

SEWER STUDY FOR RADY CHILDREN'S HOSPITAL

SAN DIEGO, CALIFORNIA

January 2023

Prepared for:

Rady Children's Hospital – San Diego 3020 Children's Way San Diego, California 92123

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Sharp Memorial Hospital Modernization Project Final Sanitary Sewer Study

Preliminary Master Sewer Study Including Children's Hospital Complex, Sharp Memorial Hospital Complex, Medical Offices and Residential Development in the Serra Mesa Community, San Diego California

Selected Tables from the City of San Diego Sewer Design Manual

City of San Diego Zoning Map: Grid 23

1. Project Location and Scope

1.1 Project Location

The Rady Children's Hospital Campus is located at 3020 Children's Way, San Diego, CA 92123, close to the intersection of Interstate 805 (I-805) and California State Route 163 (Cabrillo Freeway). The campus is bounded by Frost Street to the north, Children's Way to the east, Birmingham Way to the south, and the nearby Sharp Hospital campus to the west. The existing site is mostly developed with existing buildings and surface parking lots. A site vicinity map is shown in Figure 1-1 below.



Figure 1-1: Site Vicinity Map

1.2 Scope of Report

This report will identify the impact of the proposed developments on existing sanitary sewer system, analyze the capacity of existing sewer infrastructure based on additional demands, and provide recommendations to mitigate the proposed impact, if needed.

2. Study Objectives

The specific objectives of this sewer study are:

- Calculate the project proposed sewer demand based on the City of San Diego Sewer Design Manual.
- Determine the capacity of the existing sanitary sewer system under the proposed condition from Rady Children's Hospital Campus project with sewer inflows from the Sharp Memorial Hospital Project PTS# 0696413
- Identify any mitigation measures, if needed.

3. Methodology

The Rady Children's Hospital Campus coordinated with the Sharp Memorial Hospital to determine the sewer flow from the Sharp Memorial Hospital Project PTS#0696143 that discharges to the city of San Diego Kearny Mesa Sewer that runs from west to east through the Rady Children's Hospital Campus. The sewer discharge from Sharp Memorial Hospital is 552,620 GPD as described in PTS# 0696413 and is accounted for in this report.

The anticipated sewer demand of the existing and proposed conditions on the Rady campus were calculated using the City of San Diego Sewer Design Manual. The density conversion (Table 1-1) from the City of San Diego Sewer Design Manual (See Appendix D for reference) was used to estimate the equivalent population, then a per-capita sewage generation rate of 80 gallons per day (gpd) was applied to calculate the average sewage demands (See Tables 4-1 and 4-2 for calculations). The dry weather peaking factor was then calculated to determine the peak dry weather sewage demands. The City of San Diego Sewer Design manual did not specify if any sewage generated from parking structures should be considered, so the sewer generation from the existing and proposed parking structures was assumed to be negligible.

The existing upstream and offsite sewage flows in the sewer lines surrounding the site were obtained from the above-mentioned calculation methods, a 2007 report titled "Sharp Memorial Hospital Modernization Project Final Sanitary Sewer Study" by Martin & Ziemniak, and a 2006 report titled "Preliminary Master Sewer Study Including Children's Hospital Complex, Sharp Memorial Hospital Complex, Medical Offices and Residential Development in the Serra Mesa Community, San Diego California" by Project Design Consultants. These reports can be found in Appendix D.

4. **Project Description**

4.1 Pre-Development Conditions

The existing Rady Children's Hospital campus includes the medical office building (MOB), the main hospital building known as Nelson Hahn, the MOB-Hahn Bridge, the Gait Lab, the Rose Pavilion

(Rose), Building 28, the Education Office Building (EOB), the Acute Care Pavilion (ACP), surface parking lots, and various utility facilities. See Appendix A, Exhibit 1 for the Existing Buildings on the Rady Children's Hospital campus.

There are five sewer mains in the project vicinity – a 15-inch line in Children's Way north of MH-245 that ultimately discharges to the 33-inch Kearny-Mesa Trunk Sewer; a 15-inch line to the south of the Rady Children's Hospital main campus (Note: This sewer pipe will hereafter be referred to as the "Kearny-Mesa Line", from Manhole 242 to Manhole 245, including P-10, P-11, and P-12 as shown in Appendix B, Exhibits 3 and 4) that ultimately discharges to the 33-inch Kearny-Mesa Trunk Sewer; an existing sewer pipe south of MH-246 that ultimately discharges to the Kearny-Mesa Trunk Sewer; an 8-inch line in Frost St that discharges to the Linda Vista Sewer System; and an existing sewer in Birmingham Drive that discharges to the Linda Vista Sewer System.

The main sewer pipes that will be impacted by the proposed project are the Kearny-Mesa Line and the sewer pipe in Children's Way north of MH-245. The Sharp Memorial Hospital also discharges to the Kearny-Mesa Line. See Appendix B, Exhibit 3 for a map showing this existing condition. See Appendix B, Exhibit 4 for the upstream sewer demands for the Children's Way sewer pipe.

The 2006 and 2007 sewer reports assumed that all the Rady Children's Hospital sewer discharge outlets to the 15-inch line in Children's Way north of MH-245. In reality, the sewage discharge from Rady Children's Hospital Campus is split between multiple pipes.

The MOB building discharges to the Children's Way line north of MH-245. The existing Gait Lab discharges to P-10, the existing Nelson Hahn Building + Mob-Hahn Bridge discharges to P-11, and the existing Rose Pavilion discharges to P12 of the Kearny-Mesa Line.

The existing ACP building discharges to the sewer pipe in Children's Way south of MH-246. The existing EOB building discharges to the sewer in Birmingham Drive. Building 28 discharges to a sewer pipe in Birmingham Way. The existing ACP, EOB, and Building 28 buildings and the public sewers they connect to are unaffected and do not have an impact on this report but are shown to account for the totality of the Rady Children's Hospital Campus.

Values for the existing flows in the Kearny-Mesa Line sewer and the Children's Way Sewer from the previous sewer studies have been updated to reflect these changes.

The anticipated peak sewer demand of the Rady campus for the pre-development condition is 553,746 gallons per day. Refer to Table 4-1 for the existing campus demands for the Kearny-Mesa Line and Table 4-2 for the existing demands for the Children's Way Line. An analysis of the existing sewer demands on the infrastructure was performed as shown on Table 5-1.

4.2 Post-Development Conditions

The post-development conditions of the Rady Children's Hospital Campus include the demolition of portions of the existing Nelson Building, the Mob-Hahn Bridge, and the Gait Lab/Building 12. New

construction includes the ICU Pavilion, Central Utility Plant (CUP), Connector Building, and MOB Stairs. See Appendix A, Exhibit 2 for the Proposed Buildings on the Rady Children's Hospital campus.

The proposed MOB Stairs, and 75% of the flow from the proposed ICU Pavilion will connect to the sewer main in Children's Way. The proposed CUP will connect to P-10 of the Kearny-Mesa Line, 25% of the flow from the proposed ICU Pavilion will connect to P-12 of the Kearny-Mesa Line, and the flow from the Connector Building will connect to P-12 of the Kearny-Mesa Line. Flow from the existing Nelson Hahn Building to remain will be redirected from P-11 to P-12 of the Kearny-Mesa Line.

The existing ACP, EOB, and Building 28 buildings and the public sewers they connect to are unaffected and not analyzed as a part of this report.

See Appendix B, Exhibit 5 for a map showing the proposed sewer flow condition.

The anticipated sewer demand for the proposed campus condition is 861,980 gallons per day (486,833 gpd existing and 375,147 gpd proposed). Refer to Table 4-1 for the detailed breakdown of the proposed demands. Refer to Table 5-2 for an analysis of the proposed sewer demands on the infrastructure.

The proposed Connector Building is a long building running north-south that functions as an enclosed corridor for infection control and ADA compliant path of travel between critical care functions across the entire Rady Children's Hospital Campus. Since the Kearny Mesa Sewer System bisects the Rady Children's Hospital campus in two, the proposed Connector Building will be built over pipe P-12 of the existing city of San Diego Kearny Mesa sewer system. See highlighted in magenta on Appendix A, Exhibit 2 and Appendix B, Exhibit 5 for the location of the Connector Building built over the existing city of San Diego Sewer. The project proposes to keep the existing sewer a public, city of San Diego sewer.

The proposed Connector Building will have a pile foundation that will not impart load on the existing city of San Diego sewer. See Appendix B, Exhibit 6 for the plan view, enlargement and proposed sections of the Connector Building and the existing sewer. Studies to verify that the proposed building will not impart significant load on the existing city of San Diego sewer will be done as a part of the proposed ministerial permit plan approvals after the revision to the Conditional Use Permit is obtained.

In due diligence, the existing city of San Diego Kearny Mesa Sewer pipes P-10, P-11, and P-12 were found to be straddling or outside of the existing 10' wide sewer easement granted to the city of San Diego. As a part of the project, the campus is proposing to redescribe the limits of the 10' wide easement to fit both the proposed project as well as fully encompass the existing sewer pipe. See Appendix B, Exhibit 7 for the location of the proposed 10' wide sewer easement.

	Table 4-1 Rady Campus Water and Sewer Demands										
Building	Building Use	Building Area (SF)	Table 1-1 Density Conversion (Pop/Net AC)	Net Acre	Population Served	Sewage Per Capita/Day (GPD)	Average Dry Weather Demand (GPD)	Dry Weather Peaking Factor	Peak Dry Weather Demand (GPD)	City Sewer Connection	
Existing Buildings to be Demolished											
Nelson (Partial)	Hospital	52,950	150	1.22	182.33	80.0	14,587	3.13	45,657	Kearney-Mesa	
MOB (Partial)	Medical Office	1,900	38.2	0.04	1.67	80.0	133	5.88	783	N Children's Way	
MOB-Hahn Bridge	Medical Office	1,300	38.2	0.03	1.14	80.0	91	6.18	564	Kearney-Mesa	
Gait Lab/Building 12	Hospital	20,300	150	0.47	69.90	80.0	5,592	3.56	19,908	Kearney-Mesa	
	66,913										
					Existing B	uilding to Remain					
Nelson	Hospital	42,150	150	0.97	145.14	80.0	11,612	3.23	37,475	Kearney-Mesa	
Hahn	Hospital	149,500	150	3.43	514.81	80.0	41,185	2.72	112,148	Kearney-Mesa	
Rose	Hospital	125,500	150	2.88	432.16	80.0	34,573	2.79	96,382	Kearney-Mesa	
ACP	Hospital	275,700	150	6.33	949.38	80.0	75,950	2.51	190,510	S Children's Way	
EOB	Office	95,000	38.2	2.18	83.31	80.0	6,665	3.48	23,174	Birmingham Drive	
Building 28	Medical Office	26,500	38.2	0.61	23.24	80.0	1,859	4.13	7,672	S Children's Way	
MOB	Medical Office	77,700	38.2	1.78	68.14	80.0	5,451	3.57	19,472	N Children's Way	
								Total (GPD)	486,833		

	Proposed Additions									
ICU Pavilion	Hospital	486,000	150	11.157	1,673.554	80.0	133,884	2.32	311,228	75% to Children's Way (233,421 GPD) 25% to Kearney-Mesa (77,807 GPD)
Connector Building	Hospital	33,500	150	0.769	115.358	80.0	9,229	3.33	30,717	Kearney-Mesa
MOB Stair	Medical Office	1,160	38.2	0.027	1.017	80.0	81	6.28	511	N Children's Way
CUP	Hospital	36,000	150	0.826	123.967	80.0	9,917	3.30	32,692	Kearney-Mesa
								Total (GPD)	375,147	

861,980

EXISTING CONDITION		PROPOSED CON	DITION
PEAK DRY WEATHER	553,746	PEAK DRY WEA	THER
DEMAND (GPD)		DEMAND (GI	PD)

	Table 4-2 Existing Children's Way/Berger Ave Upstream Sewer Demands									
Area # (Per Exhibit 4)	Zone	Building Area (SF)	# of Floors	Table 1-1 Density Converstion (Pop/Net AC)	Net Acre	Population Served	Sewage Per Capita/Day (GPD)	Average Dry Weather Demand (GPD)	Dry Weather Peaking Factor	Peak Dry Weather Demand (GPD)
1	RM-3-7	417,656	N/A	111.80	9.59	1071.94	80.00	85,756	2.47	211,629
2	RM-4-10	5,684	N/A	196.20	0.13	25.60	80.00	2,048	4.07	8,343
3										
3.1	Commercial	33,110	2.00	43.70	1.52	66.43	80.00	5,315	3.58	19,049
3.2	Commercial	87,365	9.00	43.70	18.05	788.81	80.00	63,105	2.57	162,275
3.3	Commercial	96,888	1.00	43.70	2.22	97.20	80.00	7,776	3.41	26,483
3.4	Commercial	16,683	2.00	43.70	0.77	33.47	80.00	2,678	3.93	10,523
MOB	Medical Office	77,700	1.00	38.20	1.78	68.14	80.00	5,451	3.57	19,472
•									Total (GPD)	457,773

5. Project Impacts

5.1 Sewer Infrastructure – Final Condition

The capacity of the existing sewer was determined using information from The City of San Diego GIS reference file. Sewer analysis of the existing and proposed conditions can be found in Table 5-1 and Table 5-2.

Per the 2007 sewer study, the Kearny-Mesa sewer line was not at capacity. However, after updating the existing condition to reflect the actual discharge from the existing buildings to the Kearny-Mesa sewer, "P-11" was determined to be at 55% full.

To conform with the City of San Diego Sewer design manual requirements, the flow from the remaining portion of Nelson-Hahn will be discharged downstream of "P-11" at Manhole 244, as shown in Appendix B, Exhibit 5. Additionally, the new sewer discharge from the Rady Children's Hospital project will occur downstream of P-11 in the Kearny-Mesa sewer or in the sewer on Children's Way.

Pipe P-11 is reduced from 55% full to 48% full. All other pipes in the Kearny-Mesa Line and the sewer pipe in Children's Way have adequate capacity. All existing sewer lines in the proposed condition fall below 50% full. Therefore, impacts to the existing sewer system due to the project would be less then significant.

The proposed Connector Building constructed over the top of the existing city of San Diego Kearny Mesa sewer will have no impacts to the existing sewer capacity as the pipe diameter, material, and analyzed sewer discharge will not change. Long term maintenance of the may be impaired, but the existing Kearny Mesa sewer system includes a manhole immediately upstream (less than 15' away) of the Connector building overbuild, which will allow for continued maintenance in this location. Additional studies of the sewer pipe, including camera investigation, can be conducted as a part of the proposed ministerial permit plan approvals after the revision to the Conditional Use Permit is obtained. Other measures to improve the long term maintenance can also be discussed after the revision to the Conditional Use Permit is obtained as a part of the ministerial permit plan approvals.

	Table 5-1										
						PIPE CAPACITY - EXISTING (KE	ARNEY MESA)				
PIPE (PER EXHBIT 3)	U/S MH (PER EXHBIT 3)	D/S MH (PER EXHBIT 3)	SLOPE (FT/FT)	MATERIAL	DIAMETER (IN)	EXISTING PEAK FLOW (GPD) (PER 2007 SEWER STUDY AND TABLE 4-1)	DESIGN CAPACITY (GPD)	NORMAL DEPTH (IN)	d/D (%)	VELOCITY (FT/S)	NOTES
P-1A	MH-1A	MH-01	0.0110	PVC	8	83,220	1,064,822	1.51	19%	2.81	
P-01	MH-01	MH-02	0.0080	PVC	8	184,935	908,083	2.45	31%	3.16	
P-02	MH-02	MH-03	0.0105	PVC	8	184,935	1,040,340	2.28	29%	3.49	From Final Sanitary Sower
P-03	MH-03	MH-04	0.0103	PVC	8	184,935	1,030,384	2.29	29%	3.46	Study for SHAPP Momorial
P-04	MH-04	MH-05	0.0093	PVC	8	184,935	979,089	2.36	30%	3.33	Hospital Modernization Project
P-05	MH-05	JC-07	0.0415	PVC	8	184,935	2,068,008	1.62	20%	5.67	hu Martin & Ziampiak datad
P-06	MH-06	JC-07	0.0021	CONCRETE	12	225,000	1,055,173	3.76	31%	1.65	by March 20, 2007
P-07	JC-07	MH-08	0.0020	CONCRETE	12	409,935	1,018,613	5.30	44%	1.90	March 29, 2007
P-08	MH-08	MH-09	0.0009	CONCRETE	15	409,935	1,241,973	5.93	40%	1.40	
P-09	MH-09	MH-242	0.0009	CONCRETE	15	409,935	1,253,150	5.90	39%	1.41	
P-10	MH-242	MH-243	0.0016	CONCRETE	15	539,283	1,645,758	5.91	39%	1.86	Added existing Gait Lab flow to 2007 Sewer Study flow
P-11	MH-243	MH-244	0.0009	CONCRETE	15	735,128	1,247,574	8.28	55%	1.64	Added existing Nelson-Hahn and MOB-Hahn Bridge flow to updated P-10 flow
P-12	MH-244	MH-245	0.0029	CONCRETE	15	831,510	2,251,323	6.31	42%	2.62	Added existing Rose Building flow to updated P-11
P-13	MH-245	MH-248	0.0693	CONCRETE	15	1,289,283	10,989,129	3.47	23%	9.28	Combined Kearney-Mesa and Children's Way flows

	PIPE CAPACITY - EXISTING (CHILDREN'S WAY)										
PIPE (PER EXHBIT 3)	U/S MH (PER EXHBIT 3)	D/S MH (PER EXHBIT 3)	SLOPE (FT/FT)	MATERIAL	DIAMETER (IN)	EXISTING ACTUAL PEAK (GPD) (PER 2006 SEWER STUDY AND TABLE 4-2)	DESIGN CAPACITY (GPD)	NORMAL DEPTH (IN)	d/D (%)	VELOCITY (FT/S)	NOTES
P-A1	MH-1.1	MH-1.2	0.0027	VCP	15	457,773	2,169,314	4.68	31%	2.17	See Appendix B, Exhibit 4.

						Table 5-	2					
					PIPE	CAPACITY - PROPOSE	D (KEARNE	Y MESA)				
PIPE (PER EXHBIT 5)	U/S MH (PER EXHBIT 5)	D/S MH (PER EXHBIT 5)	SLOPE (FT/FT)	MATERIAL	DIAMETER (IN)	PROPOSED PEAK FLOW (GPD) (PER 2007 SEWER REPORT & TABLE 4-1)	DESIGN CAPACITY (GPD)	NORMAL DEPTH (IN)	d/D (%)	VELOCITY (FT/S)	NOTES	
P-1A												
P-01												
P-02												
P-03 P-04	THESE EXISTING PIPES ARE ON SHARP MEMORIAL HOSPITAL CAMPUS PROPERTY. PER COORDINATION WITH SHARP MEMORIAL HOSPITAL PIS#0696143, WE UNDERSTAND THAT 552,620											
P-05												
P-06		THIS FLOW IS ACCOUNTED FOR BELOW IN PIPE P-10 AND ALL DOWNSTREAM PIPES.										
P-07												
P-08												
P-09												
P-10	MH-242	MH-243	0.0016	CONCRETE	15	585,312	1,669,939	6.13	41%	1.92	Added sewer demand from SHARP Hospital, proposed CUP, subtracted existing Gait Lab demand from existing flow.	
P-11	MH-243	MH-244	0.0009	CONCRETE	15	585,312	1,252,454	7.21	48%	1.55	Removed all of Nelson-Hahn sewer discharge	
P-12	MH-244	MH-245	0.0029	CONCRETE	15	939,840	2,248,224	6.77	45%	2.71	Added sewer demand from Nelson-Hahn Building to remain and 25% of flow from proposed ICU Pavilion and 100% of flow from Connector Building. Included unchanged Rose Pavilion discharge.	
P-13	MH-245	MH-248	0.0693	CONCRETE	15	1,631,545	10,990,239	3.91	26%	9.94	Combined Kearney-Mesa and Children's Way flows	

					PIPE	CAPACITY - PROPOSED) (CHILDREI	N'S WAY	')		
PIPE (PER EXHBIT 5)	U/S MH (PER EXHBIT 5)	D/S MH (PER EXHBIT 5)	SLOPE (FT/FT)	MATERIAL	DIAMETER (IN)	PROPOSED PEAK FLOW (GPD) (PER TABLE 4-1 & TABLE 4-2)	DESIGN CAPACITY (GPD)	NORMAL DEPTH (IN)	d/D (%)	VELOCITY (FT/S)	NOTES
P-A1	MH-1.1	MH-1.2	0.0027	VCP	15	691,705	2,169,314	5.82	39%	2.43	Added sewer demand from proposed MOB Stairs, and 75% of ICU Pavilion flow. See Exhibit 2 for existing flows.

6. References

City of San Diego Sewer Design Guidelines 2004 - Density Conversion (Table 1-1, Figure 1-1, pages 1-15, 1-16, 1-17, 1-18)

City of San Diego Sewer Zoning Map – Grid 23 (Refer to Appendix D)

City of San Diego Sewer GIS Sewer Data

Preliminary Master Sewer Study Including Children's Hospital Complex, Sharp Memorial Hospital Complex, Medical Offices and Residential Development in the Serra Mesa Community, San Diego California (Refer to Appendix D)

Sharp Memorial Hospital Modernization Project Final Sanitary Sewer Study (Refer to Appendix D)

Appendix A Rady Children's Hospital Campus Plan

Exhibit 1 – Existing Campus Plan

Exhibit 2 – Proposed Campus Plan

EXHIBIT 1



EXHIBIT 2



Appendix B Campus Sewer Maps

- Exhibit 3 Existing Campus Sewer Map
- Exhibit 4 Children's Way/Berger Ave Existing Sewer Tributary Areas
- Exhibit 5 Proposed Campus Sewer Map
- Exhibit 6 Cross Sections of Proposed Connector Building Above the City of San Diego Sewer
- Exhibit 7 Kearny Mesa Sewer Easement Exhibit











EXHIBIT 6 CROSS SECTIONS OF PROPOSED CONNECTOR BUILDING ABOVE THE CITY OF SAN DIEGO SEWER





EXISTING SEWER



Appendix C Flowmaster V8i Calculations

Table B-1 – Flowmaster Calculations Existing Condition

Table B-2 – Flowmaster Calculations Proposed Condition

Table B1 - Flowmaster Calculations for Existing Condition Report

Label	Solve For	Roughness Coefficient	Channel Slope (ft/ft)	Normal Depth (in)	Diameter (in)	Discharge (gal/day)	Percent Full (%)	Velocity (ft/s)	Discharge Full (ft³/s)	Slope Full (ft/ft)
P-1A	Normal Depth	0.010	0.01100	1.51	8.00	83220.00	18.9	2.81	1.65	0.00007
P-01	Normal Depth	0.010	0.00800	2.45	8.00	184935.00	30.6	3.16	1.41	0.00033
P-02	Normal Depth	0.010	0.01050	2.28	8.00	184935.00	28.5	3.49	1.61	0.00033
P-03	Normal Depth	0.010	0.01030	2.29	8.00	184935.00	28.7	3.46	1.59	0.00033
P-04	Normal Depth	0.010	0.00930	2.36	8.00	184935.00	29.5	3.33	1.51	0.00033
P-05	Normal Depth	0.010	0.04149	1.62	8.00	184935.00	20.2	5.67	3.20	0.00033
P-06	Normal Depth	0.013	0.00210	3.76	12.00	225000.00	31.4	1.65	1.63	0.00010
P-07	Normal Depth	0.013	0.00196	5.30	12.00	409935.00	44.2	1.90	1.58	0.00032
P-08	Normal Depth	0.013	0.00089	5.93	15.00	409935.00	39.6	1.40	1.92	0.00010
P-09	Normal Depth	0.013	0.00090	5.90	15.00	409935.00	39.4	1.41	1.94	0.00010
P-10	Normal Depth	0.013	0.00155	5.91	15.00	539282.60	39.4	1.86	2.55	0.00017
P-11	Normal Depth	0.013	0.00089	8.28	15.00	735128.00	55.2	1.64	1.93	0.00031
P-12	Normal Depth	0.013	0.00291	6.31	15.00	831510.00	42.1	2.62	3.48	0.00040
P-13	Normal Depth	0.013	0.06929	3.47	15.00	1289283.00	23.1	9.28	17.00	0.00095
P-A1	Normal Depth	0.013	0.00270	4.68	15.00	457773.00	31.2	2.17	3.36	0.00012

Label	Solve For	Roughness Coefficient	Channel Slope (ft/ft)	Normal Depth (in)	Diameter (in)	Discharge (gal/day)	Percent Full (%)	Velocity (ft/s)	Discharge Full (gal/day)	Slope Full (ft/ft)		
(E) P-01A												
(E) P-01												
(E) P-02												
(E) P-03	THESE	E EXISTING PIPES	ARE ON SHARP	MEMORIAL HOSE	PITAL CAMPUS PI	ROPERTY. PER C	COORDINATION W	ITH SHARP MEM	ORIAL HOSPITAL,			
(E) P-04	WE UNDERSTAND THAT 552,620 GPD WILL BE DISCHARGED FROM THE SHARP MEMORIAL HOSPITAL CAMPUS INTO PIPE P-10.											
(E) P-05												
(E) P-06	11101				DALL DOWNSTR							
(E) P-07												
(E) P-08												
(E) P-09												
(P) P-10	Normal Depth	0.013	0.00160	6.13	15.00	585312.00	40.9	1.92	1669938.68	0.00020		
(P) P-11	Normal Depth	0.013	0.00090	7.21	15.00	585312.00	48.1	1.55	1252454.01	0.00020		
(P) P-12	Normal Depth	0.013	0.00290	6.77	15.00	939840.00	45.1	2.71	2248223.75	0.00051		
(P) P-13	Normal Depth	0.013	0.06930	3.91	15.00	1631545.00	26.0	9.94	10990239.32	0.00153		
(P) P-A1	Normal Depth	0.013	0.00270	5.82	15.00	691705.00	38.8	2.43	2169313.98	0.00027		

Table B2- Flowmaster Calculation for Proposed Condition Report

Appendix D Reference Documents

Sharp Memorial Hospital Modernization Project Final Sanitary Sewer Study

Preliminary Master Sewer Study Including Children's Hospital Complex, Sharp Memorial Hospital Complex, Medical Offices and Residential Development in the Serra Mesa Community, San Diego California

Excerpt from City of San Diego Sewer Design Manual

City of San Diego Zoning Map: Grid 23



SHARP Memorial Hospital Modernization Project

FINAL SANITARY SEWER STUDY

WO# 422832



Prepared By: Martin & Ziemniak 7576-B Trade Street San Diego, CA 92121 (858) 831-9420

March 29, 2007



THE CITY OF SAN DIEGO

March 29, 2007

11:55

Mr. Andrew Ziemniak, PE Martin & Ziemniak Civil Engineering & Land Surveying 7576-B Trade St. San Diego, CA 92121

Dear Mr. Ziemniak:

Subject: Sharp Memorial Hospital Modernization Project (W.O. 42-2832)

We have received the master sewer study dated March 29, 2007 which was received by our office on March 29, 2007. The sewer study is accepted by the Development Section of Metropolitan Wastewater Department.

If you have any questions or require any additional information please call me at (61)533-5106 or Assistant Engineer Alejandro Ruiz at (619) 235-1991.

Sincerely,

Jarban u. 13. Hal BARBARA A.B. SALVINI

Senior Civil Engineer

AR

CC: Chris Toth, Deputy Director, Metropolitan Wastewater Department
 Ann Sasaki, Deputy Director, Metropolitan Wastewater Department
 Robert Ferrier, Assistant Director, Metropolitan Wastewater Department
 Isam Hireish, Senior Civil Engineer, Metropolitan Wastewater Department
 Hushmand Yazdani, Associate Engineer-Civil, Metropolitan Wastewater Department
 Mehdi Rastakhiz, Associate Engineer-Civil, Metropolitan Wastewater Department
 Alejandro Ruiz, Assistant Engineer-Civil, Metropolitan Wastewater Department
 Bill Tripp, DPM, Development Services Department
 Lou Smith, Vice President, Facilities Management & Developmeent, Sharp, 3475 Kenyon St.,
 San Diego, CA 92110
 Timothy Jacoby, Senior Managing Director, Facilities/Plant Operations/Planning, Children's
 Hospital & Health Center, MC5044, 3020 Children's Way, San Diego CA 92123

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Land Development Review Division Development Services A00 8 Street Suite 800 AS 9084 Sno Diana 74 97101-4502

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REFERENCES

- City of San Diego Metropolitan Wastewater Department's Sewer Design Guide (2004)
- Temporary Sewer Pump Station Study for the Women's Center Expansion and Medical Office Building at the Sharp Hospital Site (August 1990)
- Preliminary Master Sewer Study Including Children's Hospital Complex, Medical Offices and Residential Development in the Serra Mesa Community, San Diego, CA (W.O. 426012) (August 2006)

Sharp Hospital - Skilled Nursing Tower Replacement Project SANITARY SEWER STUDY

Project Location and Purpose

The Sharp Hospital Skilled Nursing Tower Replacement Project is located at 7901 Frost Street in the City of San Diego, 92123. The existing site is located within the southeasterly quadrant of the intersection of Health Center Drive and Frost Street, east of Highway 163. See Exhibit A at the end of this Report for a vicinity map. The purpose of the project is to replace the outdated ten-story nursing tower that does not meet current Office of Statewide Health and Planning and Development (OSHPD) code requirements with a new seven-story nursing tower that is to be attached to the existing two-story hospital building.

The purpose of this Study is to quantify expected sewage production due to the proposed Sharp Hospital development, examine impact to the existing sanitary sewer infrastructure and determine what, if any, additional sanitary sewer infrastructure will be required to accommodate the subject development.

Existing Sanitary Sewer System

Sewage generated at the existing Sharp Hospital Skilled Nursing Tower and surrounding site is collected though various sized sewer laterals that ultimately discharge through 8-inch, 12-inch and 15-inch private sewer vitrified clay pipe (VCP) to the west end of a 15-inch City of San Diego sewer main tributary to the Kearney Mesa Trunk Sewer. See Exhibit B – Existing and Proposed Sanitary Sewer Map located at the back of this Report. The City owned public 15-inch sewer main, constructed within a 10-foot wide sewer easement, originates approximately 800 feet west of Children's Way, southeast of the existing hospital site at manhole No. 242 (as defined on City of San Diego's Sewer Field Book G14S). Sewage flows from the existing hospital site enter manhole No. 242 from the north. Estimated peak sewer flow developed from the existing Sharp Hospital site is 225,000 gallons per day (GPD) as shown at manhole No. 06 on Exhibit B – Existing and Proposed Sanitary Sewer Map. See Exhibit C – Sharp Hospital Vicinity Land Use and Area Map and Appendix A – Sanitary Sewer Flow

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Calculations for a summary of sewer flow computations along with a map indicating delineation of sewer system tributary areas. The amount of sewage shown in this report from the existing Sharp Hospital Site is considerably less than those indicated in the Preliminary Master Plan Sewer Study that indicated Children's Hospital Complex, Medical Offices and Residential Development in Serra Mesa County, San Diego, California, (w.o.426012) dated August 10, 2006by Project Design Consultants took a conservative approach and they assumed all of the Sharp Hospital Site was going east to the Kearny Mesa Trunk Line Sewer when in reality it is not. The existing Women's Center and Outpatient Pavilion along with a portion of other existing minor buildings are going west to the Linda Vista Trunk Line Sewer. See the actual existing condition calculations sewage flows going to the Kearny Mesa Trunk line Sewer in Appendix B of this report. In addition, sewage discharge from an existing sewer pump station constructed to divert sewage flows equivalent to those developed by the Women's Center Expansion and Medical Office Building from the City's sewer main in Birmingham Drive enter manhole No. 242 from the west. Based upon the Temporary Sewer Pump Station Study for the Women's Center Expansion and Medical Office Building at the Sharp Hospital Site prepared by John Powell & Associates in August 1990, the pumped peak flow is 76 gallons per minute (GPM) or 109,440 GPD. The combined sewer flows are conveyed from manhole No. 242 approximately 340 feet easterly through 15-inch VCP to manhole No. 243. From manhole No. 243, the sewage wastewater continues to flow easterly through 15-inch VCP to manhole No. 244, located 112 feet east of manhole No. 243. Approximately 300 feet further east, downstream of manhole No. 244, the 15-inch sewer main conveys flows to manhole No. 245, located within the Children's Way right-of-way, where the easterly flowing 15-inch sewage pipe combines with 605,976 GPD of peak sewer flows originating from the north and surrounding vicinity flowing southerly in an existing 15-inch sanitary sewage collector pipe along Berger Avenue and Children's Way to manhole No. 245. Peak sewer flows originating north of manhole No. 245 are based upon computations provided in the Preliminary Master Sewer Study Including Children's Hospital Complex, Medical Offices and Residential Development in the Serra Mesa Community, San Diego, CA (W.O. 426012) dated August 10, 2006, by Project Design Consultants and are included herein. See further discussion in the 'Proposed Sanitary Sewer System Improvements' section of this Report. The 940,424 GPD of combined peak wastewater flows entering manhole No. 245 discharge southeast through 15-inch VCP and continue easterly within the I-805 right-of-way to 33-inch VCP Kearney Mesa Trunk Sewer along the east side of I-

805. According to conclusions provided in the accepted Preliminary Master Sewer Study by Project Design Consultants referenced above, the Kearny Mesa Sewer System from manhole No. 248 (sewer manhole No. 3 per City of San Diego Construction Drawing 19072-2D) to the 33-inch Trunk Sewer provides adequate capacity for all anticipated Campus built-out conditions assumed to occur within the next eight years and meets City performance standards as depicted in the City of San Diego - Metropolitan Wastewater Department's *Sewer Design Guide (2004)*. Therefore, the intention of this Sewer Study is to verify that the existing 15-inch sewer main tributary to manhole No. 248 provides sufficient capacity to convey existing and proposed sewer flows while meeting design requirements of the previously referenced City of San Diego Sewer Design Guide.

Based upon hydraulic modeling computations using Haestad Methods, SewerCAD[®] Version 5.6 software, the maximum d_n/D achieved within the City of San Diego's above described sewer main between manhole No. 242 and manhole No. 248 resulting from the existing peak sewer load conditions is 0.32, occurring within pipe No. 13, well below the maximum allowed d_n/D of 0.5. However, the minimum average pipe velocity is 1.33 feet per second (fps) and occurs within pipe No. 11. In addition, pipe No. 10 achieves an average pipe velocity of 1.63 fps, also being less than what the City of San Diego requires for minimum velocity within a gravity sewer pipeline (2.0 fps). Therefore, due to the constructed pipe slopes of the sewer infrastructure serving the Hospital area, the existing condition does not meet the desired cleansing velocity for such facilities. See Appendix B – Sharp Hospital Existing Sewer Study Summary located at the back of this Report.

Proposed Sanitary Sewer System Improvements

In order to accommodate the Sharp Hospital Skilled Nursing Tower Replacement Project, new sewer infrastructure, including two 8-inch gravity collection sewers, one sewer lift station and a sewer forcemain will be constructed to convey wastewater flows to the City of San Diego's collection main leading to the Kearny Mesa Trunk Line sanitary sewer system. Originally, Sharp Hospital intended to distribute a portion of the sewer flows from the site westerly to the City of San Diego's Linda Vista Trunk Sewer System, and a portion of the improved sites sewage, easterly to the Kearney Mesa Sewer System. However, further analysis of the Linda Vista Sewer System revealed that no capacity for additional wastewater flows without extensive sewer infrastructure rehabilitation or replacement is feasible. Therefore, the Hospital's onsite sewage collection system has been modified to convey all flows easterly to the Kearney Mesa Trunk Sewer Line located east of the Sharp Hospital site.

Along the western side of the proposed Hospital Skilled Nursing Tower an on-site private 8-inch polyvinyl chloride (PVC) sewer line will collect wastewater from 4-inch and 6-inch laterals and discharge southerly to a sewer lift station located south of the Hospital's driveway entrance at Health Center Drive. See Exhibit B – Sharp Hospital Existing and Proposed Sanitary Sewer Map, located at the back of this Report. The private sewer lift station will operate utilizing a sewage grinder plus duplex submersible sewage pumps with non-clog impellers coupled to a ¹/₂ horsepower (HP), 1750 RPM. 480 volt, 3-phase, 60 Hz motor capable of pumping 58 GPM (83,220 GPD) of peak sewer flow to 14 feet of head. The lift station's discharge line will be routed to a new onsite sewer manhole (manhole No. 1A) located at the north side of the new Hospital Tower. From manhole No. 1A, these diverted sewer flows combine with additional peak sewer flows of 101,715 GPD from various intersecting laterals coming from the new building addition and are conveyed easterly through a private 8-inch PVC gravity sewer line to manhole No. 01. The additional segments of proposed 8-inch PVC gravity private sewer pipeline continue southerly, connected by manhole's No. 02, 03, 04 and 05, to a point-of-connection (located at the southeast corner of the existing hospital site) with the Hospital's existing 8-inch VCP sewer. From the point-of-connection at manhole No. 05. the combined 184,935 GPD of new peak sewer flow discharges southerly and confluences with existing flows produced at the hospital site within the existing private 12-inch VCP. See Appendix A – Sanitary Sewer Flow Calculations for a summary of sewer flow computations. Sewer flows continue southeast through an existing private 15-inch VCP to manhole No. 08, then turn and flow easterly to existing manhole No. 09. At manhole No. 09 the flow turns to the south and are routed to the City of San Diego's manhole No. 242, described above. From existing manhole No. 242, the existing and new Tower sewage flow peak of 409,935 GPD combine with the sewage pump station flow from Birmingham Drive having a peak flow of 109,440 GPD per the existing sanitary sewer system as previously described above to result in a total peak flow of 519,375 GPD. From existing manhole No. 242 easterly the sewage will flow through existing manholes No. 243 and No. 244 as previously described above to manhole No.

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245. The 519,375 GPD developed within the tributary area west of manhole No. 245 combine with a peak sewer flow of 721,671 GPD developed within the tributary area north of manhole No. 245 to produce a peak sewer discharge of 1,241,046 GPD. Flow computations for sanitary sewer flows originating north of manhole No. 245 are based upon analysis provided in the accepted Preliminary Master Sewer Study Including Children's Hospital Complex, Medical Offices and Residential Development in the Serra Mesa Community, San Diego, CA (W.O. 426012) dated August 10, 2006, by Project Design Consultants. Please note that all existing and future sewer flows produced within the Children's Hospital area (adjacent to Children's Way) discharge easterly to the 15inch sewer main located within Children's Way and thus are tributary to the sewer pipe north of manhole No. 245 and have been included in flow calculations provided herein indicated at Node 5 in Exhibit B. See Appendix A – Equivalent Population and Sanitary Sewer Flow Calculations at the back of this Report for computations for determining average and peak sewer flows for the areas tributary to the north of manhole No. 245. Further, Project Design Consultant's Master Sewer Study conservatively assumed that the entire Hospital Zone, including Sharp Hospital, Children's Hospital, Mary Birch Center, Outpatient Pavilion Building (O.P.P.) etc., as well as surrounding residential and commercial areas, discharge southerly and easterly into the 15-inch sewer main that ties into the Kearney Mesa Trunk Line Sewer east of the I-805. However, that Master Sewer Study did not clearly identify how these flows were routed to the confluence point (manhole No. 248) but only verified adequate capacity of the City's sewer system downstream from the confluence point. In addition, it has been shown herein that the entire Hospital Zone defined by Project Design Consultant's Master Sewer Study is not tributary to the easterly 15-inch sanitary sewer main that ties into the Kearney Mesa Trunk Line east of I-805, but in fact, a significant portion of the wastewater flows, including that from Mary Birch Center and Outpatient Pavilion Building (O.P.P.). discharge westerly to the Linda Vista Sewer System. Therefore, the analysis provided herein demonstrates a more accurate accounting of peak flows tributary to manhole No. 245 and 248 and is based upon the land use methodology consistent with that used by Project Design Consultants in their Master Sewer Study. Sewer flows originating from the south of manhole No. 248 have not been evaluated in this Study, however, they are not considered to have significant impact to the performance of existing sewer infrastructure.

Based upon hydraulic modeling computations using Haestad Methods, SewerCAD Version 5.6 software, the maximum d_n/D achieved within the City of San Diego's above described sewer main between manhole No. 242 and manhole No. 248 resulting from the existing and proposed sewer load conditions is 0.35, representing a 9% increase within pipe No. 13, yet below the maximum allowed d_n/D of 0.5. Moreover, the minimum average velocity is 1.5 feet per second (fps) occurring within pipe No. 11, which actually provides an 11% increase from the existing condition. In addition, the average velocity within pipe No. 10 increases from below 1.63 fps to 1.84 fps for the proposed condition. See Appendix C – Sharp Hospital Proposed Sewer Study Summary located at the back of this Report.

Conclusions

Based on the analysis, the 15-inch sewer infrastructure from existing sewer manhole No. 242 to manhole No. 248 (sewer manhole No. 3 per City of San Diego Construction Drawing 19072-2D) provides sufficient capacity to receive additional sewer flows from the proposed Sharp Hospital Skilled Nursing Tower Replacement Project. The project will increase peak sewer flows from 225,000 GPD to 409,935 GPD, which represents a 45% increase based upon the land use method of guantifying anticipated sewer demands tributary to the subject sewer main. However, impact to the public sewer infrastructure due to the 45% sewer load increase is limited as the maximum d_n/D increase only rises 0.08 from 0.29 to 0.37, a 22% increase occurring within pipe No. 10. In addition, in accordance with Section 1.3.3.1 of the City of San Diego's Sewer Design Guide the minimum average flow velocity within the sewer main should be greater than or equal to 2.0 fps. However, as detailed above, the existing condition results in sewer flows that fall below 2.0 fps within two reaches of the public sewer pipeline (pipe No. 10 and pipe No. 11). However, as a result of the added flow condition, proposed by this Study, the existing condition improves as the pipe velocities for these two reaches increase, although they still fall below the minimum flow velocity of 2.0 fps, even for the proposed condition. Yet this is an existing condition and no improvements for this existing condition, due to previously constructed pipe slopes, are proposed by this Study.

As stated previously, according to the *Preliminary Master Sewer Study Including Children's Hospital Complex, Medical Offices and Residential Development in the Serra Mesa Community, San Diego, CA (W.O. 426012)* dated August 10, 2006, by Project Design Consultants, the downstream portions of sewer infrastructure have enough capacity to receive the sewer flows identified by this Study. Therefore, the proposed sewer improvements and existing public sewer infrastructure capable of serving all conditions identified by this Sewer Study.

EXHIBIT A

Sharp Hospital Vicinity Map


EXHIBIT B

Sharp Hospital Existing and Proposed Sanitary Sewer Map



EXHIBIT C

Sharp Hospital Vicinity Land Use and Area Map





APPENDIX A

Equivalent Population and Sanitary Sewer Flow Calculations

SHARP HOSPITAL MODERNIZATION PROJECT SEWER STUDY KEARNEY MESA SYSTEM TRIBUTARY SEWER FLOW CALCULATIONS [TRIBUTARY AREA WEST OF MH-245]

PROPOSED PROJECT DATA

PROPOSED SHARP HOSPITAL AREA CO-1-2		1.62	ACRES
(MODERNIZATION PROJECT)	Х	1.5	FLOOR AREA RATIO (F.A.R.)
	=	2.43	ACRES (INCLUDES ALL FLOORS)
EXISTING SHARP HOSPITAL AREA CO-1-2		5.1	ACRES
	Х	1.5	FLOOR AREA RATIO (F.A.R.)
	=	7.65	ACRES (INCLUDES ALL FLOORS)
EXISTING WOMEN'S CENTER & MOB AREA CO-1-2			
*(PER JOHN POWELL PUMP STATION STUDY, AUG	6. 1990)		
		109440	GPD
PROPOSED SHARP HOSPITAL AREA CO-1-2		2.04	ACRES
(MODERNIZATION PROJECT)	Х	1.5	FLOOR AREA RATIO (F.A.R.)
	=	3.06	ACRES (INCLUDES ALL FLOORS)

EQUIVALENT POPULATION CALCULATIONS

				SUBTOTAL POP.	365
PROP HOSP.	HOSPITAL	2.43	150	364.5	365
LABEL	SWR. TABLE 1-1 ZONE PER CITY ZONING	AREA (ACRES)	POP/NET ACRE	EQUIVALENT POPULATION	EQUIVALENT POPULATION (ROUNDED UP)
PROPOSED R	ESIDENTIAL FOUN	ALENT POP	PULATION		

PROPOSED R	ESIDENTIAL EQUIN	ALENT POF			
LABEL	SWR. TABLE 1-1 ZONE PER CITY ZONING	AREA (ACRES)	POP/NET ACRE	EQUIVALENT POPULATION	EQUIVALENT POPULATION (ROUNDED UP)
EXIST HOSP.	HOSPITAL	7.65	150	1147.5	1148
				SUBTOTAL POP.	1148

PROPOSED R	ESIDENTIAL EQUIN	ALENT POF	PULATION		
LABEL	SWR. TABLE 1-1 ZONE PER CITY ZONING	AREA (ACRES)	POP/NET ACRE	EQUIVALENT POPULATION	EQUIVALENT POPULATION (ROUNDED UP)
PROP HOSP.	HOSPITAL	3.06	150	459.0	459
				SUBTOTAL POP.	459

PROPOSED PEAK FLOW CALCULATIONS

NODE 1

AVERAGE FLOW

= TOTAL EQUIV. POP. X 80 GPD
= 365 X 80 GPD
= 29200.00 GPD
= 6.2945 x (EQUIV. POP.) ^ (-0.1342)
= 2.85
= PEAK FACTOR x AVERAGE FLOW
= 83220.0 GPD

NODE 2

AVERAGE FLOW

- = TOTAL EQUIV. POP. X 80 GPD
- = 459 X 80 GPD

= 0.13 CFS

= 36720.00 GPD

PEAK FACTOR

= 6.2945 x (EQUIV. POP.) ^ (-0.1342) = 2.77

PEAK FLOW

= PEAK FACTOR x AVERAGE FLOW = 101714.4 GPD

= TOTAL EQUIV. POP. X 80 GPD

= 0.16 CFS

NODE 3

AVERAGE FLOW

PEAK FACTOR

PEAK FLOW

= PEAK FACTOR x AVERAGE FLOW

= 6.2945 x (EQUIV. POP.) ^ (-0.1342)

= 225008.0 GPD

= 1148 X 80 GPD = 91840.00 GPD

= 0.35 CFS

= 2.45

NODE 4

PEAK FLOW*

- = 109440.0 GPD
- = 0.17 CFS

A-2.

SHARP HOSPITAL MODERNIZATION PROJECT SEWER STUDY KEARNEY MESA SYSTEM TRIBUTARY SEWER FLOW CALCULATIONS [TRIBUTARY AREA NORTH OF MH-245]

PROPOSED PROJECT DATA

PROPOSED RES. SITE AREA RM-3-7		9.59	ACRES
PROPOSED RES. SITE AREA RM-4-10		0.13	ACRES
PROPOSED COMMERCIAL SITE AREA CO-1-2		5.37	ACRES
	Х	1.5	FLOOR AREA RATIO (F.A.R.)
	=	8.06	ACRES (INCLUDES ALL FLOORS)
PROPOSED HOSPITAL SITE AREA CO-1-2		9.58	ACRES
	Х	1.5	FLOOR AREA RATIO (F.A.R.)
	=	14.37	ACRES (INCLUDES ALL FLOORS)
PROPOSED HOSPITAL SITE AREA CO-1-2		3.62	ACRES
	х	1.5	FLOOR AREA RATIO (F.A.R.)
	=	5.43	ACRES (INCLUDES ALL FLOORS)

EQUIVALENT POPULATION CALCULATIONS

PROPOSED P	RESIDENTIAL EQUIN	ALENT POP	ULATION		1
LABEL	SWR. TABLE 1-1 ZONE PER CITY ZONING	AREA (ACRES)	POP/NET ACRE	EQUIVALENT POPULATION	EQUIVALENT POPULATION (ROUNDED UP)
RES. AREA	RM-3-7	9.59	111.8	1071.9	1072
				SUBTOTAL POP.	1072

PROPOSED F	RESIDENTIAL EQUIN	ALENT POF	ULATION		I
LABEL	SWR. TABLE 1-1 ZONE PER CITY ZONING	AREA (ACRES)	POP/NET ACRE	EQUIVALENT POPULATION	EQUIVALENT POPULATION (ROUNDED UP)
RES. AREA	RM-4-10	0.13	196.2	25.6	26
				SUBTOTAL POP.	26

PROPOSE	RESIDENTIAL EQUIN	ALENT POP	ULATION		
LABEL	SWR. TABLE 1-1 ZONE PER CITY ZONING	AREA (ACRES)	POP/NET ACRE	EQUIVALENT POPULATION	EQUIVALENT POPULATION (ROUNDED UP)
COMM. CO-1-2	CO-1-2	8.06	43.7	352.2	353
				SUBTOTAL POP.	353

PROPOSED RE	SIDENTIAL EQUIN	ALENT POP	ULATION		·
LABEL	ZONE PER CITY ZONING	AREA (ACRES)	POP/NET ACRE	EQUIVALENT POPULATION	POPULATION (ROUNDED UP)
HOSP. SPACE	HOSP.	14.37	150	2155.5	2156
				SUBTOTAL POP.	2156

PROPOSED RE	ESIDENTIAL EQUIN	ALENT POP	ULATION		T
LABEL	ZONE PER CITY ZONING	AREA (ACRES)	POP/NET ACRE	EQUIVALENT POPULATION	POPULATION (ROUNDED UP)
HOSP. SPACE	HOSP.	5.43	150	814.5	815
				SUBTOTAL POP.	815

TOTAL PROPOSED FOUNALENT POPULATION	TOTAL POP	4422
TOTAL TROPOGED EQUIVALENT OF DEATION	TIOTAL FOF.	4422

PROPOSED PEAK FLOW CALCULATIONS

NODE 5

AVERAGE FLOW

- = TOTAL EQUIV. POP. X 80 GPD
- = 4422 X 80 GPD = 353760 GPD

PEAK FACTOR

= 6.2945 x (EQUIV. POP.) ^ (-0.1342) = 2.04

PEAK FLOW

- = PEAK FACTOR x AVERAGE FLOW
- = 721670.4 GPD
- = 1.12 CFS

APPENDIX B

Existing Condition Sewer Study Summary Existing Condition Pipe Report Existing Condition Manhole Report

APPENDIX B SHARP HOSPITAL - EXISTING SEWER CONDITION SEWER STUDY SUMMARY

			POPULATION	IN-LINE	POPULAT	ION SERVED	DEAKIANC	PEAK DE	SIGN FLOW	LINE SIZE	DESIGN	dn			INFLOW	
LINE	FROM	то	ACRE	ACRES	IN-LINE	TOTAL	RATIO	MGD	CFS	(IN)	SLOPE (%)	(FT)	dn/D	fps	INFILTRATION	COMMENTS
P-06	MH-06	JC-07	150	7.65	1148	1148	2.45	0.23	0.35	12	0.21	0.31	0.31	1 65		PRIVATE SEWER SEE APPENDIX A - EXISTING & PROPOSED SEWER FLOW CALCULATIONS FOR POPULATION COMPUTATIONS
P-07	JC-07	MH-08		-	1.1	1148		0.23	0.35	12	0 20	0.29	0.29	1 61		PRIVATE SEWER NO ADDED FLOWS
P-08	MH-08	MH-09	-	1	-	1148		0 23	0.35	15	0.09	0.29	0 23	1.19	-	PRIVATE SEWER NO ADDED FLOWS
P-09	MH-09	MH-242		-		1148		0.23	0.35	15	0.09	0.29	0 23	1.20	-	PRIVATE SEWER NO ADDED FLOWS
P-10	MH-242	MH-243	-	-	-	1148	1.46	0.34	0.53	15	0.16	0.36	0 29	1.63	-	EXISTING POMP STATION INFLOW PER TEMPORARY POMP STATION STUDY FOR THE WOMEN'S CENTER EXPANSION AND MEDICAL OFFICE BUILDING AT THE SHARP HOSPITAL SITE DATED AUGUST 196-BBY JOIN POWFLL & ASSOCIATES, INC. SET APPENDIXA - SEWER FLOW CALCULATIONS
P-11	MH-243	MH-244	-	-	-	1148	-	0.34	0.53	15	0.09	0 38	0.3	1.33	(-)	NO ADDED FLOWS
P-12	MH-244	MH-245		-		1148		0.34	0.53	15	0.30	0 34	0.27	2.04	-	NO ADDED FLOWS
P-13	MH-245	MH-248	VARIES	17.78	3607	4755	2.1	0.94	1.46	15	6.9	0.4	0.32	8.76	-	INFLOW PER PRELIMINARY MASTER SEWER STUDY INCLUDING CHILDRENS HOSPITAL COMPLEX MEDICAL OFFICES AND RESIDENTIAL DEVELOPMENT IN THE SERRA MESA COMMUNITY SAN DIEGO CA (W O 426012), DATED AUGUST 10, 2006 BY PROJECT DESIGN CONSULTANTS

SHADED AREA REPRESENTS PRIVATE SEWER SYSTEM
NON-SHADED AREA REPRESENTS PUBLIC SEWER SYSTEM

Gravity	Pipe	Report
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Label	Constructed Slope (ft/ft)	L (ft)	Material	Section Size	Total Flow (gpd)	Design Capacity (gpd)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	(d/D) (%)	Average Velocity (ft/s)	Mannings n
P-01	0.008000	15.00	PVC	8 inch	0.00	908,082.88	391.97	391.85	0.0	0.00	0.010
P-1A	0.011004	269.00	PVC	8 inch	0.00	1,065,001.47	394.95	391.99	0.0	0.00	0.010
P-02	0.010526	95.00	PVC	8 inch	0.00	1,041,642.50	391.79	390.79	0.0	0.00	0.010
P-03	0.010282	71.00	PVC	8 inch	0.00	1,029,467.75	390.73	390.00	0.0	0.00	0.010
P-04	0.009310	116.00	PVC	8 inch	0.00	979,632.93	389.94	388.86	0.0	0.00	0.010
P-05	0.041488	168.00	PVC	8 inch	0.00	2,067,960.51	388.76	382.10	23.6	0.00	0.010
P-06	0.002105	57.00	Concrete	12 inch	225,000.00	1,056,493.98	382.22	382.10	31.4	1.65	0.013
P-07	0.001957	46.00	Concrete	12 inch	225,000.00	1,018,488.59	382.10	381.96	28.7	1.61	0.013
P-08	0.000885	113.00	Concrete	15 inch	225,000.00	1,241,941.99	381.96	381.74	23.1	1.19	0.013
P-09	0.000901	111.00	Concrete	15 inch	225,000.00	1,253,080.71	381.68	381.46	23.0	1.20	0.013
P-10	0.001554	341.00	Concrete	15 inch	334,440.00	1,645,891.78	381.45	380.88	29.0	1.63	0.013
P-11	0.000893	112.00	Concrete	15 inch	334,440.00	1,247,474.05	380.88	380.68	29.5	1.33	0.013
P-12	0.002908	306.00	Concrete	15 inch	334,440.00	2,251,514.88	380.68	379.81	26.9	2.04	0.013
P-13	0.069286	14.00	Concrete	15 inch	1,056,111.00	0,989,106.48	379.81	378.61	31.7	8.76	0.013
P-14	0.054706	17.00	Concrete	15 inch	1,056,111.00	9,764,669.44	378.60	377.45	32.1	8.05	0.013
P-15	0.083182	22.00	PVC	8 inch	0.00	2,928,159.28	380.20	378.60	17.0	0.00	0.010

Gravity Node Report

Label	Rim Elevation (ft)	Sump Elevation (ft)	Total Flow (gpd)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Gravity Element Headloss (ft)	Velocity In (ft/s)	Velocity Out (ft/s)	Has Messages?	Has Flooding?
JC-07		381.79	225,000.00	382.10	382.10	0.00	1.64	1.64	false	false
MH-01	399.83	391.97	0.00	391.97	391.97	0.00	0.00	0.00	false	false
MH-1A	397.93	394.95	0.00	394.95	394.95	0.00	0.00	0.00	false	false
MH-02	399.73	391.79	0.00	391.79	391.79	0.00	0.00	0.00	false	false
MH-03	397.68	390.73	0.00	390.73	390.73	0.00	0.00	0.00	false	false
MH-04	398.39	389.94	0.00	389.94	389.94	0.00	0.00	0.00	false	false
MH-05	393.15	388.76	0.00	388.76	388.76	0.00	0.00	0.00	false	false
MH-06	385.74	381.91	225,000.00	382.22	382.22	0.00	1.65	1.65	false	false
MH-08	393.53	381.61	225,000.00	381.96	381.96	0.00	1.24	1.24	false	false
MH-09	399.18	381.33	225,000.00	381.68	381.68	0.00	1.25	1.25	false	false
MH-242	397.58	381.07	334,440.00	381.45	381.45	0.00	1.63	1.63	false	false
MH-243	403.79	380.46	334,440.00	380.88	380.88	0.00	1.42	1.42	false	false
MH-244	395.56	380.35	334,440.00	380.68	380.68	0.00	2.04	2.04	false	false
MH-245	394.10	379.30	1,056,111.00	379.81	379.81	0.00	3.50	3.50	false	false
MH-246	394.26	380.20	0.00	380.20	380.20	0.00	0.00	0.00	false	false
MH-248	393.87	378.09	1,056,111.00	378.60	378.60	0.00	3.50	3.50	false	false
0-1	393.87	377.16	1,056,111.00	377.16	377.16	0.00	0.00	0.00	false	

Label	Ground Elevation (ft)	Set Rim Equal to Ground Elevation?	Rim Elevation (ft)	Sump Elevation (ft)	Total Flow (gpd)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Gravity Element Headloss (ft)	Depth In (ft)	Depth Out (ft)	Velocity Out (ft/s)
MH-01	399.83	true	399.83	391.97	0.00	391.97	391.97	0.00	0.00	0.00	0.00
MH-1A	397.93	true	397.93	394.95	0.00	394.95	394.95	0.00	0.00	0.00	0.00
MH-02	399.73	true	399.73	391.79	0.00	391.79	391.79	0.00	0.00	0.00	0.00
MH-03	397.68	true	397.68	390.73	0.00	390.73	390.73	0.00	0.00	0.00	0.00
MH-04	398.39	true	398.39	389.94	0.00	389.94	389.94	0.00	0.00	0.00	0.00
MH-05	393.15	true	393.15	388.76	0.00	388.76	388.76	0.00	0.00	0.00	0.00
MH-06	385.74	true	385.74	381.91	225,000.00	382.22	382.22	0.00	0.31	0.31	1.65
MH-08	393.53	true	393.53	381.61	225,000.00	381.96	381.96	0.00	0.35	0.35	1.24
MH-09	399.18	true	399.18	381.33	225,000.00	381.68	381.68	0.00	0.35	0.35	1.25
MH-242	397.58	true	397.58	381.07	334,440.00	381.45	381.45	0.00	0.38	0.38	1.63
MH-243	403.79	true	403.79	380.46	334,440.00	380.88	380.88	0.00	0.42	0.42	1.42
MH-244	395.56	true	395.56	380.35	334,440.00	380.68	380.68	0.00	0.33	0.33	2.04
MH-245	394.10	true	394.10	379.30	,056,111.00	379.81	379.81	0.00	0.51	0.51	3.50
MH-246	394.26	true	394.26	380.20	0.00	380.20	380.20	0.00	0.00	0.00	0.00
MH-248	393.87	true	393.87	378.09	,056,111.00	378.60	378.60	0.00	0.51	0.51	3.50

Manhole Report

APPENDIX C

Proposed Condition Sewer Study Summary

Proposed Condition Pipe Report

Proposed Condition Manhole Report

APPENDIX C SHARP HOSPITAL - PROPOSED SEWER CONDITION SEWER STUDY SUMMARY

			POPULATION	IN-LINE	POPULAT	ION SERVED		PEAK DES	SIGN FLOW		DESIGN	da			INFLOW	
LINE	FROM	то	ACRES	ACRES	IN-LINE	TOTAL	RATIO	MGD	CFS	(IN)	SLOPE (%)	(FT)	dn/D	fps	INFILTRATION	COMMENTS
LINE	11101												and the second			
			150	2.42	265	365	2.85	0.08	0.13	8		0.2	0.29	2.81		*PRIVATE SEWER INFLOW SEE APPENDIX A - PROPOSED SEWERFLOW CALCULATIONS FOR POPULATION COMPUTATIONS
P-1A	MH-1A	MH-01	150	2.43	305	305	2.00	0.00	0.10			÷	A. Same			PRIVATE SEWER INFLOW
	MU 01	MU 02	150	3.06	459	824	2 77	0.18	0.30	8	0.8	0 23	0 34	3.16		SEE APPENDIX A - PROPOSED SEWER FLOW CALCULATIONS FOR POPULATION COMPUTATIONS
P-01	MH-01	MH-03	150			824	1	0.18	0 30	8	1.05	0.22	0.328	3 49	-	PRIVATE SEWER NO ADDED FLOWS
P-02	MH 02	MH 04				824	-	0.18	0.30	8	1.03	0.22	0 329	3.46	-	PRIVATE SEWER NO ALIGED FLOWS
P-03	MH-03	MH-05				824		0.18	0.30	8	0.93	0 22	0.333	3.34	-	SPRIVATE SEWER NG ADDED FLOWS
P-04	MH 05	10.07			-	824	-	0.18	0.30	8	4.15	0 32	0.48	5.67	4	PRIVATE SEWER NO ADJELTE OMS
P-03	MH-05	10.07	150	7.65	1148	1148	2 45	0.23	0.35	12	0.21	0.39	0.39	1.65		PREVAIL SEWERNBRANCH LIGET FEITOW SEE APPENDER A PROPOSED SEWERTEOW CALOUR HONS FOR POPULATION COMPUTATIONS
P-06	MH-06	30-07	150	7.03	1140				0.65	12	0.196	0.4	0.4	19	н.	PRIVATE SEWEN INFLOW FROM P 06 SEE APPENDIX A - PROPOSED SEWER FLOW CALCULATIONS FOR POPULATION COMPUTATIONS
P-07	JC-07	MH-08	-	· ·		1972	1.1	0.41	0.65	12	0.190	0.39	0.31	1.0		*PRIVATE SEWER NO ADDED FLOWS
P-08	MH-08	MH-09		-	-	1972		0.41	0.05	15	0.09	0.4	0.32	141		*PRIVATE SEWEN NO ADDED FLOWS
P-09	MH-242	MH-242			-	1972	-	0.52	0.82	15	0 16	0.46	0.37	184	-	EXISTING PUMP STATION INFLOW PER TEMPORARY POMP STATION STUDY FOR THE WOMEN'S CENTER EXPANSION AND MEDICAL OFFICE BUILDING AT THE SHARP MOSHTAL SITE, DATED AUGUST 1990 BY JOINT FOWELE & ASSOCIATES, INC. SEE APPENDIX A - SEWER FLOW CALCULATIONS
D 44	MU 040	MIL 244				1972		0.52	0.82	15	0.09	0.46	0.37	1.50	3	NO ADDED FLOWS
P211	WITI-243	MI1-244						0.52	0.82	15	0.30	0.4	0.32	2.31		NO ADDED FLOWS
P-12	MH-244	MH-245						0.52	0.02	10						
P-13	MH-245	MH-248	VARIES	17.78	4422	6394	2.04	1 24	1.94	15	6.90	0.44	0.35	9 18		INFLOW PER PRELIMINARY MASTER SEWER STUDY INCLUDING CHILDRENS HOSPITAL COMPLEX MEDICAL OFFICES AND RESIGENTIAL DE VELOPMENT IN THE SERRA MESA COMMUNITY, SAN DIEGO, CA (W O 426012), DATED AUGUST 10, 2006 BY PROJECT DESIGN CONSULTANTS

* SHADED AREA REPRESENTS PRIVATE SEWER SYSTEM * NON-SHADED AREA REPRESENTS PUBLIC SEWER SYSTEM

Gravity	Pipe	Report
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Label	Constructed Slope (ft/ft)	L (ft)	Material	Section Size	Total Flow (gpd)	Design Capacity (gpd)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	(d/D) (%)	Average Velocity (ft/s)	Mannings n
P-01	0.008000	15.00	PVC	8 inch	184,935.00	908,082.88	392.22	392.06	34.0	3.16	0.010
P-1A	0.011004	269.00	PVC	8 inch	83,220.00	1,065,001.47	395.11	392.22	29.3	2.81	0.010
P-02	0.010526	95.00	PVC	8 inch	184,935.00	1,041,642.50	392.04	390.98	32.8	3.49	0.010
P-03	0.010282	71.00	PVC	8 inch	184,935.00	1,029,467.75	390.98	390.19	32.9	3.46	0.010
P-04	0.009310	116.00	PVC	8 inch	184,935.00	979,632.93	390.19	389.06	33.3	3.34	0.010
P-05	0.041488	168.00	PVC	8 inch	184,935.00	2,067,960.51	389.01	382.22	50.7	5.67	0.010
P-06	0.002105	57.00	Concrete	12 inch	225,000.00	1,056,493.98	382.26	382.22	39.0	1.65	0.013
P-07	0.001957	46.00	Concrete	12 inch	409,935.00	1,018,488.59	382.22	382.08	40.3	1.90	0.013
P-08	0.000885	113.00	Concrete	15 inch	409,935.00	1,241,941.99	382.08	381.82	31.1	1.40	0.013
P-09	0.000901	111.00	Concrete	15 inch	409,935.00	1,253,080.71	381.79	381.55	31.5	1.41	0.013
P-10	0.001554	341.00	Concrete	15 inch	519,375.00	1,645,891.78	381.55	380.98	37.0	1.84	0.013
P-11	0.000893	112.00	Concrete	15 inch	519,375.00	1,247,474.05	380.98	380.76	36.9	1.50	0.013
P-12	0.002908	306.00	Concrete	15 inch	519,375.00	2,251,514.88	380.76	379.85	32.0	2.31	0.013
P-13	0.069286	14.00	Concrete	15 inch	1,241,046.00	0,989,106.48	379.85	378.64	34.6	9.18	0.013
P-14	0.054706	17.00	Concrete	15 inch	1,241,046.00	9,764,669.44	378.64	377.46	34.3	10.17	0.013
P-15	0.083182	22.00	PVC	8 inch	0.00	2,928,159.28	380.20	378.64	20.4	0.00	0.010

Gravity N	ode I	Report
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Label	Rim Elevation (ft)	Sump Elevation (ft)	Total Flow (gpd)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Gravity Element Headloss (ft)	Velocity In (ft/s)	Velocity Out (ft/s)	Has Messages?	Has Flooding?
JC-07		381.79	409,935.00	382.22	382.22	0.00	1.97	1.97	false	faise
MH-01	399.83	391.97	184,935.00	392.22	392.22	0.00	2.43	2.43	false	false
MH-1A	397.93	394.95	83,220.00	395.11	395.11	0.00	1.93	1.93	faise	false
MH-02	399.73	391.79	184,935.00	392.04	392.04	0.00	2.43	2.43	false	false
MH-03	397.68	390.73	184,935.00	390.98	390.98	0.00	2.43	2.43	faise	false
MH-04	398.39	389.94	184,935.00	390.19	390.19	0.00	2.43	2.43	false	false
MH-05	393.15	388.76	184,935.00	389.01	389.01	0.00	2.43	2.43	false	false
MH-06	385.74	381.91	225,000.00	382.26	382.26	0.00	1.41	1.41	false	false
MH-08	393.53	381.61	409,935.00	382.08	382.08	0.00	1.52	1.52	false	false
MH-09	399.18	381.33	409,935.00	381.79	381.79	0.00	1.53	1.53	false	false
MH-242	397.58	381.07	519,375.00	381.55	381.55	0.00	1.84	1.84	false	false
MH-243	403.79	380.46	519,375.00	380.98	380.98	0.00	1.65	1.65	false	false
MH-244	395.56	380.35	519,375.00	380.76	380.76	0.00	2.31	2.31	false	false
MH-245	394.10	379.30	,241,046.00	379.85	379.85	0.00	3.68	3.68	false	false
MH-246	394.26	380.20	0.00	380.20	380.20	0.00	0.00	0.00	false	false
MH-248	393.87	378.09	1,241,046.00	378.64	378.64	0.00	3.68	3.68	false	false
0-1	393.87	377.16	,241,046.00	377.16	377.16	0.00	0.00	0.00	false	

Labei	Ground Elevation (ft)	Set Rim Equal to Ground Elevation?	Rim Elevation (ft)	Sump Elevation (ft)	Total Flow (gpd)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Gravity Element Headloss (ft)	Depth In (ft)	Depth Out (ft)	Velocity Out (ft/s)
MH-01	399.83	true	399.83	391.97	184.935.00	392.22	392.22	0.00	0.25	0.25	2.43
MH-1A	397.93	true	397.93	394.95	83,220.00	395.11	395.11	0.00	0.16	0.16	1.93
MH-02	399.73	true	399.73	391.79	184,935.00	392.04	392.04	0.00	0.25	0.25	2.43
MH-03	397.68	true	397.68	390.73	184,935.00	390.98	390.98	0.00	0.25	0.25	2.43
MH-04	398.39	true	398.39	389.94	184,935.00	390.19	390.19	0.00	0.25	0.25	2.43
MH-05	393.15	true	393.15	388.76	184,935.00	389.01	389.01	0.00	0.25	0.25	2.43
MH-06	385.74	true	385.74	381.91	225,000.00	382.26	382.26	0.00	0.35	0.35	1.41
MH-08	393.53	true	393.53	381.61	409,935.00	382.08	382.08	0.00	0.47	0.47	1.52
MH-09	399.18	true	399.18	381.33	409,935.00	381.79	381.79	0.00	0.46	0.46	1.53
MH-242	397.58	true	397.58	381.07	519,375.00	381.55	381.55	0.00	0.48	0.48	1.84
MH-243	403.79	true	403.79	380.46	519,375.00	380.98	380.98	0.00	0.52	0.52	1.65
MH-244	395.56	true	395.56	380.35	519,375.00	380.76	380.76	0.00	0.41	0.41	2.31
MH-245	394.10	true	394.10	379.30	,241,046.00	379.85	379.85	0.00	0.55	0.55	3.68
MH-246	394.26	true	394.26	380.20	0.00	380.20	380.20	0.00	0.00	0.00	0.00
MH-248	393.87	true	393.87	378.09	,241,046.00	378.64	378.64	0.00	0.55	0.55	3.68

Manhole Report

PRELIMINARY MASTER SEWER STUDY INCLUDING CHILDREN'S HOSPITAL COMPLEX, SHARP MEMORIAL HOSPITAL COMPLEX, MEDICAL OFFICES AND RESIDENTIAL DEVELOPMENT IN THE SERRA MESA COMMUNITY, SAN DIEGO, CALIFORNIA CITY PTS #____, W.O. #426012

NOVEMBER 14, 2006

Prepared For: Children's Hospital and Health Center 3020 Children's Way, MC 5044 San Diego, CA 92123

Prepared By:



PROJECT DESIGN CONSULTANTS

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Prepared By: TLH Checked By: TEH/MK

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SECTION 1

INTRODUCTION

This study encompasses an evaluation of the capacity of the existing sewer infrastructure considering a built-out condition assumed for year 2014 based on current zoning of the area as outlined in Exhibit A, referred to herein as "the study area." The study area is a triangular site containing Children's Hospital Medical Complex and Sharp Memorial Hospital Medical Complex (cumulatively referred to herein as "medical complex"), along with existing and potential medical office and residential development upstream from the medical complex. The study area is bound on the north, west, and east sides by State Route 163 and Interstate 805, and on the south by Vista Hill Avenue and Birmingham Way (see Exhibit A – Vicinity Map). Design calculations compare peak flows generated by the proposed ultimate built-out condition based on current zoning in the area with the ultimate capacity of the existing 15-inch sewer mains that would receive the flow from the study area. Said existing 15-inch sewer mains run from an existing manhole within Children's Way to the easterly existing Kearny Mesa Trunk Sewer which continues south (see Exhibit C – Sewer Infrastructure Exhibit). The purpose of this study is to determine the ability of the existing 15-inch sewer mains to support the anticipated sewage generated by the study area assuming built-out conditions over the next eight years.

SECTION 2

DESIGN CRITERIA

This sewer study is based on design criteria outlined in the *City of San Diego Sewer Design Guide* provided by the City of San Diego Metropolitan Wastewater Department dated 2004.

SECTION 3

EXISTING SEWER INFRASTRUCTURE

The medical complex is bound to the north by Frost Street, to the south by Vista Hill Avenue and Birmingham Way, and is currently occupied by Children's Hospital and Sharp Memorial Hospital buildings, parking structures, and open spaces. Currently, sewage from Children's Hospital, Sharp Memorial Hospital, and the upstream office and residential basins north of Frost Street discharge both to the west under State Route 163 to the Linda Vista Trunk Sewer and to the east under Interstate 805 to the Kearny Mesa Trunk Sewer.

See Exhibit C – Sewer Exhibit, for existing sewer infrastructure within and around the study area.

There are two residential basins upstream of Mesa College Drive. The western-most residential basin consists of existing 8-inch mains that discharge to the south through an existing 10-inch main under Mesa College Drive to an existing 8-inch main in Health Center Drive, and ultimately to the Linda Vista Trunk Sewer. The eastern-most residential basin consists of existing 8- to 10-inch mains that discharge to the south through an existing 12-inch main under Mesa College Drive to an existing 15-inch main in Children's Way, and ultimately connecting to the Kearny Mesa Trunk Sewer.

On the west side of the medical complex, there is an existing 8-inch main that flows from the north to south along Health Center Drive. Said main acquires sewer flow from the upstream western-most residential basin, the 8-inch main in Frost Street and an 8-inch main within the Sharp Memorial Hospital Complex. The existing 8-inch sewer main in Health Center Drive discharges toward the west to an existing 8-inch sewer main under State Route 163. A second smaller basin within the Sharp Memorial Hospital area north of Vista Hill Avenue also discharges under State Route 163 in a second existing 8-inch sewer main. Both 8-inch sewer mains discharging under State Route 163 continue west to the Linda Vista Trunk Sewer (see Exhibit C – Sewer Infrastructure Exhibit).

On the east side of the medical complex, there is an existing 15-inch main that flows from the north to south along Children's Way. Said main acquires sewer flow from the upstream easternmost residential basin, a 15-inch main within the Children's Hospital Complex, and an 8-inch main from the southern portion of Children's Way before discharging toward the east through an existing 15-inch sewer main under Interstate 805. The 15-inch sewer main discharging under Interstate 805 continues east to the 33-inch vitrified clay (V.C.) Kearny Mesa Trunk Sewer that flows from north to south.

SECTION 4

PROPOSED CITY OF SAN DIEGO GROUP JOBS

Per Jenny Jarrell with the City of San Diego, two City of San Diego Group Jobs (G.J.) are proposed in the area. G.J. 763 (per City Construction Drawing No. 32831-D) is proposed in the residential area to the north of Mesa College Drive and is currently at "30% design" phase. Construction is scheduled to begin in the year 2013. G.J. 789 (per City Construction Drawing No. 33704-D) is proposed in Birmingham Drive and currently in the "pre-design" phase. Construction is scheduled to begin in the year 2015.

SECTION 5

ULTIMATE BUILT-OUT CONDITION

Based on the ultimate built-out condition would consist of hospitals, office buildings, commercial space, parking infrastructure, etc. throughout the study area. The built-out condition includes some proposed projects by both Sharp Memorial Hospital and by Children's Hospital. Currently, Sharp Memorial Hospital is constructing the Hospital Modernization Project southeast of the intersection of Health Center Drive and Frost Street. Children's Hospital is proposing a Ronald McDonald House and an Acute Care Pavilion northwest and northeast of the intersection of Children's Way and Birmingham Way respectively.

The medical complex site area is approximately 65+/- acres. The upstream office and residential basins encompass approximately 15+/- additional acres. Currently, the sewage from some of this area discharges to the Linda Vista Trunk Sewer to the west. However, to be conservative, all the sewer basins analyzed herein are assumed to discharge through the 15-inch main, which flows from west to east, from Children's Way, under Interstate 805 to the Kearny Mesa Trunk Sewer (see Exhibit C).

SECTION 6

ANALYSIS

The ultimate built-out development is assumed to discharge into the existing 15-inch sewer main that begins in Children's Way and flows easterly under Interstate 805 to the 33-inch Kearny Mesa Trunk Sewer east of Interstate 805 as shown in Exhibit C.*

As requested by the City of San Diego Wastewater Department in preliminary meetings on May 11, and June 22, 2006, this report analyzes the ability of the 15-inch sewer main from Children's Way to the Kearny Mesa Trunk Sewer to accept flow from all existing projects in the study area including all proposed or anticipated projects over the next eight years (see meeting notes from the June 22, 2006 meeting in Appendix 1). Said analysis will review the flattest section of the existing 15-inch sewer main between existing sewer manhole number 3 (per City of San Diego Construction Drawing 19072-2D) and the 33-inch Kearny Mesa Trunk Sewer east of Interstate 805.

Per City of San Diego Sewer Design Guide, the design capacity for 15-inch sewer mains is considered to be the flowrate at a pipe flow depth/ Diameter (d/D) = 0.50.

As discussed in the preliminary meetings with the City of San Diego Wastewater Department, this analysis considers built-out conditions of the entire study area. The equivalent population of the residential basin area, north of Mesa College Drive, is assumed based on built-out populations per current zoning, RM-3-7. Zones determined herein are per City of San Diego Development Services Department Official Zoning Map, Grid Tile 23 dated 02/02/06, attained from the City of San Diego website on June 7, 2006, see Exhibit B. The equivalent population of the office basin area, between Mesa College Drive and Frost Street, is assumed based on built-out populations per current zoning, RM-4-10 and CO-1-2. To be conservative, the CO-1-2 at said location is assumed to be all commercial and no offices. To assume built-out building floor area for the CO-1-2, the site area is assumed to be multiplied by a Floor Area Ratio (FAR) of 1.5 associated with CO-1-2 zoning per City of San Diego Land Development Code.

The medical complex south of Frost Street and north of Vista Hill Avenue and Birmingham Way, is also zoned CO-1-2. However, instead of basing the equivalent population of the medical

complex basin area on built-out conditions per current zoning, CO-1-2, this entire area is assumed to be hospital. This approach generates a more conservative equivalent population than the current CO-1-2 zoning. To assume built-out conditions, the site area is multiplied by a Floor Area Ratio (FAR) of 1.5 associated with CO-1-2 zoning per City of San Diego Land Development Code. The resulting floor area represents the maximum built-out building conditions of hospital, offices, commercial, parking infrastructure, etc. within the medical complex. To be conservative, the entire built-out condition of hospital, offices, commercial, parking infrastructure, etc. is assumed to be all hospital structures.

Further more, this report assumes that all the flow from the study area discharges to the east in the 15-inch main under Interstate 805 to the Kearny Mesa Trunk Sewer. Note: This assumption neglects the existing flow that currently discharges to the east under State Route 163 to the Linda Vista Trunk Sewer.

This report analyzes the flow in the existing 15-inch sewer main between existing sewer manhole number 3 located within Children's Way (per City of San Diego Construction Drawing 19072-2D) and the 33-inch Kearny Mesa Trunk Sewer east of Interstate 805. The flow entering said main is based on equivalent populations and multiplied by a Peaking Factor per the formula in the City of San Diego Sewer Design Guide.

*Proposed development throughout the hospital campus site is assumed to be based on the development identified in the Long Range Plan for Expansion and Improvement (LRPEI). It has been determined that proposed development based on a Floor Area Ratio (FAR) of 1.5 associated with the City zoning is greater, and therefore more conservative, than the proposed build-out conditions listed in the LRPEI.

SECTION 7

CONCLUSION

Based on the analysis, the existing 15-inch sewer infrastructure from existing sewer manhole number 3 (per City of San Diego Construction Drawing 19072-2D) in Children's Way to the existing Kearny Mesa Trunk Sewer has enough capacity to receive the sewer flow from the study

5

area under built-out conditions assumed within the next eight years (See Calculations in Exhibit E-1). The sewer discharge from the built-out development is estimated to be 3.39 cfs (2.19 MGPD).

This estimated sewage discharge will flow at:

 \circ d_n /D = 4.8in/15in = 0.32 in the 15-inch main under Interstate 805.

EXHIBIT A

VICINITY MAP



NOT TO SCALE

EXHIBIT B

<u>CITY OF SAN DIEGO ZONING</u>



EXHIBIT C

SEWER INFRASTRUCTURE EXHIBIT



EXHIBIT D

SEWER BASIN AREAS BY ZONE


EXHIBIT E

SEWER CALCULATIONS

EXHIBIT E-1

SEWER FLOW CALCULATIONS

SEWER FLOW CALCULATIONS*

CALCULATIONS FOR THE PROPOSED PROJECT ARE SHOWN BELOW

PROPOSED PROJECT DATA:

PROPOSED RES. SITE AREA RM-3-7	417,656	SF RM-3-7
PROPOSED RES. SITE AREA	9.59	ACRES RM-3-7
PROPOSED RES. SITE AREA RM-4-10	5,684	SF RM-4-10
PROPOSED RES. SITE AREA	0.13	ACRES RM-4-10
PROPOSED COMMERCIAL SITE AREA		
CO-1-2	234,046	SF (SITE AREA)
	5.37	ACRES (SITE AREA)
x	1.5	FLOOR AREA RATIO (F.A.R.)
=	8.06	ACRES (INCLUDES ALL FLOORS)
PROPOSED COMMERCIAL AREA	8.06	ACRES (ASSUMED TO INCLUDE
		ALL FLOORS BUILT-OUT)
PROPOSED HOSPITAL AREA	64.44	ACRES (HOSPITAL COMPLEX SITE
		AREA)
x	1.5	FLOOR AREA RATIO (F.A.R.)
=	96.66	ACRES (INCLUDES ALL FLOORS)
PROPOSED HOSPITAL AREA	96.66	ACRES (ASSUMED TO INCLUDE
		ALL FLOORS BUILT-OUT)

EQUIVALENT POPULATION CALCULATIONS:

PROPOSED RESIDENTIAL EQUIVALENT POPULATION				
SWR. TABLE 1-1	AREA	POP/NET	EQUIVALENT	EQUIVALENT
ZONE PER CITY	(ACRES)	ACRE**	POPULATION	POPULATION
ZONING				(ROUNDED UP)
RM-3-7	9.59	111.8	1071.9	1072
			SUBTOTAL POP.:	1072

PROPOSED RESIDENT	IAL EQUIVALENT	POPULATION		
SWR. TABLE 1-1 ZONE PER CITY ZONING	AREA (ACRES)	POP/NET ACRE**	EQUIVALENT POPULATION	EQUIVALENT POPULATION (ROUNDED UP)
RM-4-10	0.13	196.2	25.6	26
			SUBTOTAL POP.:	26

PROPOSED RESIDENT	IAL EQUIVALENT	POPULATION		
SWR. TABLE 1-1	BUILT-OUT	POP/NET	EQUIVALENT	EQUIVALENT
ZONE PER CITY	FLOOR AREA	ACRE**	POPULATION	POPULATION
ZONING	(ACRES)			(ROUNDED UP)
COMMERCIAL	8.06	43.7	352.2	353
			SUBTOTAL POP.:	353

PROPOSED HOSPITAL EQUIVALENT POPULATION				
SWR. TABLE 1-1 ZONE PER CITY ZONING	BUILT-OUT FLOOR AREA (ACRES)	POP/NET ACRE**	EQUIVALENT POPULATION	EQUIVALENT POPULATION (ROUNDED UP)
HOSPITAL SPACE	96.66	150	14499.0	14499
			SUBTOTAL POP.:	14499

PROPOSED RES. (RM-3-7) EQUIVALENT POP. SUBTOTAL:	1072
PROPOSED RES. (RM-4-10) EQUIVALENT POP. SUBTOTAL:	26
PROPOSED COMMERCIAL/RETAIL EQUIVALENT POP. SUBTOTAL:	353
PROPOSED HOSPITAL EQUIVALENT POP. SUBTOTAL:	14499
TOTAL PROPOSED EQUIVALENT POPULATION:	15950

PROPOSED PEAK FLOW CALCULATIONS:

FROFOSED FEAR	. FIOW CALCULA	LTOND.
TOTAL EQUIV. POP	PULATION**	15950
AVERAGE FLOW***		
	= TOTAL EQUIV. P	OP.x 80 GPD
	= 1276000.00	GPD
PEAK FACTOR		
	= 6.2945x(EQUIV.	POP)^(-0.1342)
	= 1.72	
PEAK FLOW		
	= PEAK FACTORX A	VERAGE FLOW
	= 2191802.55	GPD
	= 3.391	CFS

PERCENT CONTRIBUTION TO EXISTING SEWER MAINS:

LOCATION 1 SEWER FLOW CALCULATIONS (S=	5.49% upstream of 805 crossing)
PIPE DIA. (D)	15 IN
EXISTING PIPE SLOPE	5.49 %
PIPE CAPACITY (Q) _{d/D=.5} ****	7.57 CFS
PROJECT'S SEWAGE FLOWRATE	3.391 CFS
PROJECT'S ESTIMATED d/D*****	0.32 UNITLESS

LOCATION 2 SEWER FLOW CALCULATIONS (S=1.45% a	along the 805)
PIPE DIA. (D)	33 IN
EXISTING PIPE SLOPE	1.45 %
PIPE CAPACITY (Q) _{d/D=.5} ****	58.07 CFS
PROJECT'S SEWAGE FLOWRATE	3.391 CFS
PROJECT'S % OF d/D DESIGN CAPACITY	5.84 %

* FLOW IS CALCULATED BASED THE CITY OF SAN DIEGO SEWER DESIGN GUIDE 2004. **POP/NET ACRE: SEE TABLE 1-1 OF THE SEWER DESIGN GUIDE. ***DAILY PER CAPITA SEWER FLOW FOR THE EQUIVALENT POPULATION SHALL BE 80 GPD PER CITY OF SAN DIEGO DESIGN GUIDE 1.3.2.2. ****SEE PIPE CAPACITY dn/D COMPUTER PIPE CALCULATIONS. *****SEE AS-BUILT DEPTH COMPUTER PIPE CALCULATIONS.

EXHIBIT E-2

COMPUTER PIPE CALCULATIONS

Capacity of 15-inch Pipe (Flowrate at d/D = 0.5) s=5.49% Worksheet for Circular Channel

Project Descrip	tion	
Worksheet	Capa	city 5.49% crossir
Flow Element	Circu	lar Channel
Method	Mann	ing's Formula
Solve For	Disch	arge
		_
Input Data		_
Mannings Coe	ffic).013	_
Channel Slope	5.49 %	
Depth	7.5 in	
Diameter	15.0 in	
Results		
Discharge	7.57	cfs
Flow Area	0.6	ft²
Wetted Perime	1.96	ft
Top Width	0.00	ft
Critical Depth	1.09	ft
Percent Full	50.0	%
Critical Slope	1.24	%
Velocity	12.33	ft/s
Velocity Head	2.36	ft
Specific Energy	35.9	in
Froude Numbe	3.10	
Maximum Disc	16.28	cfs
Discharge Full	15.13	cfs
Slope Full	1.37	%
Flow Type	Supercritical	

Capacity of 33-inch Pipe (Flowrate at d/D = 0.75) Worksheet for Circular Channel

Project Description				
Worksheet	Capa	city 1.45% alon		
Flow Element	Circu	lar Channel		
Method	Mann	ing's Formula		
Solve For	Disch	arge		
Input Data		_		
Mannings Coef	fic).013	_		
Channel Slope	1.45 %			
Depth	24.8 in			
Diameter	33.0 in			
Results				
Discharge	58.07	cfs		
Flow Area	4.8	ft²		
Wetted Perime	5.76	ft		
Top Width	0.00	ft		
Critical Depth	2.46	ft		
Percent Full	75.0	%		
Critical Slope	1.07	%		
Velocity	12.15	ft/s		
Velocity Head	2.30	ft		
Specific Energy	52.3	in		
Froude Numbe	1.51			
Maximum Discl	68.50	cfs		
Discharge Full	63.68	cfs		
Slope Full	1.21	%		
Flow Type	Supercritical			

Est As-Blt Depth of 15-inch Pipe (As-Blt Flowrate) s=5.49% Worksheet for Circular Channel

Project Description	on		
Worksheet	Est A	s-Blt Depth 5.49% cross	
Flow Element	Circular Channel		
Method	Mann	ning's Formula	
Solve For	Chan	inel Depth	
Input Data		—	
Mannings Coeffi	c).013	—	
Channel Slope	5.49 %		
Diameter	15.0 in		
Discharge	3.39 cfs	;	
Results			
Depth	4.8	in	
Flow Area	0.3	ft²	
Wetted Perime	1.51	ft	
Top Width	0.00	ft	
Critical Depth	0.74	ft	
Percent Full	32.2	%	
Critical Slope	0.63	%	
Velocity	9.94	ft/s	
Velocity Head	1.54	ft	
Specific Energy	23.3	in	
Froude Numbe	3.24		
Maximum Discl	16.28	cfs	
Discharge Full	15.13	cfs	
Slope Full	0.28	%	
Flow Type 3	upercritical		

Page 1 of 1

APPENDIX 1

MEETING NOTES: MEETING WITH THE CITY OF SAN DIEGO WASTEWATER DEPARTMENT

MEETING AT:	CITY OF SAN DIEGO WASTEWATER DEPARTMENT
DATE & TIME:	6/22/2006 AT 2 PM
SUBJECT:	MASTER SEWER STUDY REQUESTED BY BARBARA SALVINI PER LETTER DATED 3/21/06
ATTENDEES:	BARBARA SALVINI, LOUIS SMITH, JANET BUTTMAN, GREG KONAR, ANDY ZIEMNIAK, ROBERT LOMBARDI, TED HAUBRICK, THERESE HAVLUCIYAN, BRIAN MOORE, TIM JACOBY
PDC PROJ. NO:	3242.00
SUMMARY BY:	THERESE HAVLUCIYAN, PROJECT DESIGN CONSULTANTS, 6/27/06

Issues Discussed:

The purpose of the meeting was to discuss the Master Sewer Study that has been requested by Barbara Salvini with the City of San Diego Metropolitan Wastewater Department. A previous meeting was held on May 11, 2006. However, all of the attendees listed above were not able to attend that meeting, and therefore, this meeting was scheduled to include all the parties so that everyone is on the same page.

Barbara Salvini summarized the issues that the Wastewater Department has regarding the capacity in the sewer system and the requirement for a Master Sewer Study.

Robert Lombardi questioned why other new developments in the area (for example the project under construction at the northeast corner of Frost Street and Health Center Drive) are not being asked to contribute. Janet and Barbara explained that other projects that are not required to apply for a CUP would not be reviewed by the Wastewater Department. Janet was going to check the computer system to find out what the status is of that specific project.

PDC then explained that preliminary calculations show that the existing 15-inch sewer main, from Children's Way that runs under Interstate 805 and connects to the Kearny Mesa trunk sewer, does have capacity to receive the existing and proposed discharge from all of the areas that connects or would possibly connect to the sewer system within the next eight years. The area of contribution included is conservative as it includes areas that currently connects to the Linda Vista trunk sewer and the calculations are also conservative because they assume that all of Children's and Sharp Memorial's project sites are hospital buildings, which is not the case. Brian Moore with RBF agreed that the 15-inch sewer main in question has capacity per their sewer calculations. PDC asked Barbara if there is a minimum peaking factor required as the peaking factor decreases when large areas are included in the sewer flow calculations. No direct answer was given to that question other than that it may not be appropriate to simply use the formula per the Sewer Design Guide because the formula is intended for projects that are more spread out than this sewer study area.

Janet and Barbara agreed that based on PDC and RBF's preliminary calculations, the Ronald McDonald House that is proposed on top of Children's Hospital Parking Structure should not be held up awaiting approval of the Master Sewer Study. However, the Wastewater Department requested letters from Children's Hospital and Sharp Memorial stating that they accept responsibility should the Master Sewer Study later show that the 15-inch sewer from Children's Way to the Kearny Mesa trunk sewer does not have capacity and a new connection needs to be built.

Action Items:

1. PDC to proceed with the Master Sewer Study and submit to the Wastewater Department with calculations showing that the existing 15-inch sewer main from Children's Way to the Kearny

Mesa trunk sewer has capacity to accept flow from all existing projects that connect to the system and all proposed projects over the next 8 years. The peaking factor will be based on the City of San Diego' Sewer Design Guide.

- 2. Depending on the City's response, PDC will then resubmit the Preliminary Sewer Report for Children's Hospital Parking Structure and Ronald McDonald House and reference the Master Sewer Study for the existing 15-inch main that is analyzed from Children's Way to the Kearny Mesa trunk sewer.
- 3. Per Janet Buttman, PDC can resubmit the Preliminary Sewer Report for Children's Hospital Parking Structure and Ronald McDonald House prior to the approval of the Master Sewer Study if the City receives a letter from each of Children's Hospital and Sharp Memorial accepting responsibility should the Master Sewer Study show that the existing 15-inch sewer main from Children's Way to the Kearny Mesa trunk sewer does not have capacity and a new connection needs to be built.
- 4. It is PDC's understanding that Martin Ziemniak Engineers will analyze the existing 15-inch sewer main, from the proposed manhole connection point downstream to Children's Way, that Sharp Memorial's project at the southeast corner of Frost Street and Health Center Drive proposes to connect to.

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

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*

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

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

Definitions:

DU = Dwelling UnitsAc = 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 = $0.8 \times \text{Gross}$ Area in Acres

For developed areas, calculate actual Net Acreage.

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

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* <u>Versus Tributary Population</u>

	<u>Ratio of Peak to</u>		<u>Ratio of Peak to</u>
Population	Average Flow	Population	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 x (pop)^{-0.1342} (Holmes & Narver, 1960)

FIGURE 1-1



SanGIS Basemap Accuracy

SanGIS Land (Lot) basemap data for the City of San Diego tested 20.7' horizontal accuracy at the 95% confidence level.

This data meets the ASPRS Standard for Class 1 Map Accuracy at a scale of 1:12,000 (1"=1,000').

This assessment assumes utilization of the data on a citywide basis. Localized data may exceed or fail to meet this accuracy with errors in excess of 100' possible.

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Official Zoning Map EMX-2 OP-1-1 CC-3-8 IS-1-1 RM-2-5 0C-1-1 OC-1-1 IH-2-1 IL-3-1 KEARNY MESA GIBBS DR RM-3-9 RMX-1 EMX-1 SOVEREIGN RD RM-1-1 RM-3-7 RM-3-7 RM-2-5 SERRA MESA RS-1-7 NIGHTINGALE WY RM-2-5 OR-1-1 RS-1-4 CONVERSE A R\$-1-2 MISSION REGENCY RD

City of San Diego Development Services Department





GRID SCALE: 800 DATE: 1/12/2021 4:21:53 PM

Legend		
	City of San Diego Boundary	
	Community Plan Areas	
	Parcels	
Zoning		
	AR-1-2	
	CC-1-1	
	-1-3	
	CC-2-2	
	CC-2-3 CC-2-5	
	CC-2-5	
	CC-3-0	
	CC-4-5	
	CC-4-6	
	CN-1-2	
	CO-1-2	
	CO-3-3	
	CP-1-1	
	CV-1-2	
	EMX-1	
	EMX-2	
	IH-1-1	
	IH-2-1	
	IL-2-1	
	IL-3-1	
	IP-2-1	
	IS-1-1	
	OC-1-1	
	OP-1-1	
	0P-2-1	
	DR-1-1	
	RM-1-3	
	RM-2-5	
	RM-3-7	
	RM-3-8	
	RM-3-9	
	RM-4-10	
	RMX-1	
	RMX-2	
	RS-1-1	
	RS-1-2	
	RS-1-3	
	RS-1-4	
	RS-1-7	
	RS-1-8	
	UNZONED	

