 2 Inch PVC



Wastewater and natural gas lines were converted from AutoCAD files which are maintained by the Navasota Public Works Department. The GIS conversion represented in this map should not be considered highly accurate, particularly in the southern portion of the City. These converted files should be used merely for general location and size analysis, and where accuracy beyond the scope is needed, the official CAD files should be utilized.

The City of Navasota is currently under a contract with Browning-Ferris Industries (BFI) for its residential trash collection. Annually, Navasota discards approximately 3,673 tons of trash. The City is divided into two collection areas. Curbside collection occurs for the two collection areas. Each resident of Navasota is allowed to place one large bulk item for weekly collection. BFI contracts separately with the commercial businesses in Navasota in which trash is collected five days a week from trashcans as well as small and large dumpsters.

The City of Navasota does not have a city sponsored recycling center. BFI does not collect wood and brush debris. Instead, the City collects the material for one quarter of Navasota each week on a continuous rotating cycle. With funds provided from grants, the City was able to purchase a commercial wood chipper. The collected material is chipped and composted for resale to the public at a cost of \$5 per cubic yard.

### **Storm Water System**

According to City Staff, the storm water sewer system was installed as a Works Progress Administration (WPA) project in the 1930's. The storm drainage system has pipes 6 feet in diameter made from quarried sandstone. Currently, there is no documentation as to the location of this infrastructure. The locations are known only through the individual recollection of the staff of the Public Works Department. The system discharges into Cedar Creek, which runs just north of Washington Avenue in Downtown Navasota and to Sandy Creek, which runs south of Downtown Navasota. Navasota is currently involved in mitigation procedures of these outlets caused by sedimentation occurring during times of inclement weather.

### **Electrical, Cable, and Telephone**

Electricity providers for the City of Navasota are Entergy and Synergy. The cable service is provided by Northland. Telephone service is provided by Sprint.



## **Utilities Outside The City Limits**

Water supply, wastewater treatment, and natural gas services are provided to residents and businesses located outside of the city limits. These services cater primarily to the industrial area and to some residential developments.

Industrial park users must pay a fee to the City of Navasota for the utilities provided. The fee is roughly 50% of the ad valorem property taxes based on the assessed property valuation. Residential areas located outside of the city limits must pay for utility services provided by the City and their rates are 1.5 times higher than the rates of the people living in the City.

## **Current Trends**

Navasota has not experienced significant growth over the last 10 years. The current growth is mainly near the Highway 6 Bypass.

The southwest part of Navasota near the airport is also growing but not at a high rate. Growth in Navasota depends largely upon where developers are willing to invest their money. Since there is no major infrastructure in the southwest part of the City, development proves to be costlier than the area near the Highway 6 Bypass. There is infrastructure (water, sewer and natural gas) between Highways 105 West and 90. However near Highway 3090 there are limited infrastructure facilities.

Sources:

City of Navasota Staff