Preliminary Engineering Report

for

Darlington Pump Stations Upgrades

City of Darlington
Darlington County, South Carolina

November 2018

Prepared by:

ERVIN ENGINEERING CO., INC.
ENGINEERS - SURVEYORS - PLANNERS

341 W. Evans Street
Florence, South Carolina 29501

Ph. (843) 662-4941
www.ervinengineering.com
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INTRODUCTION

This Preliminary Engineering Report will outline the need for upgrading four primary sewer pump stations in the south Darlington area. This area is heavily trafficked with more than 24,000 vehicles on an average day and is seeing unprecedented commercial growth since the opening of Walmart in 2016. The City has received interest from two possible hotels and a number of retail businesses. The benefits of these renovations, along with maps, cost estimates and schedules are outlined in this report.

1. PROJECT COMPONENTS

The City of Darlington is proposing to upgrade the following four sewer pump stations:

**Altel Sewer Pump Station**
This is the primary receiving pump station for the commercial area of south Darlington. The scope of this project will upgrade the internal piping of the pump station, increase the force main size to 6", and replace the control panel. The pumps in the station will be replaced and upsized to a capacity of 400 gpm. A new on-site generator will be located and new fencing to secure the area will be added to the site. VFDs (variable frequency drives) will be added to the pumps to help control energy usage and extend the life of the pumps.

**Joe Louis Pump Station**
This pump station serves a residential area of the City as well as receives all flow from the Altel Pump Station. This project will replace this pump station structure and upsize the pumps, replace interior piping, and the control panel.
Approximately 3,900' of new 6" force main will be installed to carry the effluent from this station. A new generator will be added to the site and VFDs will be added to the pumps.

**Grove Hill Pump Station**
This pump station is the second largest pump station in the City's system. It pumps directly to the Main Pump Station. This project will replace all the interior piping and valves of the station. The pumps will be upsized and VFDs installed. The control panel will be replaced with an upgraded version. This site currently has a generator.

**Main Pump Station**
All flow of the City is received by this pump station. Effluent from this station goes directly to the City wastewater treatment plant. This project will replace and upgrade the pumps, replace internal piping and valves, the control panel, and install new VFDs on the pumps. This site already has a generator in place.

2. **SERVICE AREA**

The project’s service area encompasses the commercial and retail areas of South Darlington. The area is bordered by US Hwy 52 By-Pass, McIver Road, and South Main Street, and continues north on South Main to Joe Lewis Blvd. The four pump stations noted in this report to be upgraded, are the major pumping stations of the City. These stations not only receive the flow from the growing southern commercial area of the City, but also serves many residential customers.

See Appendix A – Project Service Area Map.
3. **EXISTING FACILITIES**

The City of Darlington's sewer system has 43 miles of gravity sewer pipe, 9.5 miles of force main and 16 pump stations which all serve approximately 3,100 customers within the incorporated City limits. The system was designed to treat domestic and light industrial waste. The City's wastewater treatment plant (WWTP) is located on the north side of the City and uses a rapid filtration process which is very economical to operate. The current wastewater treatment system is designed for a flow of 1.6 million gallons per day (mgd). The normal daily flow to the plant from the Main Pump Station is 800,000 gallons per day. The City has a pretreatment plan in place for industrial waste.

**NEED**

South Darlington/Hwy 52 By-Pass serves as a critical entrance to the City as the most heavily trafficked area with more than 24,000 vehicles on an average day. The location serves as the halfway point for travelers between Charlotte and Myrtle Beach. The current capacity of this part of the City's sewer system is nearing its maximum due to unprecedented commercial growth.

In 1995, the City leaders extended the sewer line in anticipation of development to this area. An anchor tenant grocery chain moved to this outskirt of the City with four other businesses in the shopping plaza. The $2 million investment by the City on expanded infrastructure has returned the investment, as the area, the main junction point for the City, has ballooned with more than 34 businesses accounting for 807 jobs today. In 2016, Walmart opened a 125,000-square-foot Super Center and fueling station, adding 255 jobs to the City, and the developer plans to add another 20,000 square feet of retail space. The developer is pre-leasing now and plans to begin construction within 6 months to a year. Depending on the type of lease, an additional...
40 to 50 jobs are expected to be created with this retail space development alone. This will increase the flow into the Altel pumping station by 12 gpm. An additional $4 million in capital investment followed in this project area by Tractor Supply and Fresenius Kidney Care, increasing the flow even more to the Altel station by 10 gpm. These two businesses account for an additional 37 new jobs.

The current infrastructure services close to 48 acres of developed property with another 75 acres of property available for development that is up for sale or lease. The City is in talks with two hotel groups to locate such a facility at this premiere location. A hotel in the area creates a potential for 30-40 new jobs and an additional sewer flow of 60 gpm. Another investor has closed on property within the last two months and has begun land clearing to develop additional restaurants-Sonic and Zaxby’s. It is anticipated the first of the 2 businesses will open by spring of 2019 creating 20 new jobs and 4 gpm of additional flow into the Altel pump station.

The growing South Darlington/ US 52 Bypass business area is served by two pumping stations, Altel and Joe Lewis. The Altel station was installed in 1995 and is currently pumping at its maximum capacity of 150 gpm. Structurally, this station is in good condition and with new upgraded pumps can sustain the increased flow from growth in the area. This station pumps sewage via a 6" diameter PVC force main to the Joe Lewis station. The force main from Altel to Joe Lewis was oversized at the time of construction in anticipation of this area of Darlington growing and is currently in good condition. We estimate increasing the pumps to double their capacity to 300 gpm will handle the additional flow into the Altel station from the growing business area and the installation of new VFDs will protect their useful life and provide energy savings to the City. Addition of a generator will allow uninterrupted operation of the sewer system served by the Altel Pump Station.
The Joe Lewis pumping station is located 1,600' east of South Main Street. This station receives all flow from the Altel station as well as serves a small, low income residential area of 93 residences. This pump station is 30 plus years old, currently pumping near its capacity at a rate of 200 gpm, and has moderate deterioration. The deterioration of the structure of this station is normal for the age and loading of this station. This pump station is 5.5 feet in diameter and 12' deep and was sized properly for its use when constructed. It is smaller in storage capacity, currently pumping at its maximum rate, and is more deteriorated than the Altel Pump Station. The Joe Lewis Pump Station currently sends flow through a 4" diameter PVC force main pipe which discharges into an 8" gravity sewer piping system. With the upgrade, the flow capacity will increase to 350 gpm. The new 6" force main from the Joe Louis Pump Station will connect to an existing 12" gravity sewer with the capacity to handle the increased flow.

The Joe Lewis Pumping Station needs to be replaced and upgraded in its entirety with new pumps and piping. Overflows from this station have occurred due to lack of pumping capacity and efficiency. New VFDs installed on the pumps will increase the life expectancy of the pumps and create an energy savings for the City. This station is a major component in the sewer system serving the critical entrance to the south of the City and a small community of residences. A new permanent generator is planned to be installed on-site for power failures.

The Grove Hill pump station is located in the northeastern quadrant of the City, 600' from the Main Pump Station. It receives flow from many residential areas of the City in the western and northern sections. Even the commercial district along the western most section of US 52 Bypass is served by the Grove Hill pump station. It is the second largest pump station in the City. This pump station has been ear-marked by the City as needing upgrades whenever funds become available. This station pumps
500 gpm and the proposed upgrades in this project will increase those pumps to 700 gpm. The project will also replace all the internal piping as well as the control panel at this station. VFDs will also be added to the pumps on this station to help with energy efficiency and prolong the life of the pumps.

Finally, the Main Pump Station is the primary pumping station for the entire City. It receives all flows from the City sewer system. It pumps the flow via a force main to the wastewater treatment plant on Society Hill Road, north of the City. The force main is 12" and is sized properly for the increased flow from upgraded pumps. The failure of the pumps at this station would be detrimental to the City and certain overflows into Swift Creek would occur. The headworks piping at this station has been replaced and upgraded within the last ten years. Now the pump station needs its internal components replaced and the pumps replaced to provide the City with increased capacity and overall efficiency. It currently is pumping 1,500 gpm. With upgraded, high efficiency pumps it will be able to pump 1,800 gpm. And as with the other stations, new VFDs would be installed on the pumps to further increase efficiency. Upgrading and upsizing this pump station guarantees the Darlington system can adequately handle the increased flow from the “Critical Entrance” of the City, the US 52 Bypass, South Main Street intersection.
4. FEASIBILITY ANALYSIS

The proposed infrastructure upgrades will increase the current sewer capacity in the area twofold, allowing for future growth and accelerating economic development. All effluent from this area goes to the Main Sewer Pumping station or the Grove Hill Pumping station. Each is already equipped with a generator. By adding generators on Altel and Joe Lewis pump stations, flow from this critical commercial area will not be interrupted due to any power failures. Based on current average daily flows, 0.7 million gallons per day (gpd), the Waste Water Treatment Facility can handle the additional flows. The City's facility has a maximum daily capacity of 1.6 million gallons. The proposed upgrades will maintain the economic viability of the City and promote prosperity and opportunity for this rural area. If this project is not constructed, the planned and imminent commercial development could be halted due to the current system's inability to handle increased flow.

5. METHOD OF CONSTRUCTION

The proposed project consists of removing and replacing one pump station on City property, installation of PVC force main piping along the shoulder of City roadways and work within the property of the City at the other three pump stations.

The force main would be constructed approximately 6' off the edge of pavement along the roadways. A trench will be excavated 30" wide and 48" deep. The force main will be placed in the bottom of the trench and backfilled with the material initially removed. The trenches will be compacted and seeding administered.
The Joe Lewis pump station will be re-constructed within a 30' x 30' fenced site adjacent to the right-of-way owned by the City. The existing concrete structure will be removed and a new structure will be installed in the same footprint. Pumps will be placed inside the new structure. The soil on site will be treated with a pre-emergent grass killer and covered with gravel. The site will be protected by a 6’ high chain-link fence with barbed wire.

The other three pump stations will have the internal piping, valves and pumps removed and replaced with new and new control panel installed. A new concrete pad for the generators poured in place and generator and wiring installed at two pump station sites. VFDs will be installed on each pump at each site. The Altel site will have a new 6’ chain link fence with barbed wire installed around the property.

Any bores under the roadways will be accomplished by the jack and bore method. A bore pit 8’ wide x 33’ long and 8’ deep will be excavated adjacent to the boring location. The casing will be pushed under the roadway and the carrier pipe installed. The boring machinery will be removed and the pit will be filled with the excavated material. The area will be compacted, graded, and seeded.

All excavated areas that have the potential of allowing stormwater runoff to a drainage structure or stream will have BMPs installed to prevent debris from leaving the site.

Competitive bids will be requested by the Owner for the construction portion only. The Owner will issue only one contract and no portion of the construction project will be completed by the design/build method. The design engineers will perform construction management and no part of the construction will be completed by the City crews.
6. **COST ESTIMATE**

Attached in this report is an itemized and detailed cost estimate for the project. See Appendix B – Cost Estimate.

7. **PERMITS REQUIRED**

The proposed project would require a modification to the City’s sewer distribution system, therefore a “Permit to Construct” is required from SCDHEC. Because land will be disturbed during the construction process, a “Land Disturbance Permit” from SCDHEC will also be required. An “Encroachment Permit” will be required as the sewer system extension will be placed within the SCDOT rights-of-way.

All entities associated with these permits have been contacted to discuss the latest requirements and formats for submittal. Formal permit requests will be completed during the design process.

8. **PROJECT SCHEDULE**

A project schedule is attached. See Appendix C – Project Schedule.
9. **PRESENCE OF ENVIRONMENTAL RESOURCES**

All construction related to the proposed project will be located on public rights-of-way or property owned by the City. No Farmlands will be disturbed by the project.

A FIRM map is included which shows no flood zones are within the project areas. None of the pump stations in this project were flooded during the 2016 and 2018 hurricanes. See Appendix D – Flood Data (FIRM) Map.

The construction staging area will be located entirely within the existing rights-of-way. Best Management Practices (BMP) would be implemented, including the installation of settlement tubes and silt fences to minimize impacts to storm water.

Wetlands – A wetlands National Wetland Inventory Map is included indicating no wetlands in our area of disturbance. See Appendix E – Wetlands Map. Although this is not a USACE letter, the construction area is along a previous disturbed area the shoulder of the road. Previously disturbed land along a highway such as shoulders and drainage structures (ditches) that are routinely maintained are not considered wetlands.

Topography – A USGS map of the area is included in this report. See Appendix F – USGS Map.

Archaeological map is found in this report. No significant sites are notes in the project area. See Appendix G – Archaeological Map
10. **USEFUL LIFE OF FACILITY**

The majority of the material used for construction is PVC and concrete, which has a life span of at least 50 years. The pumps, motors and controls have a 20 year life span and can easily be replaced as they become aged.

11. **ADVANTAGES/DISADVANTAGES**

Advantages:
- Energy savings to the City by installing VFDs
- Increased efficiency of sewer flow and prevents overflows
- Increased sewer flow capacity available to the “Critical Entrance” of the City
- Increased sewer flow capacity available to the entire southern US 52 Bypass area
- Support economic development
- New businesses bring new jobs
- Improved economic conditions for the residents

Disadvantages:
- Temporary slowing of traffic flow due to signage warning of construction ahead. No lanes will be closed during construction.
- Driveways will be cut for installing the force main. Individuals will be contacted prior to any construction in their driveways.
12. **CONCLUSIONS AND RECOMMENDATIONS**

This project will benefit the entire South Darlington area, including the existing commercial businesses, planned developments, residents of the low-income neighborhood adjacent to the Joe Lewis Blvd, and residents in the southern and northern area of the City. The project will contribute to the area’s economic competitiveness, support economic development efforts, and help bring new jobs and capital investment to this rural area. Expansion and upgrades to the sewer system in the project area will allow the City of Darlington to solidify investments in retail and industry to improve the economic conditions for our residents and the surrounding area.

The improvements to the City’s system will be incorporated into the operations and maintenance schedule for the City’s Water and Sewer Department, which has adequate funds to operate and maintain the system.

It is this firm’s recommendation to begin the project as soon as possible.
APPENDIX A

Project Service Area
PROJECT SERVICE AREA
DARLINGTON PUMP STATIONS UPGRADES
APPENDIX B

Cost Estimate
**CITY OF DARLINGTON**  
**PUMP STATIONS UPGRADES**

**SUMMARY COST ESTIMATE**

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<th>Category</th>
<th>Cost</th>
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<td>CONTINGENCIES (10%)</td>
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<td>ADMIN/ENG/LEGAL/LAND</td>
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**DETAILED COST ESTIMATE**

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<th>UNIT COST</th>
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<td>1</td>
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<td>$65,000.00</td>
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<td></td>
<td>Lift Station Upgrade (Pumps, VFDs, Rails and Control Panel)</td>
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<td>$65,000.00</td>
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<tr>
<td></td>
<td>New Interior Piping and Valves</td>
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<td></td>
<td>Bypass Pumping</td>
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<tr>
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<tr>
<td>8</td>
<td>Generator</td>
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<td><strong>TOTAL</strong></td>
<td></td>
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|                             | Altal Pump Station                                          |      |     |           |          |
|                             | Lift Station Upgrade (Pumps, VFDs, Rails and Control Panel) | LS   | 1   | $65,000.00 | $65,000.00 |
|                             | New Interior Piping and Valves                              | LS   | 1   | $20,000.00 | $20,000.00 |
|                             | Bypass Pumping                                              | LS   | 1   | $12,000.00 | $12,000.00 |
|                             | Generator                                                   | EA   | 1   | $25,000.00 | $25,000.00 |
|                             | **TOTAL**                                                   |      |     |           | **$122,000.00** |

APPENDIX B
### Grove Hill Pump Station

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**TOTAL** $290,000.00

### Main Pump Station

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**TOTAL** $515,000.00

**TOTAL CONSTRUCTION COST** $1,219,000.00

### ADMIN/ENG/LEGAL/LAND

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**TOTAL PROJECT COST** $187,000.00

APPENDIX B
APPENDIX C

Project Schedule
APPENDIX D

Flood Data (FIRM) Map
APPENDIX E

Wetlands Map
APPENDIX F

USGS Map
APPENDIX G

Archaeological Site Map
CITY OF DARLINGTON
PUMP STATIONS UPGRADES