

## Technical Memorandum

**Date:** 12/05/2022  
**Project:** Garden Street Sewer Capacity Upgrade – City of Santa Barbara  
**Project No.** 1208-02  
**To:** Adam Hendel, PE  
**From:** Murthy Kadiyala, PE  
**Subject:** Technical Memorandum for Garden Street Sewer Capacity Upgrade

### INTRODUCTION

Two new developments are proposed on Garden Street and East Mason Street in the City of Santa Barbara (**Figure 1**). These developments will generate an additional total of 820 GPM or 1.2 MGD of peak sewer flow. This will cause surcharging and backup of the existing 33-inch diameter sewer main south of Garden Street and just upstream of El Estero Wastewater Treatment Plant and requires replacement or upgrade thereof. Four options are developed for the upgrade which are discussed in the following sections. LEE + RO has prepared this technical memorandum to address the following:

- Alignment options for the upgrade of the existing 33-inch diameter sewer main south of Garden Street
- Cost estimates for the proposed alignment options
- Assessment of current easements and additional required easements



Figure 1 - Vicinity Map

F&A, inc. calculated the peak water demand for the development of 101 Garden St (Santa Barbara), composing of six lots. The peak sewer flow is assumed to be equal to the peak water demand at 385 GPM.

RRM Design Group calculated the peak sewer flow for the development in 121 E Mason Street as 435 GPM, broken down as follows:

- Santa Barbara Street lateral connection Sewer flow 155 GPM
- Mason Street lateral connection Sewer flow 132 GPM
- Gray Avenue lateral connection Sewer flow 148 GPM

Water Systems Consulting, Inc. (WSC) worked with the City of Santa Barbara to develop an estimate of future peak flow rate (year 2050) through the pipe of interest. Factoring in future build out developments, the estimated future flow is 13.79 MGD.

## HAZARDOUS SOIL AND GROUNDWATER CONTAMINATION

The project site is identified by the Department of Toxic Substances Control (DTSC) as cleanup sites. The DTSC supervises investigations and cleanup actions at sites where oil or hazardous chemicals may have been released into the environment. DTSC, federal or state agencies, and other companies partly responsible for the contamination may perform cleanups. Handling, disposal, and treatment of hazardous soil will be required during open-cut construction which will be governed by Resource Conservation and Recovery Act (RCRA) regulations. Shallow groundwater in the open trenches will need to be dewatered to facilitate construction. The entire area was historically developed using filled-in soil and archaeological monitoring may be required.

## CONSTRUCTABILITY & EASEMENTS

### Construction Methods

The upgrade of the Garden Street Sewer consists of both open-cut installation of new pipeline and manholes south of Garden Street and trenchless crossing of Laguna Channel using jack and bore method. Depending on the selected alignment option, temporary sewer bypass pumping may be required to handle sewer flows, in addition to the groundwater dewatering.

### Open-cut

Open-cut trenching will be the primary method of installing the new pipeline. There are several advantages of the open-cut method. It provides various excavation and trenching options, it allows direct pipe inspection, and gives high level of control over elevation and slopes. It also often the lowest cost method compared to other methods.

### Jack & Bore method

All alignment options have to cross below the Laguna Channel trenchlessly to mitigate the environmental impacts. The Jack & Bore method uses a auger boring machine (**Figure 2**) to bore the soil inside the jacked casing underneath the open channel. The jacked steel casing pipeline is installed in sections by welding the pipe joints and pushing in pipe casing and

inserting the carrier pipes within the jacked casing. This method requires jacking pit, in which the bore machine will be placed, and a receiving pit. All alignment options that are considered for this work will include the use of jack and bore method to install the new pipe that will pass underneath the Laguna Channel.

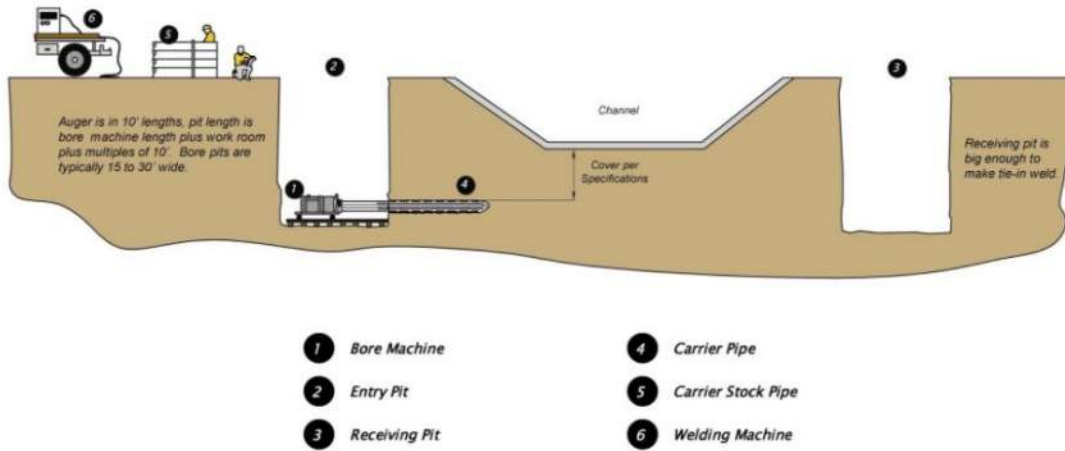


Figure 2 – Jack & Bore beneath Laguna Channel

Official Record 80 Easement

The City of Santa Barbara has an existing sewer easement along the existing sewer pipeline, highlighted as red in **Figure 3** below. However, the easement width is only 10 feet. While the option consisting of removing and replacing in the original alignment can barely manage to fit within the original easement, upgrade of the pipeline will mostly require additional new permanent and temporary easements. A draft of the court ruling document is available in **Appendix A**.



Figure 3 – Sewer Easement (Not To Scale)

Hydraulics



Figure 4 - Pipeline and Manhole IDs

Table 1 – Existing Sewer GIS Data

Sewer Line	I.D.	Inv. Elev.	Rim	Size (")	UpSt. Elev.	DnSt. Elev.	Length (')	Slope
Manhole 1	MH-H09-091	-9.19	10.64					
Pipe 1	CP-H9-44			33	-6.46	0	66.39	
Manhole 2	MH-H09-029	-6.64	12.87					
Pipe 2	CP-H9-88			33	N/A	N/A	71.48	
Manhole 3	MH-H09-083	N/A						
Pipe 3	CP-H9-43			33	0	-7.1	338.74	-0.0014
Manhole 4	MH-H10-004	-7.1	8.21					
Pipe 4	CP-H10-9			33	-7.1	-8.82	115.91	-0.0148
Manhole 5	MH-H10-003	-8.82	9.42					
Pipe 5	CP-H9-79			42	-8.82	-9.34	288.98	-0.0018
Manhole 6	MH-H10-074	-9.34	12.15					

Manhole and pipeline data are available through the GIS files and additional data provided by the City, as shown above in **Figure 4** and **Table 1**. Incomplete or unknown information is shown as dashed line: pipe 2, manhole 3, and pipe 3. According to the CCTV report, the unknown sections have been replaced with RCP material. The slopes of the pipes are calculated using the upstream and downstream elevations.



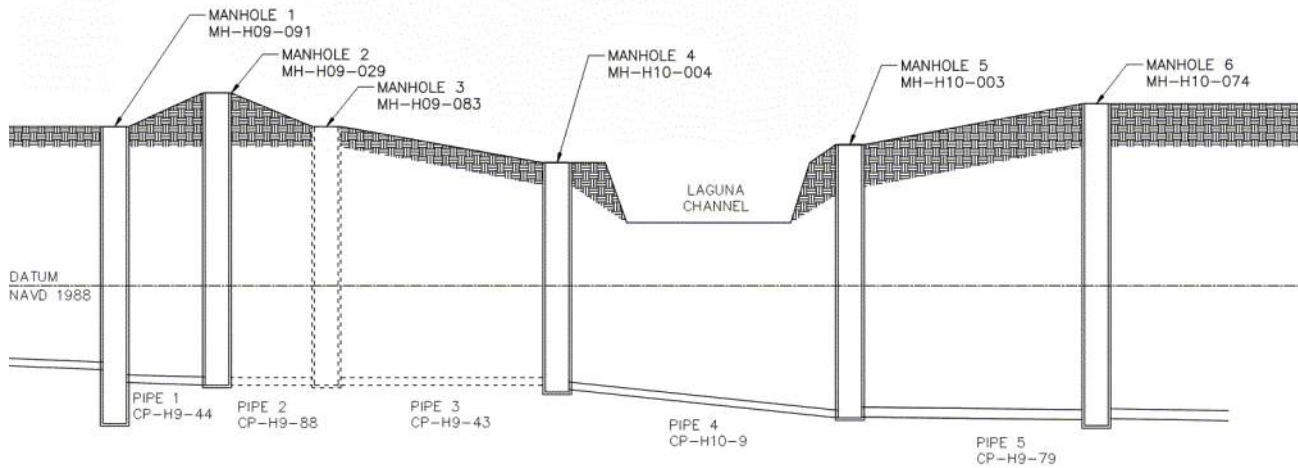


Figure 5 - Sewer line profile - Not To Scale

Table 2 - Existing and New Pipeline Capacities

Description	Diameter d inches	Depth over Dia. D/d	Mannings Coefficient n	Pipe Slope s	Velocity V ft/sec	Flow Q MGD
Existing Pipe 3 - 33" ID Pipe	33	0.5	0.015	0.0014	2.89	5.55
Existing Pipe 4 - 33" ID Pipe	33	0.5	0.015	0.0148	9.39	18.04
New Pipe 3 - 42" ID Pipe	42	0.5	0.01	0.0013	4.90	15.25
New Pipe 4 - 42" ID Pipe	42	0.5	0.01	0.0148	16.54	51.47
New Pipe 3 - 36" ID Pipe	36	0.5	0.01	0.0013	4.42	10.11
New Pipe 3 - 18" ID Pipe	18	0.5	0.01	0.0013	2.79	1.59

Figure 5 shows the profile of the sewer line to be upgraded; it is not to scale and is created for the purpose of gauging the allowable slope permitted by the current layout. The design of the new pipelines is limited by the allowable slope. From Table 2, the existing 33-inch RCP (Pipe 3) does not satisfy future peak flow of 13.79 MGD. Two pipes of different sizes are proposed.

## ALIGNMENT OPTIONS AND ESTIMATED COSTS

### Alignment option A

Removal and replacement of existing 33" sewer line with new 48" HDPE or 44.5" Hobas pipe (42" I.D.) in place.

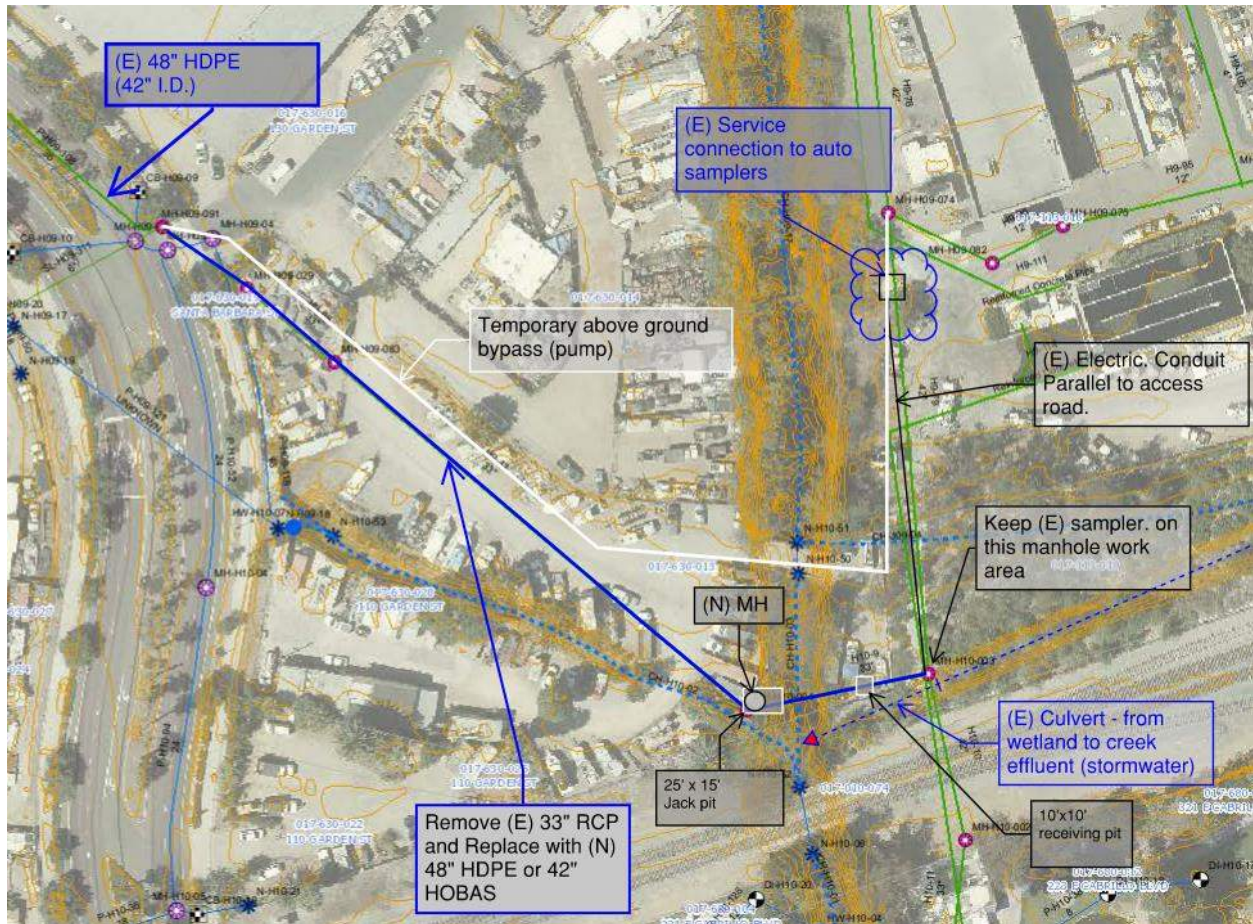


Figure 6 - Option A

*A sampler or autosampler is an attached device that automatically collects wastewater samples for analysis*

Alignment option A requires temporary bypassing of wastewater flow to accommodate the removal and replacement of the existing 33" pipe with a new 48" HDPE or 44.5" HOBAS pipe (42" I.D.) in place. The bypass line, operated with two pumps (1 main pump; 1 backup pump), may pass through the bridge over the Laguna Channel and connect to the intercepting manhole (MH-H09-074). The new pipeline will remain within the original easement granted to the city.

### Cost

The estimated total cost for this option is \$ 6.45M.



Alignment option B

Installation of a new 48" HDPE or 44.5" Hobas pipe (42" I.D.) line connecting to a new manhole; abandonment of the existing 33" sewer line.

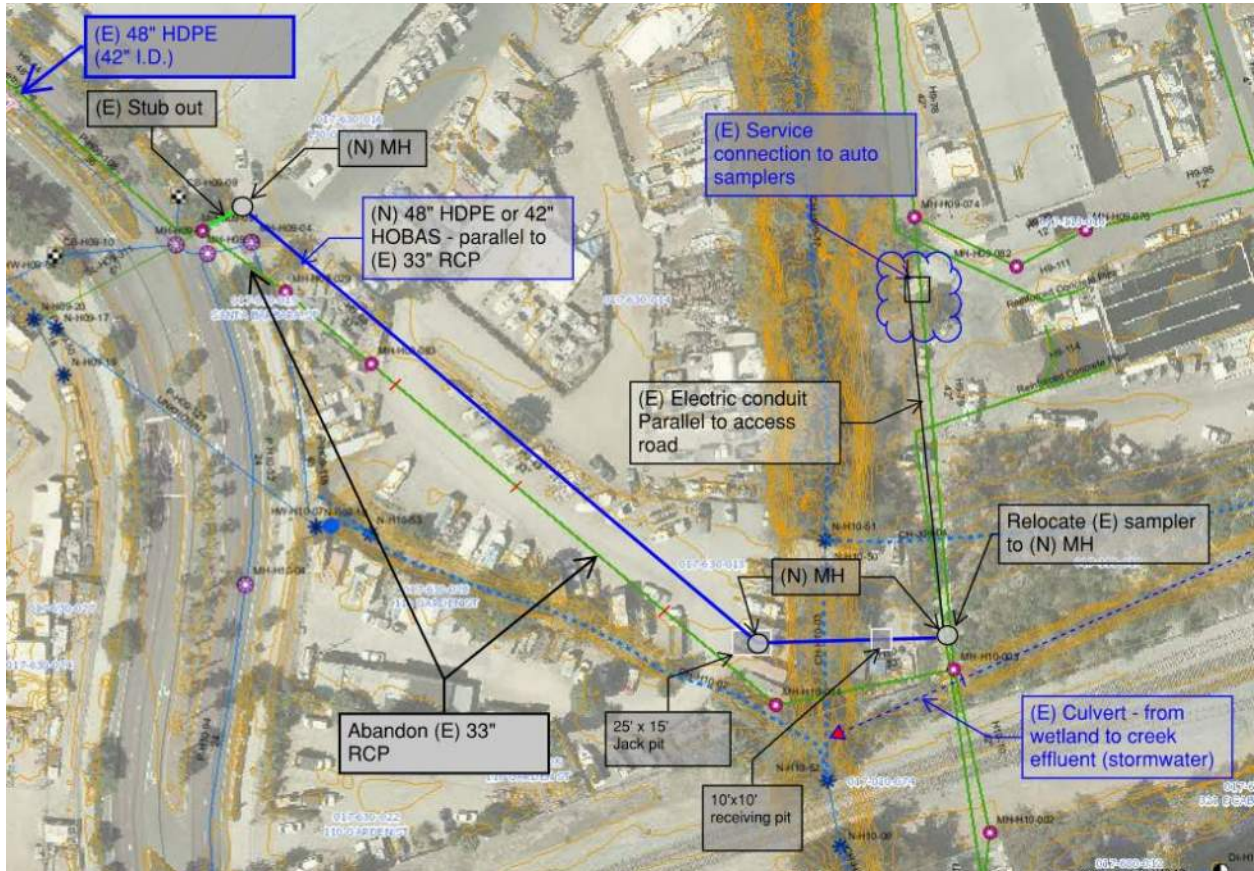


Figure 7 - Option B

For option B, a new 48" HDPE line is to be installed parallel to the existing 33" line. Upon completion of the new line and confirmation of successful operation, the existing 33" line shall be abandoned.

Costs

The estimated total cost for this option is \$ 6.0M.

Alignment option C1 and C2

*C1: Installation of a new 20" HDPE or 19.5" Hobas pipe (18" I.D.) line connecting to the existing manhole. The new line will operate concurrently with the existing 33" line.*

*C2: Installation of a new 42" HDPE (39" I.D.) or 38.3" Hobas pipe (36" I.D.) line that will operate with the existing 33" line. The new and existing line will have a combined capacity of a 48" HDPE (42" I.D.)*

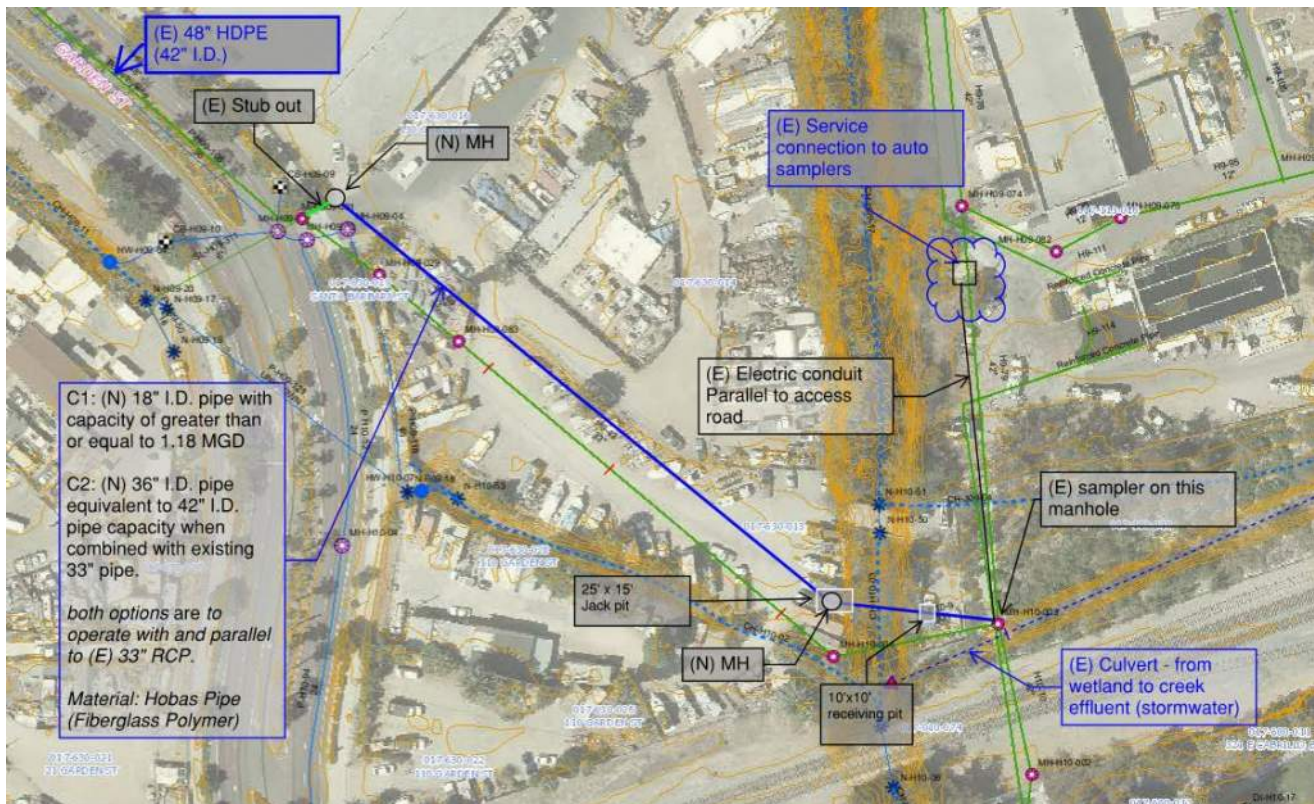


Figure 8 - Option C1 and C2

Alignment option C considers utilizing the new and existing lines for simultaneous operation. The design size of the new line is adjusted to provide the flow capacity of 1.18 MGD for option C1 and an equivalent flow capacity of a 42" I.D. pipe when combined with the existing line for option C2. The new line will connect to the existing manhole (MH-H010-003). This option will require easement acquisition in addition to the original easement. Both options C1 and C2 do not include the cost of rehabilitating the existing parallel line.

Costs

The estimated total cost for this option C1 is \$ 5.60M.

The estimated total cost for this option C2 is \$ 5.66M.



Alignment option D

Installation of a new 48" HDPE or 44.5" Hobas pipe (42" I.D.) line along Garden street and storm drain open channel; abandonment of the existing 33" sewer line.

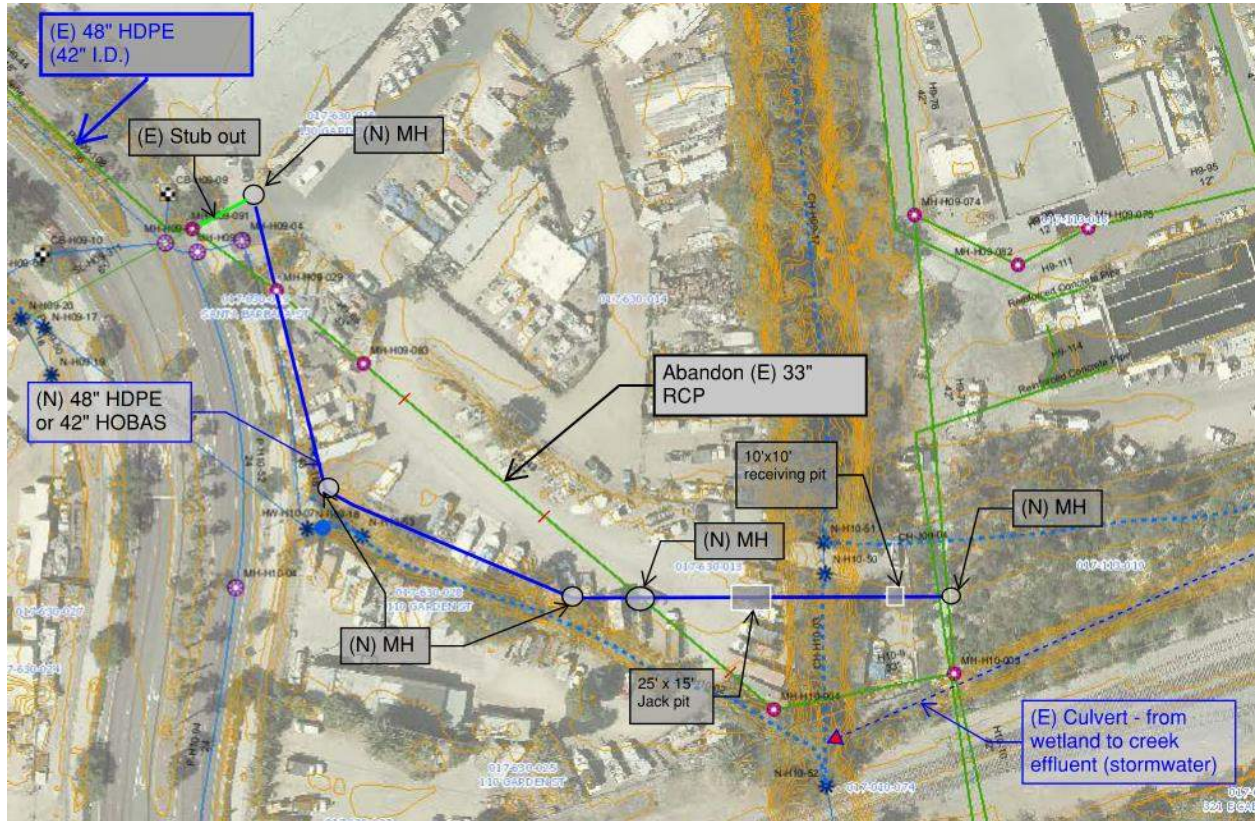


Figure 9 - Option D

Similar to option B, alignment option D will have a new pipeline installed, and the existing line will be abandoned. The new line will run parallel to south of Garden Street and along the existing stormwater open channel perpendicular to Garden Street. Upon construction completion of the new line and confirmation of successful operation, the existing 33" line shall be abandoned.

Costs

The estimated total cost for this option is \$ 5.91M.

**Cost Estimates**

Table 3 - Alignment options cost estimates

Item Description	Qty.	Option A	Option B	Option C1	Option C2	Option D
Mobilization, Demobilization, Cleanup	App. B	\$ 100,000.00	\$ 100,000.00	\$ 100,000.00	\$ 100,000.00	\$ 100,000.00
Jack & Bore	App. B	\$ 200,000.00	\$ 200,000.00	\$ 200,000.00	\$ 200,000.00	\$ 200,000.00
Bypass pumping	App. B	\$ 400,000.00	\$ -	\$ -	\$ -	\$ -
Demo, cleaning, disposal	App. B	\$ 30,000.00	\$ 30,000.00	\$ 30,000.00	\$ 30,000.00	\$ 30,000.00
Soil contamination RCRA	App. B	\$ 1,040,000.00	\$ 1,040,000.00	\$ 1,040,000.00	\$ 1,040,000.00	\$ 1,040,000.00
Dewatering, treatment, & disposal	App. B	\$ 1,000,000.00	\$ 1,000,000.00	\$ 1,000,000.00	\$ 1,000,000.00	\$ 1,000,000.00
Excavation, hauling, shoring & backfill	App. B	\$ 169,000.00	\$ 169,000.00	\$ 169,000.00	\$ 169,000.00	\$ 169,000.00
48" HDPE / 42", 18" Hobas Pipe	App. B	\$ 324,500.00	\$ 324,500.00	\$ 99,120.00	\$ 173,460.00	\$ 324,500.00
Manhole, frame, & cover	App. B	\$ 31,500.00	\$ 93,000.00	\$ 62,000.00	\$ 62,000.00	\$ 155,000.00
New Easement	App. B	\$ -	\$ 100,000.00	\$ 100,000.00	\$ 100,000.00	\$ 100,000.00
<b>Direct cost subtotal</b>		<b>\$ 3,295,000.00</b>	<b>\$ 3,081,500.00</b>	<b>\$ 2,700,120.00</b>	<b>\$ 2,774,460.00</b>	<b>\$ 3,018,500.00</b>
Bonding and All Risk Insurance	2%	\$ 65,900.00	\$ 61,630.00	\$ 54,002.40	\$ 55,489.20	\$ 60,370.00
<b>Subtotal</b>		<b>\$ 3,360,900.00</b>	<b>\$ 3,143,130.00</b>	<b>\$ 2,754,122.40</b>	<b>\$ 2,829,949.20</b>	<b>\$ 3,078,870.00</b>
Contingency	25%	\$ 840,225.00	\$ 785,782.50	\$ 688,530.60	\$ 707,487.30	\$ 769,717.50
<b>Subtotal</b>		<b>\$ 4,201,125.00</b>	<b>\$ 3,928,912.50</b>	<b>\$ 3,442,653.00</b>	<b>\$ 3,537,436.50</b>	<b>\$ 3,848,587.50</b>
General Contractor Overhead and Profit	15%	\$ 630,168.75	\$ 589,336.88	\$ 516,397.95	\$ 530,615.48	\$ 577,288.13
<b>Subtotal</b>		<b>\$ 4,831,293.75</b>	<b>\$ 4,518,249.38</b>	<b>\$ 3,959,050.95</b>	<b>\$ 4,068,051.98</b>	<b>\$ 4,425,875.63</b>
Escalation Construction Midpoint	3%	\$ 144,938.81	\$ 135,547.48	\$ 118,771.53	\$ 122,041.56	\$ 132,776.27
<b>Subtotal</b>		<b>\$ 4,976,232.56</b>	<b>\$ 4,653,796.86</b>	<b>\$ 4,077,822.48</b>	<b>\$ 4,190,093.53</b>	<b>\$ 4,558,651.89</b>
<b>TOTAL ESTIMATED CONSTRUCTION COST</b>		<b>\$ 4,976,232.56</b>	<b>\$ 4,653,796.86</b>	<b>\$ 4,077,822.48</b>	<b>\$ 4,190,093.53</b>	<b>\$ 4,558,651.89</b>
Design, advertisement, bidding & award, construction mgmt., inspection, compaction testing, etc.	35%	\$ 1,741,681.40	\$ 1,628,828.90	\$ 1,427,237.87	\$ 1,466,532.74	\$ 1,595,528.16
<b>TOTAL PROJECT COST</b>		<b>\$ 6,717,913.96</b>	<b>\$ 6,282,625.76</b>	<b>\$ 5,505,060.35</b>	<b>\$ 5,656,626.27</b>	<b>\$ 6,154,180.06</b>
<b>AVERAGE TOTAL PROJECT COST</b>		<b>\$</b>				<b>6,063,281.28</b>

The cost estimate breakdown is shown in **Appendix B** of this technical memorandum.

Discussion and Conclusion

A total of four alignment options are presented in this technical memorandum. These options are evaluated based on the criteria shown in **Table 4**. The arrows indicate satisfactory scores of each option per criterion.

Table 4 – Selection Criteria

Criteria	Alignment Options			
	Option A	Option B	Option C (1&2)	Option D
Constructability	↓↓(-2)	↑ (1)	↑ (1)	↑ (1)
Easement Constraints	↑↑ (2)	↓(-1)	↓↓ (-2)	→(0)
Cost	↓(-1)	↑ (1)	↑ (1)	↑ (1)
Total Net Preferred Symbols	-1	1	0	2

LEGEND:

- ↑↑ Significantly Preferred / Advantageous      ↓ Constrained / Not Preferred
- ↑ Preferred / Advantageous                      ↓↓ Significant Disadvantage
- Neutral / Meets Objectives

**Constructability**

Alignment option A requires more than 800 ft. of bypass pumping until completion of project, this carries significant risks to the environment and the community if the bypass is designed incorrectly, along with delays and unexpected change orders which causes financial burden. Alignment option B, C and D does not require temporary bypasses which is an advantage.

**Easement constraints**

Alignment option A does not require additional easement which is a significant advantage over other options. Option B requires quitclaiming of current easements and acquiring new permanent easements. Alignment option C requires acquiring new easements and keeping the current easements. As for alignment option D, the disadvantage of acquiring new easement is negated by its easy acquisition due to being near the stormwater open channel.

**Cost**

Alignment option costs are weighted from least cost (↑) to highest cost (↓) relative to the average cost of \$5.9M (→). Alignment option C1 has the lowest anticipated cost of \$5.6M; this does not address maintenance cost of existing pipe as well as cost of addressing any infiltration. These costs are not representative of the final cost estimates and are provided as an initial estimate with a 50% margin. Costs of project design and contamination issues are included in the estimates.



## APPENDIX A

### Official Record 80 Southern Pacific Railroad Company, et al., with City of Santa Barbara

*This agreement, made this 17 day of April, 1925, by and between Southern Pacific Railroad Company, a corporation, Southern Pacific Company, a corporation, parties of the first part, and city of Santa Barbara, a municipal corporation of the State of California, party of the second part,*

*Witnesseth, that the parties of the first part for and in consideration of the sum of ten (10) dollars, lawful money of the United States of America, to [thou] paid by the party of the second part, the receipt whereof is hereby acknowledged, do by these [presents] grant (subject to the terms, covenants and conditions herein contained) unto the said party of the second part, the right to construct, maintain and use a sewer to be laid with a thirty-three (33) inch inside diameter monolithic reinforced concrete pipe, including three (3) manholes, upon, along and beneath the property and beneath the tracks of the parties of the first part. The land upon and along which this easement is granted being a strip of land ten (10) feet wide, [situate], lying and being in the city of Santa Barbara, County of Santa Barbara, State of California, and being five (5) feet on each side of the following described center line, [to-wit]:*

*Commencing at the intersection of the southerly line of Montecito Street with the southerly prediction of the center line of Garden Street, as said Garden Street exists northwesterly of Montecito Street; [thence] northeasterly along the said southeasterly line of Montecito Street a distance of 6.00 feet to the point of beginning of the outer line to be described; [thence] south of 48°10' east parallel to and 6.00 feet at right angle northerly from the said southerly prediction of the outer line of Garden Street, a distance of 462.2 feet (number is not clear: 462,482,452) to the center of a manhole; [xxx] continuing south 48°10' east parallel to and 6.00 feet at right angles northeasterly from the said southerly production of the center line of Garden Street, a distance of 510.00 feet to the center of the a manhole; [thence] continuing south 48°10' east parallel to and 6.00 feet at right angle northeasterly from the said southerly production of the centerline of Garden street, a distance 417.6 feet, more or less, to the center of a manhole; [thence] south 18°28' east, a distance of 210.00 feet, more or less, to a point, said point being 120.00 feet radially northly from the northerly line of Cabrillo Boulevard (50.00 feet wide), the end of said center line to be described. Said strip of land is above tinted in red on map marked "Los Angeles [xxxxx]", sheet 1 of 1, hereto attached and made a part of this agreement and the location of said manholes is also shown on said map.*

**The excerpt cited above is for reference and is not an exact transcription of the actual document.**

The mentioned Los Angeles drawing sheet is not included in this report. [xxx] are substitutes for intelligible words from the original document.

## APPENDIX B

ALIGNMENT OPTION A					
Item Description	Qty	Unit	Unit Price	Labor	Total Price
<b>General contractor</b>			Subtotal		
Mobilization, Demobilization, Cleanup	1	LS		\$ 100,000	\$ 100,000
Jack & Bore	1	LS		\$ 200,000	\$ 200,000
<b>Sewer Line Upgrade</b>			Subtotal		
Bypass pumping	1	LS	\$ 250,000	\$ 150,000	\$ 400,000
Demo, cleaning, disposal	1	LS	\$ 30,000	\$ -	\$ 30,000
Soil contamination RCRA	2600	CY	\$ 400	\$ -	\$ 1,040,000
Dewatering	1	LS	\$ 800,000	\$ 200,000	\$ 1,000,000
Excavation, hauling, shoring, backfill (6'x20'x590')	2600	CY	\$ 40	\$ 25	\$ 169,000
48" HDPE / 42" Hobas Pipe	590	LF	\$ 250	\$ 100	\$ 206,500
Manhole w/ lid	1	LS	\$ 25,000	\$ 6,500	\$ 31,500
New Easement	0	LS	\$ -	\$ -	\$ -
<b>Direct cost subtotal</b>					<b>\$ 3,177,000</b>
Bonding and All Risk Insurance	2%				\$ 63,540
			<b>Subtotal</b>		<b>\$ 3,240,540</b>
Contingency	25%				\$ 810,135
			<b>Subtotal</b>		<b>\$ 4,050,675</b>
General Contractor Overhead and Profit	15%				\$ 607,601.25
			<b>Subtotal</b>		<b>\$ 4,658,276.25</b>
Escalation Construction Midpoint	3%				\$ 139,748.29
			<b>Subtotal</b>		<b>\$ 4,798,024.54</b>
<b>TOTAL ESTIMATED CONSTRUCTION COST</b>					<b>\$ 4,798,025</b>
Design, advertisement, biding & award, construction mgmt., inspection, compaction testing, etc.	35%				\$ 1,679,308.59
<b>TOTAL PROJECT COST</b>					<b>\$ 6,477,333.13</b>

ALIGNMENT OPTION B					
Item Description	Qty	Unit	Unit Price	Labor	Total Price
<b>General contractor</b>			Subtotal		
Mobilization, Demobilization, Cleanup	1	LS		\$ 100,000	\$ 100,000
Jack & Bore	1	LS		\$ 200,000	\$ 200,000
<b>Sewer Line Upgrade</b>			Subtotal		
Demo, cleaning, disposal	1	LS	\$ 30,000	\$ -	\$ 30,000
Soil contamination RCRA	2600	CY	\$ 400	\$ -	\$ 1,040,000
Dewatering	1	LS	\$ 800,000	\$ 200,000	\$ 1,000,000
Excavation, hauling, shoring, backfill (6'x20'x590')	2600	CY	\$ 40	\$ 25	\$ 169,000
48" HDPE / 42" Hobas Pipe	590	LF	\$ 250	\$ 100	\$ 206,500
Manhole w/ lid	3	LS	\$ 25,000	\$ 6,000	\$ 93,000
Autosampler relocation	1	LS	\$ 15,000	\$ 10,000	\$ 25,000
New Easement	1	LS	\$ 100,000	\$ -	\$ 100,000
<b>Direct cost subtotal</b>					<b>\$ 2,963,500</b>
Bonding and All Risk Insurance	2%				\$ 59,270
			<b>Subtotal</b>		<b>\$ 3,022,770</b>
Contingency	25%				\$ 755,693
			<b>Subtotal</b>		<b>\$ 3,778,463</b>
General Contractor Overhead and Profit	15%				\$ 566,769.38
			<b>Subtotal</b>		<b>\$ 4,345,231.88</b>
Escalation Construction Midpoint	3%				\$ 130,356.96
			<b>Subtotal</b>		<b>\$ 4,475,588.83</b>
<b>TOTAL ESTIMATED CONSTRUCTION COST</b>					<b>\$ 4,475,589</b>
Design, advertisement, bidding & award, construction mgmt., inspection, compaction testing, etc.	35%				\$ 1,566,456.09
<b>TOTAL PROJECT COST</b>					<b>\$ 6,042,044.92</b>



ALIGNMENT OPTION C1					
Item Description	Qty	Unit	Unit Price	Labor	Total Price
<b>General contractor</b>			Subtotal		
Mobilization, Demobilization, Cleanup	1	LS		\$ 100,000	\$ 100,000
Jack & Bore	1	LS		\$ 200,000	\$ 200,000
<b>Sewer Line Upgrade</b>			Subtotal		
Demo, cleaning, disposal	1	LS	\$ 30,000	\$ -	\$ 30,000
Soil contamination RCRA	2600	CY	\$ 400	\$ -	\$ 1,040,000
Dewatering	1	LS	\$ 800,000	\$ 200,000	\$ 1,000,000
Excavation, hauling, shoring, backfill (6'x20'x590')	2600	CY	\$ 40	\$ 25	\$ 169,000
18" Hobas Pipe	590	LF	\$ 150	\$ 100	\$ 147,500
Manhole w/ lid	2	LS	\$ 25,000	\$ 6,000	\$ 62,000
New Easement	1	LS	\$ 100,000	\$ -	\$ 100,000
<b>Direct cost subtotal</b>					<b>\$ 2,748,500</b>
Bonding and All Risk Insurance	2%				\$ 54,970
			<b>Subtotal</b>		<b>\$ 2,803,470</b>
Contingency	25%				\$ 700,868
			<b>Subtotal</b>		<b>\$ 3,504,338</b>
General Contractor Overhead and Profit	15%				\$ 525,650.63
			<b>Subtotal</b>		<b>\$ 4,029,988.13</b>
Escalation Construction Midpoint	3%				\$ 120,899.64
			<b>Subtotal</b>		<b>\$ 4,150,887.77</b>
<b>TOTAL ESTIMATED CONSTRUCTION COST</b>					<b>\$ 4,150,888</b>
Design, advertisement, biding & award, construction mgmt., inspection, compaction testing, etc.	35%				\$ 1,452,810.72
<b>TOTAL PROJECT COST</b>					<b>\$ 5,603,698.49</b>

ALIGNMENT OPTION C2					
Item Description	Qty	Unit	Unit Price	Labor	Total Price
<b>General contractor</b>			Subtotal		
Mobilization, Demobilization, Cleanup	1	LS		\$ 100,000	\$ 100,000
Jack & Bore	1	LS		\$ 200,000	\$ 200,000
<b>Sewer Line Upgrade</b>			Subtotal		
Demo, cleaning, disposal	1	LS	\$ 30,000	\$ -	\$ 30,000
Soil contamination RCRA	2600	CY	\$ 400	\$ -	\$ 1,040,000
Dewatering	1	LS	\$ 800,000	\$ 200,000	\$ 1,000,000
Excavation, hauling, shoring, backfill (6'x20'x590')	2600	CY	\$ 40	\$ 25	\$ 169,000
36" Hobas Pipe	590	LF	\$ 200	\$ 100	\$ 177,000
Manhole w/ lid	2	LS	\$ 25,000	\$ 6,000	\$ 62,000
New Easement	1	LS	\$ 100,000	\$ -	\$ 100,000
<b>Direct cost subtotal</b>					<b>\$ 2,778,000</b>
Bonding and All Risk Insurance	2%				\$ 55,560
			<b>Subtotal</b>		<b>\$ 2,833,560</b>
Contingency	25%				\$ 708,390
			<b>Subtotal</b>		<b>\$ 3,541,950</b>
General Contractor Overhead and Profit	15%				\$ 531,292.50
			<b>Subtotal</b>		<b>\$ 4,073,242.50</b>
Escalation Construction Midpoint	3%				\$ 122,197.28
			<b>Subtotal</b>		<b>\$ 4,195,439.78</b>
<b>TOTAL ESTIMATED CONSTRUCTION COST</b>					<b>\$ 4,195,440</b>
Design, advertisement, biding & award, construction mgmt., inspection, compaction testing, etc.	35%				\$ 1,468,403.92
<b>TOTAL PROJECT COST</b>					<b>\$ 5,663,843.70</b>

ALIGNMENT OPTION D					
Item Description	Qty	Unit	Unit Price	Labor	Total Price
<b>General contractor</b>			Subtotal		
Mobilization, Demobilization, Cleanup	1	LS		\$ 100,000	\$ 100,000
Jack & Bore	1	LS		\$ 200,000	\$ 200,000
<b>Sewer Line Upgrade</b>			Subtotal		
Bypass pumping	0	LS	\$ -	\$ -	\$ -
Demo, cleaning, disposal	1	LS	\$ 30,000	\$ -	\$ 30,000
Soil contamination RCRA	2600	CY	\$ 400	\$ -	\$ 1,040,000
Dewatering	1	LS	\$800,000	\$ 200,000	\$ 1,000,000
Excavation, hauling, shoring, backfill (6'x20'x590')	2600	CY	\$ 40	\$ 25	\$ 169,000
48" HDPE / 42" Hobas Pipe	590	LF	\$ 250	\$ 100	\$ 206,500
Manhole w/ lid	5	LS	\$ 25,000	\$ 6,000	\$ 155,000
New Easement	1	LS	\$100,000	\$ -	\$ 100,000
<b>Direct cost subtotal</b>					<b>\$ 2,900,500</b>
Bonding and All Risk Insurance	2%				\$ 58,010
			<b>Subtotal</b>		<b>\$ 2,958,510</b>
Contingency	25%				\$ 739,628
			<b>Subtotal</b>		<b>\$ 3,698,138</b>
General Contractor Overhead and Profit	15%				\$ 554,720.63
			<b>Subtotal</b>		<b>\$ 4,252,858.13</b>
Escalation Construction Midpoint	3%				\$ 127,585.74
			<b>Subtotal</b>		<b>\$ 4,380,443.87</b>
<b>TOTAL ESTIMATED CONSTRUCTION COST</b>					<b>\$ 4,380,444</b>
Design, advertisement, biding & award, construction mgmt., inspection, compaction testing, etc.	35%				\$ 1,533,155.35
<b>TOTAL PROJECT COST</b>					<b>\$ 5,913,599.22</b>