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# SANITARY SEWER ANALYSIS

for

## PALMDALE LOGISTICS PARK

South of West Avenue M,  
West of Division Street,  
City of Palmdale, CA

*Prepared For:*

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A handwritten signature in black ink, appearing to read "Michael Golias", written over a horizontal line.

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**Prepared: September 2023**  
**Langan Project No. 722010501**

# **LANGAN**

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## **1. INTRODUCTION**

The purpose of this sanitary sewer analysis report is to calculate the estimated sanitary sewer flows for the project and future tributary areas, and ensure the downstream sanitary sewer facilities have adequate capacity. The proposed project development consists of warehouse building #1 and warehouse building #2 which are 716,930 SF and 703,140 SF, respectively. The project proposes a new 10-inch public sanitary sewer along Avenue M and proposed public street B to serve the proposed buildings. This 10-inch public sewer will convey the sewer discharge from the proposed buildings to the existing 15-inch sanitary sewer in Division Street. This sewer line is classified as a LACSD trunk sewer per the City of Palmdale Sewer Master Plan. The 10-inch public sewer will extend and stub 5-ft south of the site to serve the approximately 62-acres of future tributary area.

There are four proposed sewer laterals that connect to the proposed 10" sewer main on proposed public street "B" and two proposed sewer laterals that connect to the existing 15" sewer main in Division Street. Refer to Appendix C for the location of all proposed laterals and the proposed sanitary sewer network.

## **2. SANITARY SEWER HYDRAULIC ANALYSIS METHODS**

Method 1, the LACSD Loading Rate Table, was used to estimate the proposed sanitary sewer flows for the project development. Per this method, both buildings are classified as warehousing > 300,000 sf. Therefore, the estimated project flows are 10 gallons/day of average dry flow per 1,000 sf of warehouse area (See Appendix A). Peak flow rates are calculated as 2.5 times the average flow rate. See Table 1 for proposed project flow rates.

Method 2, the Los Angeles County Code of Ordinances Title 20 Division 2 Chapter 20.32 Main Line Sewer Size Specifications was used to estimate the sanitary sewer flows for the future tributary area of 62-acres. Per this method, the zone for the proposed development and future tributary area is categorized as Planned Industrial (M-4) zoning. Therefore, the estimate future flows are 0.021 cfs of peak dry flow per acre of site (See Appendix B). See Table 2 for future tributary area flow rates.

Table 3 shows the flow rates, velocities, and capacities for the proposed 10-inch sanitary sewer in Avenue M and the existing 15-inch sanitary sewer in Division Street. The peak flow rate in the existing 15-inch sewer were provided as 0.3 million gallons/day via a LACSD Will Serve Letter dated 7/23/2022. Both sewers were analyzed to ensure a minimum velocity of 2 feet per second when flowing one-half full.

## **3. CONCLUSION**

This sewer study analysis concludes that the anticipated combined flow rates of the project area and future tributary area will not negatively affect downstream sanitary sewer facilities. The proposed 10-inch sanitary sewer and the existing 15-inch sewer have adequate capacity for the proposed flow rates while maintaining self-cleansing velocity of over 2 feet per second.

Table 1: Proposed Project Area Flow Rates						
Building Area (sf)	Land Use	Unit Flow Factor (gpd/1,000 sf)	Average Dry Flow (cfs)	Peak Dry Flow (cfs)	Average Dry Flow (mgd)	Peak Dry Flow (mgd)
716,930 (#1)	Warehousing > 300,000 sf	10	0.0111	0.0277	0.0072	0.0179
703,140 (#2)	Warehousing > 300,000 sf	10	0.0109	0.0272	0.0070	0.0176

Table 2: Future Tributary Area Flow Rates						
Parcel Area (ac)	Zoning	Unit Flow Coefficient (cfs/ac)	Average Dry Flow (cfs)	Peak Dry Flow (cfs)	Average Dry Flow (mgd)	Peak Dry Flow (mgd)
62.0	Planned Industrial M-4	0.021	0.521	1.302	0.337	0.842

Note:

The unit flow coefficient method in Table 1 is used to calculate the Peak Dry Flow value. Average Dry Flow is calculated by dividing by 2.5.

Table 3: Flow Rate, Velocity, and Capacity for Project area + Future Tributary area							
Total Average Dry Flow (mgd)	Total Peak Dry Flow (mgd)	Total Average Dry Flow (cfs)	Total Peak Dry Flow (cfs)	Pipe Slope (%)	Pipe Diameter (in)	Capacity at d/D = 0.75 (cfs)	Velocity at Half Full (ft/s)
0.351	0.877	0.543	1.357	0.70%	10	1.648	3.36
0.471	1.177	0.728	1.821	0.91%	15	5.620	5.03

Notes:

These values are only displaying the worst-case scenario of the sewer line along Avenue M.

Flow rates for the existing 15-inch sewer in Division Street was provided via LACSD Will Serve Letter dated 7/25/2022. PDF = 0.3 mgd. ADF back calculated by dividing 2.5

## **APPENDIX A**

**Method 1: LACSD Loading Rate Table (Dated 2020)**

SANITATION DISTRICT NO. 20  
 CONNECTION FEE LOADINGS, CAPACITY UNITS, AND UNIT RATES  
 EFFECTIVE JULY 1, 2020

CATEGORY	UNIT OF USAGE	LOADINGS			CAPACITY UNITS	CHARGE
		FLOW (GPD)	COD (PPD)	SS (PPD)		
Single Family Home	Parcel	260	1.22	0.59	1.00	2,073.76
Condominium	No. of Units	195	0.92	0.44	0.75	1,555.32
Multi-Unit Residential	No. of Units	156	0.73	0.35	0.60	1,244.26
Mobile Home Park	Spaces	156	0.73	0.35	0.60	1,244.26
Hotel/Motel/Rooming House	Rooms	125	0.54	0.28	0.48	995.40
Store	1000 Sq.Ft.	100	0.43	0.23	0.38	788.03
Supermarket	1000 Sq.Ft.	150	2.00	1.00	0.88	1,824.91
Shopping Center	1000 Sq.Ft.	325	3.00	1.17	1.51	3,131.38
Regional Mall	1000 Sq.Ft.	150	2.10	0.77	0.82	1,700.48
Office Building	1000 Sq.Ft.	200	0.86	0.45	0.76	1,576.06
Medical, Dental, Veterinary Clinic	1000 Sq.Ft.	300	1.29	0.68	1.14	2,364.09
Restaurant	1000 Sq.Ft.	1,000	16.68	5.00	5.71	11,841.17
Indoor Theatre	1000 Sq.Ft.	125	0.54	0.28	0.48	995.40
Car Wash - Tunnel, No Recycling	1000 Sq.Ft.	3,700	15.86	8.33	14.07	29,177.80
Car Wash - Tunnel, Recycling	1000 Sq.Ft.	2,700	11.74	6.16	10.31	21,380.47
Car Wash - Wand	1000 Sq.Ft.	700	3.00	1.58	2.66	5,516.20
Bank, Credit Union	1000 Sq.Ft.	100	0.43	0.23	0.38	788.03
Service Shop, Auto Maint/Repair	1000 Sq.Ft.	100	0.43	0.23	0.38	788.03
Animal Kennel	1000 Sq.Ft.	100	0.43	0.23	0.38	788.03
Gas Station	1000 Sq.Ft.	100	0.43	0.23	0.38	788.03
Auto Sales	1000 Sq.Ft.	100	0.43	0.23	0.38	788.03
Wholesale Outlet	1000 Sq.Ft.	100	0.43	0.23	0.38	788.03
Nursery/Greenery	1000 Sq.Ft.	25	0.11	0.06	0.10	207.38
Lt Manufacturing =< 300,000 sq.ft.	1000 Sq.Ft.	25	0.23	0.09	0.12	248.85
Lt manufacturing > 300,000 sq.ft.	1000 Sq.Ft.	10	0.09	0.05	0.05	103.69
Lumber Yard =< 300,000 sq.ft.	1000 Sq.Ft.	25	0.23	0.09	0.12	248.85
Lumber Yard > 300,000 sq.ft.	1000 Sq.Ft.	10	0.09	0.05	0.05	103.69
Warehousing =< 300,000 sq.ft.	1000 Sq.Ft.	25	0.23	0.09	0.12	248.85
Warehousing > 300,000 sq.ft.	1000 Sq.Ft.	10	0.09	0.05	0.05	103.69
Open Storage =< 300,000 sq.ft.	1000 Sq.Ft.	25	0.23	0.09	0.12	248.85
Open Storage > 300,000 sq.ft.	1000 Sq.Ft.	10	0.09	0.05	0.05	103.69
Drive-In Theatre	1000 Sq.Ft.	20	0.09	0.05	0.08	165.90
Night Club	1000 Sq.Ft.	350	1.50	0.79	1.33	2,758.10
Bowling/Skating	1000 Sq.Ft.	150	1.76	0.55	0.73	1,513.84
Club & Lodge Halls	1000 Sq.Ft.	125	0.54	0.27	0.47	974.67
Auditorium/Amusement	1000 Sq.Ft.	350	1.50	0.79	1.33	2,758.10
Golf Course & Park	1000 Sq.Ft.	100	0.43	0.23	0.38	788.03
Campground, Marina, RV Park	Spaces	55	0.34	0.14	0.22	456.23
Convalescent Home	Beds	125	0.54	0.28	0.48	995.40
Laundromat	1000 Sq.Ft.	3,825	16.40	8.61	14.55	30,173.21
Mortuary/Funeral Home	1000 Sq.Ft.	100	1.33	0.67	0.59	1,223.52
Health Spa without Showers	1000 Sq.Ft.	300	1.29	0.68	1.14	2,364.09
Health Spa with Showers	1000 Sq.Ft.	600	2.58	1.35	2.28	4,728.17
Special Event Center*	Attendance	10	0.04	0.02	0.04	82.95
College/University	Students	20	0.09	0.05	0.08	165.90
Private School	1000 Sq.Ft.	200	0.86	0.45	0.76	1,576.06
Library/Museum	1000 Sq.Ft.	100	0.43	0.23	0.38	788.03
Post Office (Local)	1000 Sq.Ft.	100	0.43	0.23	0.38	788.03
Post Office (Regional)	1000 Sq.Ft.	25	0.23	0.09	0.12	248.85
Church	1000 Sq.Ft.	50	0.21	0.11	0.19	394.01

X = 0.7242    Y = 0.1128    Z = 0.1630

Connection Fee Rate = \$2,073.76

Doc 5705732

\* Including, but not limited to, Convention Center, Fairground, Racetrack, Sports Stadium/Arena

## **APPENDIX B:**

**Method 2: Los Angeles County Code of Ordinances Title 20 Division 2 Chapter  
20.32 Main Line Sewer – Size Specifications**

20.32.440 - Main-line sewers—Size specifications.

A. The size of main-line sewer pipe shall be determined by standards of design and the coefficients listed below, but in no case shall it be less than eight inches inside diameter.

For zoning in the following categories for residential areas:	Coefficient cu. ft. per sec. per acre
R-1	0.004
R-2	0.008
R-3	0.012
R-4	0.016*
<b>For commercial areas:</b>	
C-1 through C-4	0.015*
<b>For heavy industrial areas:</b>	
M-1 through M-4	0.021*

\* Individual building, commercial or industrial plant capacities shall be the determining factor when they exceed the coefficients shown.

- B. The coefficient to be used for any zoned area not listed will be determined by the county engineer based upon the intended development and use.
- C. The county engineer shall determine which of the coefficients or combination of coefficients shall be used for design, as determined by the established or proposed zoning in the study area. Any modifications to these coefficients due to topography, development or hazard areas shall be approved by the county engineer.

(Ord. 8690 § 12 (part), 1964; Ord. 6130 Part 5 Ch. 6 § 5606, 1952.)

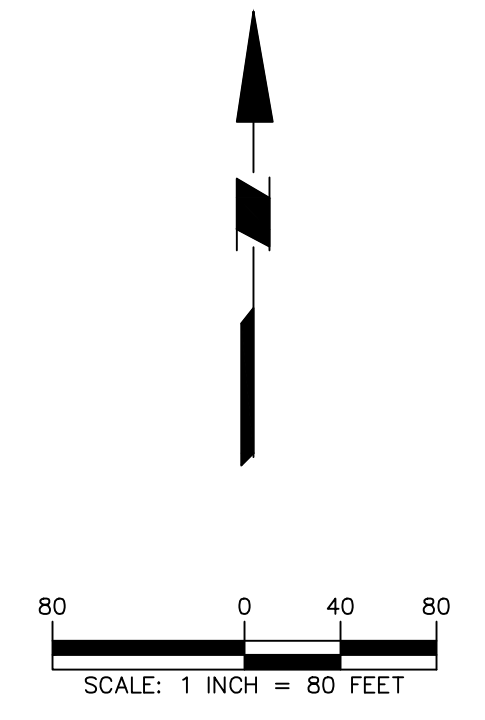
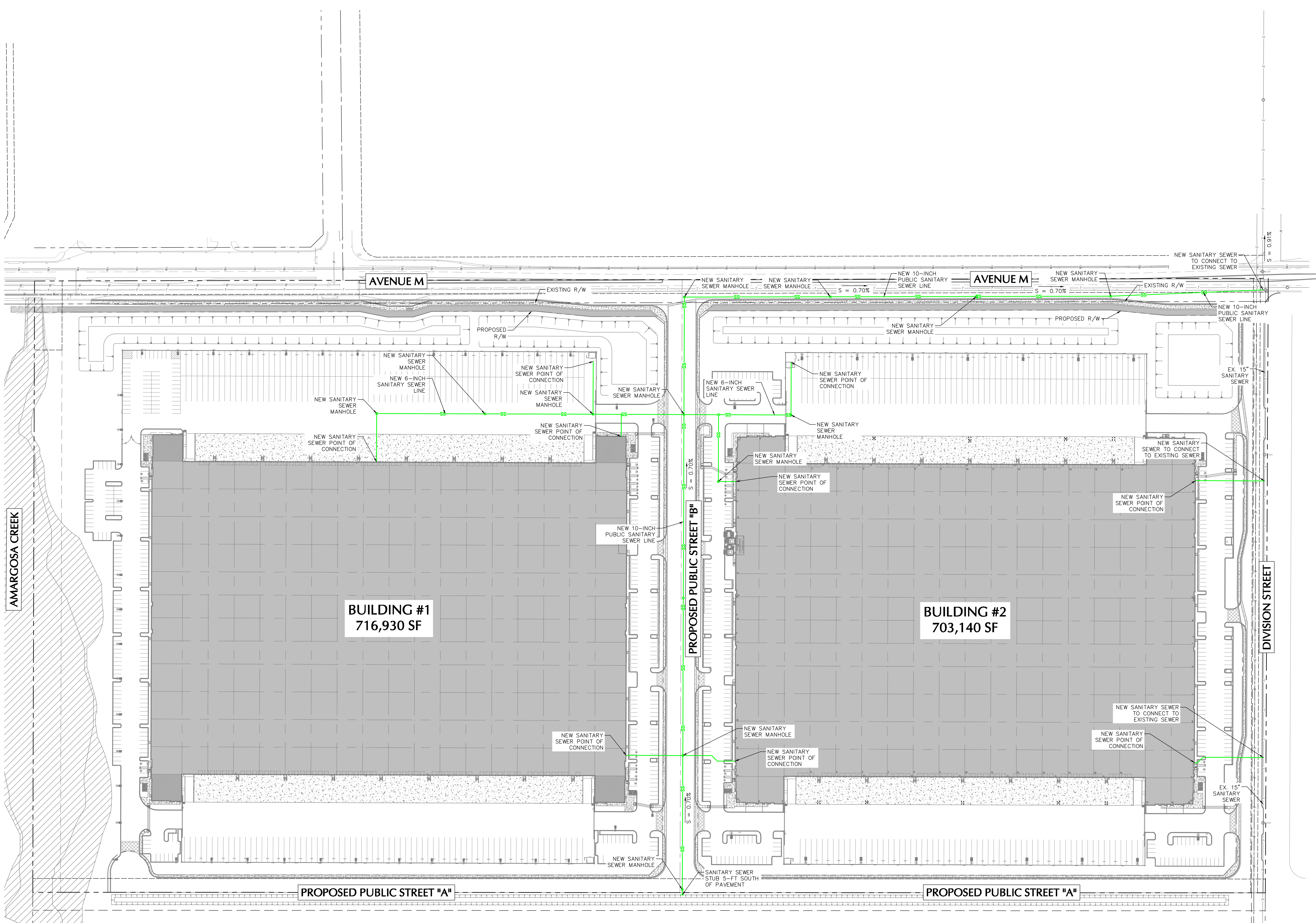
20.32.450 - Main-line sewers—Minimum velocity.

A mainline sewer shall be designed to provide a minimum velocity of two feet per second for pipes flowing one-half full, except that the county engineer may approve a gradient that will develop a lower velocity if he finds that a gradient that will develop a velocity of two feet per second is unobtainable.

(Ord. 6130 Part 5 Ch. 6 § 5607, 1952.)

## **APPENDIX C:**

### **Sanitary Sewer Analysis Exhibit**



Date	Description	No.
Revisions		

Signature \_\_\_\_\_ Date \_\_\_\_\_

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Project  
**PALMDALE LOGISTICS PARK**  
 PALMDALE  
 LOS ANGELES COUNTY CALIFORNIA

Drawing Title  
**SANITARY SEWER STUDY**

Project No. <b>722010501</b>	Drawing No. <b>1</b>
Date <b>09/08/2023</b>	
Drawn By <b>DMB</b>	
Checked By <b>MRC</b>	

## **APPENDIX D:**

### **Sanitary Sewer Hydraulic Calculations**

# Channel Report

## 10-inch

### Circular

Diameter (ft) = 0.83

Invert Elev (ft) = 10.00

Slope (%) = 0.70

N-Value = 0.013

### Calculations

Compute by: Known Depth  
Known Depth (ft) = 0.62

$d/D = 0.75$

### Highlighted

Depth (ft) = 0.62

**Q (cfs) = 1.648**

Area (sqft) = 0.43

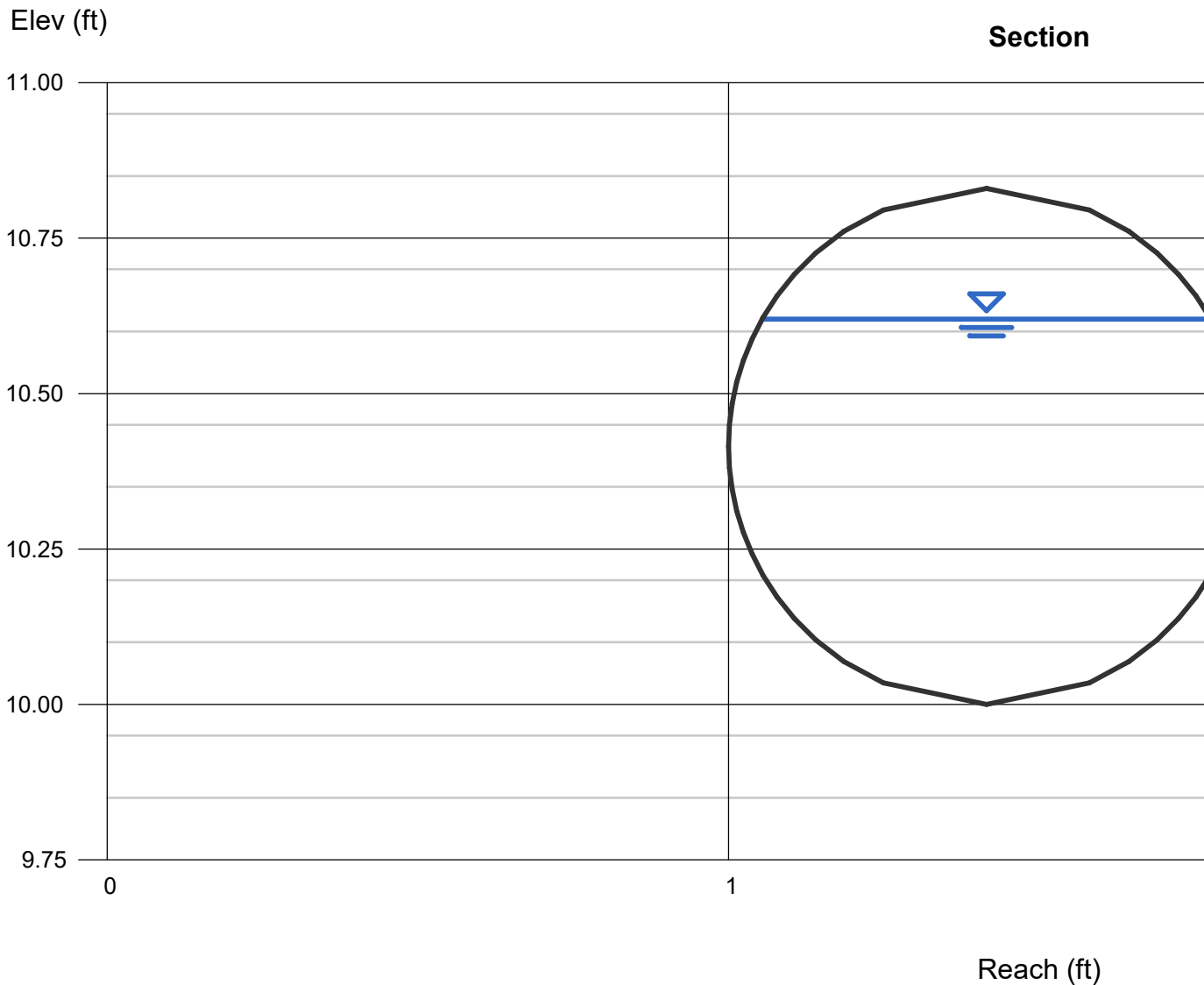
Velocity (ft/s) = 3.80

Wetted Perim (ft) = 1.73

Crit Depth,  $Y_c$  (ft) = 0.58

Top Width (ft) = 0.72

EGL (ft) = 0.84



# Channel Report

## 10-inch

### Circular

Diameter (ft) = 0.83

Invert Elev (ft) = 10.00

Slope (%) = 0.70

N-Value = 0.013

### Calculations

Compute by: Known Depth  
Known Depth (ft) = 0.42

Half-Flow



### Highlighted

Depth (ft) = 0.42

Q (cfs) = 0.913

Area (sqft) = 0.27

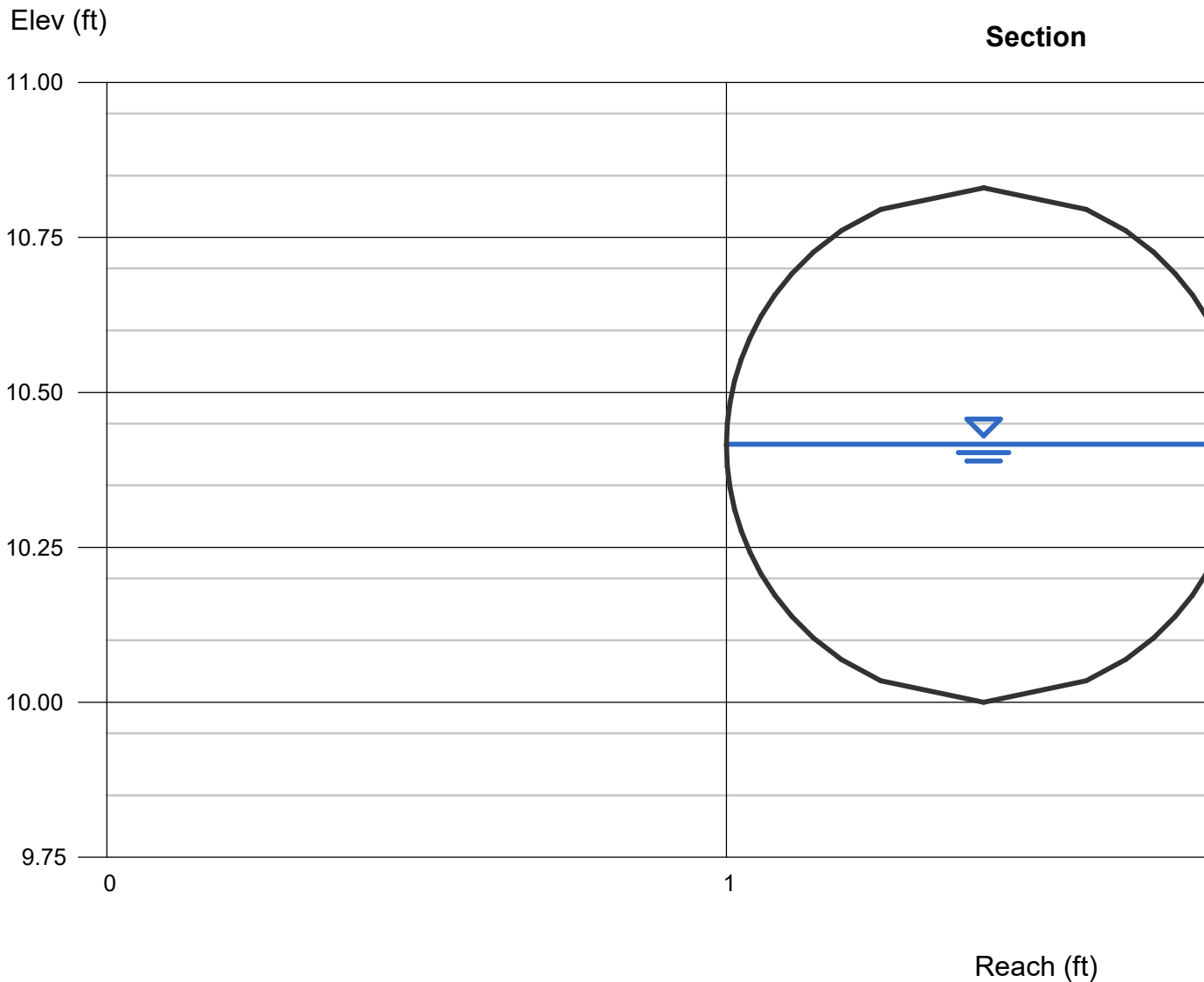
Velocity (ft/s) = 3.36

Wetted Perim (ft) = 1.31

Crit Depth, Yc (ft) = 0.43

Top Width (ft) = 0.83

EGL (ft) = 0.59



# Channel Report

## 15-inch

### Circular

Diameter (ft) = 1.25

Invert Elev (ft) = 10.00

Slope (%) = 0.91

N-Value = 0.013

### Calculations

Compute by:

Known Depth (ft)

Known Depth

= 0.94

$d/D = 0.75$

### Highlighted

Depth (ft) = 0.94

**Q (cfs) = 5.620**

Area (sqft) = 0.99

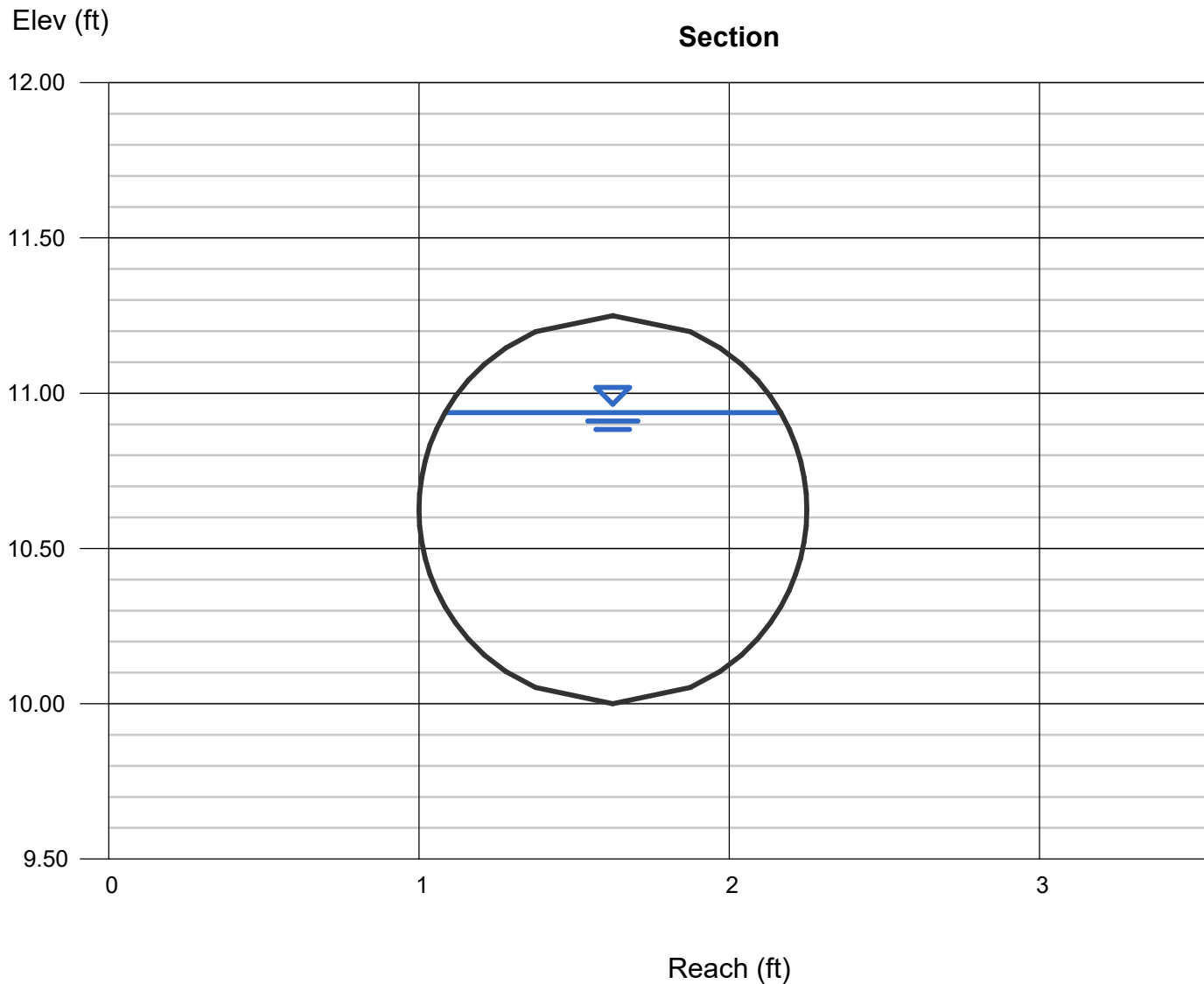
Velocity (ft/s) = 5.69

Wetted Perim (ft) = 2.62

Crit Depth,  $Y_c$  (ft) = 0.96

Top Width (ft) = 1.08

EGL (ft) = 1.44



# Channel Report

## 15-inch

### Circular

Diameter (ft) = 1.25

Invert Elev (ft) = 10.00

Slope (%) = 0.91

N-Value = 0.013

### Calculations

Compute by:

Known Depth (ft) = 0.63

Half-Flow

Known Depth

= 0.63

### Highlighted

Depth (ft) = 0.63

Q (cfs) = 3.102

Area (sqft) = 0.62

Velocity (ft/s) = 5.03

Wetted Perim (ft) = 1.97

Crit Depth, Yc (ft) = 0.71

Top Width (ft) = 1.25

EGL (ft) = 1.02

