

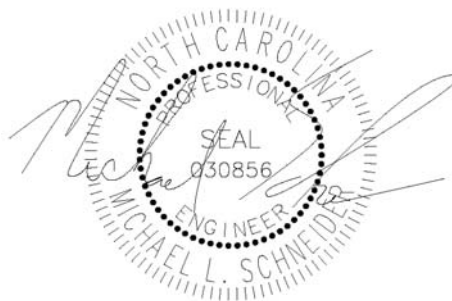


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Sewer Capacity Analysis for Weaver's Pointe Subdivision

Zebulon, North Carolina



04-26-24

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Narrative

The Weaver's Pointe project is a proposed 87 lot subdivision located at the existing road stubs of Weavers Pond Drive and Yulee Drive.

Limits of study

Per the City of Raleigh, the study consists of the analysis of the existing sewer outfall, starting at the existing manhole located at the end of Sage Tree Drive, and ending at the existing MH located approximately 300' south of Pearces Road. Refer to the "Basin Study Map" in this report.

Flow Data:

Existing Flows

The existing flow data to be included in the analysis was provided by the City of Raleigh. Please see Appendix A for the flow map provided by the City of Raleigh for the flow quantities and locations.

Proposed New Flows:

The proposed flows generated by the new project are as follows:

Daily flow = 348 br x 75 gpd/br = 26,100 gpd

Max Peak flow = 26,100 gpd x 2.5 = 62,250 gpd = 43.3 gpm

Per the City, this flow will be applied at MH-26 (see Basin Study Map).

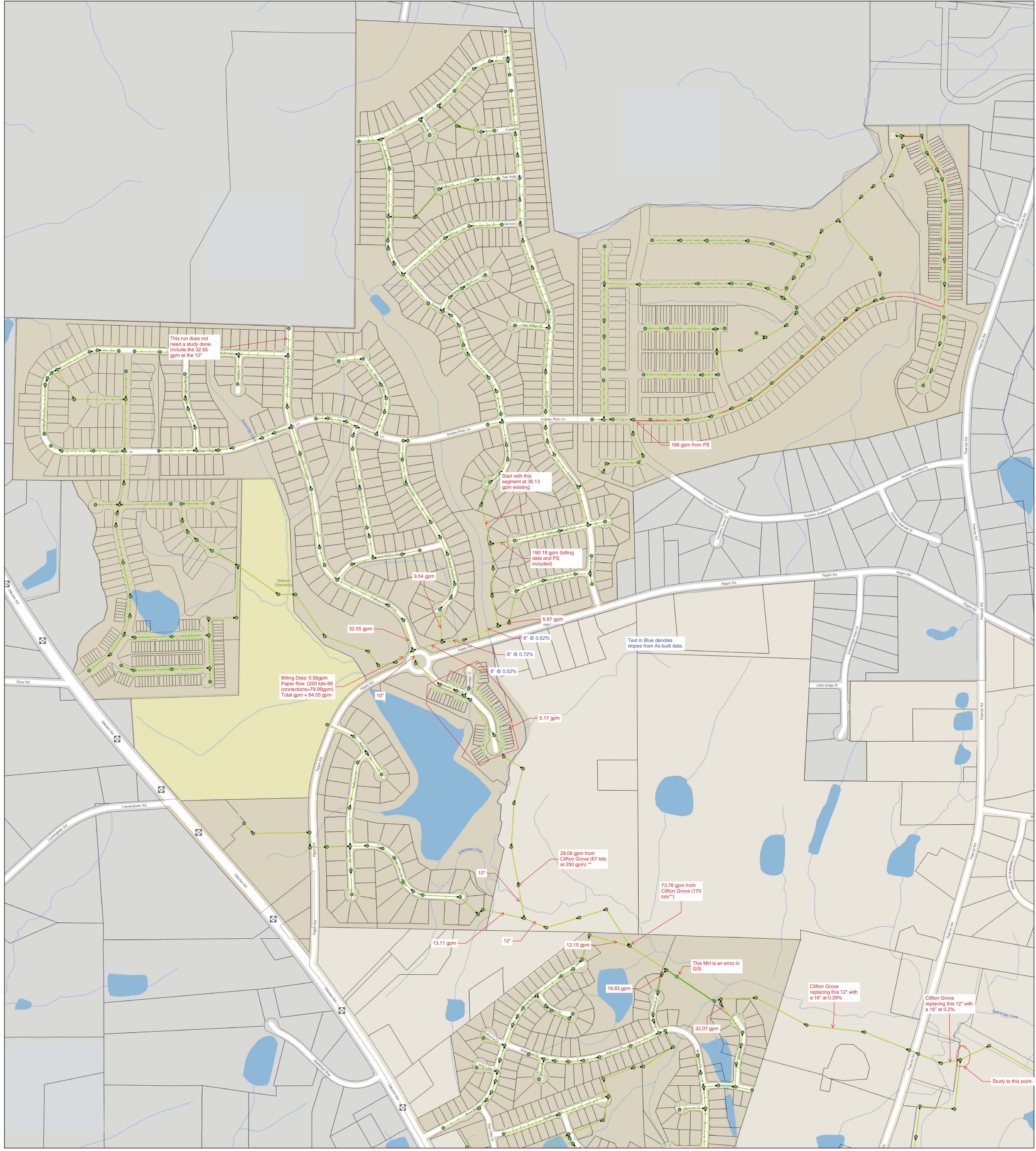
Executive Summary:

Pipes that are over 66% must be replaced.

The study found that all pipes are under 66% capacity, and therefore no pipe replacements are required. See Appendix C for the flow and capacity calculations, which include the capacity of all pipes within the study limits.

Appendix A

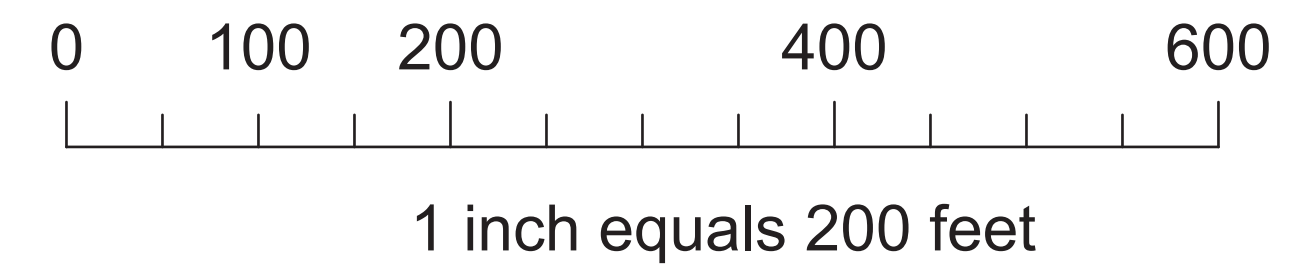
Flow Map Provided By the City



TITLE

** Clifton Grove Sanitary Sewer Study done prior to SB 673 being passed. Calculated 250 gpm per lot for SFD.

Existing flows based on 2023 billing data.



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Appendix B
Basin Study Map

Appendix C
Calculations

| Upstream MH | Downstream MH | PIPE SEGMENT | MATERIAL | LENGTH (FT) | EX. DIA. (INCHES) | SLOPE (%) | MANNING (N) | CAPACITY OF EX. PIPE FULL FLOW (GPM) | TOTAL FLOW IN PIPE (GPM) | % FULL EXISTING PIPE |
|-------------|---------------|--------------|----------|-------------|-------------------|-----------|-------------|--------------------------------------|--------------------------|----------------------|
| 34 | 33 | 33 | DIP | 276 | 8 | 0.500 | 0.013 | 384.5 | 36.1 | 9.4% |
| 33 | 32 | 32 | DIP | 170 | 8 | 0.500 | 0.013 | 384.5 | 226.3 | 58.9% |
| 32 | 31 | 31 | DIP | 186 | 8 | 0.500 | 0.013 | 384.5 | 226.3 | 58.9% |
| 31 | 30 | 30 | DIP | 209 | 8 | 0.500 | 0.013 | 384.5 | 226.3 | 58.9% |
| 30 | 29 | 29 | DIP | 250 | 8 | 0.520 | 0.013 | 392.1 | 232.2 | 59.2% |
| 29 | 28 | 28 | DIP | 150 | 8 | 0.720 | 0.013 | 461.4 | 232.2 | 50.3% |
| 28 | 26 | 27 | DIP | 204 | 8 | 0.520 | 0.013 | 392.1 | 241.7 | 61.6% |
| 26 | 25 | 25 | DIP | 92 | 10 | 0.690 | 0.013 | 818.9 | 402.2 | 49.1% |
| 25 | 24 | 24 | DIP | 217 | 10 | 0.470 | 0.013 | 675.9 | 402.2 | 59.5% |
| 24 | 23 | 23 | PVC | 119 | 10 | 1.090 | 0.013 | 1029.3 | 402.2 | 39.1% |
| 23 | 22 | 22 | PVC | 114 | 10 | 1.290 | 0.013 | 1119.7 | 402.2 | 35.9% |
| 22 | 21 | 21 | PVC | 283 | 10 | 0.520 | 0.013 | 710.9 | 402.2 | 56.6% |
| 21 | 20 | 20 | PVC | 161 | 10 | 0.520 | 0.013 | 710.9 | 402.2 | 56.6% |
| 20 | 19 | 19 | DIP | 154 | 10 | 1.150 | 0.013 | 1057.2 | 407.4 | 38.5% |
| 19 | 18 | 18 | DIP | 247 | 10 | 0.560 | 0.013 | 737.8 | 407.4 | 55.2% |
| 18 | 17 | 17 | PVC | 298 | 10 | 1.750 | 0.013 | 1304.2 | 407.4 | 31.2% |
| 17 | 16 | 16 | DIP | 266 | 10 | 0.700 | 0.013 | 824.8 | 407.4 | 49.4% |
| 16 | 15 | 15 | DIP | 229 | 10 | 0.520 | 0.013 | 710.9 | 436.5 | 61.4% |
| 15 | 14 | 14 | DIP | 163 | 12 | 0.280 | 0.013 | 848.3 | 449.6 | 53.0% |
| 14 | 13 | 13 | DIP | 235 | 12 | 0.280 | 0.013 | 848.3 | 449.6 | 53.0% |
| 13 | 12 | 12 | DIP | 191 | 12 | 0.280 | 0.013 | 848.3 | 449.6 | 53.0% |
| 12 | 11 | 11 | DIP | 300 | 12 | 0.280 | 0.013 | 848.3 | 449.6 | 53.0% |
| 11 | 10 | 10 | DIP | 298 | 12 | 0.280 | 0.013 | 848.3 | 535.5 | 63.1% |
| 10 | 9 | 9 | PVC | 389 | 12 | 0.280 | 0.013 | 848.3 | 554.3 | 65.3% |
| 9 | 8 | 8 | DIP | 48 | 12 | 2.540 | 0.013 | 2555.0 | 576.4 | 22.6% |
| 8 | 7 | 7 | DIP | 239 | 12 | 0.370 | 0.013 | 975.1 | 576.4 | 59.1% |
| 7 | 6 | 6 | DIP | 390 | 12 | 0.940 | 0.013 | 1554.3 | 576.4 | 37.1% |
| 6 | 5 | 5 | DIP | 397 | 16 | 0.290 | 0.013 | 1859.3 | 576.4 | 31.0% |
| 5 | 4 | 4 | DIP | 327 | 16 | 0.320 | 0.013 | 1953.1 | 576.4 | 29.5% |
| 4 | 3 | 3 | DIP | 69 | 16 | 0.800 | 0.013 | 3088.1 | 576.4 | 18.7% |
| 3 | 2 | 2 | DIP | 168 | 16 | 1.170 | 0.013 | 3734.5 | 576.4 | 15.4% |
| 2 | 1 | 1 | DIP | 132 | 16 | 0.200 | 0.013 | 1544.0 | 576.4 | 37.3% |

Note: Pipe Full Flows Calculated using the below formula.

Determination of adequacy of line size:

$$Q = \frac{\sqrt{s}}{n} \left(\frac{D}{16} \right)^{8/3}$$

Where
 Q = discharge, in cfs
 D = Diameter, in inches
 n = Manning's roughness coefficient
 s = slope, dimensionless