

Wilson & Company Inc
City of Santa Fe
Midtown Engineering Support

To: Lee Logston, Project Manager **Date:** 06/01/2022
City of Santa Fe

From: Ross Gabaldon, PE **Prepared by:** Ross Gabaldon, PE

TM No.: WWW-01 **Reviewed by:** Brian Ambrogi, PE

Subject: Technical Memorandum- Existing Water and Sewer Infrastructure

SECTION 1: SUMMARY

The purpose of this report is to evaluate the existing water and sewer utility system’s current capacity and determine if the existing water and sewer systems are able to satisfy the demands of the proposed new development for the Santa Fe Midtown area. The following options will be evaluated to determine the most critical infrastructure upgrades necessary to support the Midtown development:

- Sewer System
 - Existing Conditions – Evaluate the present-day flows and available capacity of the existing system
 - Full build-out scenario – Evaluate infrastructure upgrades necessary to the existing system to accommodate full build-out demands and prioritize recommended improvements to align with the respective phases of development.
- Water System
 - Existing Conditions – Evaluate the present-day flows and available capacity of the existing system
 - Full build-out scenario – Evaluate infrastructure upgrades necessary to the existing system to accommodate full build-out demands and prioritize recommended improvements to align with the respective phases of development.

The water and sewer systems were modeled in WaterCAD Connect Edition Update 2, Version 10.02.01.06 and SewerCAD Connect Edition Update 2, Version 10.02.00.55 (respectively) to determine the impact the future demands will have on pressure and flow on the water system and capacity on the sewer system. All assumptions for sewer and water flow rates are shown in **Table 1A and 1B** (attached)

SECTION 2: INTRODUCTION

This technical memorandum was developed in conjunction with the City of Santa Fe and Opticos Design to determine the water and sewer demand of a proposed re-development of the existing Midtown College Campus and evaluate the impacts these new demands would have on infrastructure capacity and sizing. The proposed project location can be found in **Figure 1**, see

Figure 2 for a more detailed layout of the proposed improvement area (definitions for lot codes can be found in **Table 1A and 1B**). Generally, the project is contained within the old community college campus, located near the intersection of Cerillos Rd. and St. Michaels Dr.



Figure 1: Project Location Map

SECTION 3: DESIGN CRITERIA / ASSUMPTIONS

General:

The proposed redevelopment of the campus consists of a variety of parcels, each parcel will be used for multifamily dwellings, commercial, office, or mixed use. See **Figure 2** below for a detailed layout of the various parcels as developed by Opticos Design.

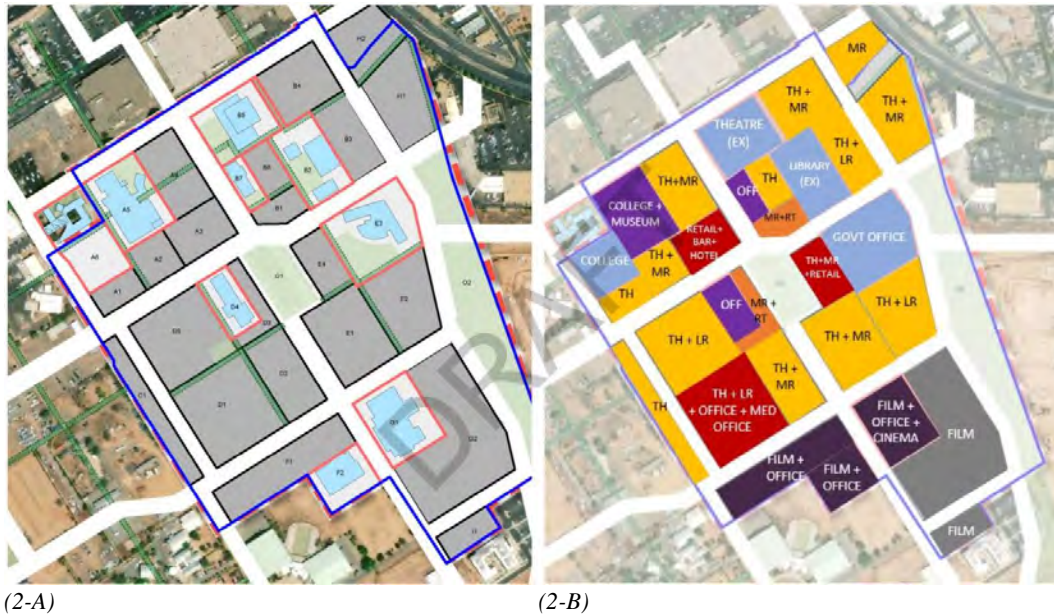


Figure 2 (A) Land Use Division (B) Land Use Category, See Table 1A & 1B for key

Wilson & Company has developed individual water and sewer demands for each parcel based on land-use data provided by Opticos Design and the City of Santa Fe. Water and sewer demands were calculated based on the use and on a per capita daily demand.

Water Base Flow Assumptions:

Residential

- Residents Per Unit (residential) = 3.41 Persons
- Usage Rate (residential) = 70 GPCPD (gallons per capita per day)

$$Base\ Demand = Residents * Usage * No.\ of\ Units$$

Office/Commercial

- Occupancy = 0.0032 Occupants / SqFt
- Usage Rate = 25 GPCPD

$$Base\ Demand = Occupancy * Usage * Area$$

Restaurant/Bar

- Occupancy = 330 Customers/day
- Usage Rate = 7 GPCPD

A peaking factor was applied to all water base flows, to determine the flow at the peak hour of the day. A peaking factor of 1.4 was used throughout the system. This peaking factor is used in similar sized developments in New Mexico and is also used by the City of Albuquerque for new xeriscaped residential and commercial developments.

$$\text{Peak Flow} = \text{Base Flow} * 1.4$$

Sewer Base Flow Assumptions:

Sewer flows are assumed to consist of 95% of the water base flow for residential and commercial applications. It is assumed that all landscaping will be xeriscaped and require low or no water. Irrigation flows for parks are accounted for separately in the model.

$$\text{SAS Flow} = \text{Water Base Flow} * 0.95$$

Peaking factors were also applied to the sewer flows. A separate peaking factor for residential and commercial has been used, with a higher peaking factor used for commercial/restaurants as compared to the residential peaking factor. A 1.3x peak factor was used for residential and a 1.6x peaking factor was used for all other parcels in this study. These peaking factors are used in similar sized developments in New Mexico and is also used by the City of Albuquerque for new xeriscaped residential and commercial developments.

$$\text{SAS Peak Flow} = 1.3(\text{residential}) \text{ or } 1.6(\text{commercial}) * \text{SAS Base Flow}$$

SECTION 4: DESIGN ANALYSIS – WATER LINE**WATER SYSTEM DESIGN CRITERIA:**

The water system was evaluated in two ways, to determine the capability of the existing system.

- Peak Flow Condition: The system is evaluated at peak flow, to determine if any pipes require upsizing
- Fire Flow condition: The system is run with fire flows (determined per IFC, maximum 2,000 GPM for the area), with the base water demand (not peak) also applied. No special requirements beyond IFC code from the Fire Marshall were specified.

For the initial model run, the system was run at peak flow, with no fire flow. In this condition, the existing system was found to be adequate to handle the peak flows for the area. The system was also evaluated at the base flow + fire flow and was found adequate in this scenario as well. Based on the calculated base and peak flows the existing water system was found to be capable of handling the proposed future demands of the development. As there is no justification to increase capacity of the existing system, no alternatives beyond simple pipe re-routing were analyzed in this report.

Option 1- Additional Waterline

This option is necessary to redirect existing water lines that are currently in the footprint of the future development. These redirected lines will be constructed in the new roadway and in the right of way. All new water lines will be a one to one replacement of existing lines, with no size increases.

As stated previously the existing water system currently will be able to meet the demands required of the future development. The system will have the adequate flows for base and peak demands and meet the required fire flow for the area. These scenarios were evaluated using WaterCAD analysis and design. See **Exhibit 1** for the results of the water modelling, anticipated flows, pipe diameter, and fire flow requirements. See **Exhibit 2** for a layout of the proposed vs. existing pipe line layout.

ASSUMPTIONS (All water lines):

- Water lines are adequately sized to provide for current and future demands (per modelling results)
- The required minimum fire flow of 2000 GPM will be met by all improvements
- The water analysis using WaterCAD is only taking into account the future development of the proposed project area, not pass-through demands for adjacent areas outside the project area. Evaluation of pass-through flows that would impact the overall City system were beyond the scope of this study.
- Relocated Lines will be installed in new roadways, no asphalt cost included in estimates

Option 1 Pros:

Waterlines will be relocated into accessible Public Right-of-Ways to eliminate future conflicts with area development. Connections along the north end and West of the property will be greatly improved by having a pipe located in the public ROW to connect to.

Option 1 Cons:

There will be costs incurred for the additional waterline and installation.

Option 2- Do Nothing

Water lines currently interfere with planned development. Additionally, the water line running along the north of the property is within the shopping center parking lot which will present design difficulties and disruption to existing business. Design standards do not allow for the placement of permanent structures on top of utility lines. All areas with new water lines in this alternate will be designated as a public right-of-way.

Option 2 Pros:

Investment into needed infrastructure not needed, no costs. Existing infrastructure is already sufficient for flows.

Option 2 Cons:

There can be no development on top of the existing waterlines. The new development would need to work around the existing water lines and provide easements. Connecting to the existing water line along the back of the cerillos road shopping center would cause design difficulties and

disruption to the existing businesses currently served from this water line. This alternate is not recommended

SECTION 5: DESIGN ANALYSIS –SEWER LINE

SEWER SYSTEM ANALYSIS

The existing sewer system divides the existing flow into two sewer sheds, a northern connection point along Cerrillos Road, and a southern connection at Siringo Road. A field visit was performed by Wilson & Company to the proposed site and the existing sewer system was inspected. During inspection, the sewer system connected to the south at Siringo Road was found to exceed the design capacity, and surcharging manholes. The northern connection had a large underutilized sanitary sewer between the manhole on the south end of the breezeway at the Tony Anaya building to Cerillos Road. South of the Tony Anaya building the existing sewer system was in poor condition and undersized, and will need to be replaced.

Due to the poor condition of the Siringo Road sewer and the available capacity between the Tony Anaya Building and Cerillos Road, it was determined that all flow in the area could be successfully re-routed to the Cerillos Road connection point, immediately to the south of the Tony Anaya Building. Replacement of the Siringo Road sewer line with a larger line was briefly considered, but determined to be cost prohibitive due to the length and location of pipe that would need to be replaced.

The total sewer base flow for future development was calculate to be 301 GPM and the peak flow was determined to be 426 GPM.

Option S1 Sewer Redesign

Due to issues with capacity of the southern sewer line it is recommended that the existing system within the campus be replaced with the intent of directing all flow towards the north, connecting to the main line on Cerrillos Rd. This diversion of flow will help alleviate the surcharging issues on the Siringo Road Sewer by diverting some of the existing flows to the north. The design analysis in Sewer CAD was used to design the proposed sewer lines with adequate slopes, depths, and capacity to accommodate the full build-out flow condition. **Exhibit 1** illustrates the proposed sewer line improvements. Due to the change of direction of the sewer, the existing sewer lines cannot be re-used, and it is recommended that all sewer lines in the improvement area be replaced with new lines. See **Exhibit 1** for the results of the sewer modelling, including depths, slopes, pipe diameters, and anticipated flows. See **Exhibit 2** for a layout of the proposed system compared to the existing system.

Option S1 Assumptions:

- Sewer is sized to service all lots of the proposed development
- Sewer shall provide gravity service to all of the proposed development
- Velocity in sewer lines shall be less than 10 ft/sec, and greater than 2.2 ft/sec
- The sewer analysis using SewerCAD is only taking into account the future development of the proposed project area, and not the city at-large
- Sewer design flow shall be at 50% full

- The 30" Silar Road interceptor is in need of repair, and it is assumed that this interceptor will be re-lined (Via CIPP) under this project

Option S1 Pros:

Option S1 will follow the existing and proposed roadways allowing sewer pipes found to be under existing facilities to be abandoned. This option also helps to alleviate the flow on the southern sewer that presently exceeds capacity. New sewers will be able to be installed in optimal locations to avoid existing utilities, and provide service to buildings.

Option S1 Cons:

Construction costs for the project will be an extra cost versus using the existing system. Current underground composition is unknown, and conditions may present the need for rock or undesirable material excavation. A geotechnical investigation is recommended before proceeding. Pavement cuts will be required for sections that will be under existing roadways.

Option S2 – Do Nothing

When Wilson and Company and City of Santa Fe officials inspected manholes in May of 2022 it was discovered that sewer lines were full and flowing over the bench along the Siringo sewer. The additional demand from the development could cause additional surcharging of the manholes, overflows, and sewer backups affecting customers and residents. Continuing with the development without the sewer redesign is not a viable option.

Option S2 Assumptions:

- Existing sewers will be used
- Existing sewers are currently over capacity (field observation)
- Existing sewers are currently in poor condition, and run underneath existing buildings
- Lines will be installed in new roadways, no asphalt cost included in estimates

Option S2 Pros:

This option will allow for the development to proceed without any additional capital costs for construction and new infrastructure.

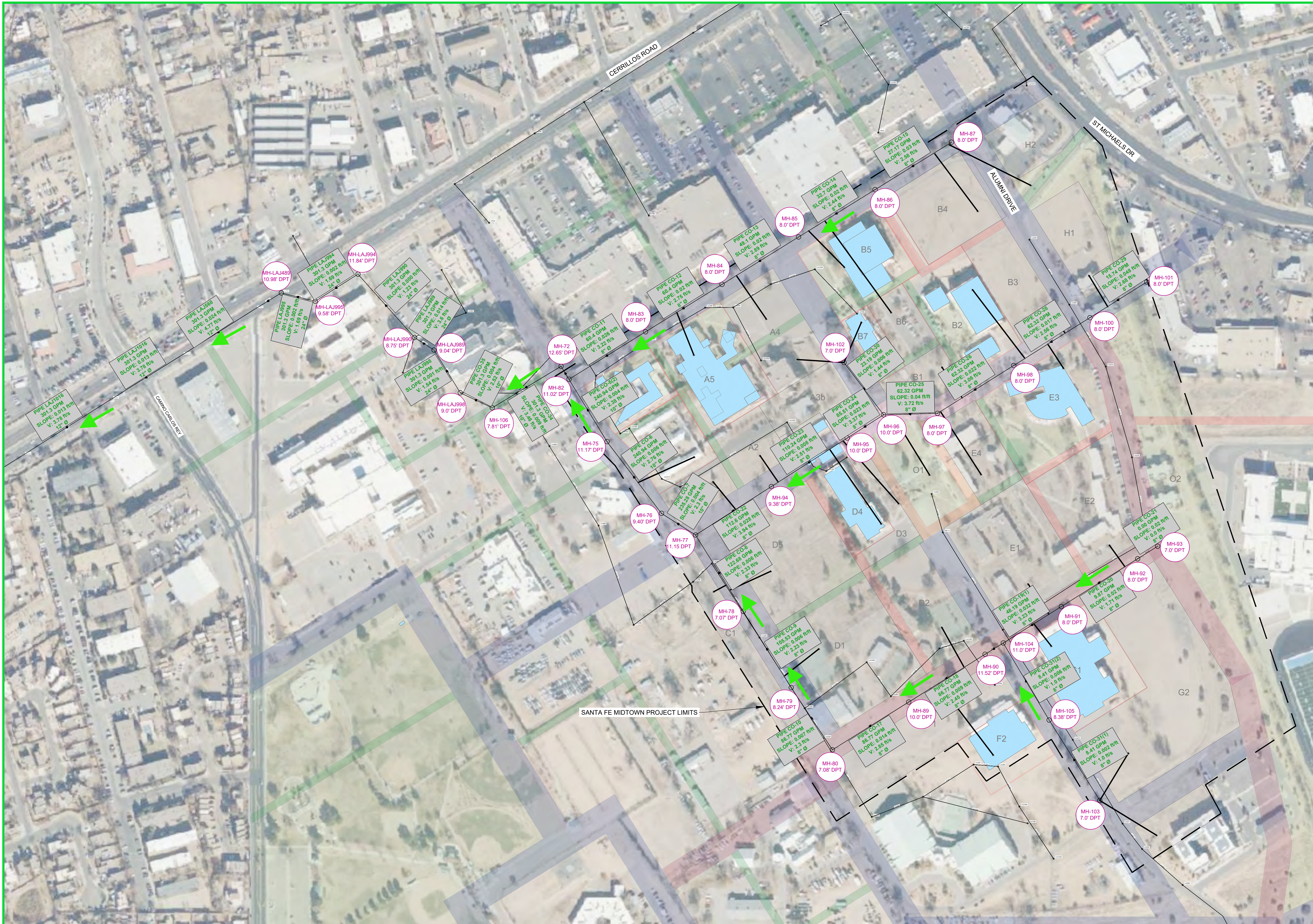
Option S2 Cons:

The extra demands on the sewer system will likely lead to sewer backups affecting residents and businesses. The existing sewer system is not in ideal locations and will likely still need relocation to fit within public right-of-way. This option was not evaluated further since the existing system is over capacity.

SECTION 6: RECOMMENDATION OF ALTERNATIVE

It is the opinion of the Engineer that Option 1 be selected for the water line, and Option 1 be selected for the sewer line. These options both allow for the full build out of future development while providing sufficient capacity and locating all new utilities in the public right-of-way. Additionally, Option 1 will improve existing conditions on the sewer lines, by re-directing flows away from an over-capacity sewer line. Approximate costs of the recommended alternates are listed below, see **Table 2** for a more detailed breakdown of the costs for each alternative.

RECOMMENDED ALTERNATIVE		ALTERNATIVE COST
WATER	WATER OPTION 1	\$ 144,045.18
SEWER	SEWER OPTION 1	\$ 434,554.27
SUBTOTAL PROJECTED COST:		\$ 588,199.45
NMGRT @ 8.625%:		\$ 50,732.20
20% CONTINGENCY:		\$ 117,639.89
GRAND TOTAL:		\$ 756,571.54

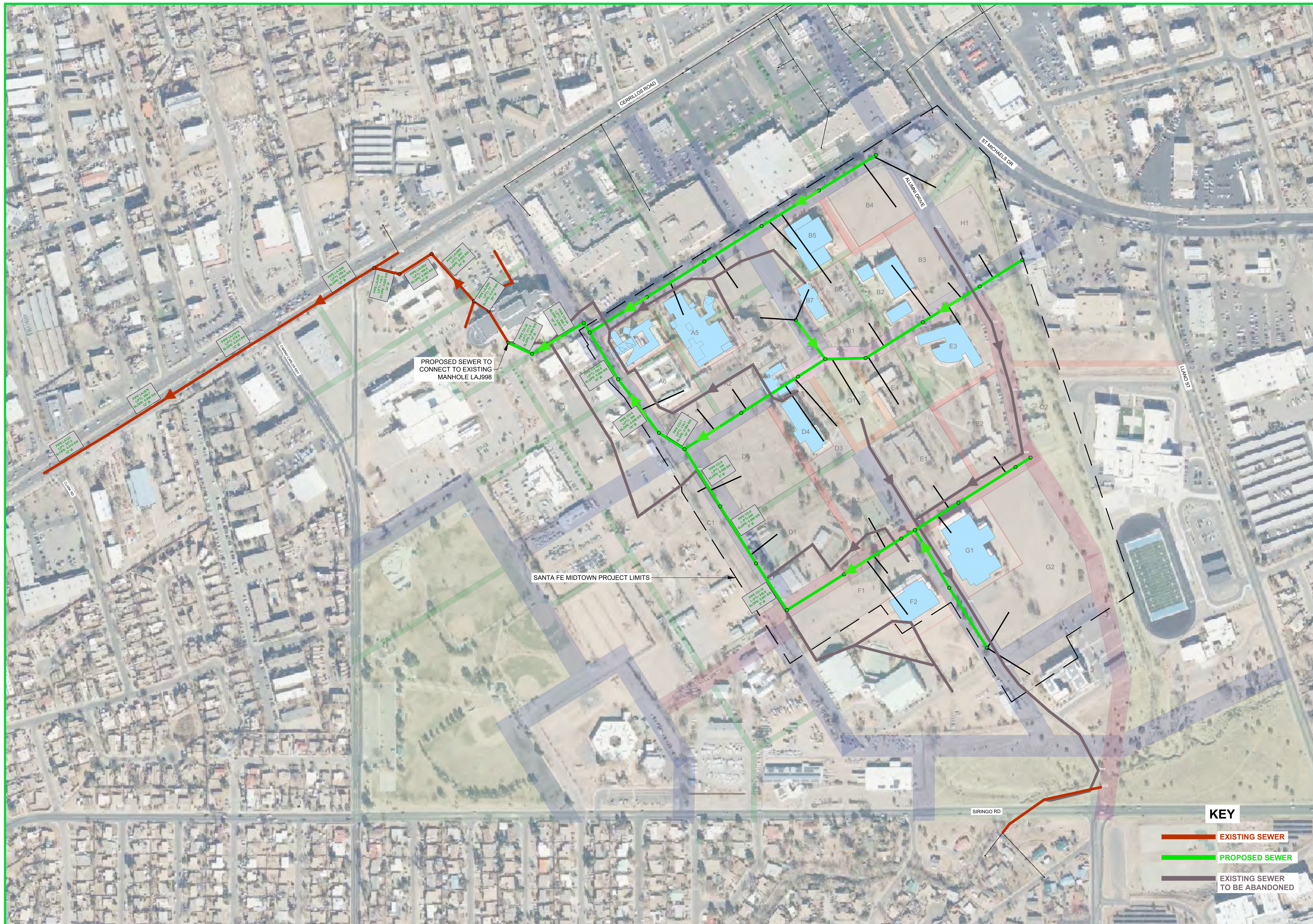


**CITY OF SANTA FE -
MIDTOWN INFRASTRUCTURE
IMPROVEMENTS**



SCALE: 1"=150'

**CITY OF SANTA FE -
MIDTOWN INFRASTRUCTURE
IMPROVEMENTS**



PROPOSED SEWER TO CONNECT TO EXISTING MANHOLE LAJ998

SANTA FE MIDTOWN PROJECT LIMITS

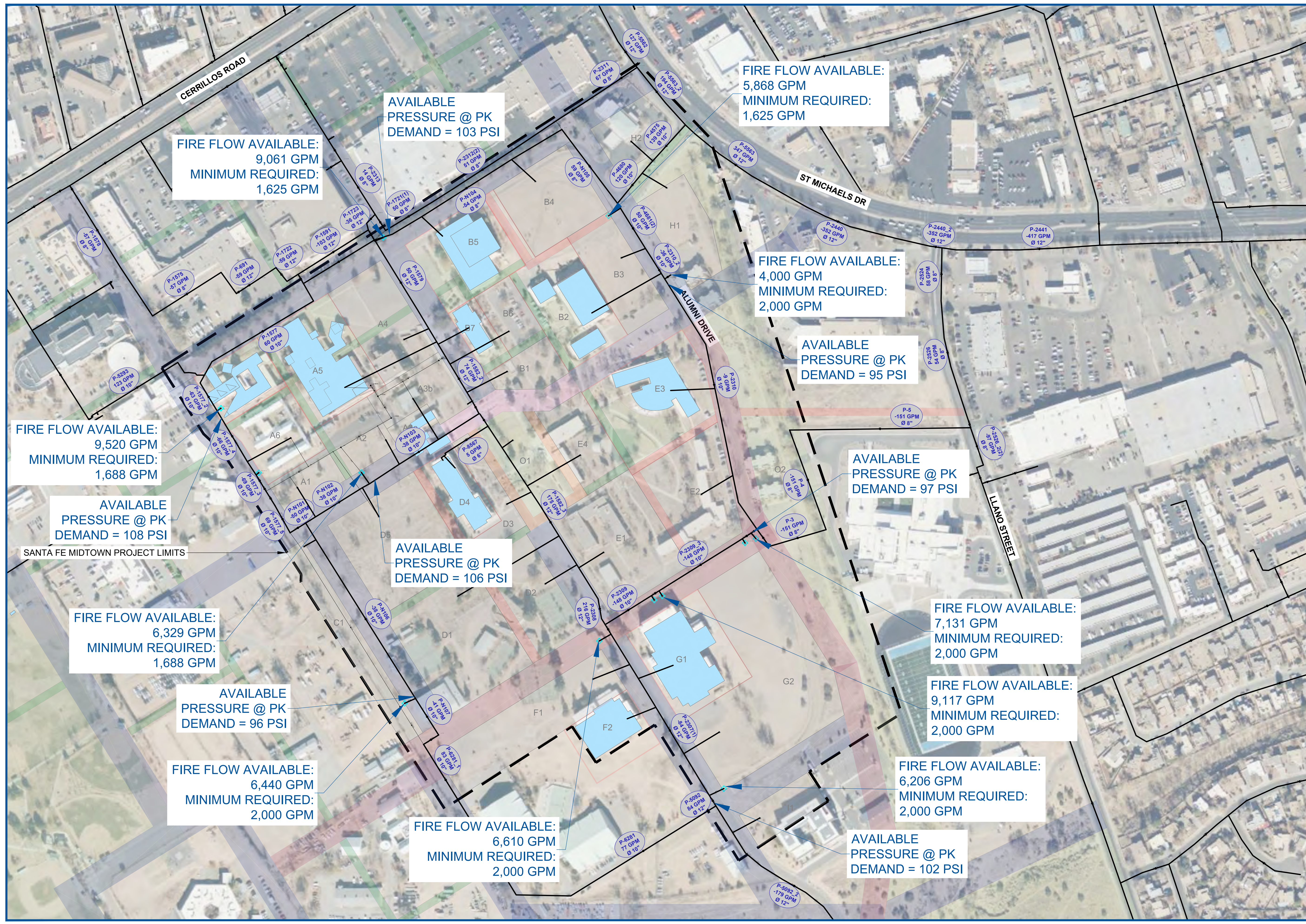
KEY

- EXISTING SEWER
- PROPOSED SEWER
- EXISTING SEWER TO BE ABANDONED



SCALE: 1"=200'

PROPOSED/
EXISTING SEWER
EXHIBIT 2

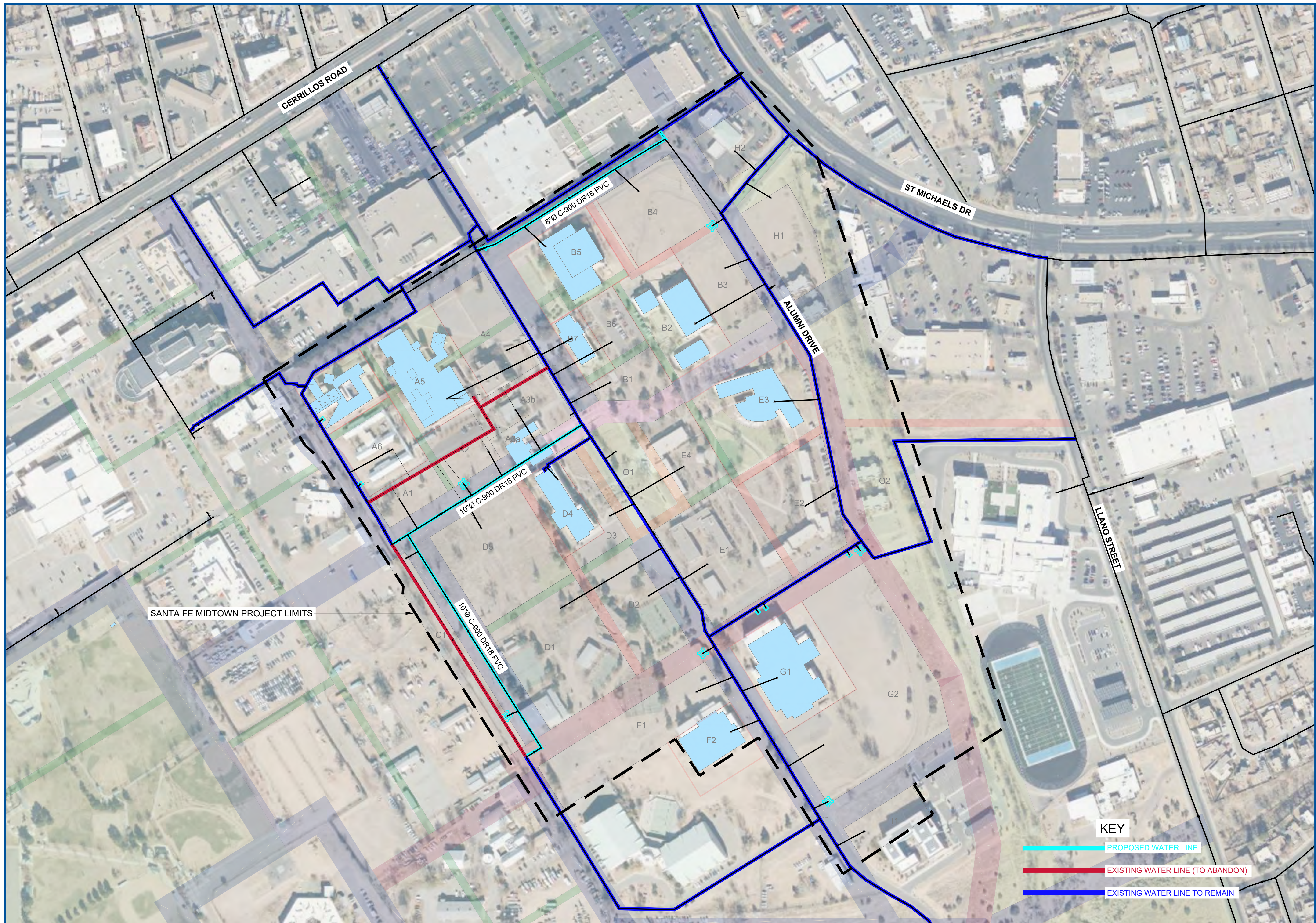


**CITY OF SANTA FE -
MIDTOWN INFRASTRUCTURE
IMPROVEMENTS**






SCALE: 1"=150'

**WATER SYSTEM
LAYOUT
EXHIBIT 4**



KEY

-  PROPOSED WATER LINE
-  EXISTING WATER LINE (TO ABANDON)
-  EXISTING WATER LINE TO REMAIN



Santa Fe Midtown
Owner: City of Santa Fe

By: MAT
Checked By: RG
Date: 5/25/2022

Santa Fe Water Demands							*Residential Demand per Capita (gpcd)	70
Block/ Parcel	Primary Use	Total Water Demand by Parcel (GPD)	Total Water Demand by Parcel (GPM)	Peak Flow (GPM)	Fire Flow (GPM)	Fire Flow Duration (Hrs)	Residents per Residential Unit	3.41
							*Commercial Demand per Capita (gpcd)	25
A							Occupants per sqft Retail	0.00225
A1	Residential-Townhouse	3580.50	2.49	3.48	875.0	4.0	*Office Demand per Capita (gpcd)	25
A2	Residential-Townhouse Residential Midrise Apts	13844.60	9.61	13.46	1000.0	2.0	Occupants per sqft Office	0.00332
A3	Ground Floor Retail, Bar, Lodging	30996.88	21.53	30.14	1437.5	4.0	*Insitutional Demand per capita (gpcd)	25
A4	Residential-Townhouse Residential Midrise Apts	24816.52	17.23	24.13	1375.0	4.0	Occupants per sqft Institutional/ Assembly	0.0196
A5	Community/ Assembly/ Library	17150.00	11.91	16.67	687.5	2.0	PEAKING FACTOR RESIDENTIAL (WATER)	1.4
A6	Community/ Assembly/ Library	8575.00	5.95	8.34	500.0	2.0	PEAKING FACTOR COMMERCIAL (WATER)	1.4
B							**Assumption of 330 Diners/ Customers per day at a demand of 7 gpcd (gpcd)	7
B1	Residential Mid-Rise Apts/ Commercial (Retail)	9196.34	6.39	8.94	875.0	3.0		
B2	Community/ Assembly/ Library	22344.00	15.52	21.72	562.5	2.0		
B3	Residential-Townhouse Residential- Low Rise Multifamily	10118.83	7.03	9.84	812.5	3.0		
B4	Residential-Townhouse Residential Midrise Apts	10578.83	7.35	10.28	875.0	3.0		
B5	Cinema	4125.00	2.86	4.01	375.0	2.0		
B6	Residential-Townhouse	4150.62	2.88	4.04	937.5	3.0		
B7	Office (Medium Trip)(Administration)	4263.00	2.96	4.14	375.0	2.0		
C								
C1	Residential-Townhouse	7135.49	4.96	6.94	1250.0	4.0		
D								
D1	Residential-Townhouse Residential- Low Rise Multifamily/ Offices	28438.00	19.75	27.65	1687.5	4.0		
D2	Residential-Townhouse Residential Midrise Apts	24108.70	16.74	23.44	1312.5	4.0		
D3	Residential Mid-Rise Apts/ Commercial	10045.47	6.98	9.77	875.0	3.0		
D4	Office (Medium Trip)	13600.93	9.45	13.22	875.0	3.0		
D5	Residential-Townhouse Residential- Low Rise Multifamily	18857.30	13.10	18.33	1062.5	4.0		
E								
E1	Residential-Townhouse Residential Midrise Apts	39624.20	27.52	38.52	1750.0	4.0		
E2	Residential-Townhouse Residential- Low Rise Multifamily	14955.80	10.39	14.54	1000.0	4.0		
E3	Community/ Assembly/ Library	14768.11	10.26	14.36	437.5	2.0		
E4	Ground Floor Retail/ Residential- Townhouse/Residential Midrise Apts	14168.62	9.84	13.78	1312.5	4.0		
F								
F1	Office/ Film (Production)	17222.50	11.96	16.74	2000.0	4.0		
F2	Office/ Film (Production)	4390.70	3.05	4.27	625.0	2.0		
G								
G1	Office/ Film (Production)	5145.90	3.57	5.00	562.5	2.0		
G2	Film (Production)	18459.20	12.82	17.95	2000.0	4.0		
H								
H1	Residential-Townhouse Residential Midrise Apts	23856.59	16.57	23.19	1312.5	4.0		
H2	Residential Midrise Apts	30604.60	21.25	29.75	1625.0	4.0		
I								
I1	Film Production	7611.10	5.29	7.40	1625.0	4.0		
O								
O1	Open Space			0.00				
O2	Open Space			0.00				
		Total Water Demand (GPM)	317.18	444.05				



Santa Fe Midtown
Owner: City of Santa Fe

By: MAT
Checked By: RG
Date: 5/13/2022

Santa Fe Sewer Demands

Block/ Parcel	Primary Use	Total Water Demand by Parcel GPD	Total Water Demand by Parcel GPM	Sewer Demands 95% Water Demands (GPM)	Sewer Peak Flow (GPM)
A					
A1	Residential-Townhouse	3580.50	2.49	2.36	3.07
A2	Residential-Townhouse Residential Midrise Apts	13844.60	9.61	9.13	11.87
A3	Ground Floor Retail, Bar, Lodging	30996.88	21.53	20.45	28.88
A4	Residential-Townhouse Residential Midrise Apts	24816.52	17.23	16.37	21.28
A5	Community/ Assembly/ Library	17150.00	11.91	11.31	18.10
A6	Community/ Assembly/ Library	8575.00	5.95	5.66	9.05
B					
B1	Residential Mid-Rise Apts/ Commercial (Retail)	9196.34	6.39	6.07	7.96
B2	Community/ Assembly/ Library	22344.00	15.52	14.74	23.59
B3	Residential-Townhouse Residential- Low Rise Multifamily	10118.83	7.03	6.68	8.68
B4	Residential-Townhouse Residential Midrise Apts	10578.83	7.35	6.98	9.07
B5	Cinema	4125.00	2.86	2.72	4.35
B6	Residential-Townhouse	4150.62	2.88	2.74	3.56
B7	Office (Medium Trip)(Administration)	4263.00	2.96	2.81	4.50
C					
C1	Residential-Townhouse	7135.49	4.96	4.71	6.12
D					
D1	Residential-Townhouse Residential- Low Rise Multifamily/ Offices	28438.00	19.75	18.76	27.33
D2	Residential-Townhouse Residential Midrise Apts	24108.70	16.74	15.91	20.68
D3	Residential Mid-Rise Apts/ Commercial	10045.47	6.98	6.63	8.72
D4	Office (Medium Trip)	13600.93	9.45	8.97	14.36
D5	Residential-Townhouse Residential- Low Rise Multifamily	18857.30	13.10	12.44	16.17
E					
E1	Residential-Townhouse Residential Midrise Apts	39624.20	27.52	26.14	33.98
E2	Residential-Townhouse Residential- Low Rise Multifamily	14955.80	10.39	9.87	12.83
E3	Community/ Assembly/ Library	14768.11	10.26	9.74	15.59
E4	Ground Floor Retail/ Residential- Townhouse/Residential Midrise Apts	14168.62	9.84	9.35	14.16
F					
F1	Office/ Film (Production)	17222.50	11.96	11.36	18.18
F2	Office/ Film (Production)	4390.70	3.05	2.90	4.63
G					
G1	Office/ Film (Production)	5145.90	3.57	3.39	5.43
G2	Film (Production)	18459.20	12.82	12.18	19.48
H					
0					
H1	Residential-Townhouse Residential Midrise Apts	23856.59	16.57	15.74	20.46
H2	Residential Midrise Apts	30604.60	21.25	20.19	26.25
I					
I1	Film Production	7611.10	5.29	5.02	8.03
O					
O1	Open Space			0.00	
O2	Open Space			0.00	
		Total Demands (GPM)	317.18	301.32	426.37

*Residential Demand per Capita (gpcd)	70
Residents per Residential Unit	3.41
*Commercial Demand per Capita (gpcd)	25
Occupants per sqft Retail	0.00225
*Office Demand per Capita (gpcd)	25
Occupants per sqft Office	0.00332
*Institutional Demand per capita (gpcd)	25
Occupants per sqft Institutional/ Assembly	0.0196
Sewer Peaking Factor (Residential)	1.3
Sewer Peaking Factor (Commercial)	1.6

City of Santa Fe Midtown - EOPC

ITEM NO.	ITEM DESCRIPTION:	UNIT:	QTY:	UNIT PRICE	BID AMOUNT
SANITARY SEWER SYSTEM					
	8" SDR 35 SEWER PIPE, (STD. SPEC. SEC 091), FURNISH & PLACE IN OPEN TRENCH, CIP	LF	5141	\$20.39	\$ 104,828.05
	TRENCHING, BACKFILL, AND COMPACTION FOR 4" TO 15" SEWER PIPE 8' OR LESS IN DEPTH, PIPE NOT INCLUDED, COMPL.	LF	6901	\$21.07	\$ 145,407.23
	MH, 4' DIA, TYPE "C" OR "E", 6' TO 10' DEEP, CIP.	EA	23	\$4,929.60	\$ 113,380.80
	MH, 4' DIA, TYPE "C" OR "E", 10' TO 14' DEEP, CIP.	EA	5	\$5,056.00	\$ 25,280.00
	10" SDR 35 SEWER PIPE, (STD. SPEC. SEC 091), FURNISH & PLACE IN OPEN TRENCH, CIP	LF	1760	\$22.21	\$ 39,089.60
	TRENCHING, BACKFILL, AND COMPACTION FOR 4" TO 15" SEWER PIPE 8' TO 12' IN DEPTH, PIPE NOT INCLUDED, COMPL.	LF	217	\$30.27	\$ 6,568.59
	30" CIPP LINING ON SILAR ROAD, CIP	LF	280	\$500.00	\$ 140,000.00
SANITARY SEWER SYSTEM SUBTOTAL					\$ 434,554.27
WATER SYSTEM					
	DUCTILE IRON MJ FITTINGS, ALL SIZES, CLASS 250, INCL. JOINING MATERIAL, CIP.	LB	620	\$3.79	\$ 2,349.80
	10" WATERLINE PIPE, EXCL FITTINGS, INCL TRACE WIRE, TRENCH & COMPACTED BACKFILL, UP TO 6' DEPTH, CIP	LF	2417	\$46.14	\$ 111,520.38
	FIRE HYDRANT ASSEMBLY, 4' BURY, MJ, INCL BLOCKING & AGGREGATE, CIP.	EA	5	\$4,000.00	\$ 20,000.00
	10" GATE VALVE, CIP	EA	5	\$2,035.00	\$ 10,175.00
WATER SYSTEM SUBTOTAL					\$ 144,045.18
MISCELLANEOUS					
	MATERIAL TESTING ALLOWANCE	LS	1	\$2,100.00	\$ 2,100.00
	MOBILIZATION AND DEMOBILIZATION	LS	1	\$7,500.00	\$ 7,500.00
MISCELLANEOUS SUBTOTAL					\$ 9,600.00
CONSTRUCTION SUBTOTAL					\$ 588,199.45
NMGRT @ 8.6250 (Santa Fe)					\$ 50,732.20
20% CONTINGENCY					\$ 117,639.89
TOTAL					\$ 756,571.54