

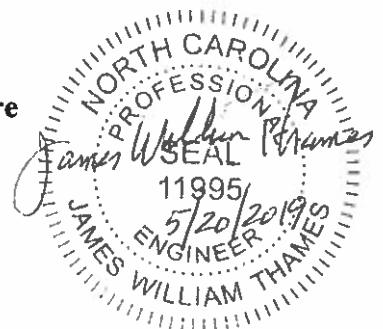
SOUTH GRANVILLE WATER AND SEWER AUTHORITY

I-85 SANITARY SEWER STUDY MASTER REPORT AND SUMMARY



Engineering – Land Surveying – Landscape Architecture

**Coulter Jewell Thames P.A.
111 West Main Street
Durham, North Carolina 27701
(919) 682-0368
2019**



SOUTH GRANVILLE WATER AND SEWER AUTHORITY
I-85 SANITARY SEWER STUDY
MASTER PLAN REPORT AND SUMMARY

SUMMARY

On April 17, 2018 South Granville Water and Sewer Authority (SGWASA) entered into an engineering contract with Coulter Jewell Thames P.A. (CJT) to perform a Study that prepares a “Master Plan” that illustrates sanitary sewer collection and pumping infrastructure improvements to convey wastewater from the east side of I-85 to the west side of I-85 where SGWASA’s Wastewater Treatment Plant is located at the end of “H” Street. The areas of concentration for the Study included the Town of Butner, City of Creedmoor, the old Lyons Station Sanitary Sewer District and specific undeveloped areas requested by SGWASA. The Scope-of-Work was to prepare a “Master Plan” that recommends specific sanitary sewer improvements that will serve the Butner / Creedmoor Area based upon current wastewater flows and future wastewater flow projections.

In developing this “Master Plan”, Coulter Jewell Thames P.A. evaluated current deficiencies with SGWASA’s collection and pumping system that serve the Town of Butner, the City of Creedmoor and the old Lyons Station Sanitary Sewer District. In addressing these current deficiencies, the “Master Plan” recommends infrastructure improvements and costs to correct these deficiencies that comply with NCDEQ Guidelines and to provide Butner and Creedmoor opportunities for future growth and development.

Also, the “Master Plan” provides mapping that illustrates recommended sanitary sewer improvements for undeveloped properties, particularly for the City of Creedmoor and surrounding areas. Preparation of this mapping was based upon future residential development and densities zoned for the areas and wastewater flow projections for this type of development according to NCDEQ Guidelines. In developing this mapping, physical restraints were evaluated such as topography, streets and environmental issues such as buffers, flood plains and creeks. The mapping shows interceptor lay-outs, sizes and the size and location of future pump stations. The purpose of this mapping is to provide SGWASA guidance for the extension of their collection / pumping system to serve the development community.

to serve the development community--YIKES: the developers, contractors, real estate folks!

In preparing this “Master Plan”, CJT completed the nine (9) contractual items either in the form of 24”x36” Planning Maps or Reports delivered to SGWASA at various times over the past year. In preparing this Master Plan Report for SGWASA, a summary of the contractual items has been prepared by CJT to assist SGWASA in understanding the Planning Maps and Reports submitted the past year. The contractual items are summarized with this Master Plan Report as follows:

1. CONTRACT ITEM II A – FLOW MONITORING OF NORTHERN INTERCEPTOR

Description: Measure existing wastewater flows in Northern Interceptor during dry and wet (rainy) periods. Work was performed by ADS with coordination from CJT. Report was delivered to SGWASA on 9/10/2018.

2. CONTRACT ITEM II B – FLOW MONITORING OF SOUTHERN INTERCEPTOR

Description: Measure existing wastewater flows in Southern Interceptor during dry and wet (rainy) periods. Work was performed by ADS with coordination from CJT. Report was delivered to SGWASA on 9/10/2018.

3. CONTRACT ITEM II C – GEOTECHNICAL BORING INVESTIGATIONS ON THE EAST AND WEST SIDE OF I-85

Description: Determine rock profile for bores under Southern Railroad and I-85 for the Northern and Southern Interceptor Extensions. Work performed by S&ME Inc. with coordination from CJT. Reports delivered to SGWASA on 1/9/2019 and 2/22/2019.

4. CONTRACT ITEM II D – INVESTIGATE THE USE OF NCDOT PIPING UNDER I-85

Description: Reviewed NCDOT records and archived drawings to see if a pipe was installed by NCDOT under I-85 that would provide a conduit for the extension of the Northern or Southern Interceptors. Records indicated that no such pipe was installed. An electronic file of archived drawings when I-85 was constructed was provided to SGWASA by CJT on 4/9/2019.

5. CONTRACT ITEM II E – EXTENSION OF NORTHERN INTERCEPTOR

Description: Planning Maps from actual field surveys showing plan and profile views of the recommended location to extend the 30 inch Northern Interceptor to serve the east side of I-85. Planning Maps delivered to SGWASA on 1/9/2019.

6. CONTRACT ITEM II F – EXTENSION OF SOUTHERN INTERCEPTOR

Description: Planning Maps from actual field surveys showing plan and profile views of the recommended location to extend the 36 inch Southern Interceptor to serve the east side of I-85. Planning Maps delivered to SGWASA on 2/22/2019.

7. CONTRACT ITEM II G – EVALUATION OF EXISTING PUMP STATIONS SERVING OLD LYON'S STATION SANITARY SEWER DISTRICT AND CITY OF CREEDMOOR SANITARY SEWER COLLECTION SYSTEM.

Description: Mapping that provides recommendations to the location and size of new pump stations and force main piping to better serve the old Lyons Station Sanitary Sewer District and the City of Creedmoor. A major focus was to show a new Joe Peed Road Pump Station and force main piping; and a new East Middleton Road Pump Station and force main piping. Part of this evaluation also showed existing pump stations that could be eliminated and proposed location of new satellite pump stations. Maps delivered to SGWASA on 5/15/2019.

8. CONTRACT ITEM II H – FUTURE WASTEWATER COLLECTION SYSTEM PIPING AND PUMPING

Description: Planning Maps that shows the location and size of interceptor piping and pump stations to serve undeveloped areas that were designated by SGWASA. Planning Maps delivered to SGWASA on 4/30/2019

9. CONTRACT ITEM II I – MASTER PLAN REPORT AND SUMMARY

Description: Contents provided by this writing and other writings for the other eight (8) contractual items.

In September 2018, CJT was asked to attend a meeting per the request of SGWASA to discuss immediate needs impacting SGWASA relative to the sanitary sewer collection and pumping systems that serve the east side of I-85. At this time, the I-85 Sanitary Sewer Study was in its early stages of development, completing the flow monitoring of the existing Northern and Southern Interceptors and completing field surveys for the possible extension of the Northern and Southern Interceptors. At this meeting, CJT became more knowledgeable of the following immediate needs impacting SGWASA:

- The Joe Peed Road Pump Station is operating at full capacity unable to receive any additional permitted wastewater flow from the City of Creedmoor. The Station also has incidents of

surcharging during wet periods. Routine maintenance is difficult due to its design and instrumentation is inaccurate.

- The East Middleton Road Pump Station is unable to handle proposed development due to its location and size. Also, staff indicated that the East Middleton Road Pump Station requires significant maintenance to keep it operational with incidents of surcharging.
- Capacity issues exist with the collection system that conveys wastewater from the old Lyons Station Sanitary Sewer District and the N.C. Highway 56 Corridor. These capacity issues primarily exist in the collection system on the west side of I-85 as the collection system traverses through Butner to convey wastewater to the beginning location of the Northern Interceptor. (It was later discovered by CJT that other non-compliant issues exist with the collection system through Butner that conveys wastewater to the existing Northern Interceptor. These non-compliant issues became apparent as CJT completed field surveys and developed planning maps in conjunction with the ADS Flow Monitoring Report for the extension of the Northern Interceptor).

As part of the "Master Plan" for SGWASA, CJT is recommending that the following infrastructure improvements be made as soon as possible, and as funding allows, to address the aforementioned needs:

1. Construct the 36 inch Southern Interceptor Extension to receive wastewater flow from a new Joe Peed Road Pump Station / Force Main.
2. Construct a new Joe Peed Road Pump Station and Force Main that discharges into the Southern Interceptor. Construction of a new Joe Peed Road Pump Station will correct maintenance and capacity issues and expand the service area to accommodate development.
3. Construct the 30 inch Northern Interceptor to correct existing non-compliant issues with the collection system through Butner and to receive wastewater flow from a new East Middleton Road Pump Station Replacement.
4. Construct a new East Middleton Road Pump Station Replacement and Force Main that discharges to the Northern Interceptor. Construction of a new East Middleton Road Pump Station Replacement will correct maintenance and capacity issues and expand the service area to accommodate development.

At the end of this Master Plan Report is a summary of estimated engineering and costs to construct the aforementioned improvements to SGWASA's Sanitary Sewer Infrastructure System. The estimated total cost to make these improvements is \$47,757,798.59. Performing these improvements will correct the major current deficiencies and provide the community many years of growth and development in the future.

A final recommendation of this Master Plan Report is that SGWASA should budget annually to address unknown maintenance issues and deficiencies that will develop due to the age of the system and the wear and tear on mechanical equipment. A major focus should be to continually address infiltration and inflow (I&I) occurring within the collection system. This issue was quantified by the Flow Monitoring Reports prepared by ADS for the Northern and Southern Interceptors. Reducing infiltration and inflow will be a constant battle that should be addressed in some capacity on an annual basis.

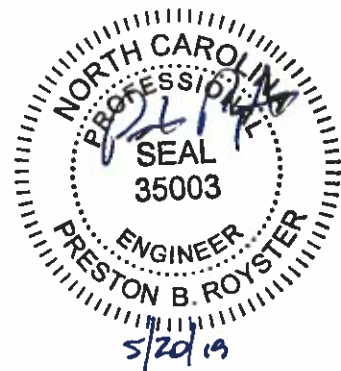
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I-85 SANITARY SEWER STUDY 2019

Prepared By: **James W. Thames P.E.**
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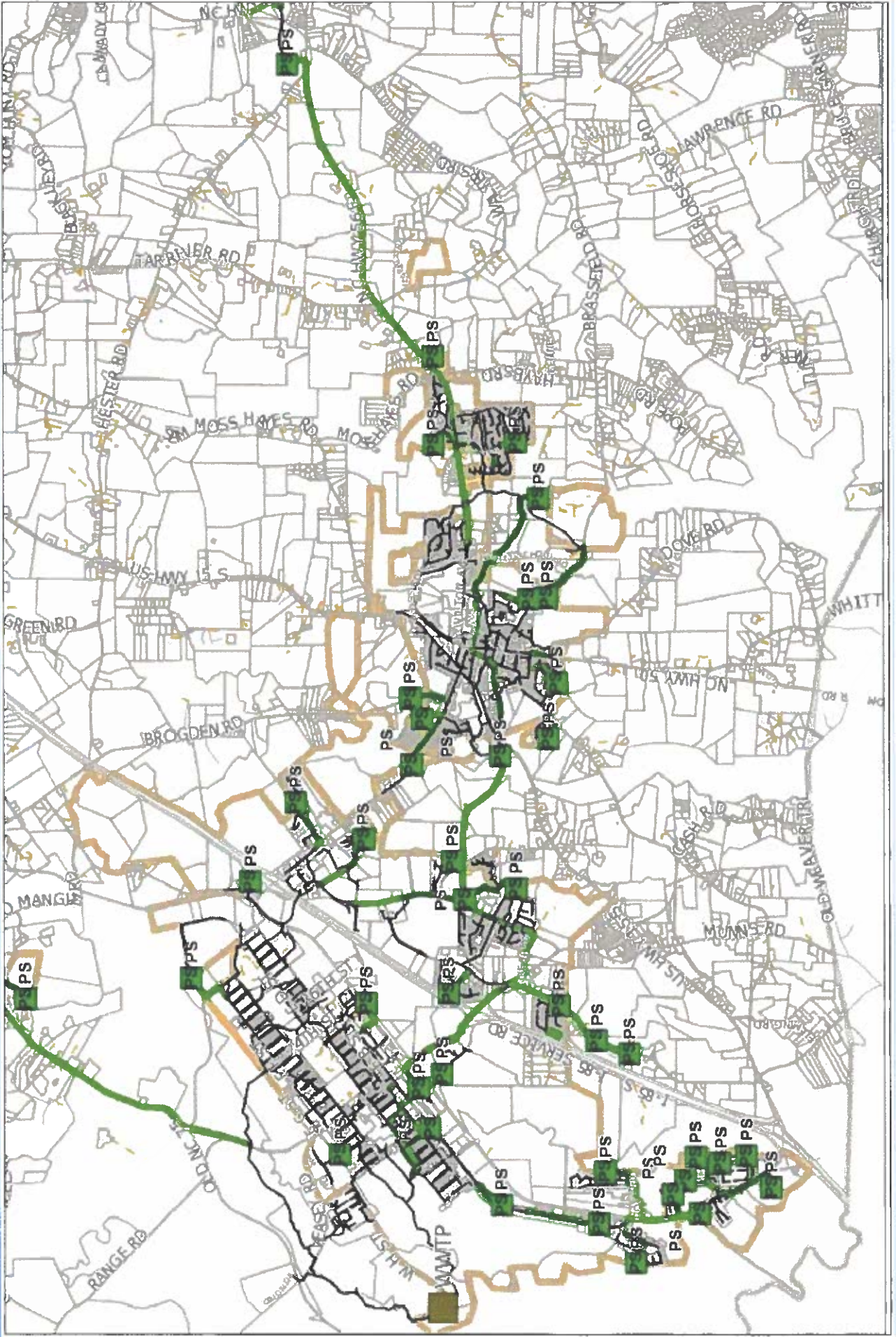
SUMMARY OF ESTIMATED CONSTRUCTION AND ENGINEERING COSTS

GENERAL:

The I-85 Sanitary Sewer Study prepared by Coulter Jewell Thames P.A. for the South Granville Water and Sewer Authority is recommending four Infrastructure Improvements to the Sanitary Sewer Collection / Pumping System to better serve the east side of I-85. The Construction and Engineering Costs for these Improvements are as follows:

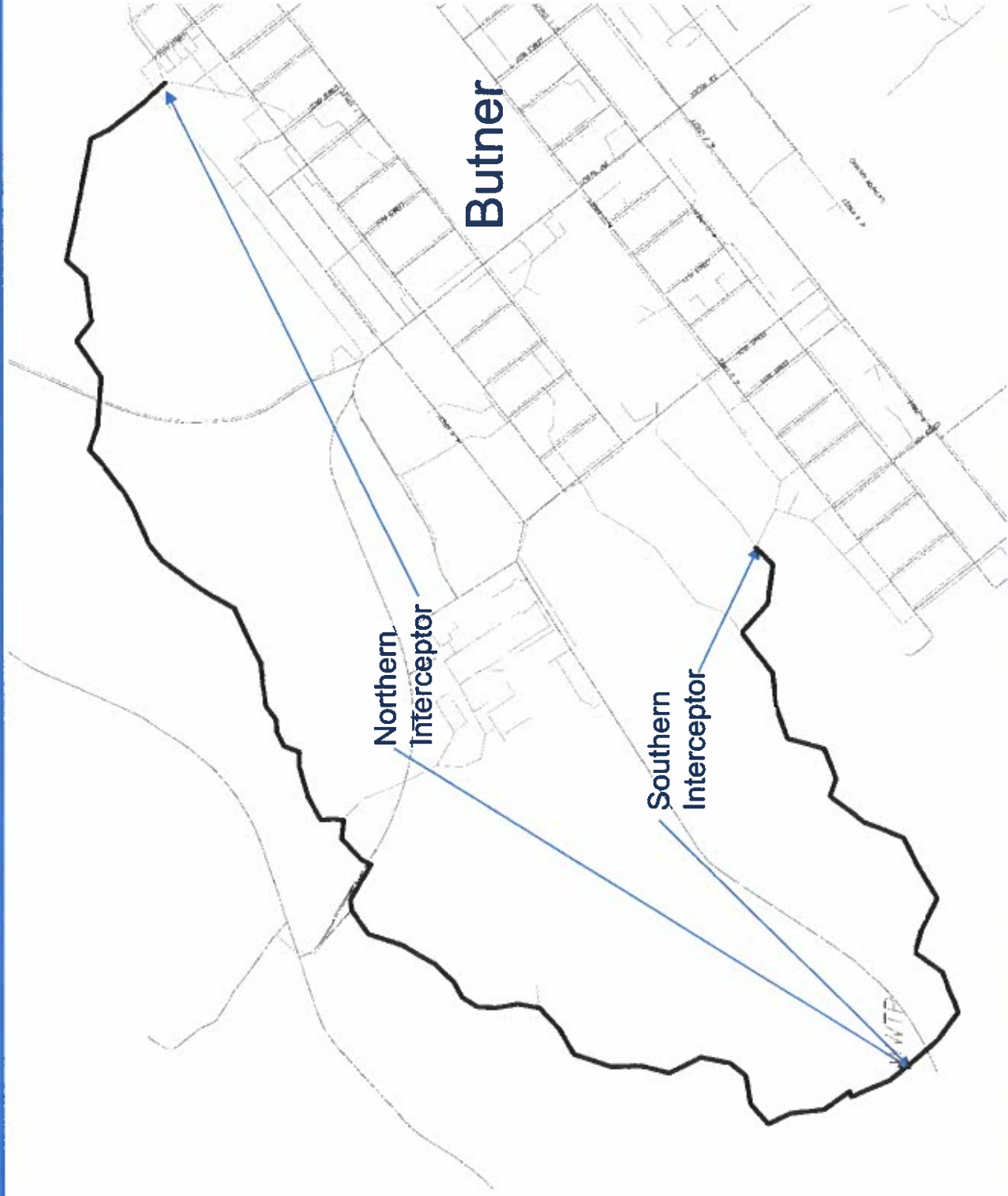
1. NORTHERN INTERCEPTOR		
A. Construction Cost -----		\$12,064,404.75
B. Engineering and Administration Costs -----		<u>\$ 844,508.00</u>
Total Estimated Cost -----		\$12,908,912.75
2. SOUTHERN INTERCEPTOR		
A. Construction Cost -----		\$13,805,211.00
B. Engineering and Administration Costs -----		<u>\$ 966,365.00</u>
Total Estimated Cost -----		\$14,771,576.00
3. JOE PEED ROAD PUMP STATION AND FORCE MAIN		
A. Construction Cost -----		\$ 9,990,540.00
B. Engineering and Administration Costs -----		<u>\$ 2,442,918.80</u>
Total Estimated Cost -----		\$12,433,458.80
4. EAST MIDDLETON ROAD PUMP STATION REPLACEMENT AND FORCE MAIN		
A. Construction Cost -----		\$ 6,064,632.00
B. Engineering and Administration Costs -----		<u>\$ 1,579,219.04</u>
Total Estimated Cost -----		\$ 7,643,851.04
TOTAL ESTIMATED COST FOR ITEMS 1 - 4 -----		\$ 47,757,798.59

Existing Sanitary Sewer System



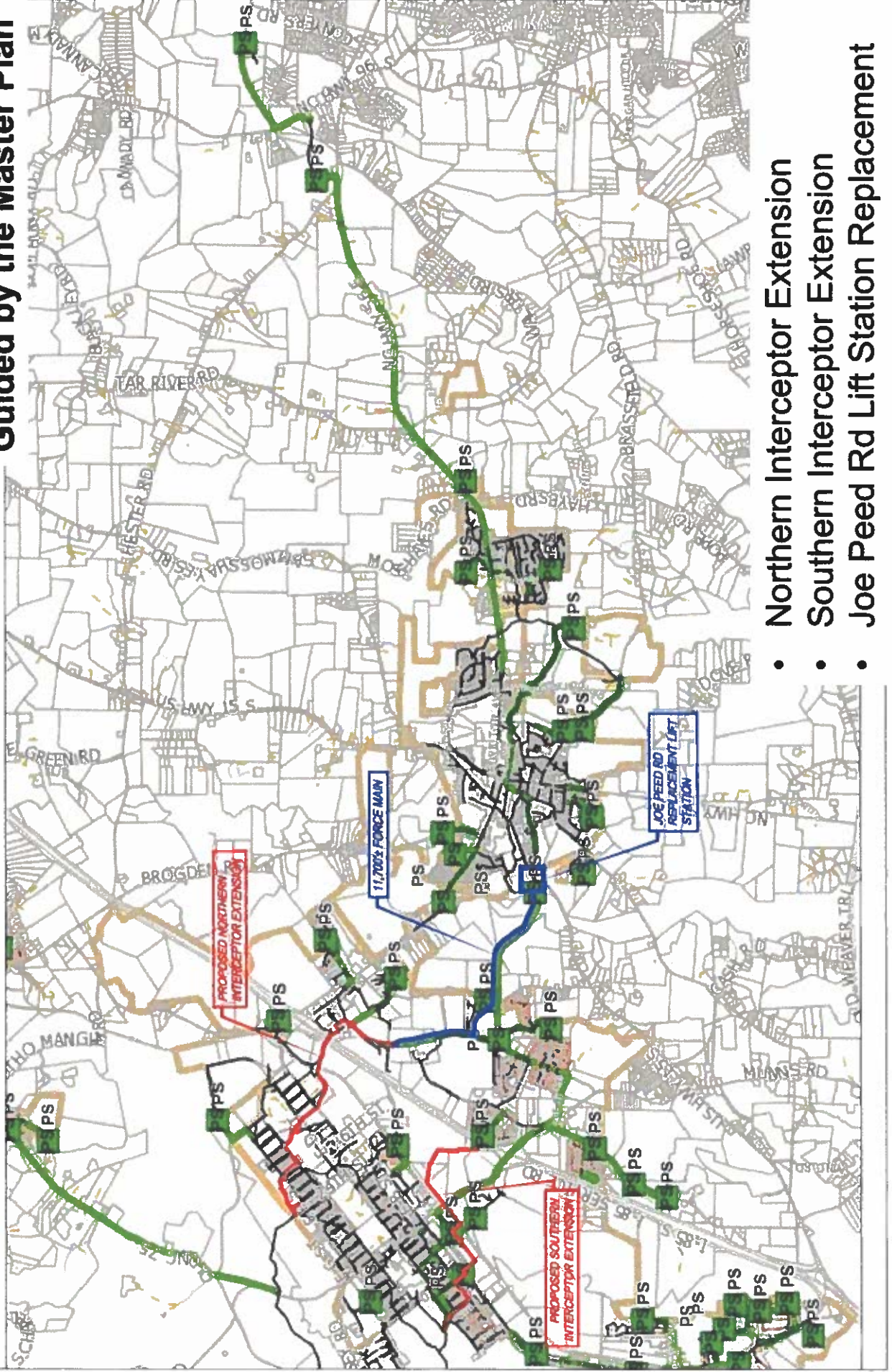
Existing Northern and Southern Interceptors

C1



Proposed Sewer Upgrades - Immediate

Guided by the Master Plan



- Northern Interceptor Extension
- Southern Interceptor Extension
- Joe Peed Rd Lift Station Replacement