



2020 Annual Performance Report Land Treatment Facility and Collection System

I. General Information

Facility/System Name:	Jacksonville Land Treatment Facility
Responsible Entity:	City of Jacksonville PO Box 128 Jacksonville, NC 28541-0128
In Charge Contact:	William E. Brown, Chief Operator Anthony Futrell, Utility Services Superintendent
Applicable Permits:	Non-Discharge Permit No. WQ0009267 Collection System Permit No. WQCS00268

The City of Jacksonville's wastewater collection system is composed of approximately 300 miles of sanitary sewer lines and 45 wastewater pumping stations. Twenty pumping stations have on-site generators to provide power in the event of power failures. 25 of the 45 pumping stations have standby connections, which allow them to be powered by portable generators during power outages. In addition, 39 of the pumping stations also have bypass connections that allow the use of portable bypass pumps that will redirect water flow if a power outage occurs. The City currently owns 5 portable generators and 3 portable bypass pumps.



(Image - Aerial of the Jacksonville Land Treatment Site)

The City's Utilities Maintenance Division staff consists of 29 employees and is responsible for maintenance, repair and the proper functioning of the sewage collection system and the maintenance and efficient operation of the wastewater pumping stations.

The Division provides routine inspections of the City's manholes and is responsible for jetting sewer lines to clear blockages. This staff also provides preventive maintenance to all the wastewater pumping stations and generators to ensure optimum operation. A section within the Division is responsible for ensuring all privately owned grease traps are maintained within the City ordinance requirements. The Utilities Maintenance Division also has an Inflow & Infiltration (I&I) Analyst on staff to identify, document, and reduce inflow and infiltration into the City's collection system.

The Jacksonville Land Treatment Site (LTS) totals 7,400 acres of land and is responsible for the treatment and land application of the City's wastewater. The system is presently designed to treat 9.0 million gallons of wastewater daily via spray irrigation of 2,300 acres of primarily loblolly pine trees. Wastewater is transported 8 miles from Jacksonville to the LTS by a 36-inch diameter force main.

Wastewater is treated with hydrogen peroxide for odor removal prior to flowing into the headworks facility. At the headworks facility, the influent (raw wastewater) passes through dual Huber Step Screens where material greater than 1/8 inch in size is removed. The wastewater flows into an aerated grit and grease removal system where inorganic material and floating materials are removed. From there, wastewater move into a series of aerated lagoons where biological treatment of the waste occurs.

Secondary treated wastewater flows into storage lagoons where it is held for irrigation. Storage lagoons have a 690 million gallon capacity, provides storage of treated wastewater during periods of inclement weather and when spray irrigation is not feasible. Treated wastewater is chlorinated to eliminate harmful bacteria and then used to irrigate 2,300 acres of pine forest on the LTS property.

Irrigation fields have three classifications of soil types: Well-drained, Moderately Well-drained, and Seasonally Suitable. These irrigation fields are divided into 28 blocks and the annual hydraulic loading for each block is a permitted maximum ranging from 49.0 to 62.6 inches/acre, depending on the relative percentage of each soil type. As the pines mature and their ability to store nutrients decreases, the mature trees are harvested and used for pulp wood. Young seedlings are planted to repeat the cycle.

The Land Treatment Facility is staffed by the Chief Operator, seven Wastewater Plant Operators, three Plants Maintenance Mechanics, one Plants Maintenance Worker, a Crew Leader, and three Equipment Operators. The Laboratory Section is also housed at the LTS and is staffed by the Supervising Chemist, assisted by two Laboratory Technicians, who performs all the required analyses and is responsible for the certification of the wastewater laboratory.



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II. Facility Performance

The City of Jacksonville's Land Treatment Facility treated 2,127 million gallons of wastewater during the 2020 calendar year, at an average daily flow of 5,810 million gallons. Hurricane Florence effected the City of Jacksonville on September 12, 2018. During 2018, record rainfall of more than 100 inches increased irrigation and storage lagoon levels at the facility. To maintain the permitted freeboard level of 2.0 feet, City staff followed the guidelines of the Emergency Action Plan required by its permit and implemented emergency irrigation on December 17, 2018. Through notification and discussions with North Carolina Department of Environmental Quality (NCDEQ) Wilmington Regional Office emergency irrigation at the facility ceased on October 7, 2020.

At no time during the calendar year of 2020 did the facility violate the freeboard level of 2.0 feet. In accordance with the permit, City laboratory staff collected surface water samples as stipulated by the guidelines of the City's Emergency Action Plan. There were no negative findings in any of the surface water samples collected. As a result of emergency irrigation, the City exceeded the annual hydraulic loading rates in multiple blocks during 2020. By June 2020, all annual hydraulic loading rates were within permitted limits. The City of Jacksonville is actively working in conjunction with the NCDEQ Wilmington Regional Office to re-evaluate the permitted annual hydraulic loading rates to ensure that the facility continues to operate efficiently.

No other monitoring or reporting requirement violations occurred during the 2020 calendar year.

III. Collection System Performance

There were four (4) reported overflows from the collection system during the 2020 calendar year greater than 1,000 gallons in volume. The locations with overflows that exceeded 1,000 gallons were as follows:

- January 7, 2020: Wardola Culvert Bridge that crosses over East Thompson School Creek. A sewer force main was hit by a contractor who was hired by the City to replace the culvert bridge. Approximately 3,000 gallons of untreated wastewater was estimated to have spilled with 2,000 of those gallons estimated to have reached East Thompson School Creek. None of the wastewater was able to be recovered. The force main has been repaired.
- April 20, 2020: 807 Huff Drive (manhole #5068) approximately 10,080 gallons of untreated wastewater was spilled into a ditch that leads to Northeast Creek. A piece of concrete was found in the line, which caused a buildup and resulted in the wastewater overflow. An emergency environmental contractor was hired and the City recovered 2,850 gallons of the untreated wastewater.
- November 17, 2020: Manhole at Brenda Drive and Onsville Drive (manhole #2824) approximately 10,623 gallons of untreated wastewater was spilled into a nearby stormwater ditch. A dam was built to stop the flow of untreated wastewater in the stormwater ditch. An emergency environmental contractor was hired and they were able to recover 10,553 gallons of untreated sewer water. 70 gallons of untreated sewer water was not able to be recovered. A broken sewer line caused the spill. This sewer line has been repaired.
- November 19, 2020: 106 Fairway Road (manhole #24) approximately 2,510 gallons of untreated wastewater was estimated to have spilled. 710 of those gallons was estimated to have reached Sandy Run Branch. A buildup of rags and grease in the sewer line caused the spill.

The City maintained constant communication with NCDWQ after each of these events to ensure full compliance with Environmental Laws and Regulations. The City continues to identify and remediate inflow and infiltration, as well as rehabilitate wastewater infrastructure to prevent further overflows.

IV. Summary

The City of Jacksonville's Land Treatment Facility and collection system saw excellent performance during 2020. Total rainfall for 2020 was 73.4 inches at the Administration Building of the Land Treatment Facility and the total influent and effluent for 2020 was 2,127 million gallons and 1,744 million gallons, respectively. The City replaced 83 linear feet (LF) of 12-inch sewer pipe during 2020. In addition, new sewer projects totaling 568 linear feet (LF) of 8-inch pipe were added during 2020. The City has ongoing maintenance programs to ensure the wastewater collection system continues to function effectively. The City utilizes cured-in-place lining, point repairs, and manhole lining to reduce or eliminate inflow and infiltration.

Other measures include the rain stopper program, fats, oils, and grease management, and pump station maintenance. The rain stopper program is a continuous effort to insert rain stoppers in manholes to prevent or minimize overflows when heavy rainfall occurs. The Fats, Oils, and Grease (F.O.G.) Management Program attempts to mitigate blockages and other issues through ordinances, grease interceptors, cleaning and maintenance, as well as education and awareness efforts. In Jacksonville, there are 196 establishments with grease interceptors that must be cleaned every 30 days. They are also regularly inspected to ensure compliance. In addition, the City cleaned 168,455 linear feet (LF) of sewer pipe in the collection system during 2020. Lastly, the City has a program that evaluates and replaces pumps in wastewater stations that fail or are over 20 years old.