



## South Avenue Capacity Study

March 2021

*Prepared For*

Plainfield Municipal Utilities Authority  
127 Roosevelt Avenue  
Plainfield, NJ 07060

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## **TABLE OF CONTENTS**

<b>SECTION 1.0 – INTRODUCTION.....</b>	<b>1</b>
1.1 Purpose and Scope .....	1
1.2 Methodology .....	1
1.3 System Overview .....	2
<b>SECTION 2.0 – SYSTEM ANALYSIS AND EVALUATION .....</b>	<b>3</b>
2.1 Flow Metering Results .....	3
2.2 Proposed Development .....	4
2.3 Capacity Evaluation .....	4
<b>SECTION 3.0 – SUMMARY AND RECOMMENDATIONS.....</b>	<b>8</b>
3.1 Capacity Determination.....	8
3.2 Recommendations .....	8

### **Appendices**

**Appendix A – Sanitary Sewer and Meter Location Map**

**Appendix B – Flow Metering Hydrographs**

**Appendix C – Future Development Location Map**

**Appendix D – Capacity Analysis Spreadsheet**

**Appendix E – Capacity Analysis Spreadsheet (After Recommended Improvements)**

### **Appendices**

**Table 1 – Pipe Summary Table**

**Table 2 – Flow Monitoring Results Summary**

**Table 3 – Projected Flow from Future Development Summary**

**Table 4 – Pipe Design Capacity Summary**

**Table 5 – Current Utilized Capacity Summary**

**Table 6 – Summary of Utilized Capacity Following Development**



have more than sufficient capacity for average daily flow conditions. The existing pipe sections 3B to 7B are nearing 50% capacity during peak flow conditions. Downstream of pipe section 3B, the pipe size increases to 18" as shown and downstream of 1B is 20". These downstream facilities are anticipated to have sufficient capacity.

To calculate the anticipated impact of the proposed or anticipated future development, the combined existing and proposed flow was evaluated. The projected sanitary flows from each proposed development can be found in Table 3 above. The peak flow for the proposed developments were estimated by applying a peaking factor (PF) of 3 to the proposed ADF. Given the combined flows, the estimated percent capacity following the development was calculated and is summarized in Table 6 below.

**Table 6 – Summary of Utilized Capacity Following Development**

Pipe Section	<i>Current (%)Capacity at ADF</i>	<i>Current (%)Capacity at PDF</i>	<i>Proposed Additional Flow (ADF) (gpd)</i>	<i>Proposed Additional Peak Flow (PDF) (gpd)</i>	<i>Combined Average Flow (gpd)</i>	<i>Combined Peak Flow (gpd)</i>	<i>Proposed (%) Capacity - Average</i>	<i>Proposed (%) Capacity - Peak</i>
<b>STUDY AREA (A)</b>								
P - 1A	13.4%	68.2%	72,273	216,819	134,757	534,841	28.9%	114.7%
P - 2A	14.7%	74.8%	72,273	216,819	134,757	534,841	31.7%	125.8%
P - 3A	16.3%	83.0%	72,273	216,819	134,757	534,841	35.2%	139.7%
P - 4A	11.3%	57.8%	72,273	216,819	134,757	534,841	24.5%	97.1%
P - 5A	14.0%	71.5%	72,273	216,819	134,757	534,841	30.3%	120.2%
P - 6A	8.1%	41.3%	72,273	216,819	134,757	534,841	17.5%	69.4%
P - 7A	8.1%	41.1%	49,698	149,094	112,182	467,116	14.5%	60.3%
P - 8A	10.0%	50.9%	26,498	79,494	88,982	397,516	14.2%	63.6%
P - 9A	10.5%	53.5%	21,998	65,994	84,482	384,016	14.2%	64.6%
P - 10A	6.1%	31.0%	2,010	6,030	64,494	324,052	6.3%	31.6%
P - 11A	16.8%	85.7%	2,010	6,030	64,494	324,052	17.4%	87.3%
<b>STUDY AREA (B)</b>								
P - 1B	6.1%	33.8%	34,737	104,211	230,781	1,189,995	7.2%	37.1%
P - 2B	1.5%	8.5%	34,737	104,211	230,781	1,189,995	1.8%	9.3%
P - 3B	5.2%	41.6%	34,737	104,211	57,006	283,761	13.2%	65.7%
P - 4B	4.6%	37.2%	34,737	104,211	57,006	283,761	11.8%	58.7%
P - 5B	4.8%	39.0%	34,737	104,211	57,006	283,761	12.4%	61.7%
P - 6B	4.5%	36.1%	34,737	104,211	57,006	283,761	11.5%	57.0%
P - 7B	4.8%	38.7%	13,875	41,625	36,144	221,175	7.8%	47.7%
P - 8B	2.1%	17.1%	0	0	22,269	179,550	2.1%	17.1%
P - 9B	2.1%	17.1%	0	0	22,269	179,550	2.1%	17.1%

**Study Area A:** The percent of capacity projected to be utilized following the proposed development ranges from 6.3% to 35.2% and 31.6% to 139.7% for average daily flow and peak flow conditions respectively. All pipe sections have sufficient capacity under average daily flow conditions. The existing pipe sections 1A to 5A are either nearing or exceeding the pipe capacity at peak flow conditions (flowing full). Pipe section 11A is also shown as nearing capacity during peak flow conditions but this should be ignored as the most upstream pipe section should have significantly less flow than the metered flow.



**Study Area B:** The percent of capacity projected to be utilized following proposed development ranges from 2.1% to 13.2% and 9.3% to 65.7% for average daily flow and peak flow conditions. All pipe sections have more than sufficient capacity for average daily flow conditions. The existing pipe sections 3B to 7B are nearing 50% to 75% capacity during peak flow conditions.

## **SECTION 3.0 – SUMMARY AND RECOMMENDATIONS**

### ***3.1 Capacity Determination***

Based on our evaluation of the average and peak flows from existing development, coupled with the anticipated flow from future developments, it was concluded that the existing system maintains sufficient capacity during average daily flow conditions. However, during peak flow conditions observed (and projected), it is anticipated that the capacity of select pipe sections will be either in excess of pipe capacity (Study Area A) or nearing pipe capacity (Study Area B). As previously discussed, it is not anticipated that I&I is a major contributor to the average and peak daily flows observed. This should be verified through condition inspection of the existing mains which was not completed as a part of this evaluation.

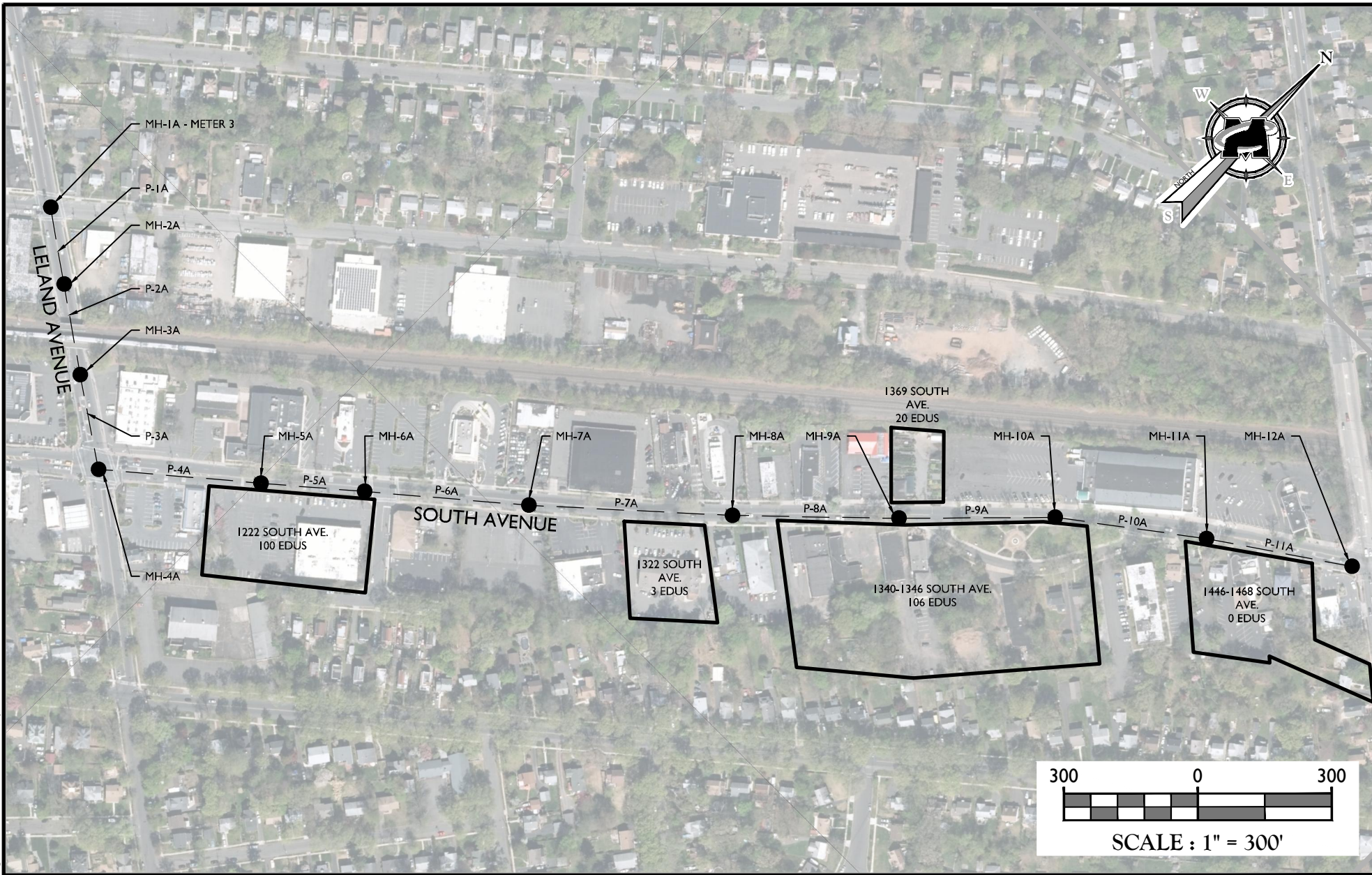
### ***3.2 Recommendations***

Given the approximate age of the subject sanitary sewers, it is recommended the PMUA preform a CCTV inspection of the subject sewers to review current condition and estimate a remaining useful life of the infrastructure. It is considered likely that condition alone may necessitate replacement of the full extent of existing infrastructure within the two study areas. Sliplining or other methods of trenchless replacement/rehabilitation can also be considered as an alternate solution, as applicable.

Although the capacity of the existing pipe sections was evaluated based upon flowing full, any replacement sewer will have to be designed to handle twice the average daily flow, flowing ½ full in accordance with NJDEP requirements. Based upon this requirement and the previously noted capacity concerns shown in Table 6, the following system improvements are recommended:

- A. Replacement of the entire extent of sewer and infrastructure within the study area, as dictated by condition. It is recommended VCP be replaced with PVC and that manholes be replaced or at a minimum rehabilitated. We understand that this may be a long-term goal as capital funding allows.
- B. Upsizing pipe sections 1A through 5A from 8” VCP to 10” PVC. This totals approximately 1,200 linear feet of main to be upsized. These pipe sections are anticipated to be at capacity or in excess of pipe capacity following the proposed flow addition. If theoretical buildout analysis suggests flows in excess of the proposed 10” capacity, it is likely analysis of the downstream 10” pipe sections will also require evaluation. We recommend that this capital improvement work be funded as soon as possible and coordinated with the currently proposed development and roadway improvements.





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