

# APPENDIX G

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## SEWER STUDY

# Sewer Capacity Study

For

## 1400 Bristol St N Newport Beach, CA 92660

August 11, 2023



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Exp.: 9/30/24

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## Section 1 Study Purpose

The purpose of this study is to provide a site-specific sewer capacity study to assess the amount of wastewater generated by the proposed development of the project site at 1400 Bristol St N, Newport Beach, CA. This sewer study will assess if the city sewer system capacity is sufficient when the project site is redeveloped from a commercial site to a residential site and if the change in sewer usage complies with the City of Newport Beach’s design criteria indicated in the City’s Sewer Master Plan (SMP).

## Section 2 Existing Site Location & Information

The proposed project site, approximately 2.38-acres, is located in the City of Newport Beach, Orange County, California. The site is at the North-West corner of Bristol Street N and Spruce Street and has an existing office building structure along with a surface parking lot. The current land use is for a 2-story office complex. The site is relatively flat and drains from North to South, and is identified as Assessor Parcel Number 427-332-02. The zoning code is PC-11 and the site is enclosed by an existing parking lot to the West and North, Spruce Street to the East and Bristol Street to the South. See Figure 1 Below as well as Appendix A for project Vicinity Map Information.



Figure 1. Vicinity Map

### Section 3 Proposed Site Description

The proposed project is comprised of a 6-story podium apartment building with two levels of subterranean parking. The proposed building height is approximately 80 feet. A leasing office, mailroom, fitness center, and business center will be on the ground level on the corner of Bristol and Spruce. Vehicular access to the building will be from proposed driveways on Bristol Street and on Spruce Avenue. See Figure 2 below for general site configuration.

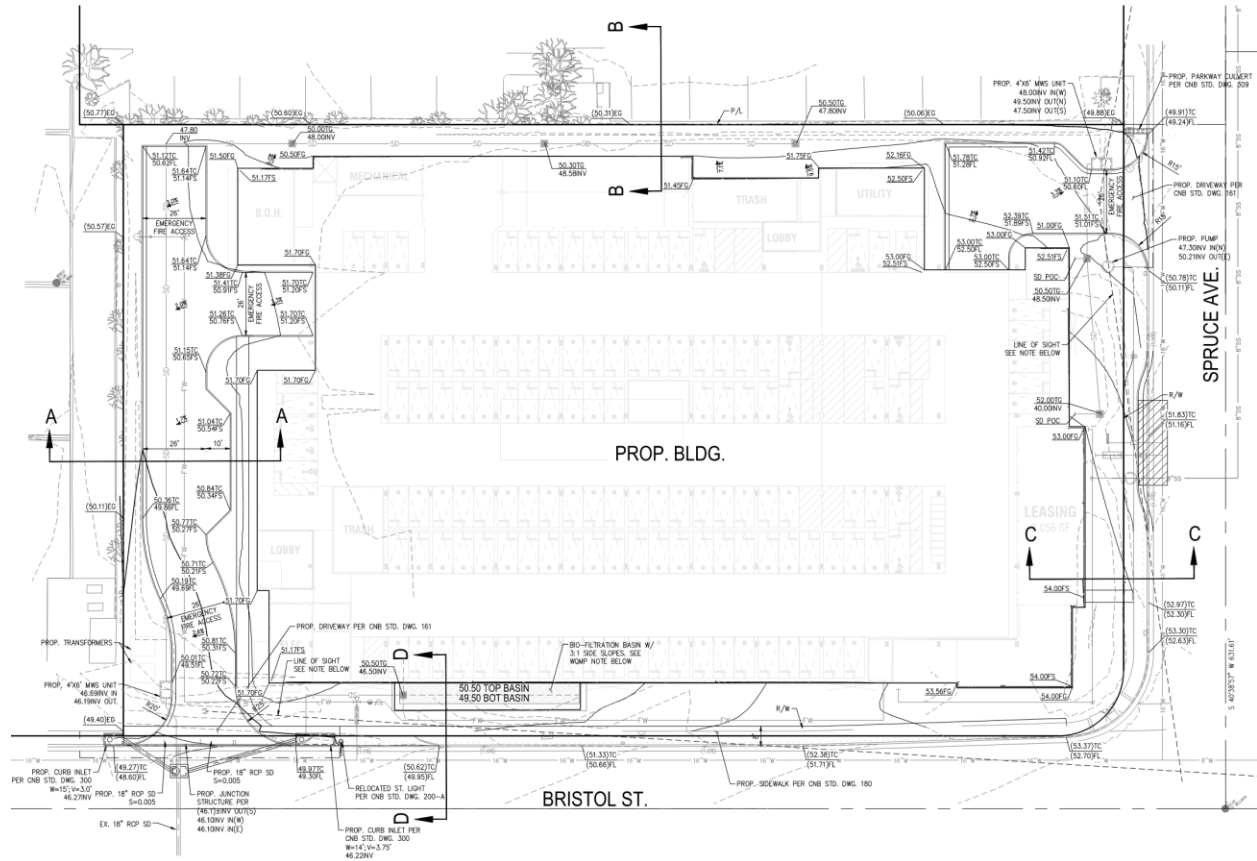


Figure 2. Proposed Site Conditions at the Project Site

## Section 4 Sewer System Layout

### 4.1 Existing Sewer System

An existing sewer lateral off of Spruce Street connects the project site to the existing 8" VCP public sewer main. The subject public sewer main originates on Spruce Street at the existing sewer laterals, with manhole ID MHM28\_019, and drains in the northeast direction to manhole MHM28\_018 at Quail Street. The sewer main then increases to a 10" diameter VCP and continues to the southeast to manhole MHM28\_033 located at the intersection of Quail Street and Dove Street. The sewer system maintains a 10" diameter and continues to the north to manhole MHM28\_003 located at the intersection of Dove Street and Newport Place. The sewer main then increases to 15" diameter and continues to the east to Macarthur Blvd. and then to the north to MHM28\_051. The sewer main then increases to an 18" diameter and continues for a short run to MHM27 to discharge in to the OCSD sewer main. See Figure 3 for a graphic representation of the existing sewer system servicing the project site.



Figure 3. Existing Sewer System at the Project Site

## 4.2 Proposed Sewer System

No change or extensions to the public sewer system layout is proposed as part of this project and the existing 8" VCP sewer lateral servicing the site is proposed to be re-used for the development. The only change proposed will be made for the land use of the project site from a commercial use to a residential use. The project site is currently a 2-story office complex with surface parking behind. The proposed project will redevelop the site to construct a 6 story 230-unit podium building, with 5 levels of residential apartment (type III) over one level on grade parking garage, and 2 levels of sub-terranean parking (type I). The change of use for the site is anticipated to increase the rate of discharge to the system and are further detailed and justified below.

**Additional proposed projects in Sewer Tributary:** In addition to this project, four other developments are currently known to be planned within the same sewer tributary. The noted projects are:

- 1300 Bristol Street (193 Apartment Units)
- 1401 Qual Street (78 Apartment Units)
- 1600 Dove Street (282 Units)
- 1660 Dove/1701 Corinthian (350 Units)

This report has been prepared to consider the flow increased from each of the above noted projects and any associated sewer capacity upgrades that may be required.

## Section 5 Design Criteria

### 5.1 Sewer Design Criteria

Design criteria utilized in this report are based on the City of Newport Beach’s Sewer Master Plan (SMP) prepared by AKM Consulting Engineers (August 2010). The focus of this study is to calculate the generation rates for the existing and proposed development based on land use generation rates in order to calculate the projected ratio of flow depth versus pipe diameter (d/D).

**d/D Requirements:** Based on the City’ SMP, existing sewer pipes are considered deficient if this ratio is greater than 0.6 at peak dry weather flows and 0.8 at peak wet weather flows.

**Manning’s Friction Factor:** Per City’s SMP requirements a Manning’s friction factor of 0.013 has been utilized on all flow calculations.

**Flow Generation Rates:** Since water use records were unavailable to the parcels in the sewer system, a typical unit flow factor of 2,500 gallons per day per acre (gpd/ac) is utilized for the project based on the commercial use and the maps provided in the City’s SMP (see Appendix D).

**Peaking Factor (Dry Weather):** Per the City’s SMP, a peaking factor formula has been applied to the calculated daily generation rates as follows:

$$\text{PDWF (mgd)} = 2.20 \times \text{ADWF (mgd)}^{0.92}$$

See Table 1 below for a brief summary of the key design factors utilized in the report and Appendix B for a listing of the City’s required design criteria for sewer systems.

**Table 1. Sewer Design Criteria**

Flow Depth vs Pipe Diameter Ratio (d/D)	Manning’s Friction Factor (n value)	Unit Flow Factor (gpd/ac)	Peaking Factor
0.6 for all pipe sizes at peak dry weather flow  0.8 for all pipe sizes at peak wet weather flow	0.013	2,500	PDWF (mgd) = 2.20 x ADWF (mgd) <sup>0.92</sup>



## 5.2 Available Pipe Capacity

The available pipe capacity for each segment has been determined by identifying the minimum slope of pipe within the reach, and calculating the flows for the given pipe diameter and slope at a d/D ratio = 0.6. Pipe diameter and slopes were obtained from the City of Newport Beach GIS – Map Viewer website. Available flows were calculated utilizing the above noted design factors and the AutoCAD HydraFlow Express extension on Civil 3D for each critical pipe segment (See Appendix C). The results of the above noted calculations are included in Table 2 below.

**Table 2. Available Pipe Capacity of the Existing Sewer System**

Stream No.	MH Reach From	MH Reach To	Pipe Diameter D (in)	Pipe Diameter D (ft)	Minimum Slope in Reach (%)	Depth of Flow @ d/D=0.6 (ft)	Pipe Flow Q @ d/D = 0.6 (CFS)
1	MHM28_019	MHM28_018	8	0.67	1	0.4	0.82
2	MHM28_018	MHM28_033	10	0.83	0.26	0.5	0.75
3	MHM28_033	MHM28_003	10	0.83	0.4	0.5	0.93
4	MHM28_003	MHM28_051	15	1.25	0.2	0.75	1.95
---	MHM28_051	MHM27	18	1.5	0.2	0.9	3.17

### 5.3 Existing Flow Rates

Existing daily flow rates were calculated based on total tributary parcel acreage and the above noted generation rates. See Figure 4 below for the assumed tributaries for each sewer segment and refer to Appendix C for a listing of all Area-Based Flow Calculations

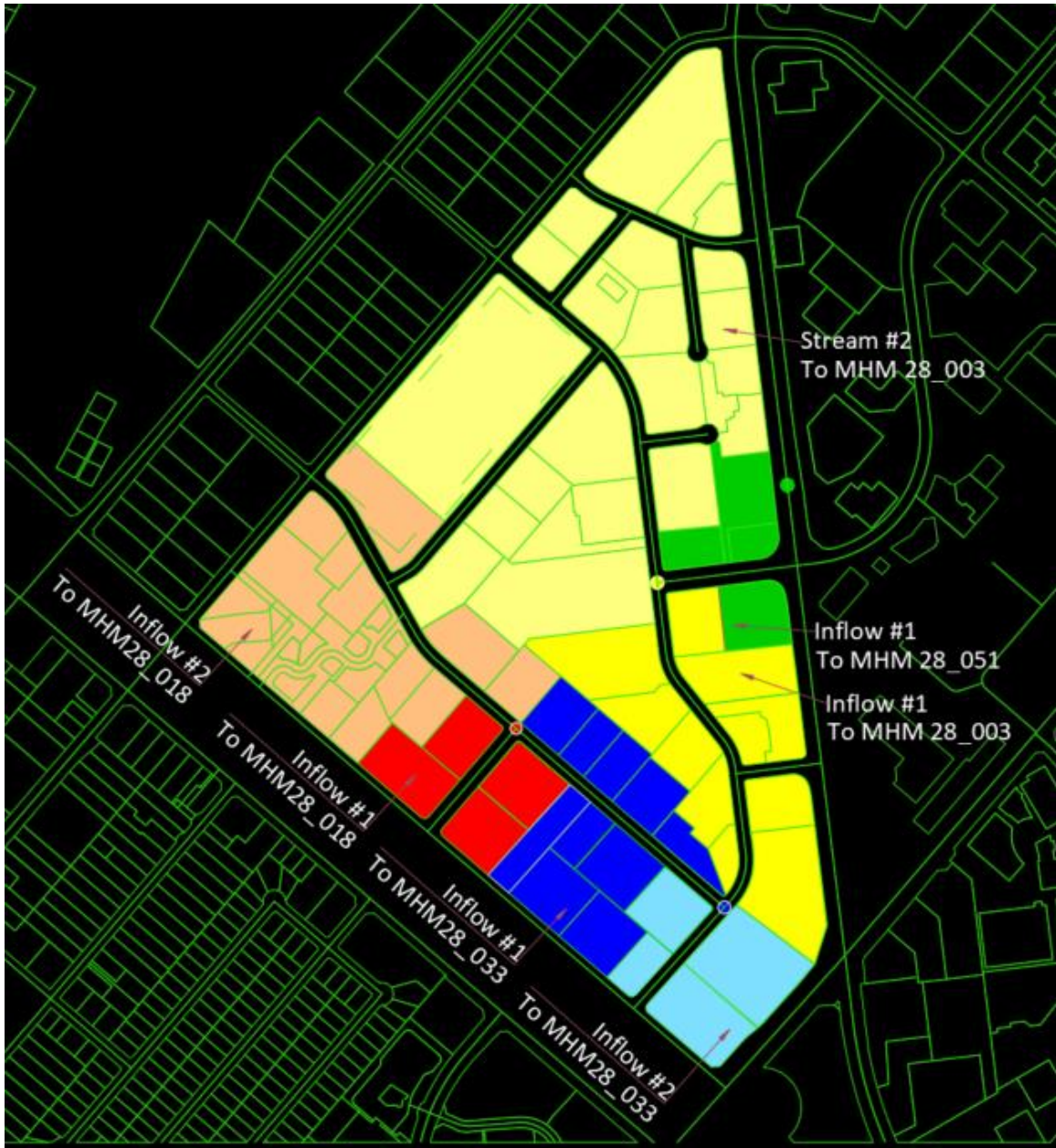


Figure 4. Existing Wastewater Flows to Important Manholes

The tributary areas generating incremental inflow along the primary system (highlighted in Figure 2) have been designated as inflow #1. Other tributary inflows that are added to the system only at the key manholes have been identified as inflow #2. The total sub area outflows for main manholes in the system are then calculated as the sum of inflow #1 and #2. The key manholes that are taken into consideration for the sewer system are identified in Table 3 below with the correlating daily flow rates for each inflow:

**Table 3. Generation Rates by Tributary Area**

<b>EXISTING GENERATION RATES BY TRIBUTARY AREA</b>				
	<b>STREAM 1</b>	<b>STREAM 2</b>	<b>STREAM 3</b>	<b>STREAM 4</b>
	<b>Sub Area Flow to MHM28_018</b>	<b>Sub Area Flow to MHM28_033</b>	<b>Sub Area Flow to MHM28_003</b>	<b>Sub Area Flow to MHM28_051</b>
<b>Inflow #1 Areas (Ac)</b>	7.91	14.48	20.60	6.43
<b>Inflow #1 Flows (gpd)</b>	19,775.00	36,187.50	51,508.33	16,083.33
<b>Inflow #2 Areas (Ac)</b>	23.96	11.19	60.10	-
<b>Inflow #2 Flows (gpd)</b>	59,906.25	27,962.50	150,252.08	-
<b>TOTAL Sub Area Flow Generation (gpd)</b>	79,681.3	64,150.0	201,760.4	16,083.3

The total cumulative flows for each segment have subsequently been calculated by summing the total sub-area flow generated from the up-stream manhole (as applies) with the Inflow #1 generation rates for the subject segment. Inflow #2 generation rates are subsequently added at the manhole to create the total system outflow from each manhole. See Table 4 below for a summary of total existing flows.

**Table 4. Total Existing Flows at Manhole**

<b>TOTAL EXISTING AVERAGE DAILY FLOWS AT MANHOLE</b>				
	<b>STREAM 1</b>	<b>STREAM 2</b>	<b>STREAM 3</b>	<b>STREAM 4</b>
	<b>Total Flow MHM28_018 (gpd)</b>	<b>Total Flow MHM28_033 (gpd)</b>	<b>Total Flow MHM28_003 (gpd)</b>	<b>Total Flow MHM28_051 (gpd)</b>
<b>Total Existing Inflow #1</b>	19,775.00	115,868.75	195,339.58	361,675.00
<b>Total Existing Inflow #2</b>	59,906.25	27,962.50	150,252.08	-
<b>Total Outflow</b>	79,681.25	143,831.25	345,591.67	361,675.00

Given the above noted average daily flows, the average daily flow for inflow #1 of each segment (mainline flows) was converted to million gallon per day (mgd) which was subsequently used to calculate the peak dry weather flow for each segment based on the Peaking Factor Formula provided in the City’s SMP [A]. The calculated peak dry weather flow [A] was then converted to cubic feet per second [B] and compared to the available pipe capacity flows [C] for the given segment (see Table 1 for reference of existing pipe capacities) to validate existing sewer system capacity [D].

**Table 5. Total Peak Flows and Available Capacity**

<b>TOTAL EXISTING PEAK DRY WEATHER FLOWS AT MANHOLE</b>				
	STREAM 1	STREAM 2	STREAM 3	STREAM 4
	Total Inflow #1 to MHM28_018	Total Inflow #1 to MHM28_033	Total Inflow #1 to MHM28_003	Total Inflow #1 to MHM28_051
<b>PEAK Flow (mgd) [A]</b>	0.06	0.30	0.49	0.86
<b>PEAK Flow (cfs) [A]*1.58 = [B]</b>	0.09	0.47	0.76	1.34
<b>Available Flow @ d/D = 0.6 (cfs) [C]</b>	0.82	0.75	0.93	1.95
<b>Available Capacity (cfs) [C]-[B] = [D]</b>	0.73	0.28	0.17	0.61
	<b>OK</b>	<b>OK</b>	<b>OK</b>	<b>OK</b>

### 5.3 Proposed Flow Rates

**Increase of Flow to Stream #1:** The total area of the project site at 1400 Bristol St N, Newport Beach, CA is 2.38 acres. Utilizing the typical unit flow factor of 2500 gpd/ac, the existing flow at the project location is calculated as 5,950 gpd. According to the City’s SMP, the residential unit flow factors range from 110 gpd/du to 240 gpd/du (see Appendix D for the City’s SMP Unit Flow Factor Map). Based on a review of similar parcels within the City, a generation rate of 160 gpd/du has been selected for the subject parcel. Given the proposed 230 dwelling units, the calculated daily flow for the proposed condition is 36,800 gpd. As a result, the total increase in daily flow is calculated as the difference between the proposed flow and existing flow at the project site, being 30,850 gpd. Results of this calculation are summarized in Table 6:

In addition to this proposed development, two other proposed developments are located along Stream #1. Namely:

- 1300 Bristol Street (193 Apartment Units)
- 1401 Qual Street (78 Apartment Units)

Per the previously prepared sewer capacity study for 1300 Bristol Street by Tait Dated August 30, 2021, and the previously prepared sewer capacity study for 1401 Quail Street by others, the total increase of sewer flows from the adjacent 1300 Bristol Street and 1401 Qual St developments are as follows:

**Table 6. Total Daily Flow Increase at the Project Site (Flows to MHM28\_018)**

	Existing Flow at Project Site (gpd)	Proposed Flow at Project Site (gpd)	Total Increase in Flow (gpd)
<b>Proposed Project: 1400 Bristol</b>	5,950	36,800	30,850
<b>Previous Project: 1300 Bristol</b>	4,925	30,880	25,955
<b>Previous Project (by others): 1401 Quail</b>	4,275	12,480	8,205
<b>TOTALS:</b>	<b>15,150</b>	<b>80,160</b>	<b>65,010</b>

**Additional Increase of Flow to Stream #4:** Furthermore, two additional developments which are tributary to Stream #4 have been identified by the City. Namely:

- 1600 Dove Street (282 Units)
- 1660 Dove/1701 Corinthian (350 Units)

The total area of the project site at 1600 Dove St is 2.49 acres and is proposed for 282 future apartment units. The total area of the project sites at 1660 Dove St & 1701 Corinthian Way, is 5.68 acres and is proposed for 350 future apartment units. Utilizing the above noted typical unit flow factor of 2,500 gpd/ac for existing and 160 gpd/du for proposed, the results of the existing and proposed flow calculation are summarized in Table 7:

**Table 7. Additional Daily Flow Increase to Inflow #1 to MHM28\_051**

	Existing Flow at Project Site (gpd)	Proposed Flow at Project Site (gpd)	Total Increase in Flow (gpd)
<b>1600 Dove</b>	6,225	45,120	38,895
<b>Proposed Project (by others): 1660 Dove/1701 Corinthian</b>	14,200	56,000	41,800
<b>TOTALS:</b>	<b>20,425</b>	<b>101,120</b>	<b>80,695</b>

Based on the above noted total increase in daily sewer generation rates, the total system peak flows for Stream #1 & #4 were re-calculated with the additional inflow added into each stream’s calculations. The results of the proposed system flows are presented in Table 8 below.

**Table 8. Total Proposed Flows**

<b>TOTAL PROPOSED DRY WEATHER FLOWS AT MANHOLE (EXISTING + DEVELOPMENT)</b>				
	<b>STREAM 1</b>	<b>STREAM 2</b>	<b>STREAM 3</b>	<b>STREAM 4</b>
	<b>Total Inflow #1 to MHM28_018</b>	<b>Total Inflow #1 to MHM28_033</b>	<b>Total Inflow #1 to MHM28_003</b>	<b>Total Inflow #1 to MHM28_051</b>
<b>Total Proposed Average Daily Inflow #1 (gpd)</b>	84,785.00	180,878.75	260,349.58	507,380.00
<b>PEAK Flow (mgd) [A]</b>	0.23	0.46	0.64	1.18
<b>PEAK Flow (cfs) [A]*1.58 = [B]</b>	0.35	0.71	0.99	1.82
<b>Available Flow @d/D = 0.6 [C]</b>	0.82	0.75	0.93	1.95
<b>Available Capacity (cfs) [B]-[A] = [D]</b>	0.47	0.04	(0.06)	0.12
	<b>OK</b>	<b>OK</b>	<b>DEFICIENT</b>	<b>OK</b>

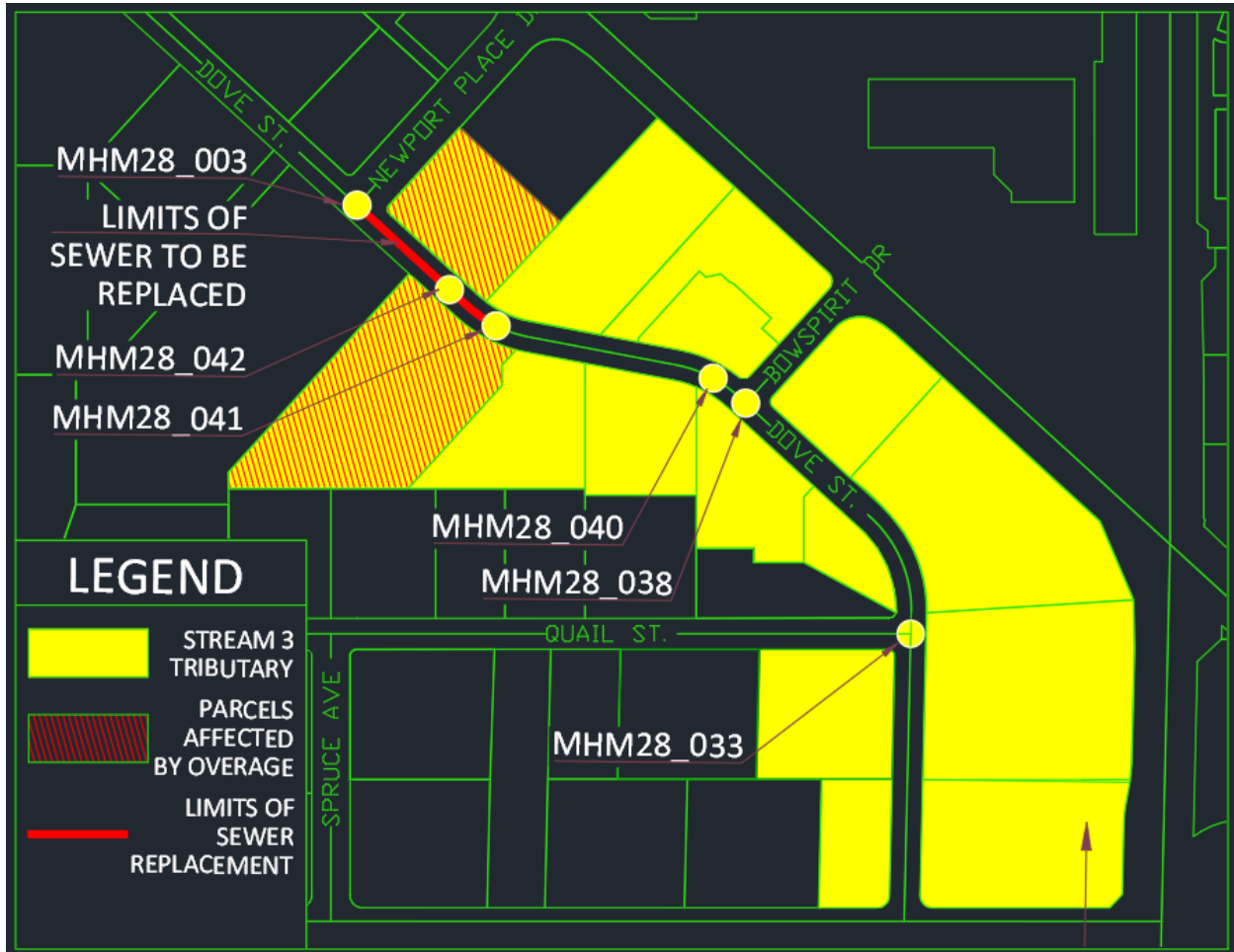
## Section 6 Results and Conclusion

Based on the above noted calculations, data, and the City’s SMP design guidelines, the combined effects of the proposed redevelopment of the noted sites located along Stream #1 (1300 Bristol, 1400 Bristol, and 1401 Quail) from commercial to high density residential will result in a portion of Stream #3 falling slightly above the City’s minimum design requirements for the required depth to diameter ratio.

As the total tributary along Stream #3 is large (~31 Acres) and generates a total of 0.33 cfs within itself, of which only 0.06 cfs is over capacity, the replacement of the entire stretch of pipe is not required. As a result, an equivalent area calculation was conducted to confirm the total existing tributary of commercial property that would generate the final 0.06 cfs of sewer flows within the tributary to identify the limits of pipe that will require capacity upgrades. Based on the previously noted sewer generation rate of 2,500 gpd for the existing conditions and the peak flow calculation methods indicated in Section 5.1, the total equivalent tributary area required to generate up to 0.06 cfs is approximately 5 acres of tributary land.

Required replacements are anticipated to include the removal of the existing 10” VCP and installation of a new 12” VCP sewer main between Newport Place (MHM28\_003) and Manhole

MHM28\_041 which is located approximately 435 feet south of Newport Place. See Figure 5 below for a graphic summary of the tributary area (yellow), contributing parcels for the overage (red cross hatch), and limits of sewer replacement (bold red line).



**Figure 5 – Sewer Replacement Limits**

As multiple developments are contributing to the overage of the give segment of pipe, it is anticipated that the cost of sewer main replacements will be shared by each development. Given that each development has varying mixes of studio through three-bedroom units, it is recommended that the cost sharing program be based on total contributing residential square footage rather than by total number of units.

Should you have any questions regarding this report, please do not hesitate to contact David Sloan at (714) 560-8643 or dsloan@tait.com.

### Appendix A - Vicinity Map





## **Appendix B – Sewer Design Criteria**

### Sewer System Criteria

<b>Collection System</b>	
Minimum Pipe Size	8-inch
Minimum Velocity	2.0 ft/sec at average flow 3.0 ft/sec at peak dry weather flow
Pipe Depth to Diameter Ratio for <i>Existing Pipes</i>	0.60 for all pipe sizes at peak dry weather flow 0.80 for all pipe sizes at peak wet weather flow
Pipe Depth to Diameter Ratio for <i>New Construction</i>	0.50 for pipes 15-inches and smaller at peak dry weather flow 0.60 for pipes 18-inches and larger at peak dry weather flow 0.80 for all pipe sizes at peak wet weather flow

### Minimum Sewer Slopes

Sewer Size (in)	2 ft/sec Velocity Slope	3 ft/sec Velocity Slope
8	0.0029	0.0065
10	0.0022	0.0049
12	0.0017	0.0038
15	0.0013	0.0029
18	0.0010	0.0022
21	0.0008	0.0018
24	0.0007	0.0015

\*Assuming  $d/D = 0.60$  and  $n=0.013$

## **Appendix C – Existing Flow Calculations**

**Area Based Sewere Generatoin Rates (2,500 gpd/Ac)**

<b>Parcel #</b>	<b>Area (acre)</b>	<b>Tribuary to MH</b>	<b>Inflow #</b>	<b>Flow (GPD)</b>
1400 Bristol St	2.38	MHM28_018	#1	5,950
1300 Brsitol St	1.97	MHM28_018	#1	4,925
1401 Quail St	1.7	MHM28_018	#1	4,250
1301 Quail St	1.85	MHM28_018	#1	4,625
1400 Quail St	1.47	MHM28_018	#2	3,675
1451 Quail St	0.705	MHM28_018	#2	1,763
1451 Quail St	0.705	MHM28_018	#2	1,763
1500 Quail St	1.586666667	MHM28_018	#2	3,967
1500 Quail St	0.7933333333	MHM28_018	#2	1,983
1501 Quail St	1.11	MHM28_018	#2	2,775
1501 Quail St	1.11	MHM28_018	#2	2,775
1701 Quail St	1.22	MHM28_018	#2	3,050
1811 Quail St	0.69	MHM28_018	#2	1,725
No Site Address	2.1525	MHM28_018	#2	5,381
3880 Birch St	1.21	MHM28_018	#2	3,025
2 Upper Newport Plaza Dr	0.18	MHM28_018	#2	450
6 Upper Newport Plaza Dr	0.76	MHM28_018	#2	1,900
3 Upper Newport Plaza Dr	0.2	MHM28_018	#2	500
4 Upper Newport Plaza	0.54	MHM28_018	#2	1,350
6 Upper Newport Plaza Dr	0.76	MHM28_018	#2	1,900
6 Upper Newport Plaza Dr	0.76	MHM28_018	#2	1,900
7 Upper Newport Plaza Dr	0.31	MHM28_018	#2	775
6 Upper Newport Plaza Dr (Different)	0.23	MHM28_018	#2	575
3620 Birch St	0.9	MHM28_018	#2	2,250
3610 Birch St	1.13	MHM28_018	#2	2,825
3600 Birch St	0.93	MHM28_018	#2	2,325
1550 Bristol St N	0.86	MHM28_018	#2	2,150
6 Upper Newport Plaza Dr	0.18	MHM28_018	#2	450
1 Upper Newport Plaza Dr	0.21	MHM28_018	#2	525
3636 Birch St	2.38	MHM28_018	#2	5,950
1800 Quail St	0.51	MHM28_018	#2	1,275
1900 Quail St	0.37	MHM28_018	#2	925
1300 Quail St	1.5	MHM28_033	#1	3,750
1301 Quail St	1.85	MHM28_033	#1	4,625
1200 Quail St	1	MHM28_033	#1	2,500
1100 Quail St	1.15	MHM28_033	#1	2,875
1101 Quail St	1	MHM28_033	#1	2,500
1000 Bristol St	3.91	MHM28_033	#1	9,775
1000 Quail St	1.52	MHM28_033	#1	3,800
895 Dove St	1.975	MHM28_033	#1	4,938

**Area Based Sewere Generatoin Rates (2,500 gpd/Ac)**

<b>Parcel #</b>	<b>Area (acre)</b>	<b>Tribuary to MH</b>	<b>Inflow #</b>	<b>Flow (GPD)</b>
901 Dove St	0.57	MHM28_033	#1	1,425
900 Bristol St	1	MHM28_033	#2	2,500
3601 Jamboree Rd	2.87	MHM28_033	#2	7,175
895 Dove St	1.975	MHM28_033	#2	4,938
3901 McArthur Blvd	2.67	MHM28_033	#2	6,675
3901 McArthur Blvd	2.67	MHM28_033	#2	6,675
3901 McArthur Blvd	2.67	MHM28_003	#1	6,675
901 Dove St	0.57	MHM28_003	#1	1,425
901 Dove St	0.57	MHM28_003	#1	1,425
3991 McArthur Blvd	0.83	MHM28_003	#1	2,075
1001 Dove St	1.51	MHM28_003	#1	3,775
1101 Dove St	1.49	MHM28_003	#1	3,725
1000 Dove St	0.9	MHM28_003	#1	2,250
1151 Dove St	1.75	MHM28_003	#1	4,375
1201 Dove St	1.795	MHM28_003	#1	4,488
1201 Dove St	1.795	MHM28_003	#1	4,488
1200 Dove St	2.166666667	MHM28_003	#1	5,417
1200 Dove St	2.166666667	MHM28_003	#1	5,417
3991 McArthur Blvd	0.83	MHM28_003	#1	2,075
1050 Dove St	1.56	MHM28_003	#1	3,900
1401 Dove St	1.92	MHM28_003	#2	4,800
1301 Dove St	6.46	MHM28_003	#2	16,150
4100 Newport Place Dr	1.246666667	MHM28_003	#2	3,117
4241 McArthur Blvd	0.72	MHM28_003	#2	1,800
4221 McArthur Blvd	1.1	MHM28_003	#2	2,750
1600 Dove St	0.83	MHM28_003	#2	2,075
4100 Newport Place Dr	1.246666667	MHM28_003	#2	3,117
1601 Dove St	0.9975	MHM28_003	#2	2,494
1601 Dove St	0.9975	MHM28_003	#2	2,494
1600 Dove St	0.83	MHM28_003	#2	2,075
1601 Dove St	0.9975	MHM28_003	#2	2,494
1601 Dove St	0.9975	MHM28_003	#2	2,494
No Site Address	2.1525	MHM28_003	#2	5,381
4000 Westerly Pl	1.46	MHM28_003	#2	3,650
No Site Address	2.1525	MHM28_003	#2	5,381
3990 Westerly Pl	1.46	MHM28_003	#2	3,650
1500 Quail St	1.586666667	MHM28_003	#2	3,967
1500 Quail St	0.7933333333	MHM28_003	#2	1,983
1660 Dove St 014	0.855	MHM28_003	#2	2,138

**Area Based Sewere Generatoin Rates (2,500 gpd/Ac)**

<b>Parcel #</b>	<b>Area (acre)</b>	<b>Tribuary to MH</b>	<b>Inflow #</b>	<b>Flow (GPD)</b>
No Site Address	2.1525	MHM28_003	#2	5,381
4200 Birch St	0.6	MHM28_003	#2	1,500
4200 Birch St	0.6	MHM28_003	#2	1,500
1660 Dove St 014	0.855	MHM28_003	#2	2,138
4250 Birch St	0.7	MHM28_003	#2	1,750
4250 Birch St	0.7	MHM28_003	#2	1,750
1600 Dove St	0.83	MHM28_003	#2	2,075
4251 McArthur Blvd	1.08	MHM28_003	#2	2,700
4229 McArthur Blvd	1.45	MHM28_003	#2	3,625
1660 Dove St	1.94	MHM28_003	#2	4,850
1701 Corinthian Way	1.83	MHM28_003	#2	4,575
4301 McArthur Blvd	0.5	MHM28_003	#2	1,250
4301 McArthur Blvd	0.5	MHM28_003	#2	1,250
4341 McArthur Blvd	0.94	MHM28_003	#2	2,350
4343 McArthur BLvd	1	MHM28_003	#2	2,500
4545 McArthur Blvd	3.16	MHM28_003	#2	7,900
4545 McArthur Blvd	3.16	MHM28_003	#2	7,900
1375 Dove St	1.68	MHM28_003	#2	4,200
1660 Dove St St140 (D)	0.2	MHM28_003	#2	500
3901 Westerly Pl	0.64	MHM28_003	#2	1,600
3919 Westerly Pl	0.37	MHM28_003	#2	925
3900 Birch St	0.97	MHM28_003	#2	2,425
4000 Birch St	0.52	MHM28_003	#2	1,300
4001 Westerly Pl	0.86	MHM28_003	#2	2,150
4020 Birch St	0.72	MHM28_003	#2	1,800
4029 Westerly Pl	0.52	MHM28_003	#2	1,300
4100 Birch St	0.38	MHM28_003	#2	950
4120 Birch St	0.58	MHM28_003	#2	1,450
4101 Westerly Pl	0.97	MHM28_003	#2	2,425
1901 Dove St	0.51	MHM28_003	#2	1,275
1801 Dove St	0.38	MHM28_003	#2	950
4100 Newport Place Dr	1.246666667	MHM28_051	#1	3,117
1200 Dove St	2.166666667	MHM28_051	#1	5,417
4141 McArthur Blvd	2.23	MHM28_051	#1	5,575
4101 McArthur Blvd	0.79	MHM28_051	#1	1,975

# Channel Report

## 8 IN VCP @ 1% Slope

### Circular

Diameter (ft) = 0.67

Invert Elev (ft) = 100.00

Slope (%) = 1.00

N-Value = 0.013

### Calculations

Compute by: Known Depth

Known Depth (ft) = 0.40

### Highlighted

Depth (ft) = 0.40

Q (cfs) = 0.820

Area (sqft) = 0.22

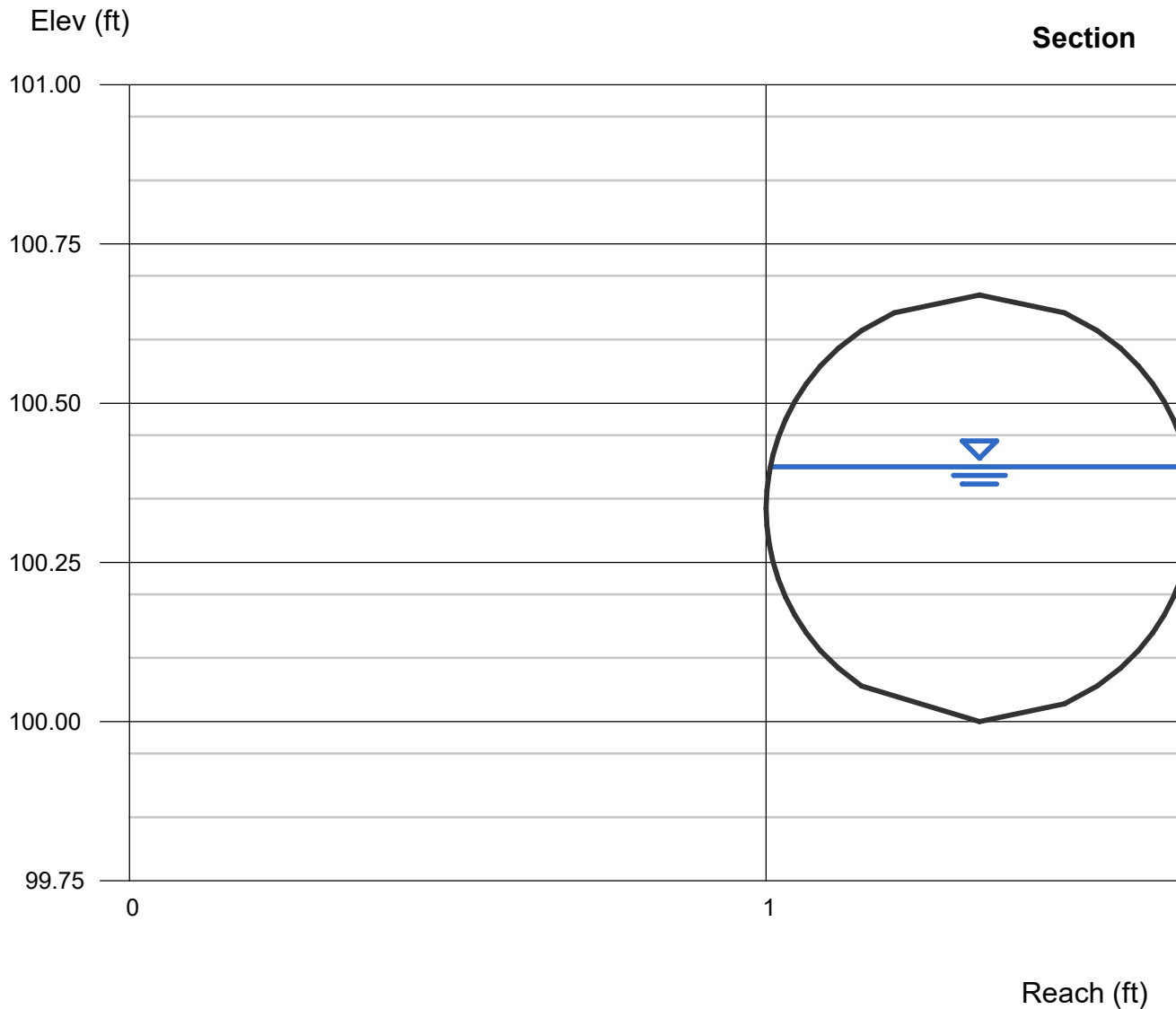
Velocity (ft/s) = 3.72

Wetted Perim (ft) = 1.19

Crit Depth, Yc (ft) = 0.43

Top Width (ft) = 0.66

EGL (ft) = 0.62



# Channel Report

## 10 IN VCP @ 0.26% Slope

### Circular

Diameter (ft) = 0.83

Invert Elev (ft) = 100.00

Slope (%) = 0.26

N-Value = 0.013

### Calculations

Compute by: Known Depth

Known Depth (ft) = 0.50

### Highlighted

Depth (ft) = 0.50

Q (cfs) = 0.749

Area (sqft) = 0.34

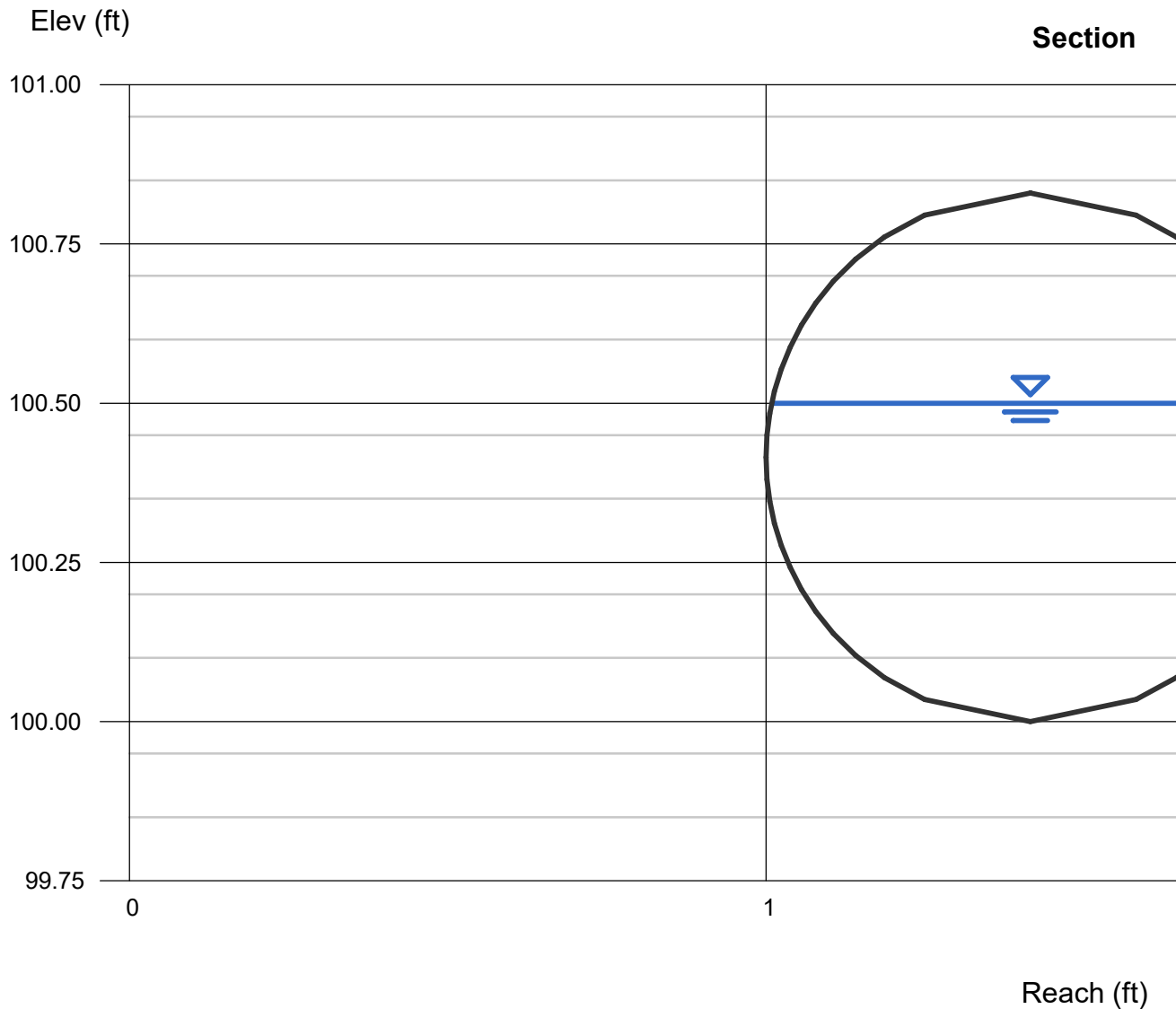
Velocity (ft/s) = 2.19

Wetted Perim (ft) = 1.48

Crit Depth, Yc (ft) = 0.39

Top Width (ft) = 0.81

EGL (ft) = 0.57





# Channel Report

## 10 IN VCP @ 0.4% Slope

### Circular

Diameter (ft) = 0.83

Invert Elev (ft) = 100.00

Slope (%) = 0.40

N-Value = 0.013

### Calculations

Compute by: Known Depth

Known Depth (ft) = 0.50

### Highlighted

Depth (ft) = 0.50

Q (cfs) = 0.930

Area (sqft) = 0.34

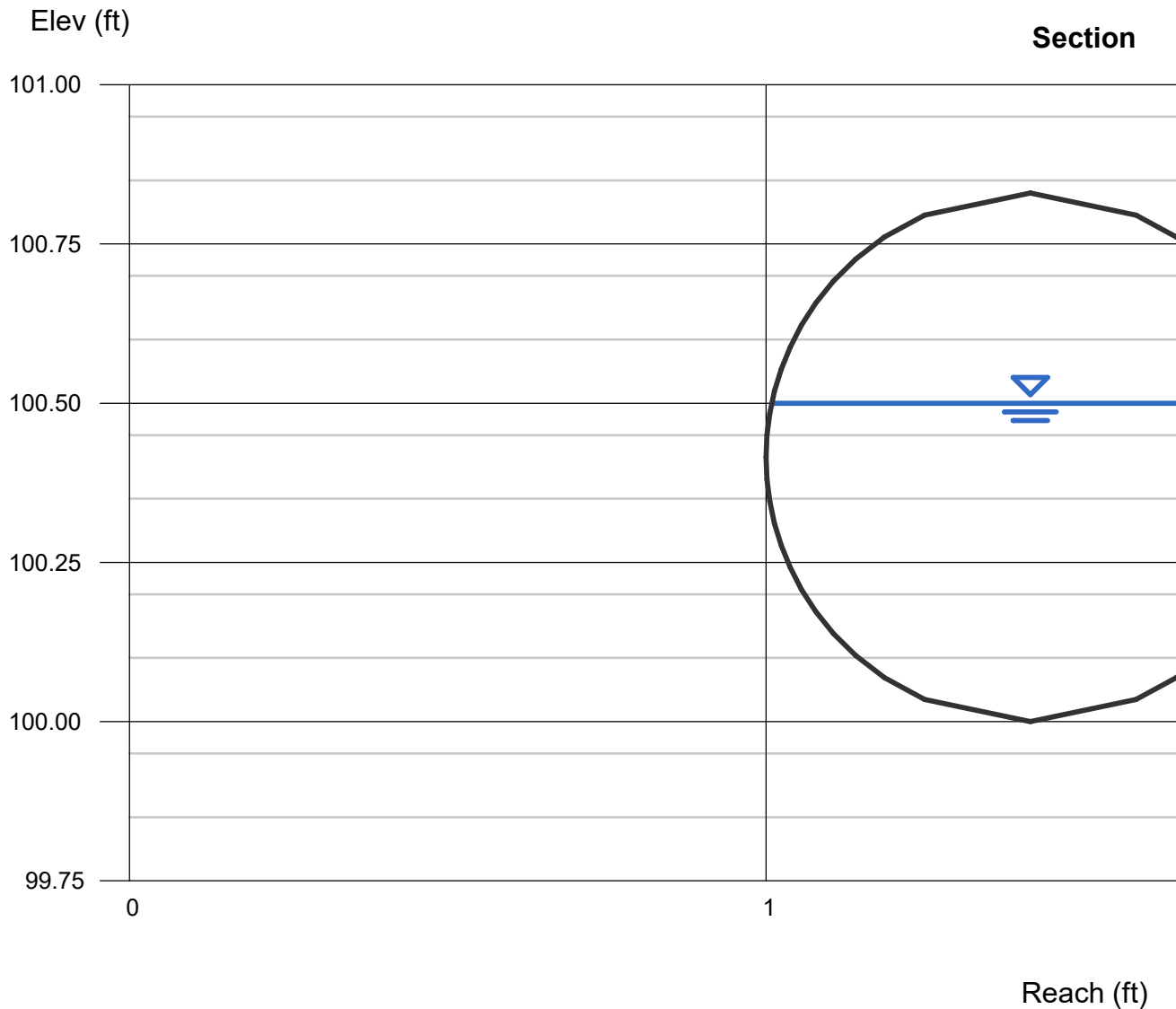
Velocity (ft/s) = 2.72

Wetted Perim (ft) = 1.48

Crit Depth, Yc (ft) = 0.43

Top Width (ft) = 0.81

EGL (ft) = 0.62



# Channel Report

## 15 IN VCP @ 0.2% Slope

### Circular

Diameter (ft) = 1.25

Invert Elev (ft) = 100.00

Slope (%) = 0.20

N-Value = 0.013

### Calculations

Compute by: Known Depth

Known Depth (ft) = 0.75

### Highlighted

Depth (ft) = 0.75

Q (cfs) = 1.947

Area (sqft) = 0.77

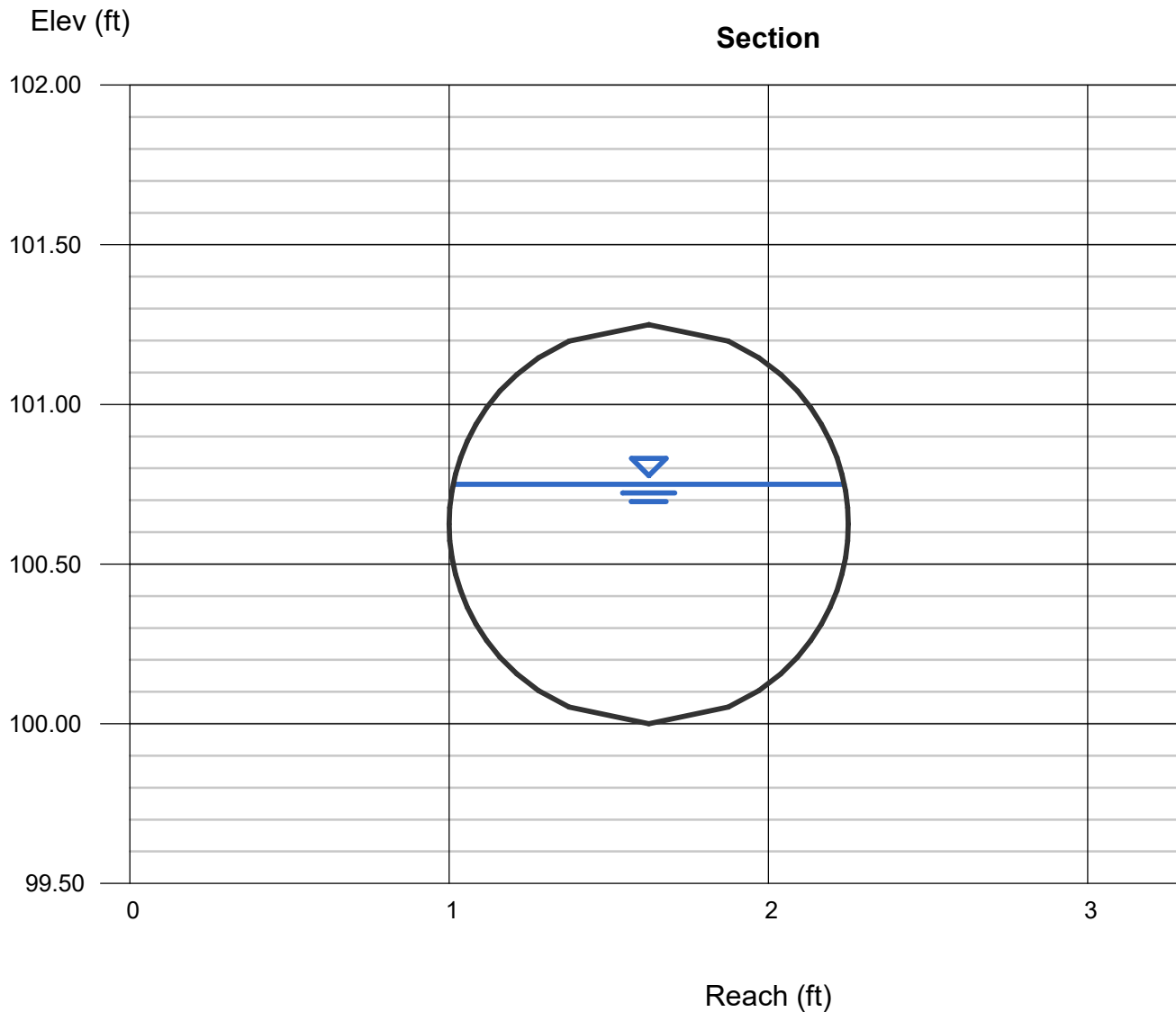
Velocity (ft/s) = 2.53

Wetted Perim (ft) = 2.22

Crit Depth, Yc (ft) = 0.56

Top Width (ft) = 1.22

EGL (ft) = 0.85



# Channel Report

## 18 IN VCP @ 0.2% Slope

### Circular

Diameter (ft) = 1.50

Invert Elev (ft) = 100.00

Slope (%) = 0.20

N-Value = 0.013

### Calculations

Compute by: Known Depth

Known Depth (ft) = 0.90

### Highlighted

Depth (ft) = 0.90

Q (cfs) = 3.166

Area (sqft) = 1.11

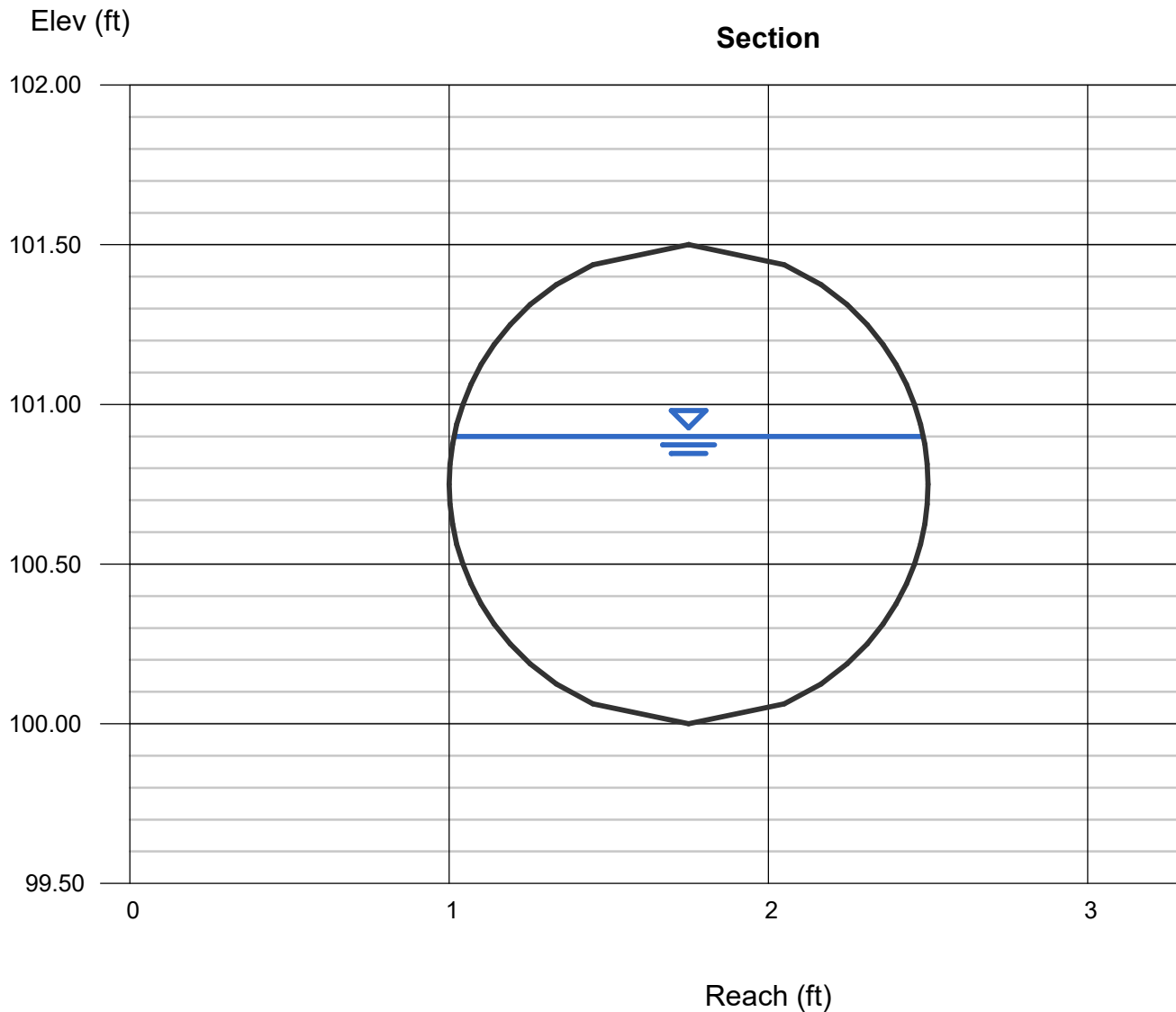
Velocity (ft/s) = 2.85

Wetted Perim (ft) = 2.66

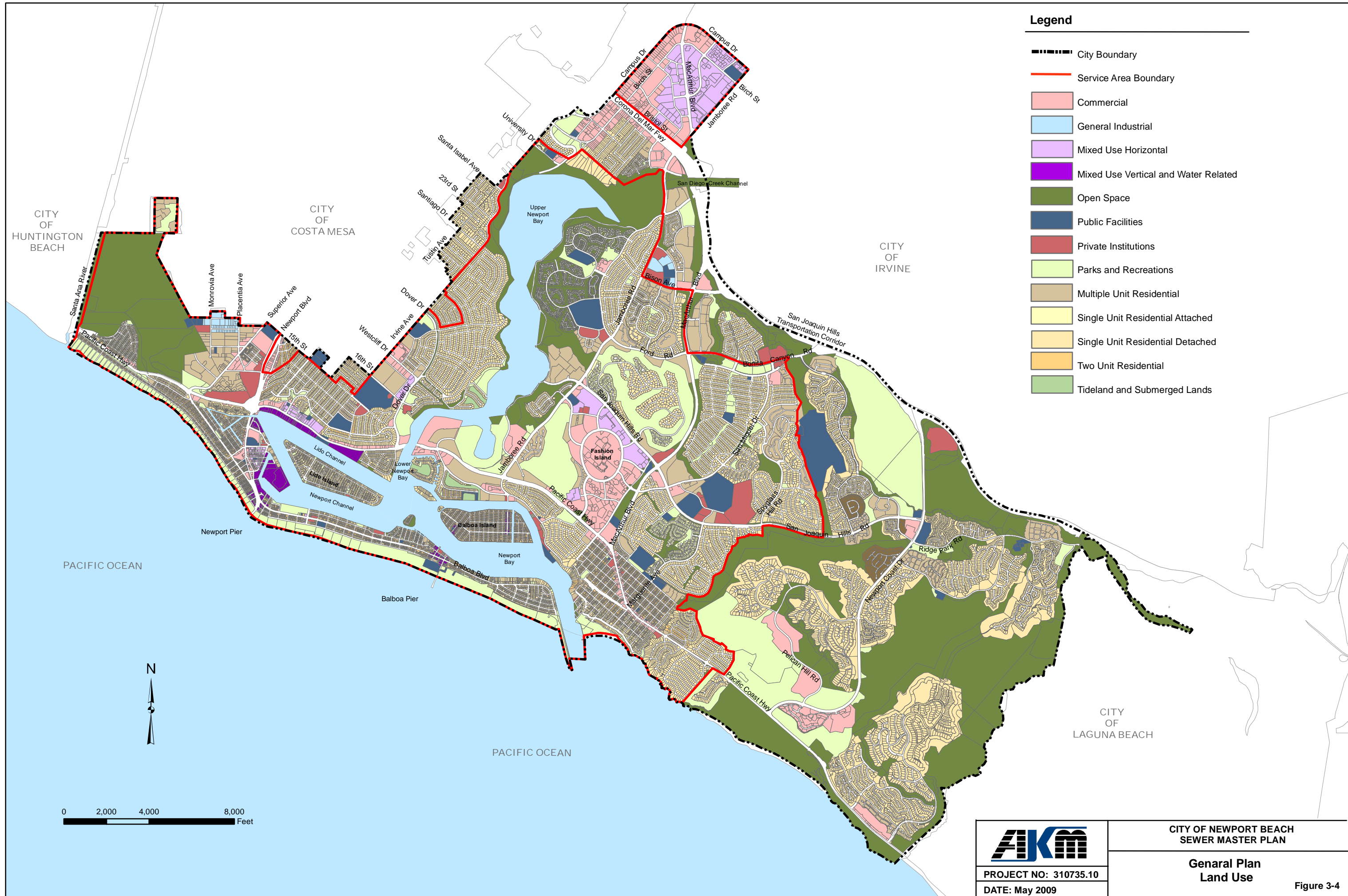
Crit Depth, Yc (ft) = 0.68

Top Width (ft) = 1.47

EGL (ft) = 1.03

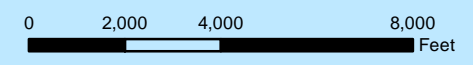


## **Appendix D – City of Newport Beach SMP Exhibits**



**Legend**

- City Boundary
- Service Area Boundary
- Commercial
- General Industrial
- Mixed Use Horizontal
- Mixed Use Vertical and Water Related
- Open Space
- Public Facilities
- Private Institutions
- Parks and Recreations
- Multiple Unit Residential
- Single Unit Residential Attached
- Single Unit Residential Detached
- Two Unit Residential
- Tideland and Submerged Lands



	<b>CITY OF NEWPORT BEACH SEWER MASTER PLAN</b>
	<b>General Plan Land Use</b>
PROJECT NO: 310735.10 DATE: May 2009	<b>Figure 3-4</b>



- Legend**
- Service Area
  - City of Newport Beach Gravity Sewer
  - City of Newport Beach Force Main
  - City of Newport Beach Sewer Pump Station
  - Costa Mesa Sanitary District Sewer
  - Irvine Ranch Water District Sewer
  - Orange County Sanitation District Sewer
- Residential Unit Flow Factors**
- 110 gpd/du
  - 120 gpd/du
  - 150 gpd/du
  - 160 gpd/du
  - 200 gpd/du
  - 220 gpd/du
  - 230 gpd/du
  - 240 gpd/du
- Commercial Loads**
- 95% of water use
  - 2500 gpd/ac
  - Parks and Recreation
  - 200 gpd/ac

