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PUBLIC SEWER SYSTEM ANALYSIS FOR THE MIDWAY RISING PROJECT IN THE CITY OF SAN DIEGO

June 6, 2024

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PUBLIC SEWER SYSTEM ANALYSIS
FOR THE MIDWAY RISING PROJECT
IN THE CITY OF SAN DIEGO

June 6, 2024

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Job No. 537-018

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June 6, 2024 537-018

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Attention: Greg Shields, P.E., Principal

Subject: Public Sewer System Analysis for the Midway Rising Project in the City of San Diego

Introduction

This report provides a public sewer system analysis for the Midway Rising project in the City of San Diego. The project is in the Midway-Pacific Highway community, north of Sports Arena Boulevard and east of Hancock Street. Figure 1 provides a vicinity map for the project.

Figure 2 presents an image of the Midway Rising property showing the current development on the site. The project encompasses approximately 49.2 gross acres and the existing development presently consists of the Pechanga Arena and multiple other commercial and retail buildings.

The Midway Rising project is preparing a Specific Plan and an EIR. The Midway Rising project proposes to implement the Midway Rising Specific Plan and redevelop the existing Sports Arena Property with a walkable, transit-centric, and modern live-work-play mixed-use neighborhood that provides a destination that offers a mix of uses, active retail experiences, a range of housing choices, and a vibrant public realm.

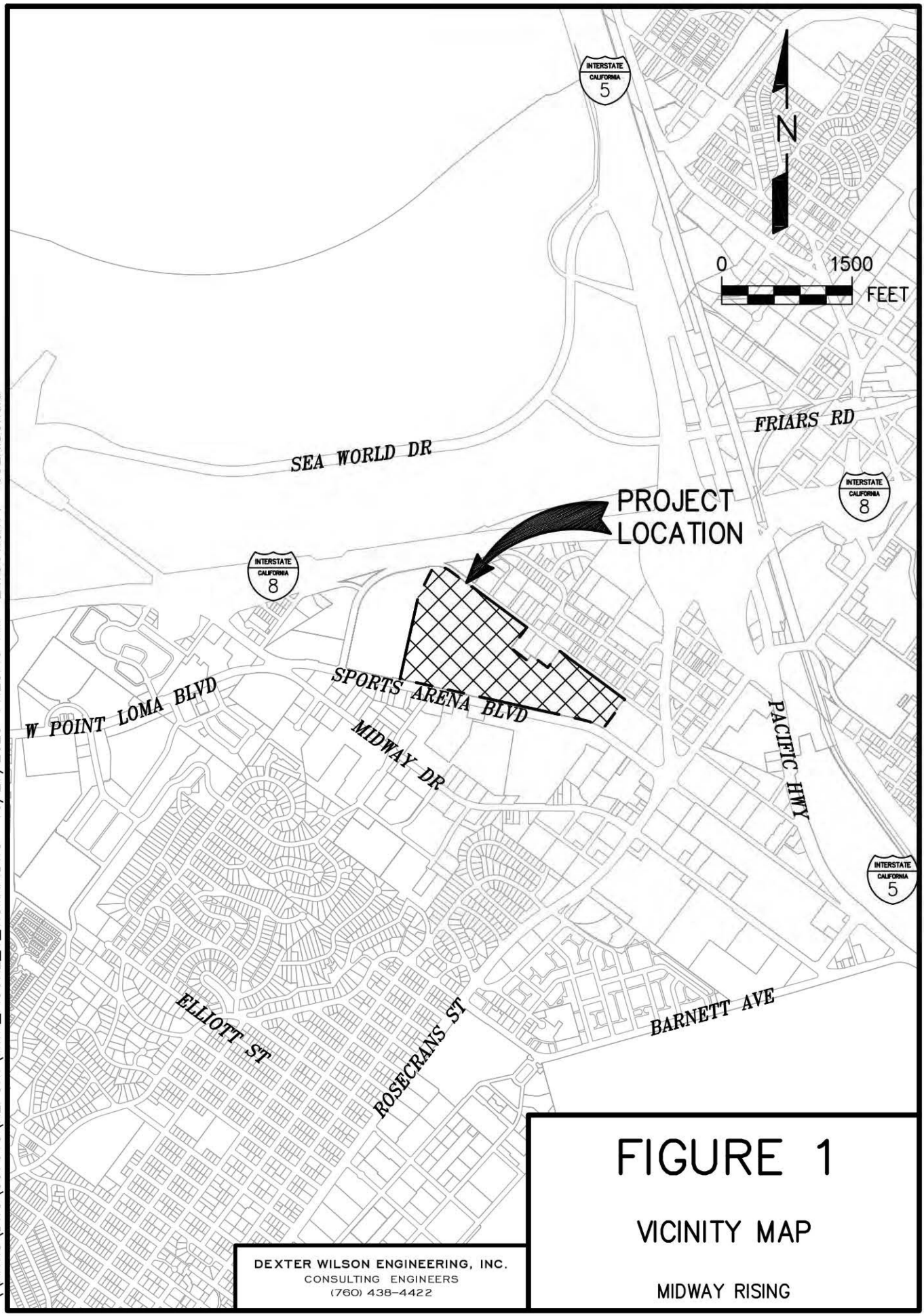

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FIGURE 1

VICINITY MAP

MIDWAY RISING

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FIGURE 2

EXISTING SITE DEVELOPMENT

MIDWAY RISING

The project proposes to construct a new Entertainment Center and 16 multi-family buildings with a total of 4,250 dwelling units. All residential units will have associated amenities and parking.

The existing topography of the site generally drains from north to south.

Purpose of Study

The purpose of this study is to analyze and determine if the existing public gravity sewer system in its current size and configuration has adequate capacity for the Midway Rising Specific Plan project. This report will determine the public sewer system improvements needed, if any, for the proposed development of the project; this determination will be made in conformance with the City of San Diego sewer system design standards.

This sewer study will also review the proposed project phasing to ensure that sufficient sewer lines are constructed in each phase to adequately support each proposed development phase.

The proposed onsite sewer facilities for the Midway Rising project will be both public and private. Analysis of the proposed public and private onsite sewer collection system is included in this study.

Study Area

In general, the study area for this sewer study encompasses the Midway Rising property. There are no existing sewer lines within the project or that traverse the project except for the 96" North Metro Interceptor #1A near the eastern end of the project site. No connections are proposed to the 96" North Metro Interceptor #1A. Thus, the sewer study area is the Midway Rising Specific Plan area.

City of San Diego Sewer Design Criteria

Sewer system analyses criteria are based on the Sewer Design Guide, Revised May 2015, City of San Diego Public Utilities Department. This guide is used for analysis and sizing of new public gravity sewer lines. This guide does not include analysis and evaluation criteria for existing sewer lines. A summary of the design criteria from the Sewer Design Guide is presented in Table 1 below.

TABLE 1
CITY OF SAN DIEGO PUBLIC UTILITIES DEPARTMENT
SEWER SYSTEM DESIGN CRITERIA

Criterion	Design Requirement	Design Guide Reference
Sewage Flow Generation	80 gallons per capita	1.3.2.2
Dry Weather Peaking Factor	Figure 1-1 based on population	1.3.2.2
Wet Weather Peaking Factor	Basin specific – determined by City	1.3.2.2
Gravity Flow Hydraulic Formula	Manning's Equation	1.3.3.1
Manning's 'n'	0.013	1.3.3.1
Desirable Gravity Flow Velocity	3 fps to 5 fps	1.3.3.1
Minimum Gravity Flow Velocity	2 fps	1.3.3.1
Where 2 fps is not achievable	Set min. slope at 1%	1.3.3.1
Maximum Gravity Flow Velocity	10 fps	1.3.3.1
Maximum Depth of Flow at Peak Wet Weather		
For 15-inch Diameter Pipe and Smaller	d/D = 0.50	1.3.3.3
For 18-inch Diameter and Larger	d/D = 0.75	1.3.3.3
Minimum Acceptable Gravity Sewer Main Size		
For Residential Areas	8-inch diameter	1.3.3.4
For Commercial, Industrial, and High-Rise Bldgs.	10-inch diameter	1.3.3.4
Net Acreage	= 0.80 x Gross Acres	Table 1-1
Force Main Velocity	4 fps to 8 fps	7.9.1.1

Midway Rising Project Sewer Generation

The sewer generation estimate for the Midway Rising project is developed in accordance with the City of San Diego Sewer Design Guide and the dwelling unit density. Table 2 presents the projected sewer generation for the Midway Rising project.

TABLE 2
MIDWAY RISING PROJECT
SEWER GENERATION

Parcel Number	Quantity, units	Area, sf	Dwelling Unit Density, DU/Ac	Population per DU	Generation Rate per DU	Average Sewer Generation, gpd
Block A1	419	117,400	155.47	1.8	144 gpd/DU	60,336
Block A2	419	118,967	153.42	1.8	144 gpd/DU	60,336
Block A3	421	139,908	131.08	1.8	144 gpd/DU	60,624
Block B1	270	52,069	225.88	1.5	120 gpd/DU	32,400
Block B2	227	79,764	123.97	1.8	144 gpd/DU	32,688
Block C1	270	54,675	215.11	1.8	144 gpd/DU	38,880
Block C2	316	84,086	163.70	1.8	144 gpd/DU	45,504
Block D1	289	72,083	174.64	1.8	144 gpd/DU	41,616
Block D2	243	49,458	214.02	1.8	144 gpd/DU	34,992
Block E1	284	77,614	159.39	1.8	144 gpd/DU	40,896
Block E2	227	80,271	123.18	1.5	120 gpd/DU	27,240
Block F	386	124,178	135.40	1.8	144 gpd/DU	55,584
Block G	241	80,088	131.08	1.8	144 gpd/DU	34,704
Block H1	130	60,240	94.00	2.2	176 gpd/DU	22,880
Block H2	108	39,299	119.71	1.8	144 gpd/DU	15,552
Entertainment Area	-	191,870	-	-	5,000 gpd/net acre	22,024
TOTAL SPECIFIC PLAN	**4,250**	—			—	**626,256 gpd 435 gpm**

From the City of San Diego's Sewer Design Guide, Figure 1-1, the peak dry weather flow to average flow ratio is approximately 1.88 based on an estimated population of 7,828 persons for the proposed project. The estimated peak dry weather flow is 1,177,361 gpd (818 gpm). Appendix A of this report provides excerpts from the Sewer Design Guide for determining these flows and peaking factors.

The ratio of peak wet weather flow to peak dry weather flow ratio is assumed to be 1.0 resulting in an estimated peak wet weather flow of 1,177,361 gpd (818 gpm).

Existing Sewer Facilities

The existing sewer facilities in the vicinity of the Midway Rising project are shown in Figure 3. There are no public sewer facilities within the current property, only building sewers. The focus for the existing sewer facilities will be on the three trunk and interceptor sewers.

In Sports Arena Boulevard there is the existing 27" Ocean Beach Trunk Sewer #14 on the north side of Sports Arena Boulevard. The existing 36" New Ocean Beach Trunk Sewer #117 is on the south side of Sports Arena Boulevard. Both of these trunk sewers flow easterly and connect to the existing 96" North Metro Interceptor #1A which traverses the property and flows south.

The area to the north of the Midway Rising site consists of larger industrial buildings. These buildings connect to sewers flowing east to the 96" North Metro Interceptor #1A sewer in Sherman Street.

LEGEND

PROJECT BOUNDARY

EXISTING GRAVITY SEWER

MIDWAY RISING PROJECT
TENTATIVE MAP BOUNDARY

KURTZ ST

HANCOCK ST

SHERMAN ST

GREENWOOD ST

CAMINO DEL RIO

SPORTS ARENA BLVD

KEMPER ST

MIDWAY DR

OCEAN BEACH TRUNK SEWER #14

NEW OCEAN BEACH TRUNK SEWER #117

NORTH METRO INTERCEPTOR #1A

EX.8" EX.10" EX.96" EX.27" EX.36"

N

0 250 FEET

FIGURE 3

EXISTING SEWER FACILITIES

MIDWAY RISING

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Midway Rising Proposed Public Sewer System

The proposed public and private sewer systems for the Midway Rising project are shown in Figure 4. The sewer systems consist of public gravity sewers in the two proposed north-south public streets, Kemper Street and Frontier Drive. A private gravity sewer is proposed along the east side of the proposed new Entertainment Center.

As noted earlier, the project drains from north to south; thus, the new public gravity sewers will flow south towards Sports Arena Boulevard and are proposed to connect to the 36" New Ocean Beach Trunk Sewer #117. Two new connections are proposed; each connection will be made at a new manhole.

The primary new collector sewers will be within the proposed public rights-of-way of Kemper Street and Frontier Drive. The primary new collector sewers within Kemper Street and Frontier Drive are proposed to be public. Branch sewers will be connected to these two collector sewers to provide a sewer connection to each proposed Building Block within the project. The branch sewers are proposed to be private. Public and private sewers are identified in Figure 4.

The new Entertainment Center will have its own 10" private gravity sewer located between the new center and the eastern property boundary. This 10" private sewer will connect to the existing 10" public sewer in Sports Arena Boulevard which flows west and connects to the 96" North Metro Interceptor #1A. The proposed connection will be made to an existing public sewer manhole in Sports Arena Boulevard.

Midway Rising Gravity Sewer Analysis

A computer spreadsheet analysis of the proposed public and private sewer systems within the Midway Rising site was prepared based on the Manning's formula for gravity sewer flow. Sewer slopes for the new sewers are based on the Tentative Map prepared for the Midway Rising project which has preliminary sewer inverts for all proposed new manholes.

LEGEND

PROJECT BOUNDARY

PROPOSED PUBLIC STREET RIGHT-OF-WAY

EXISTING PUBLIC GRAVITY SEWER

PROPOSED PUBLIC GRAVITY SEWER

PROPOSED PRIVATE GRAVITY SEWER

N

0 250 FEET

BLOCK A3
BLOCK A2
BLOCK A1
BLOCK C1
BLOCK C2
BLOCK B1
BLOCK B2
BLOCK E1
BLOCK E2
BLOCK D1
BLOCK D2
BLOCK H2
BLOCK H1
BLOCK F
BLOCK G

KURTZ ST
KEMPER ST (PUBLIC)
FRONTIER DR (PUBLIC)
PVT DR 'A-1'
PVT DR 'A-2'
PVT DR 'B-1'
PVT DR 'B-2'
PVT DR 'C-1'
PVT DR 'C-2'
PVT DR 'D'
PVT DR 'E'
HANCOCK ST
SHERMAN ST
GREENWOOD ST
CAMINO DEL RIO
SPORTS ARENA BLVD
KEMPER ST
MIDWAY DR

NORTH METRO INTERCEPTOR #1A

OCEAN BEACH TRUNK SEWER #14

NEW OCEAN BEACH TRUNK SEWER #117

ENTERTAINMENT CENTER

PROPOSED POINT OF CONNECTION TO 36" TRUNK SEWER WITH NEW MANHOLE

PROPOSED POINT OF CONNECTION TO 36" TRUNK SEWER WITH NEW MANHOLE

PROPOSED POINT OF CONNECTION TO 10" SEWER MAIN AT EXISTING MANHOLE

FIGURE 4

PROPOSED SEWER FACILITIES

MIDWAY RISING

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This spreadsheet analysis is provided in Appendix B. The spreadsheet analysis accounts for all 4,250 dwelling units which are part of the Midway Rising Specific Plan, plus it incorporates the commercial flow from the Entertainment Center at the east end of the project site.

As shown in Figure 4, the proposed 10" private gravity sewer at the east end of the site connects to an existing 10" public gravity sewer in Sports Arena Boulevard. This existing 10" public sewer collects flows from the Grosvenor Square commercial property south of Sports Arena Boulevard and west of Rosecrans Street. It is estimated that approximately 8 acres of commercial land flows into the existing 10" public sewer line. This existing sewer flow is accounted for in the spreadsheet calculations in Appendix B.

Depth of Flow. Under existing peak wet weather flow conditions as shown in Appendix B, the maximum depth of flow for any segment of gravity sewer is 0.38 d/D. There are several sewer segments both private and public which flow at this maximum d/D as presented in the sewer system calculations in Appendix B.

Velocity of Flow. Flow velocities for all proposed sewer lines within the Midway Rising site are greater than 2 fps and many segments have flow velocities greater than 3 fps. The lowest flow velocity, 1.68 fps, is in the existing 10" public gravity sewer line in Sports Arena Boulevard to which is connected the new Entertainment Center 10" private gravity sewer. This existing 10" public sewer line in Sports Arena Boulevard has a slope of 0.3 percent. The additional flow from the proposed Entertainment Center increases the flow velocity in this existing public sewer segment.

Depth of Sewer Lines. The table in the upper left corner of Exhibit A at the back of this report shows the depth of the sewer lines proposed for the Midway Rising project. Several manholes are shown to be greater than 15 feet but no manholes are greater than 20 feet deep. Of the seven manholes over 15 feet deep, two are proposed manholes on the 36" Trunk Sewer and one is an existing manhole on the 10" collector sewer. These three manholes are in Sports Arena Boulevard.

The depths of the proposed sewer lines will be reviewed during final design and the Sewer Design Guide requirements under Section 2.2.2.3 will be addressed either by using thicker wall PVC pipe, DR18 in lieu of SDR35, or confirming with a geotechnical engineer that the soil characteristics provisions of SDS-101 are satisfied.

36" New Ocean Beach Trunk Sewer #117 Gravity Sewer Analysis

As noted earlier, two new connections are proposed to the 36" New Ocean Beach Trunk Sewer #117. The City provided average dry weather flow and peak wet weather flow data for the existing 36" trunk sewer. The data provided by the City regarding the 36" New Ocean Beach Trunk Sewer #117 can be found in Appendix C.

The project's peak wet weather flows were added into the City's data to determine if there is adequate capacity within the trunk sewer. The flow from proposed public Manhole 2 which receives flow from Kemper Street, as shown in Exhibit A, was added into Facility Sequence Number 15165. The flow from proposed Manhole 38 which receives flows from Frontier Drive was added into Facility Sequence Number 5040580.

Under existing plus proposed project peak wet weather flows as shown in Appendix D, the maximum depth of flow for any sewer segment downstream of the project is 0.60 d/D, and the maximum velocity is 5.4 fps.

For this analysis, existing sewer flow generated currently on the project site was not subtracted from the City flow data thereby rendering the analysis to be more conservative. The conclusion reached is that the 36" New Ocean Beach Trunk Sewer #117 has available capacity for the Midway Rising project.

Midway Rising Project Phasing

The Midway Rising project is proposed to be constructed in three phases. Figure 5 identifies the current concept for development phasing of the Midway Rising site.

The first phase will be the construction of the Entertainment Center at the east end of the project site. This will be followed by two additional phases. The second phase is centered on the construction of Frontier Drive; the third phase is contingent on the construction of Kemper Street.

The proposed development phases coincide well with the three primary gravity sewer lines that are required for sewer service to the Midway Rising project. The Entertainment Center will construct the 10" private gravity sewer at the east boundary of the site. This sewer line will provide sewer service only for the Entertainment Center; therefore, once constructed, the first phase of the Midway Rising project will have full sewer service.

Phase 2 will be constructed around the public gravity sewer line proposed in Frontier Drive. Phase 3 will be constructed around the public gravity sewer line in Kemper Street.

LEGEND

PROJECT BOUNDARY

PROPOSED PUBLIC STREET RIGHT-OF-WAY

PROPOSED PHASE 1

PROPOSED PHASE 2

PROPOSED PHASE 3

N

0 250 FEET

BLOCK A3
BLOCK A2
BLOCK A1
BLOCK B1
BLOCK B2
BLOCK C1
BLOCK C2
BLOCK D1
BLOCK D2
BLOCK E1
BLOCK E2
BLOCK F
BLOCK G
BLOCK H1
BLOCK H2

KURTZ ST
HANCOCK ST
SHERMAN ST
GREENWOOD ST
CAMINO DEL RIO
KURTZ ST
SPORTS ARENA BLVD
SPORTS ARENA BLVD
KEMPER ST
MIDWAY DR

PVT DR 'A-1'
PVT DR 'A-2'
KEMPER ST (PUBLIC)
PVT DR 'B-1'
PVT DR 'B-2'
FRONTIER DR (PUBLIC)
PVT DR 'C-1'
PVT DR 'C-2'
PVT DR 'D'
PVT DR 'E'

ENTERTAINMENT CENTER

MIDWAY RISING PROJECT TENTATIVE MAP BOUNDARY

FIGURE 5

PROPOSED PROJECT PHASING

MIDWAY RISING

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Conclusions and Recommendations

The following conclusions and recommendations are summarized based on the sewer system analysis prepared for the proposed Midway Rising project.

1. The Midway Rising project proposes to construct 4,250 multi-family dwelling units plus a new Entertainment Center on a property that is the current home of the Pechanga Arena.

2. The Specific Plan area will generate an average sewage flow of 626,256 gpd.

3. The onsite gravity sewer system for serving the Midway Rising project will be composed of public and private gravity sewer lines.

4. The Midway Rising project is proposing to connect to the existing City of San Diego 36-inch New Ocean Beach Trunk Sewer #117 in Sports Arena Boulevard. Two connections are proposed at new manholes on the 36" trunk sewer.

5. A third sewer connection is proposed to the existing 10" public gravity sewer in Sports Arena Boulevard at the east end of the project site. This connection will be made to an existing manhole.

6. The analysis of the proposed onsite gravity sewers has resulted in required sewer line sizes ranging from 8" diameter to 15" diameter.

7. The maximum calculated d/D for any of the new proposed onsite public or private gravity sewers is 0.38 d/D.

8. Flow velocities in the proposed onsite public or private gravity sewers exceed 2 fps. The maximum flow velocity in the onsite gravity sewers is 3.8 fps.

9. Several segments of proposed gravity sewer are anticipated to be at depths greater than 15 feet but less than 20 feet. During final design the Sewer Design Guide will be satisfied either by addressing the geotechnical issues or by increasing the PVC pipe strength by using thicker wall pipe.

10. An analysis of the flow in the existing 36" New Ocean Beach Trunk Sewer #117 using flow data provided by the City of San Diego concluded that this trunk sewer has sufficient flow capacity for the proposed Midway Rising project.

11. The Midway Rising project is proposing to build out in three development phases. Phase 1 will include construction of new onsite private gravity sewers. Phase 2 and Phase 3 will include construction of new onsite public and private gravity sewers.

12. The design of the onsite public and private gravity sewers will be in accordance with the City of San Diego Sewer Design Guide.

We appreciate the opportunity to have provided you with this report. If you have any questions regarding the information or conclusions and recommendations presented in this report, please do not hesitate to contact the undersigned.

Dexter Wilson Engineering, Inc.

Andrew Oven, P.E.

AO:WT:ah

Attachments

cc: Martin Jones, P.E., Project Design Consultants/Bowman
Thomas Aristide, Project Design Consultants/Bowman

APPENDIX A

CITY OF SAN DIEGO
SEWER DESIGN GUIDE EXCERPTS

street alignments) and all potential points of entry of sewage from surrounding lands.

1.3.1.3 Depth of Mains

The planning study shall clearly identify all existing and/or proposed facilities which will exceed standard depths for sewer mains as defined in Subsection 2.2.1.5. In cases where proposed sewers will exceed 15 feet in depth, a request for design deviation (ATTACHMENT 2) must be submitted to the Water and Sewer Development Review Senior Civil Engineer with the Sewer Planning Study. A design deviation will only be approved in exceptional cases and when adequate justification is provided. Mains more than 20 feet deep shall also require approval from the Wastewater Collection Division Senior Civil Engineer.

1.3.1.4 Existing Studies

The City of San Diego maintains an extensive library of sewer planning studies which were prepared for lands throughout the City. These studies are available for review at the Water and Sewer Development Section, Public Utilities Department. All studies are catalogued by subdivision or trunk sewer name. Logs of sewer flow study analyses for recently monitored trunk sewers and a map of sewers which meet the Regional Water Quality Control Board (RWQCB) criteria for being critical or sub-critical may also be viewed. In addition, information regarding proposed CIP projects within the vicinity of a given project may be requested. In many cases, an addendum or reference to one of the existing planning studies may be acceptable in lieu of an independent study. Concurrent with the preparation of planning studies for sewers proposed to connect to existing canyon sewer mains, a study of flow redirection per Council Policy 400-13 and a cost-benefit analysis per Council Policy 400-14 shall be prepared (Refer to ATTACHMENT 1). An existing analysis of redirection of flows and a cost-benefit analysis, as required by Council Policies 400-13 and 400-14 respectively, may be available for reference for various existing canyon sewers.

1.3.2 Flow Estimation

1.3.2.1 Land Use

Present or future allowable land use, whichever results in higher equivalent population, shall be used to generate potential sewage flows.

1.3.2.2 Flow Determination

Flow definitions and calculation procedures are listed below. All calculations shall be tabulated for each sewer main section (manhole to manhole) in the

format shown on Figure 1-2.

Equivalent Population: The equivalent population shall be calculated from zoning information (Ref. Section 1.6). For major new facilities such as high rise apartment buildings, flow rates (assuming one lateral) shall be checked based on the most current, adopted edition of the Uniform Plumbing Code. The most conservative flow rate shall govern.

Daily Per Capita Sewer Flow: The sewer flow for the equivalent population shall be 80 gallons per capita per day (gpcd).

Average Dry Weather Flow (ADWF): Equivalent populations shall be used to calculate the average dry weather flow. The average dry weather flow for each sewer main reach (manhole to manhole) shall be determined by multiplying the total accumulated equivalent population contributing to that reach by 80 gallons per capita per day:

Average Dry Weather Flow = (80 gpcpd) x (Equivalent Population)

Peaking Factor for Dry Weather Flow (PFDWF): The peaking factor is the ratio of peak dry weather flow to average dry weather flow. It is dependent upon the equivalent population within a tributary area. The tributary area is the area upstream of, and including, the current reach for the total flow in each reach of pipe. Figure 1-1, consisting of the table prepared by Holmes and Narver in 1960, shall be used to determine peaking factors for each tributary area. In no instance shall the dry weather flow peaking factor be less than 1.5.

Peak Dry Weather Flow (PDWF): The peak dry weather flow for each sewer main reach shall be determined by multiplying the average dry weather flow by the appropriate peaking factor (Note that peak dry weather flows are not algebraically cumulative as routed through the sewer system, i.e. the peak dry weather flow at any point shall be based on the equivalent population in the basin to that point (Ref. Figure 1-2).

Peak Dry Weather Flow = (Average Dry Weather Flow) x (Dry Weather Flow Peaking Factor)

Peaking Factor for Wet Weather Flow (PFWWF): The peaking factor for wet weather flow is the ratio of peak wet weather flow to peak dry weather flow. It is basin-specific and shall be based on essential information available at the time of the planning study. Information such as historical rainfall/sewage flow data, land use, soil data, pipe/manhole age, materials and conditions, groundwater elevations (post development), inflow and infiltration (I/I) studies, size, slope and densities of the drainage basin, etc., should be utilized in the wet weather analysis to estimate the peaking factor for wet weather. Upward adjustments shall be made in areas with expected high inflow and

infiltration (i.e. high ground water or in areas with lush landscaping schemes). Flow meters are installed throughout the City's sewer system. Flow data collected from these meters are available upon request. The objective of this analysis is to quantify the magnitude of peak wet weather flow with a 10-year return period on a statistical basis.

The Senior Civil Engineer overseeing the preparation of the planning study shall coordinate with the City Sewer Modeling Group for approval of the peaking factors to be used for design.

Peak Wet Weather Flow (PWWF): The peak wet weather flow (or design flow) for a gravity sewer main reach shall be determined by multiplying the peak dry weather flow (ref. Figure 1-2) by the appropriate wet weather peaking factor. The peak wet weather flow is the design flow for a gravity sewer main. It is determined at any point in the system based on the associated upstream average dry weather flow in the basis to that point times the peaking factor for wet weather.

Peak Wet Weather Flow = (Peak Dry Weather Flow) x (Wet Weather Peaking Factor)

1.3.3 Pipe Sizing Criteria

1.3.3.1 Hydraulic Requirements

Manning's formula for open-channel flows shall be used to calculate flows in gravity sewer mains. Manning's coefficient of roughness "n" shall be assumed to be 0.013 for all types of sewer pipe. Sewer grades shall be designed for velocities of 3 to 5 feet per second (fps) where possible. This is extremely important in areas where peak flow will not be achieved for many years. The minimum allowable velocity is 2 fps at calculated peak dry weather flow, excluding infiltration. Sewer mains that do not sustain 2 fps at peak flows shall be designed to have a minimum slope of 1 percent. Additional slope may be required by the Senior Civil Engineer where fill of varied depth is placed below the pipe in order to provide adequate slope after expected settlement occurs. The maximum allowable velocity shall be 10 fps and shall be avoided by adjusting slopes, by increasing the pipe diameter, or by utilizing a vertical curve transition to lower velocities per subsections 2.2.4 and 2.2.9.4. If the Senior Civil Engineer approves a velocity greater than 10 fps, the pipe shall be upgraded to SDR 18 PVC (standard dimension ratio polyvinyl chloride), concrete-encased VC (vitrified clay), or PVC sheet-lined reinforced concrete pipe.

TABLE 1-1
CITY OF SAN DIEGO SEWER DESIGN GUIDE
DENSITY CONVERSIONS

Zone	Maximum Density (DU/Net Ac)	Population per DU	Equivalent Population (Pop/Net Ac)
AR-1-1, RE-1-1	0.1	3.5	0.4
RE-1-2	0.2	3.5	0.7
AR-1-2, RE-1-3	1	3.5	3.5
RS-1-1, RS-1-8	1	3.5	3.5
RS-1-2, RS-1-9	2	3.5	7.0
RS-1-3, RS-1-10	3	3.5	10.5
RS-1-4, RS-1-11	4	3.5	14.0
RS-1-5, RS-1-12	5	3.5	17.5
RS-1-6, RS-1-13	7	3.5	24.5
RS-1-7, RS-1-14	9	3.5	31.5
RX-1-1	11	3.4	37.4
RT-1-1	12	3.3	39.6
RX-1-2, RT-1-2, RU-1-1	14	3.2	44.8
RT-1-3, RM-1-2	17	3.1	52.7
RT-1-4	20	3.0	60.0
RM-1-3	22	3.0	66.0
RM-2-4	25	3.0	75.0
RM-2-5	29	3.0	87.0
RM-2-6	35	2.8	98.0
RM-3-7, RM-5-12	43	2.6	111.8
RM-3-8	54	2.4	129.6
RM-3-9	73	2.2	160.6
RM-4-10	109	1.8	196.2
RM-4-11	218	1.5	327.0

TABLE 1-1
CITY OF SAN DIEGO SEWER DESIGN GUIDE
DENSITY CONVERSIONS (Continued)

Zone	Maximum Density (DU / Net Ac)	Population Per DU	Equivalent Population (Pop/Net Ac)
Schools/Public	8.9	3.5	31.2
Offices	10.9	3.5	38.2*
Commercial/Hotels	12.5	3.5	43.7*
Industrial	17.9	3.5	62.5*
Hospital	42.9	3.5	150.0*

Figures with asterisk (*) represent equivalent population per floor of the building.

Definitions:
DU = Dwelling Units
Ac = Acreage
Pop = Population

Net Acreage is the developable lot area excluding areas that are dedicated as public streets in acres. Gross Area is the entire area in acres of the drainage basin, including lots, streets, etc.

For undeveloped areas, assume Net Acreage = 0.8 x Gross Area in Acres

For developed areas, calculate actual Net Acreage.

Tabulated figures are for general case. The tabulated figures shall not be used if more accurate figures are available.

Population is based on actual equivalent dwelling units (EDU) or the maximum estimate obtained from zoning.

Conversion of Fixture Units to Equivalent Dwelling Units (EDU): The Water Meter Data Card, maintained by the Development Services Department, contains a table of plumbing fixtures that should be used for determining the equivalent dwelling units (EDU's) for the purpose of estimating the rate of wastewater generation in residential, commercial, or industrial areas. Currently, the basis for conversion is: 20 fixtures = 1 EDU and 1 EDU = 280 gallons of wastewater per day.

In high rise building areas, flow rates shall be based on the most current, adopted edition of the applicable Plumbing Code, assuming one lateral per area. The most conservative flow rate shall govern.

PUBLIC UTILITIES DEPARTMENT

PEAKING FACTOR FOR SEWER FLOWS
(Dry Weather)

Ratio of Peak to Average Flow*
Versus Tributary Population

Population	Ratio of Peak to Average Flow	Population	Ratio of Peak to Average Flow
200	4.00	4,800	2.01
500	3.00	5,000	2.00
800	2.75	5,200	1.99
900	2.60	5,500	1.97
1,000	2.50	6,000	1.95
1,100	2.47	6,200	1.94
1,200	2.45	6,400	1.93
1,300	2.43	6,900	1.91
1,400	2.40	7,300	1.90
1,500	2.38	7,500	1.89
1,600	2.36	8,100	1.87
1,700	2.34	8,400	1.86
1,750	2.33	9,100	1.84
1,800	2.32	9,600	1.83
1,850	2.31	10,000	1.82
1,900	2.30	11,500	1.80
2,000	2.29	13,000	1.78
2,150	2.27	14,500	1.76
2,225	2.25	15,000	1.75
2,300	2.24	16,000	1.74
2,375	2.23	16,700	1.73
2,425	2.22	17,400	1.72
2,500	2.21	18,000	1.71
2,600	2.20	18,900	1.70
2,625	2.19	19,800	1.69
2,675	2.18	21,500	1.68
2,775	2.17	22,600	1.67
2,850	2.16	25,000	1.65
3,000	2.14	26,500	1.64
3,100	2.13	28,000	1.63
3,200	2.12	32,000	1.61
3,500	2.10	36,000	1.59
3,600	2.09	38,000	1.58
3,700	2.08	42,000	1.57
3,800	2.07	49,000	1.55
3,900	2.06	54,000	1.54
4,000	2.05	60,000	1.53
4,200	2.04	70,000	1.52
4,400	2.03	90,000	1.51
4,600	2.02	100,000+	1.50

*Based on formula: Peak Factor = $6.2945 \times (pop)^{-0.1342}$
(Holmes & Narver, 1960)

FIGURE 1-1

APPENDIX B

ANALYSIS OF PUBLIC GRAVITY SEWER SYSTEM

DATE: 6/6/2024

JOB NUMBER: 537-018

SEWER STUDY SUMMARY

FOR: Midway Rising - Existing Sewer Flow plus Specific Plan Build-Out

BY: Dexter Wilson Engineering, Inc.

LINE	FROM	IE	TO	IE	LENGTH (ft)	Δ ELEVATION (ft)	POP. PER D.U.	IN-LINE DUs	POPULATION SERVED		SEWAGE PER CAPITA/DAY (gpd/person)	AVG. DRY WEATHER FLOW (gpd)	PEAKING FACTOR	PEAK FLOW (gpd)	PEAK FLOW (DESIGN FLOW)		LINE SIZE (inches)	DESIGN SLOPE (%)	DEPTH K' (1)	dn (feet)	dn/D(2)	C_a for Velocity(3)	VELOCITY (f.p.s.)	Comments
									IN-LINE	TOTAL					M.G.D.	C.F.S.								
	26	1.32	22	-1.72	151.91	3.04	1.8	210.5	378.9	378.9	80	30,312	3.404	103,172	0.103	0.160	8	2.00	0.043254	0.13755	0.21	0.1169	3.07	Proposed Kemper Street Public Gravity Sewer
	34	1.79	30	-0.56	116.70	2.35	1.8	573.0	1,031.4	1,031.4	80	82,512	2.491	205,503	0.206	0.318	8	2.01	0.085886	0.19447	0.29	0.1906	3.75	Proposed Private Gravity Sewer
	30	-0.56	22	-1.72	58.30	1.16	1.8	0.0	0.0	1,031.4	80	82,512	2.491	205,503	0.206	0.318	8	1.99	0.086403	0.19506	0.29	0.1914	3.74	Proposed Private Gravity Sewer
	22	-1.72	18	-3.38	222.13	1.66	1.8	210.5	378.9	1,789.2	80	143,136	2.322	332,385	0.332	0.514	10	0.75	0.125768	0.29668	0.36	0.2508	2.95	Proposed Kemper Street Public Gravity Sewer
	18	-3.38	14	-3.87	162.93	0.49	1.8	209.5	377.1	2,166.3	80	173,304	2.266	392,647	0.393	0.608	12	0.30	0.144023	0.38289	0.38	0.2767	2.20	Proposed Kemper Street Public Gravity Sewer
	14	-3.87	10	-4.47	200.00	0.60	0	0.0	0.0	2,166.3	80	173,304	2.266	392,647	0.393	0.608	12	0.30	0.144201	0.38314	0.38	0.2770	2.19	Proposed Kemper Street Public Gravity Sewer
	12	-1.56	10	-4.47	174.03	2.91	1.8	419.0	754.2	754.2	80	60,336	2.788	168,227	0.168	0.260	8	1.67	0.077155	0.18407	0.28	0.1765	3.32	Proposed Private Gravity Sewer
	10	-4.47	6	-4.96	162.07	0.49	0	0.0	0.0	2,920.5	80	233,640	2.151	502,466	0.502	0.777	15	0.30	0.101382	0.39730	0.32	0.2147	2.32	Proposed Kemper Street Public Gravity Sewer
	8	-1.46	6	-4.96	179.00	3.50	1.65	540.0	891.0	891.0	80	71,280	2.614	186,290	0.186	0.288	8	1.96	0.079011	0.18632	0.28	0.1795	3.61	Proposed Private Gravity Sewer
Q	6	-4.96	2	-5.86	300.93	0.90	1.8	209.5	377.1	4,188.6	80	335,088	2.041	683,771	0.684	1.058	15	0.30	0.138715	0.46896	0.38	0.2692	2.52	Proposed Kemper Street Public Gravity Sewer
	74	4.16	70	0.67	178.94	3.49	1.6551	470.0	777.9	777.9	80	62,232	2.768	172,284	0.172	0.267	8	1.95	0.073163	0.17918	0.27	0.1700	3.53	Proposed Private Gravity Sewer
	70	0.67	66	-0.29	47.92	0.96	1.8	0.0	0.0	777.9	80	62,232	2.768	172,284	0.172	0.267	8	2.00	0.072189	0.17793	0.27	0.1684	3.56	Proposed Frontier Drive Public Gravity Sewer
	66	-0.29	50	-1.29	100.25	1.00	1.8	36.0	64.8	842.7	80	67,416	2.686	181,076	0.181	0.280	8	1.00	0.107525	0.21852	0.33	0.2239	2.82	Proposed Frontier Drive Public Gravity Sewer
	62	5.43	58	3.08	235.00	2.35	2.01	250.5	502.9	502.9	80	40,232	2.998	120,599	0.121	0.187	8	1.00	0.071523	0.17708	0.27	0.1672	2.51	Proposed Private Gravity Sewer
	58	3.08	54	0.43	265.00	2.65	1.8	156.5	281.7	784.6	80	62,768	2.763	173,418	0.173	0.268	8	1.00	0.102848	0.21349	0.32	0.2169	2.78	Proposed Private Gravity Sewer
	54	0.43	50	-1.29	171.88	1.72	1.8	229.0	412.2	1,196.8	80	95,744	2.451	234,634	0.235	0.363	8	1.00	0.139105	0.25050	0.38	0.2698	3.03	Proposed Private Gravity Sewer
	50	-1.29	42	-3.95	265.91	2.66	1.8	0.0	0.0	2,039.5	80	163,160	2.285	372,777	0.373	0.577	10	1.00	0.121914	0.29181	0.35	0.2452	3.39	Proposed Frontier Drive Public Gravity Sewer
	46	-0.45	42	-3.95	177.00	3.50	1.8	543.0	977.4	977.4	80	78,192	2.523	197,247	0.197	0.305	8	1.98	0.083189	0.19130	0.29	0.1863	3.69	Proposed Private Gravity Sewer
AH	42	-3.95	38	-6.96	300.74	3.01	1.8	193.0	347.4	3,364.3	80	269,144	2.109	567,637	0.568	0.878	12	1.00	0.114133	0.33818	0.34	0.2338	3.76	Proposed Frontier Drive Public Gravity Sewer
	82	5.79	86	1.79	200.00	4.00	0	0.0	275.3	275.3	80	22,024	3.749	82,568	0.083	0.128	10	2.00	0.019097	0.11547	0.14	0.0658	2.80	Proposed Private Gravity Sewer
	86	1.79	90	-0.14	97.45	1.93	0	0.0	0.0	275.3	80	22,024	3.749	82,568	0.083	0.128	10	1.98	0.019191	0.11575	0.14	0.0661	2.79	Proposed Private Gravity Sewer
	90	-0.14	94	-1.24	55.00	1.10	0	0.0	0.0	275.3	80	22,024	3.749	82,568	0.083	0.128	10	2.00	0.019097	0.11547	0.14	0.0658	2.80	Proposed Private Gravity Sewer
	94	-1.24	98	-2.43	397.00	1.19	0	0.0	349.6	624.9	80	49,992	2.896	144,773	0.145	0.224	10	0.30	0.086494	0.24396	0.29	0.1915	1.68	Existing Sports Arena Boulevard Public Sewer; 8 ac Ex. Commercial
	98	-2.43	102	-5.64	15.00	3.21	0	0.0	0.0	624.9	80	49,992	2.896	144,773	0.145	0.224	10	21.40	0.010237	0.08555	0.10	0.0425	7.59	

Total DUS	Total Pop.	Min Slope	Max dn/D
4,250.0	8,178	0.30	0.38

See Table 2 of the Report for Dwelling Unit reference and Average Sewer Generation Calculations.

1) K' based on n = 0.013
2) dn/D using K' in Brater King Table 7-14
3) From Brater King Table 7-4 based on dn/D

APPENDIX C

CITY OF SAN DIEGO
36" NEW OCEAN BEACH TRUNK SEWER #117 DATA

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 117 - NEW OCEAN BEACH
2024 DWF AS-BUILT

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	AVG. FLOW (MGD)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
5012	B18S568.1	B18S137	5.76	5.65	11.80	0.002	24	58	4.17	10.25	42.7	6.50	6.77	5.30	1.48	3.445	6.40	53.8
5055309	B18S137.1	B18S140	5.65	4.73	9.70	0.004	24	261	2.82	13.01	54.2	5.82	5.94	3.89	1.48	3.028	8.68	34.9
4769	B17S18.1	B17S216	4.81	2.42	9.42	0.004	20	600	2.09	3.23	16.1	2.69	2.76	6.73	0.22	0.308	5.67	5.4
4784	B17S216.1	B17S57	2.42	0.17	5.17	0.004	21	562	2.13	3.12	14.9	0.43	0.50	4.74	0.22	0.308	6.48	4.7
4786	B17S57.1	B17S105	0.17	-1.81	4.19	0.005	21	428	1.47	4.03	19.2	-1.48	-1.44	5.67	0.22	0.307	6.97	4.4
4818	B17S105.1	B17S120	-1.81	-2.07	5.93	0.001	24	192	1.37	4.02	16.8	-1.74	-1.71	7.67	0.22	0.307	5.37	5.7
4834	B17S120.1	B17S144	-2.07	-2.61	5.39	0.001	24	398	1.34	4.08	17.0	-2.27	-2.24	7.66	0.22	0.306	5.40	5.7
4848	B17S144.1	B17S172	-2.61	-3.09	5.91	0.001	24	374	1.90	3.20	13.4	-2.82	-2.77	8.73	0.22	0.306	5.23	5.9
4884	B17S172.1	B17S363	-3.09	-6.00	6.00	0.016	24	185	1.95	3.20	13.4	-5.73	-5.68	11.73	0.22	0.474	18.34	2.6
5055317	B17S363.1	B17S362	-6.00	-6.72	6.10	0.045	24	16	2.44	13.51	56.3	-5.59	-5.50	11.69	0.22	2.369	30.97	7.7
5055339	B17S362.1	B17S361	-6.72	-7.90	6.25	0.045	24	26	7.00	16.37	68.2	-6.54	-5.77	12.79	0.22	2.152	31.18	6.9
5055337	B17S361.1	PS11D001	-7.90	-8.40	8.21	0.045	24	11	10.84	111.80	465.9	0.92	2.74	7.29	0.22	5.709	31.16	18.3
5019	B18S140.1	B18S145	4.73	4.51	12.50	0.001	33	237	2.49	12.90	39.1	5.59	5.68	6.91	1.85	3.416	10.42	32.8
5017	B18S145.1	C18S25	4.51	4.14	12.10	0.001	33	407	2.58	12.34	37.4	5.17	5.27	6.93	1.86	3.366	10.32	32.6
9696	C18S25.1	C18S28	4.14	3.47	15.50	0.001	33	618	2.49	12.53	38.0	4.52	4.61	10.99	1.86	3.302	11.25	29.4
9788	C18S28.1	C18S32	3.47	3.09	17.10	0.001	33	384	2.46	12.53	38.0	4.14	4.23	12.97	1.86	3.268	10.75	30.4
9701	C18S32.1	C18S78	3.09	2.41	20.40	0.001	33	685	2.21	13.37	40.5	3.53	3.60	16.88	1.86	3.215	10.77	29.9
5456119	C18S78.1	C18S396	2.41	2.30	19.00	0.002	33	71	2.04	14.18	43.0	3.48	3.55	15.52	1.86	3.213	13.52	23.8
9705	C18S396.1	C18S73	2.30	2.25	16.30	0.001	33	75	2.28	14.09	42.7	3.43	3.51	12.88	2.10	3.563	8.74	40.8
9710	C18S73.1	C18S70	2.25	2.13	21.10	0.001	33	119	2.18	14.57	44.1	3.34	3.42	17.76	2.10	3.557	10.95	32.5
5046244	C18S70.1	C18S65	2.13	1.66	7.70	0.001	33	475	2.70	14.40	43.6	2.86	2.97	4.84	2.64	4.341	10.74	40.4
9732	C18S65.1	C18S61	1.66	1.42	18.40	0.001	33	225	2.66	14.53	44.0	2.63	2.74	15.77	2.64	4.329	11.14	38.9
9730	C18S61.1	C18S57	1.42	1.34	24.30	0.001	33	84	2.67	14.51	44.0	2.55	2.66	21.75	2.64	4.327	10.68	40.5
9758	C18S57.1	C18S113	1.34	0.98	26.00	0.001	33	362	2.68	14.41	43.7	2.18	2.29	23.82	2.64	4.316	10.75	40.1
9766	C18S113.1	C18S116	0.98	0.62	14.60	0.001	33	360	2.72	14.24	43.2	1.81	1.92	12.79	2.64	4.305	10.83	39.8
9768	C18S116.1	C18S203	0.62	0.41	10.40	0.001	33	210	2.80	13.88	42.1	1.57	1.69	8.83	2.64	4.301	10.81	39.8
9775	C18S203.1	C18S125	0.41	0.07	9.10	0.001	33	340	4.05	10.74	32.5	0.96	1.22	8.14	2.71	4.385	10.83	40.5
9785	C18S125.1	C18S133	0.07	0.02	9.00	0.002	33	20	4.43	10.40	31.5	0.89	1.19	8.11	2.85	4.591	16.92	27.1
9784	C18S133.1	C18SD5	-0.25	-7.57	9.30	0.166	12	44										
9784	C18SD5.1	C18SD2	-7.57	-7.04	9.40	-0.006	12	92										
9784	C18SD2.1	C18S132	-7.04	-1.10	9.50	-0.078	12	76										
9849	C18S133.3	C18SD6	0.00	-7.57	9.30	0.171	15	44						SIPHON				
9849	C18SD6.3	C18SD1	-7.57	-7.04	9.40	-0.006	15	92										
9849	C18SD1.1	C18S132	-7.04	-1.10	9.50	-0.078	15	76										
9850	C18S133.4	C18SD4	0.50	-7.57	9.30	0.183	18	44										
9850	C18SD4.4	C18SD3	-7.57	-7.04	9.40	-0.006	18	92										
9850	C18SD3.1	C18S132	-7.04	-1.10	9.50	-0.078	18	76										
9787	C18S132.1	C18S144	-1.10	-1.20	8.80	0.001	36	101	2.79	14.04	39.0	-0.03	0.09	8.83	2.85	4.586	13.69	33.5
9789	C18S144.1	C18S166	-1.20	-1.40	8.60	0.002	36	127	2.56	15.00	41.7	-0.15	-0.05	8.75	2.86	4.598	17.11	26.9
9792	C18S166.1	C18S157	-1.40	-1.83	12.20	0.001	36	484	2.61	14.72	40.9	-0.60	-0.50	12.80	2.87	4.588	12.85	35.7
9807	C18S157.1	C18S160	-1.83	-2.27	10.70	0.001	36	444	2.65	14.70	40.8	-1.05	-0.94	11.75	2.92	4.636	13.56	34.2
9803	C18S160.1	C18S162	-2.27	-2.65	9.40	0.001	36	389	2.68	14.56	40.4	-1.44	-1.33	10.84	2.92	4.622	13.49	34.3

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 117 - NEW OCEAN BEACH
2024 DWF AS-BUILT

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	AVG. FLOW (MGD)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
15259	C18S162.1	D18S145	-2.65	-2.98	9.00	0.001	36	317	2.67	14.60	40.6	-1.76	-1.65	10.76	2.93	4.627	13.87	33.4
15255	D18S145.1	D18S140	-2.98	-3.33	10.70	0.001	36	350	2.67	14.56	40.4	-2.12	-2.01	12.82	2.93	4.614	13.65	33.8
15252	D18S140.1	D18S134	-3.33	-4.00	13.00	0.001	36	656	2.64	14.65	40.7	-2.78	-2.67	15.78	2.93	4.596	13.77	33.4
15247	D18S134.1	D18S211	-4.00	-4.43	11.60	0.001	36	441	2.66	14.53	40.4	-3.22	-3.11	14.82	2.93	4.581	13.46	34.0
15321	D18S211.1	D18S207	-4.43	-4.93	9.10	0.001	36	498	2.66	14.51	40.3	-3.72	-3.61	12.82	2.93	4.568	13.69	33.4
15315	D18S207.1	D18S202	-4.93	-5.25	8.80	0.001	36	319	2.67	14.41	40.0	-4.05	-3.94	12.85	2.93	4.562	13.61	33.5
15312	D18S202.1	D18S194	-5.25	-5.55	9.50	0.001	36	299	2.70	14.30	39.7	-4.36	-4.25	13.86	2.93	4.555	13.70	33.2
15165	D18S194.1	D18S42	-5.55	-6.10	9.90	0.001	36	558	3.12	12.82	35.6	-5.03	-4.88	14.93	2.93	4.550	13.51	33.7
5040580	D18S42.1	D18S47	-6.10	-7.00	10.00	0.002	36	567	2.62	14.59	40.5	-5.79	-5.68	15.79	2.93	4.542	17.20	26.4
15170	D18S47.1	D18S51	-7.00	-7.13	10.90	0.001	36	128	2.61	14.63	40.6	-5.91	-5.80	16.81	2.93	4.541	13.63	33.3
15175	D18S51.1	D18S55	-7.13	-7.67	10.30	0.001	36	641	4.34	10.06	27.9	-6.83	-6.54	17.13	2.93	4.537	12.54	36.2
15176	D18S55.1	D18S60	-7.67	-7.90	10.00	0.007	36	33	4.23	10.26	28.5	-7.05	-6.77	17.05	2.93	4.537	35.91	12.6
15181	D18S60.1	D18S326	-7.90	-7.95	9.74	0.003	36	16	4.31	10.12	28.1	-7.11	-6.82	16.85	2.93	4.537	23.85	19.0

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 117 - NEW OCEAN BEACH
2024 WWF AS-BUILT

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	AVG. FLOW (MGD)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
5012	B18S568.1	B18S137	5.76	5.65	11.80	0.002	24	58	4.31	13.64	56.9	6.79	7.08	5.01	2.18	5.038	6.40	78.7
5055309	B18S137.1	B18S140	5.65	4.73	9.70	0.004	24	261	3.23	17.45	72.7	6.19	6.35	3.52	2.18	5.032	8.68	58.0
4769	B17S18.1	B17S216	4.81	2.42	9.42	0.004	20	600	2.49	4.28	21.4	2.78	2.87	6.64	0.27	0.551	5.67	9.7
4784	B17S216.1	B17S57	2.42	0.17	5.17	0.004	21	562	2.53	4.14	19.7	0.52	0.62	4.65	0.27	0.549	6.48	8.5
4786	B17S57.1	B17S105	0.17	-1.81	4.19	0.005	21	428	1.80	5.26	25.0	-1.37	-1.32	5.56	0.27	0.548	6.97	7.9
4818	B17S105.1	B17S120	-1.81	-2.07	5.93	0.001	24	192	1.67	5.24	21.9	-1.63	-1.59	7.56	0.27	0.547	5.37	10.2
4834	B17S120.1	B17S144	-2.07	-2.61	5.39	0.001	24	398	1.64	5.30	22.1	-2.17	-2.13	7.56	0.27	0.546	5.40	10.1
4848	B17S144.1	B17S172	-2.61	-3.09	5.91	0.001	24	374	2.57	3.86	16.1	-2.77	-2.67	8.68	0.27	0.545	5.23	10.4
4884	B17S172.1	B17S363	-3.09	-6.00	6.00	0.016	24	185	2.82	3.64	15.2	-5.70	-5.57	11.70	0.27	0.545	18.34	3.0
5055317	B17S363.1	B17S362	-6.00	-6.72	6.10	0.045	24	16	3.42	16.70	69.6	-5.33	-5.15	11.43	0.27	0.807	30.97	2.6
5055339	B17S362.1	B17S361	-6.72	-7.90	6.25	0.045	24	26	11.61	48.07	200.3	-3.89	-1.80	10.14	0.27	8.855	31.18	28.4
5055337	B17S361.1	PS11D001	-7.90	-8.40	8.21	0.045	24	11	14.38	27.18	113.3	-6.13	-2.92	14.34	0.27	15.095	31.16	48.4
5019	B18S140.1	B18S145	4.73	4.51	12.50	0.001	33	237	2.90	17.29	52.4	5.95	6.08	6.55	2.65	5.845	10.42	56.1
5017	B18S145.1	C18S25	4.51	4.14	12.10	0.001	33	407	2.98	16.73	50.7	5.53	5.67	6.57	2.65	5.761	10.32	55.8
9696	C18S25.1	C18S28	4.14	3.47	15.50	0.001	33	618	2.87	17.21	52.1	4.91	5.03	10.60	2.65	5.682	11.25	50.5
9788	C18S28.1	C18S32	3.47	3.09	17.10	0.001	33	384	2.81	17.58	53.3	4.56	4.68	12.54	2.65	5.636	10.75	52.4
9701	C18S32.1	C18S78	3.09	2.41	20.40	0.001	33	685	2.39	19.51	59.1	4.04	4.13	16.36	2.65	5.585	10.77	51.9
5456119	C18S78.1	C18S396	2.41	2.30	19.00	0.002	33	71	2.26	20.41	61.9	4.00	4.08	15.00	2.65	5.579	13.52	41.3
9705	C18S396.1	C18S73	2.30	2.25	16.30	0.001	33	75	2.71	20.24	61.3	3.94	4.05	12.36	3.12	6.584	8.74	75.3
9710	C18S73.1	C18S70	2.25	2.13	21.10	0.001	33	119	2.63	20.62	62.5	3.85	3.95	17.25	3.12	6.578	10.95	60.1
5046244	C18S70.1	C18S65	2.13	1.66	7.70	0.001	33	475	3.12	20.38	61.7	3.36	3.51	4.34	3.72	7.569	10.74	70.5
9732	C18S65.1	C18S61	1.66	1.42	18.40	0.001	33	225	3.08	20.45	62.0	3.13	3.27	15.28	3.72	7.559	11.14	67.9
9730	C18S61.1	C18S57	1.42	1.34	24.30	0.001	33	84	3.09	20.34	61.6	3.03	3.18	21.27	3.72	7.555	10.68	70.7
9758	C18S57.1	C18S113	1.34	0.98	26.00	0.001	33	362	3.13	20.00	60.6	2.65	2.80	23.35	3.72	7.545	10.75	70.2
9766	C18S113.1	C18S116	0.98	0.62	14.60	0.001	33	360	3.20	19.54	59.2	2.25	2.41	12.35	3.72	7.538	10.83	69.6
9768	C18S116.1	C18S203	0.62	0.41	10.40	0.001	33	210	3.32	19.04	57.7	2.00	2.17	8.40	3.72	7.535	10.81	69.7
9775	C18S203.1	C18S125	0.41	0.07	9.10	0.001	33	340	4.55	16.44	49.8	1.44	1.76	7.66	3.80	7.669	10.83	70.8
9785	C18S125.1	C18S133	0.07	0.02	9.00	0.002	33	20	4.94	16.50	50.0	1.40	1.77	7.61	3.98	7.970	16.92	47.1
9784	C18S133.1	C18SD5	-0.25	-7.57	9.30	0.166	12	44	2.27	104.68	872.3	1.15	1.23	8.15	1.22	1.421	9.38	15.1
9784	C18SD5.1	C18SD2	-7.57	-7.04	9.40	-0.006	12	92										
9784	C18SD2.1	C18S132	-7.04	-1.10	9.50	-0.078	12	76										
9849	C18S133.3	C18SD6	0.00	-7.57	9.30	0.171	15	44										
9849	C18SD6.3	C18SD1	-7.57	-7.04	9.40	-0.006	15	92						SIPHON				
9849	C18SD1.1	C18S132	-7.04	-1.10	9.50	-0.078	15	76										
9850	C18S133.4	C18SD4	0.50	-7.57	9.30	0.183	18	44										
9850	C18SD4.4	C18SD3	-7.57	-7.04	9.40	-0.006	18	92										
9850	C18SD3.1	C18S132	-7.04	-1.10	9.50	-0.078	18	76										
9787	C18S132.1	C18S144	-1.10	-1.20	8.80	0.001	36	101	3.19	19.60	54.4	0.43	0.59	8.37	3.98	7.969	13.69	58.2
9789	C18S144.1	C18S166	-1.20	-1.40	8.60	0.002	36	127	2.99	20.58	57.2	0.31	0.45	8.29	3.99	7.993	17.11	46.7
9792	C18S166.1	C18S157	-1.40	-1.83	12.20	0.001	36	484	3.05	20.32	56.4	-0.14	0.01	12.34	4.00	8.007	12.85	62.3
9807	C18S157.1	C18S160	-1.83	-2.27	10.70	0.001	36	444	3.09	20.29	56.4	-0.58	-0.43	11.28	4.07	8.107	13.56	59.8
9803	C18S160.1	C18S162	-2.27	-2.65	9.40	0.001	36	389	3.11	20.17	56.0	-0.97	-0.82	10.37	4.06	8.100	13.49	60.0

CITY OF SAN DIEGO
HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 117 - NEW OCEAN BEACH
2024 WWF AS-BUILT

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	AVG. FLOW (MGD)	MAX. FLOW (MGD)	FULL CAPACITY (MGD)	MAX. Q/CAP (%)
15259	C18S162.1	D18S145	-2.65	-2.98	9.00	0.001	36	317	3.10	20.24	56.2	-1.29	-1.14	10.29	4.08	8.124	13.87	58.6
15255	D18S145.1	D18S140	-2.98	-3.33	10.70	0.001	36	350	3.11	20.20	56.1	-1.65	-1.50	12.35	4.08	8.124	13.65	59.5
15252	D18S140.1	D18S134	-3.33	-4.00	13.00	0.001	36	656	3.07	20.32	56.4	-2.31	-2.16	15.31	4.08	8.114	13.77	58.9
15247	D18S134.1	D18S211	-4.00	-4.43	11.60	0.001	36	441	3.10	20.17	56.0	-2.75	-2.60	14.35	4.08	8.106	13.46	60.2
15321	D18S211.1	D18S207	-4.43	-4.93	9.10	0.001	36	498	3.10	20.09	55.8	-3.26	-3.11	12.36	4.08	8.095	13.69	59.1
15315	D18S207.1	D18S202	-4.93	-5.25	8.80	0.001	36	319	3.13	19.88	55.2	-3.59	-3.44	12.39	4.08	8.088	13.61	59.4
15312	D18S202.1	D18S194	-5.25	-5.55	9.50	0.001	36	299	3.19	19.58	54.4	-3.92	-3.76	13.42	4.08	8.083	13.70	59.0
15165	D18S194.1	D18S42	-5.55	-6.10	9.90	0.001	36	558	3.60	17.76	49.3	-4.62	-4.42	14.52	4.08	8.077	13.51	59.8
5040580	D18S42.1	D18S47	-6.10	-7.00	10.00	0.002	36	567	3.12	19.86	55.2	-5.35	-5.19	15.35	4.08	8.069	17.20	46.9
15170	D18S47.1	D18S51	-7.00	-7.13	10.90	0.001	36	128	3.15	19.73	54.8	-5.49	-5.33	16.39	4.08	8.066	13.63	59.2
15175	D18S51.1	D18S55	-7.13	-7.67	10.30	0.001	36	641	5.15	13.51	37.5	-6.55	-6.13	16.85	4.08	8.064	12.54	64.3
15176	D18S55.1	D18S60	-7.67	-7.90	10.00	0.007	36	33	5.05	13.70	38.1	-6.76	-6.36	16.76	4.08	8.064	35.91	22.5
15181	D18S60.1	D18S326	-7.90	-7.95	9.74	0.003	36	16	5.13	13.55	37.6	-6.82	-6.41	16.56	4.08	8.064	23.85	33.8


D18S42
D18S47
D18S51
36" TS#117
D18S55
96-INCH NM

APPENDIX D

ANALYSIS OF
36" NEW OCEAN BEACH TRUNK SEWER #117

CITY OF SAN DIEGO HYDRAULIC MODEL RESULTS TABLE
TRUNK SEWER 117 - NEW OCEAN BEACH
2024 WWF AS-BUILT
DATA RECEIVED FROM CITY OF SAN DIEGO PLUS PROPOSED MIDWAY RISING PROJECT FLOWS

FACILITY SEQUENCE NUMBER	PIPE ID	DOWNSTREAM MH ID	UPSTREAM MH INV. EL. (FT)	DOWNSTREAM MH INV. EL. (FT)	DOWNSTREAM MH RIM EL. (FT)	PIPE SLOPE (FT/FT)	PIPE DIAMETER (IN)	PIPE LENGTH (FT)	MAX. VELOCITY (FT/SEC)	MAX. DEPTH (IN)	MAX. d/D (%)	MAX. HGL. EL. (FT)	MAX. EGL. EL. (FT)	HGL. DEPTH BELOW RIM (FT)	MAX. FLOW (MGD)	COMMENTS
15165	D18S194.4	D18S42	-5.55	-6.10	9.90	0.001	36	558	3.66	18.66	51.8	-4.54	-4.34	14.44	8.761	POC to proposed MH 2 (Exhibit A) which receives flow from proposed public Kemper Street. Appendix B Row Q's Peak Flow of 683,771 gpd has been added to the column MAX. FLOW in this spreadsheet.
5040580	D18S42.1	D18S47	-6.10	-7.00	10.00	0.002	36	567	3.23	21.76	60.4	-5.19	-5.02	15.19	9.320	POC to proposed MH 38 (Exhibit A) which receives flow from proposed public Frontier Drive. Appendix B Row AH's Peak flow of 567,637 gpd has been added to the column MAX. FLOW in this spreadsheet.
15170	D18S47.1	D18S51	-7.00	-7.13	10.90	0.001	36	128	3.25	21.61	60.0	-5.33	-5.16	16.23	9.317	
15175	D18S51.1	D18S55	-7.13	-7.67	10.30	0.001	36	641	5.36	14.61	40.6	-6.46	-6.01	16.76	9.315	
15176	D18S55.1	D18S60	-7.67	-7.90	10.00	0.007	36	33	5.25	14.82	41.2	-6.66	-6.24	16.66	9.315	
15181	D18S60.1	D18S326	-7.90	-7.95	9.74	0.003	36	16	5.33	14.65	40.7	-6.73	-6.29	16.47	9.315	

EXHIBIT A

SEWER ANALYSIS
MANHOLE NUMBERS

MANHOLE INFORMATION			
NO.	RIM	INVERT	DEPTH
2	9.64	-5.86	15.50
6	12.05	-4.96	17.01
8	11.50	-1.46	12.96
10	12.26	-4.47	16.73
12	12.25	-1.56	13.81
14	13.07	-3.87	16.94
18	12.24	-3.38	15.62
22	11.65	-1.72	13.37
26	10.41	1.32	9.09
30	11.80	-0.56	12.36
34	10.97	1.79	9.18
38	10.53	-6.96	17.49
42	11.01	-3.95	14.96
46	11.50	-0.46	11.96
50	12.38	-1.29	13.67
54	11.86	0.43	11.43
58	11.89	3.08	8.81
62	11.51	5.43	6.08
66	11.68	-0.29	11.97
70	11.20	0.67	10.53
74	10.97	4.16	6.81
78	9.35	4.37	4.98
82	10.50	5.79	4.71
86	11.03	1.79	9.24
90	11.03	-0.14	11.17
EX. 94	9.27	-1.24	10.51
EX. 98	9.80	-2.43	12.23
EX. 102	9.90	-5.64	15.54

LEGEND

- PROJECT BOUNDARY
- PROPOSED PUBLIC STREET RIGHT-OF-WAY
- EXISTING PUBLIC GRAVITY SEWER
- PROPOSED PUBLIC GRAVITY SEWER
- PROPOSED PRIVATE GRAVITY SEWER
- (0) COMPUTER MODEL MANHOLE NUMBER

N

0 250 FEET

PROPOSED POINT OF CONNECTION TO 36" TRUNK SEWER WITH NEW MANHOLE

PROPOSED POINT OF CONNECTION TO 36" TRUNK SEWER WITH NEW MANHOLE

PROPOSED POINT OF CONNECTION TO 10" SEWER MAIN AT EXISTING MANHOLE

EXHIBIT A

SEWER ANALYSIS MANHOLE NUMBERS

MIDWAY RISING

DEXTER WILSON ENGINEERING, INC.
CONSULTING ENGINEERS
(760) 438-4422