

Brandon-Irene WSC Plant Operations and Maintenance Manual

TX1090018

RN101437325

CN600656615

February 2025

Operations & Maintenance Manual

A. Raw Water Sources

Describe the water source information (aquifer, surface water body, source of purchased water) PWS Well Name, TCEQ Well ID #, well depth, location of the well, date the well was drilled, and well pump capacity. This process should be somewhat standard for groundwater facilities, with a few variations in the equipment size and control settings. Include a well log if you have it available.

Plant 1- Groundwater production plant was built in 1966 and utilizes one well.

Well 1 (2598 ft deep) - drilled in 1966, pump capacity – 141 GPM

G1090018A from the Trinity Aquifer is located at 1590 FM 1243, Brandon, TX.

Plant 4- Blending station built in 1979 and utilizes groundwater from Well 4 and purchased treated surface water from Aquilla WSC. The Aquilla WSC contract allows for 222 GPM daily.

Well 4 (2205 ft deep)- drilled in 1979, pump capacity - 110 GPM

G1090018B from the Trinity Aquifer is located at 5822 HWY 22, Hillsboro, TX.

Plant 5- Blending station built in 2017 and utilizes water from Plant 4 and groundwater from Well 5.

Well 5 (2196 ft deep)- drilled in 2017, pump capacity - 143 GPM

G1090018C from the Trinity Aquifer is located at 145 CR 3123 E, Hillsboro, TX.

B. Treatment Plant Description & Design

Describe the treatment process (all equipment included) and type of chemicals used, how they are injected, and what residual goal you attempt to achieve. List any emergency interconnections or backup water sources if available.

The system design includes: Three treatment plants (1, 4 and 5). At plant 1, Well 1 pumps into the ground storage tank (50,000 gallons). Two booster pumps use suction to pump the potable water into the distribution system under a pressure tank (4,000 gallons) that is controlled by a pressure switch located in the pumphouse. At plant 4, Well 4 pumps into the ground storage tank (100,000 gallons) where it blends with treated surface water from Aquilla WSC. Two booster pumps use suction to pump the potable water into the distribution system under a pressure tank (7,500 gallons) which is controlled by a pressure switch located in the pumphouse. At plant 5, Well 5 pumps into the elevated storage tank where it blends with Plant 4 water. The elevated storage tank provides pressure for the pressure plane. All plants utilize chlorination (gas chlorine) that is added with a chlorine regulator and water injector at each treatment plant. A free chlorine residual is to be maintained between 2 and 1.5 mg/L at the plant, to allow for required residuals in the distribution lines. This system purchases treated surface water from Aquilla WSC that is provided through an elevated storage tank owned by the City of Hillsboro. The system actively serves 719 connections and 2,000 people.

C. Plant Design Criteria & Capacities

A distribution map of the system is available at the end of the O&M manual. The plant capacities are as follows:

WELL:

Plant 1- One submersible pump rated at 85 GPM.

Plant 4- One submersible pump rated at 135 GPM.

Operations & Maintenance Manual

Plant 5- One submersible pump rated at 185 GPM.

GROUND STORAGE TANK:

Plant 1- One AWWA ground storage tank at 50,000 gallons

Plant 4- One AWWA ground storage tank at 100,000 gallons

Plant 5- One AWWA elevated storage tank at 250,000 gallons

BOOSTER PUMP:

Plant 1- 20 hp rated at 300 GPM each. Two pumps on-site.

Plant 4- 45 hp rated at 275 GPM each. Two pumps on-site.

PRESSURE TANK:

Plant 1- One 4,000-gallon hydropneumatic tank

Plant 4- One 7,500-gallon hydropneumatic tank

CHLORINE FEED:

Plant 1- Rotometer setting is 7 lbs/day

Plant 4- Rotometer setting is 15 lbs/day

Plant 5- Rotometer setting is 7.5 lbs/day

D. Major Components & Processes

1. WELL

Plant 1- The float switch in the Ground Storage Tank controls the well. The well comes on automatically when the level in the Ground Storage Tank drops below a pre-determined level. The well can also be turned on manually at the tank. The manual switch is needed to check the well during monthly routine checks. If the well does not operate with the manual switch on, then a check of the breaker, telephone relay connections, and/or starter resets, at the well location, should be done. If the well still does not operate, then an electrician should be called to test pump motors.

Plant 4- The process is the same as plant 1.

Plant 5- The level transducer in the Elevated Storage Tank controls the well. The well comes on automatically when the level in the Ground Storage Tank drops below a pre-determined level. The well can also be turned on manually at the tank. The manual switch is needed to check the well during monthly routine checks. If the well does not operate with the manual switch on, then a check of the breaker, telephone relay connections, and/or starter resets, at the well location, should be done. If the well still does not operate, then an electrician should be called to test pump motors.

2. GROUND STORAGE TANK

Operations & Maintenance Manual

The ground storage tanks are equipped with a float switch, which controls the whole plant at Plants 1 and 4 depending upon the water level in the ground storage tank. The float turns the wells off and on at a pre-determined level.

The elevated storage tank has a level transducer, which controls the whole plant at Plant 5 depending upon the water level in the elevated storage tank. The transducer turns the well off and on at a pre-determined level.

3. BOOSTER PUMPS

Plant 1- The pressure switch at the pressure tank controls the booster pumps. They operate automatically depending upon the water level in the pressure tanks. The pump can be manually operated at the control switch.

Plant 4- The pressure switch at the pressure tank controls the booster pumps. They operate automatically depending upon the water level in the pressure tanks. The pump can be manually operated at the control switch.

4. PRESSURE TANK

Plant 1

The 4,000-gallon pressure tank has a pressure relief valve, a pressure gauge, and a drain valve.

Plant 4

The 7,500-gallon pressure tank has a pressure relief valve, a pressure gauge, and a drain valve.

5. ELECTRICAL & CONTROLS

The central breaker panel contains a main breaker, which turns off all the power inside the plant, and several smaller breakers to turn off individual pumps, air compressors, lights, and other electrical outlets. The motor starters are for each individual pump motor and contain motor protection in each. All pumps, motors, and chemical feed pumps can be manually or automatically turned on and off at the main panel. It contains relays, alternators, and manual-off-auto switches.

6. CHLORINE FEED EQUIPMENT

At all plants, gas chlorine is injected into the well line prior to entry into the water storage tank with a water injector. The chlorine dosage is adjusted manually. Once the water level in the storage tank reaches the top, the controller will stop the well motor and chlorine feed. The only way the chlorine feed can be turned on manually is to turn the well on manual at the control switch. This is done to prevent the chlorine feed system from injecting chlorine when the well is not running.

Operations & Maintenance Manual

E. Start Up Procedures

If for any reason the system has been offline or down, the steps for startup of the plant are as follows:

Plants 1, 4 and 5-

1. Turn all switches on the main control panel to the OFF position.
2. Check the main power source from the electrical company.
3. Check all the breakers to be properly reset to ON position.
4. Check and reset all monitor starter resets.
5. At the main control panel turn the well switch to ON. The well and chemical feed pumps should start at this time.
6. From the main control panel turn either of the Booster Pump Switches to the ON position. The pump that was turned to the ON position should start as the storage tank level is above the suction line. Starting the pump will cause the water level and pressure to build in the pressure tank at Plants 1 and 4. If the tank does not have enough level, then wait until it does, and the Booster Pump will start.
7. At Plants 1 and 4, When the Booster Pump builds enough pressure in the pressure tank it will shut off.
8. At this time all switches should be in the ON position on the main control panel, and the plant should be back to complete automatic operation.
9. All flush valves to be opened one or two at a time. They should be run until all air is removed from the distribution system, and a free chlorine residual of at least 0.2 mg/L is obtained at the farthest reaches in the distribution system.

Operations & Maintenance Manual

Daily

1. Conduct a visual check of premises daily for trash or damage to fence/ building.
2. Conduct a visual check of pumps, tanks, piping and other equipment for leaks or problems.
3. Conduct a visual check of storage tank and system pressure.
4. Read water meter(s) daily and note usage in daily log sheet.
5. Verify that usage is in normal range of daily usage and system does not appear to have a leak.
6. Record system pressure daily in log sheet.
7. Record minimum and maximum pressures of pressure tanks if applicable to site.
8. Record chlorine usage and note it daily.
9. Test chlorine residual at Plants 1, 4 and 5 and record daily. Make adjustment if needed. Chlorine should be between 1.0 mg/L and 2.0 mg/L.
10. Collect and record disinfectant residuals in the distribution using the sites noted on the Monitoring Plan and Sample Siting Plan.
11. Record any distribution flushing with date, location and estimated amount of water flushed with comments on work orders and turn into office manager/ supervisor.
12. Record any leak/repair locations with estimated losses during the leak on work orders and turn into office manager/ supervisor.

Monthly

1. Collect at least two (2) microbiological samples from the Monitoring Plan and Sample Siting Plan for analysis and deliver to NELAP approved laboratory with a completed MRF form.
 - a. Be sure that the sample was collected properly and follow coliform sample collection SOP. If there is a problem, collect repeats according to TCEQ rules.
 - b. Confirm that all samples are negative. If needed, retake sample(s) according to TCEQ rules.
2. Mow and clean the outside of the plant building which includes but is not limited to, clearing the fence of any undergrowth and any other general facility cleanup.
3. Prepare the monthly operation report from the daily log sheet information and file accordingly.
4. Flush any dead ends in the distribution system and record them in the flushing log. Estimate the amount of water lost and note on work order. Turn work order into office manager/ supervisor.
5. Check chlorine feed pump(s) and injector, well, flow meter, pumps, pressure tanks, storage tanks and ensure all are operating properly.

Quarterly

1. Complete the 90-day disinfectant residual analyzers verification, use appropriate log.
2. Be available to assist the TCEQ quarterly sampler when needed.

Operations & Maintenance Manual

Annually

1. Complete the annual tank inspections and inspection form.
2. Check the wellhead and the well sealing clock for any cracks and/or needed caulking.
3. Check and replace the screen openings, i.e. the well vent, tank vents, etc.
4. Change the filter for air compressors.
5. Conduct minor repairs and painting touch ups to storage and pressure tanks.
6. Exercise all valves.
7. Check water level in all wells and record.
8. Check and record well drawdown levels and GPM.
9. Check and record all motor starter delay switch settings.
10. Check and record all pressure setting (on/off for booster pumps) and alternating switching is working or not.
11. Check and calibrate all level indicators, scales, gauges, and switches for operation and proper storage.
12. Check all control panels for signs of intrusion from water, dirt, weeds, or bugs.
13. Check and update 24 hour phone list for all suppliers of parts and service. Verify that they are still in service.
14. Check heater(s) and air conditioner(s) for safe operations.

Every 3 Years

1. Calibrate or replace the well meter(s).

Emergency Response

1. Water well service company (address and phone number)
 - a. Central Texas Water Well – Bowie, Texas – Nelson Thomas
940-366-1371 or 940-872-6992
 - b. Jurgensen Pump, LLC- Valley Mills, Texas
2. Volunteer Fire Department (if applicable- address and phone number)
 - a. Mertens Volunteer Fire Department, 201 S Berry, Mertens, TX 76666, 903-682-4593
3. Local Fire Department (address and phone number)
 - a. City of Bynum, 205 White Ave., Bynum, TX 76631, 254-626-1071
 - b. City of Hillsboro, 110 W Franklin St., Hillsboro, TX 76645, 254-582-2401
4. Local Sheriff's Department (address and phone number)
 - a. Hill County Sheriff's Department, 406 Hall St., Hillsboro, TX 76645, 254-582-5313 or 911
Emergency

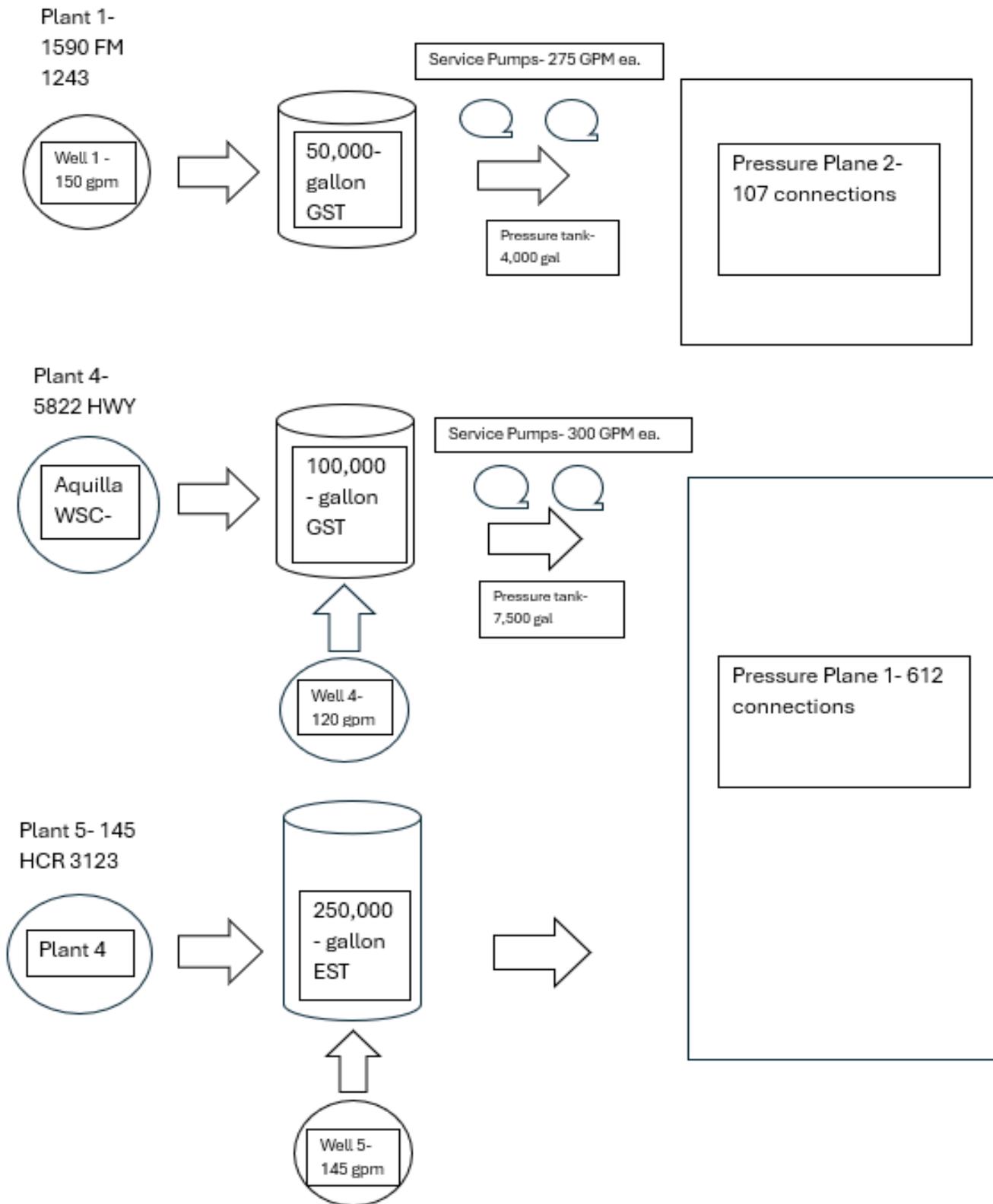
Operations & Maintenance Manual

Records

Records including monthly logs, operation reports, drawings, etc. are kept at the water treatment plant located at 7416 SH 22, Brandon, TX 76621.

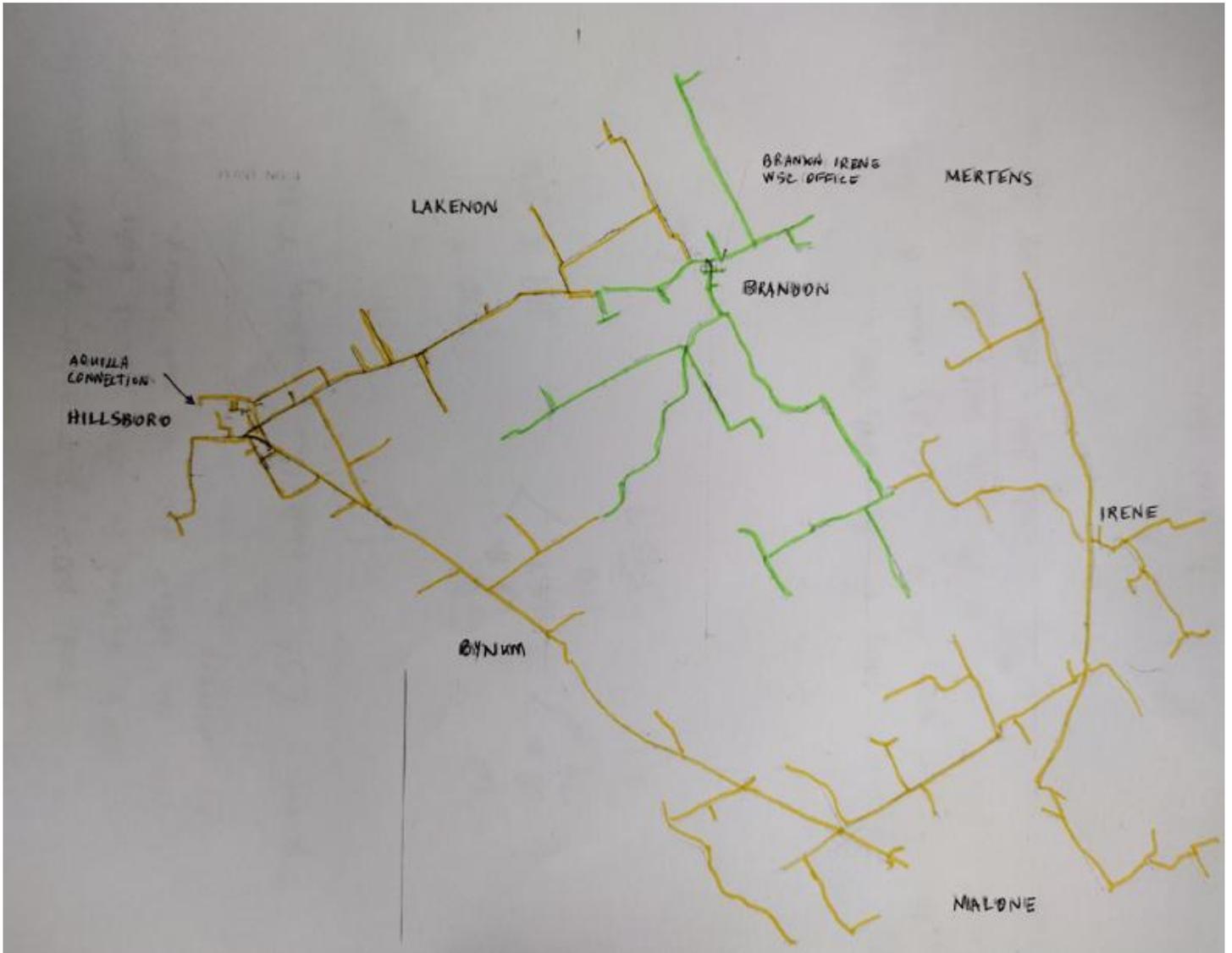
Operations & Maintenance Manual

Diagram of Brandon-Irene WSC.



Operations & Maintenance Manual

Diagram of Brandon-Irene WSC pressure planes.



Operations & Maintenance Manual

Operations & Maintenance Manual

Operations & Maintenance Manual