Appendix P

Water System Analysis

WATER SYSTEM ANALYSIS
FOR THE
EAST OTAY MESA
SPECIFIC PLAN AMENDMENT

September 23, 2015

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Job No. 701-012

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Attention: Andrea Rosati, Vice President

Subject: Water System Analysis for the East Otay Mesa Specific Plan Amendment

Introductions

This letter-report summarizes our efforts to evaluate the potable water system requirements for the proposed East Otay Mesa Specific Plan Amendment (Project). The project is within the Otay Water District (OWD) for potable and recycled water service. This study provides information on planning criteria, projected water demands, existing facilities, and proposed facilities associated with serving the project. This study provides recommended water facilities specific to the needs of the East Otay Mesa Specific Plan Amendment, but takes into account Otay Water District regional planning for the area.

Project Overview

The Project is 220.3 acres in size and is located along the north side of Otay Mesa Road just east of State Route 125. Figure 1 provides a location map for the project. The project proposes up to 3,158 residential dwelling units, 1,389,564 square feet of technology park, and 84,842 square feet of commercial development.

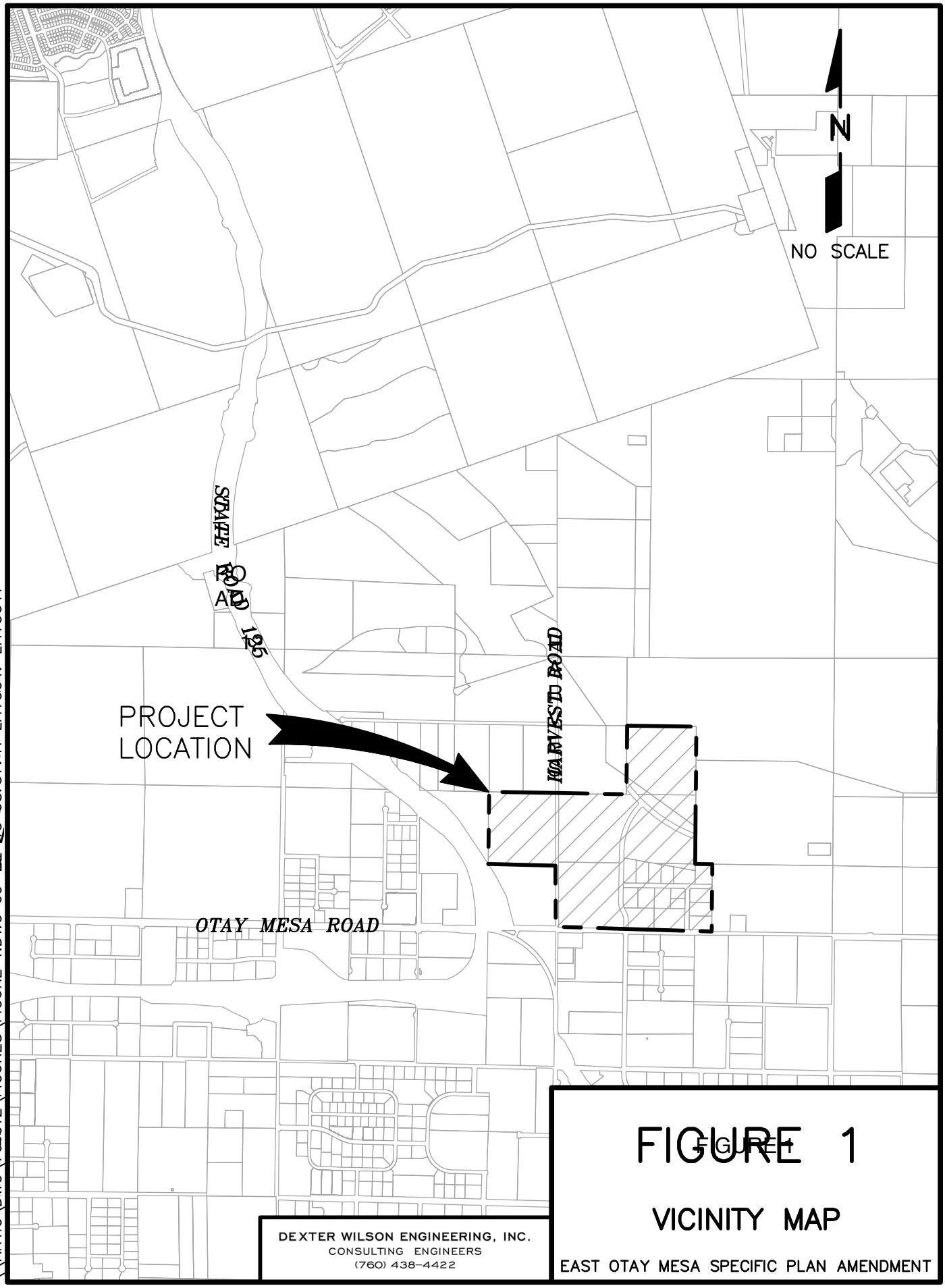

FIGURE 1

VICINITY MAP

EAST OTAY MESA SPECIFIC PLAN AMENDMENT

DEXTER WILSON ENGINEERING, INC.
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Purpose of Study

The purpose of this study is to provide the required potable water improvements that will be necessary to serve the proposed Specific Plan Amendment for the East Otay Mesa property. This report will also serve as supporting documentation for the Project's environmental report for the Specific Plan Amendment.

Planning Criteria

The planning criteria used in this study are in accordance with the October 2008 Otay Water District Water Resources Master Plan, last amended April 2013. The criteria pertinent to this study are summarized below. OWD has recently determined that it is not feasible to supply recycled water to the East Otay Mesa area and the demand factors reflect that all demands will be met with potable water.

- Minimum Pressure, Static = 60 psi
- Maximum Pressure, Static = 200 psi (120 psi desired)
- Minimum Pressure, Peak Hour = 40 psi
- Minimum Pressure, Max Day plus Fire = 20 psi
- Commercial Demand Factor = 1,785 gpd/acre
- Industrial Demand Factor = 893 gpd/acre
- High Density Residential Demand Factor (>8 DU/ac) = 300 gpd/DU
- Maximum Velocity, Peak Hour = 6 fps
- Maximum Velocity, Max Day plus Fire = 10 fps
- Hazen Williams "C", 12-inch diameter and less = 120
- Hazen Williams "C", greater than 12-inch diameter = 130

In order to determine maximum day demand and peak hour demand, Figure 4-2 and Figure 4-3 from the OWD Master Plan were used, respectively. These figures are included in Appendix A. For industrial and commercial land uses, OWD uses a fire flow requirement of 3,500 gpm for planning purposes. For residential land uses, OWD uses a fire flow requirement of 1,500 gpm and 2,500 gpm for single-family and multi-family residences, respectively. The actual fire flow requirements will need to be confirmed with the fire department once building footprints and construction materials are known.

Projected Water Demands

Table 1 summarizes the projected average total water demands for the project. A detailed projection of water demand by land use area is included with the hydraulic analysis in Appendix B.

TABLE 2
EAST OTAY MESA SPECIFIC PLAN AMENDMENT
PROJECTED WATER DEMAND

Land Use	Area	Units	Demand Factor	Demand, gpd
Residential	110.9	3,158	300 gpd/DU	947,400
Industrial Park	47.7	--	893 gpd/acre	42,596
Commercial	7.8	--	1,785 gpd/acre	13,923
Open Space	53.9	--	--	0
TOTAL	**220.3**	**3,158**		**1,003,919**

The maximum day demand and peak hour demand peaking factors are 2.5 and 5.0, respectively, resulting in a maximum day demand of 2,509,798 gpd (1,743 gpm) and peak hour demand of 5,019,595 gpd (3,486 gpm).

Existing Facilities

The project can be served by supplying potable water to the project in an existing 24-inch line in Otay Mesa Road directly adjacent to the project and a north-south 21-inch line that crosses through the project. Both lines are part of the 870 Zone water system that serves the entire Otay Mesa Area. An 11.0 million gallon 870 Zone Reservoir is located northeast of the project, adjacent to the East Mesa Detention Facility. From this reservoir, transmission lines in Alta Road convey water to the Otay Mesa area. Figure 2 provides the location of existing potable water facilities in the vicinity of the project.

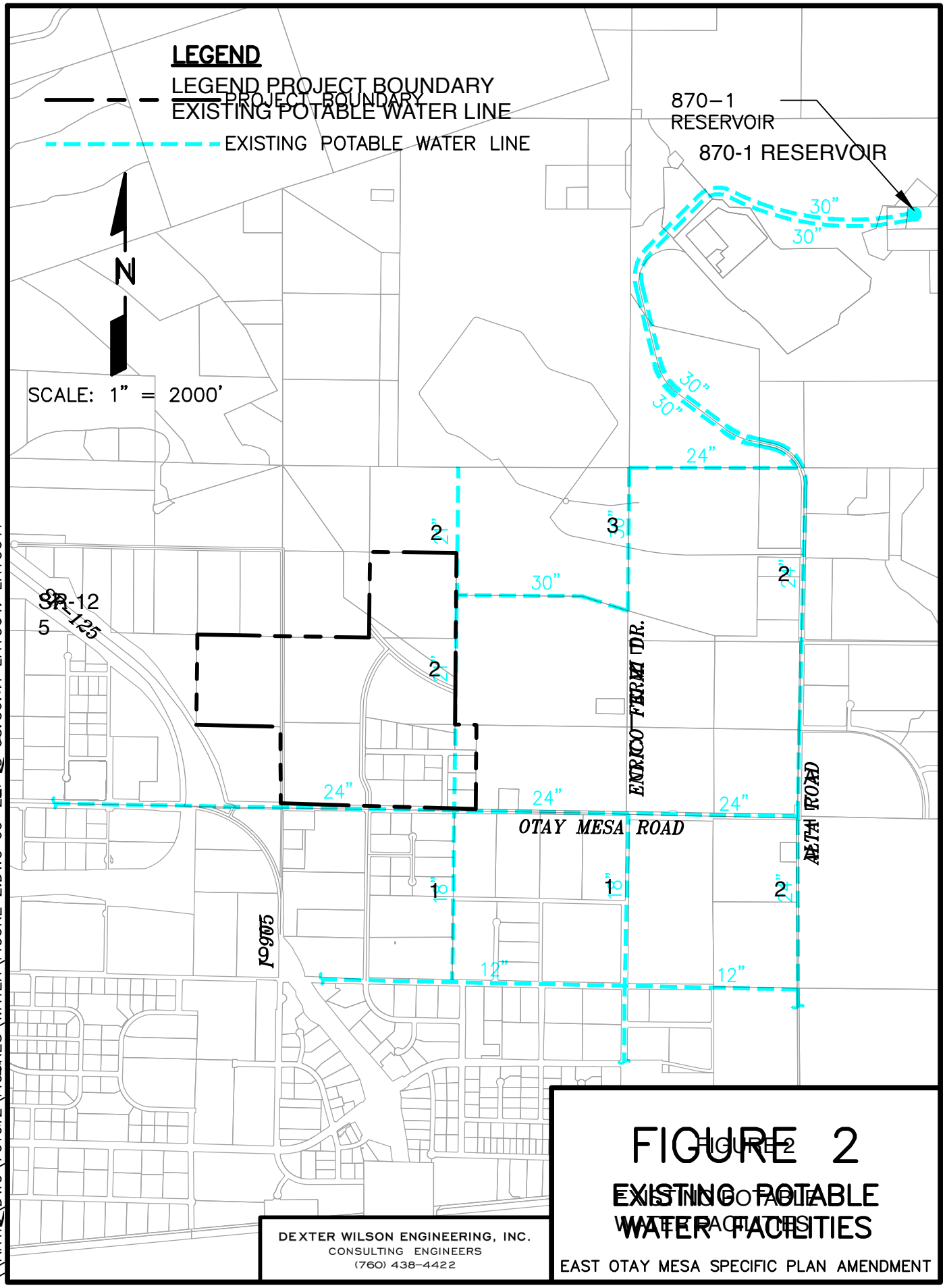


FIGURE 2

EXISTING POTABLE WATER FACILITIES

EAST OTAY MESA SPECIFIC PLAN AMENDMENT

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

Proposed Water Facilities

To provide potable water service to the project, it is proposed to expand the 870 Zone system by connecting to the existing 24-inch line in Otay Mesa Road at three locations. The project will also connect to the 21-inch pipeline that runs from north to south through the proposed project and relocate a section of this line to Vann Centre Boulevard. The project proposes to construct 12-inch water lines throughout the project. Smaller diameter pipelines could satisfy the District's criteria in some areas of the project, but, due to the potential higher fire flows once building data is known, 12-inch piping is recommended in the backbone streets throughout the Project.

Static pressures on the project are expected to range from 112 to 142 psi. The maximum static pressure is greater than the desired maximum pressure of 120 psi, but within the District limit of 200 psi. Figure 3 provides the proposed water system requirements for the system.

Hydraulic Analysis

Analysis using the KYPIPE computer software developed by the University of Kentucky determined residual pressures throughout the proposed water system. This computer software utilizes the Hazen-Williams equation for determining headloss in pipes. The Hazen-Williams "C" value used for pipe sizes 12 inches in diameter or less is 120, and for all pipe sizes greater than 12 inches in diameter is 130.

The system was modeled under multiple flow scenarios. For all flow scenarios the hydraulic gradeline available in the vicinity of the project was assumed to be 840 feet. The proposed system meets all design criteria except for the proposed 12-inch in Lone Star Road. The velocity in this line is 10.34 fps during a maximum day demand plus fire flow condition which is greater than the District's maximum of 10 fps.

Appendix B provides the computer modeling output for the hydraulic analysis and Exhibit A provides the corresponding node and pipe diagram.

If you have any questions, please let us know.

Dexter Wilson Engineering, Inc.

Stephen M. Nielsen, P.E.

SMN:pjs

\\ARTIC\DWG\701012\FIGURES\WATER\FIGURE 3.DWG 09-23-15 15:13:01 LAYOUT: LAYOUT

SR-125

HARVEST ROAD

BLVD

HARVEST

ZINSER ROAD 12"

ALEJANDRO ROAD

SUNROAD BLVD

LONE STAR DRIVE 12"

12" ROAD

ALEJANDRO DRIVE 12"

VIEW DRIVE 12"

SUNROAD DRIVE 12"

DAVID RIDGE DRIVE 12"

MESA ROAD 24"

OTAY 24"

VANN CENTRE BLVD 21"

12"

21"

24"

A

B

B

C

D

E

F

G

H

I

J

K

M

N

EXISTING 21" TO REMAIN

EXISTING 21" TO BE RELOCATED

EXISTING 21" TO BE RELOCATED

SCALE: 1" = 400'

OFF RAMP

SR 905

VALLE CENTRO LN

DRIVE

FIGURE 3
PROPOSED WATER SYSTEM

LEGEND

- PROJECT BOUNDARY
- EXISTING WATER LINE (870 ZONE)
- PROPOSED WATER LINE (870 ZONE)
- PROPOSED FIRE HYDRANT
- A — LAND USE AREA

APPENDIX A

MAXIMUM DAY DEMAND AND PEAK HOUR DEMAND PEAKING FACTOR CURVES

Figure 4-2. MDD Peaking Factor Curve

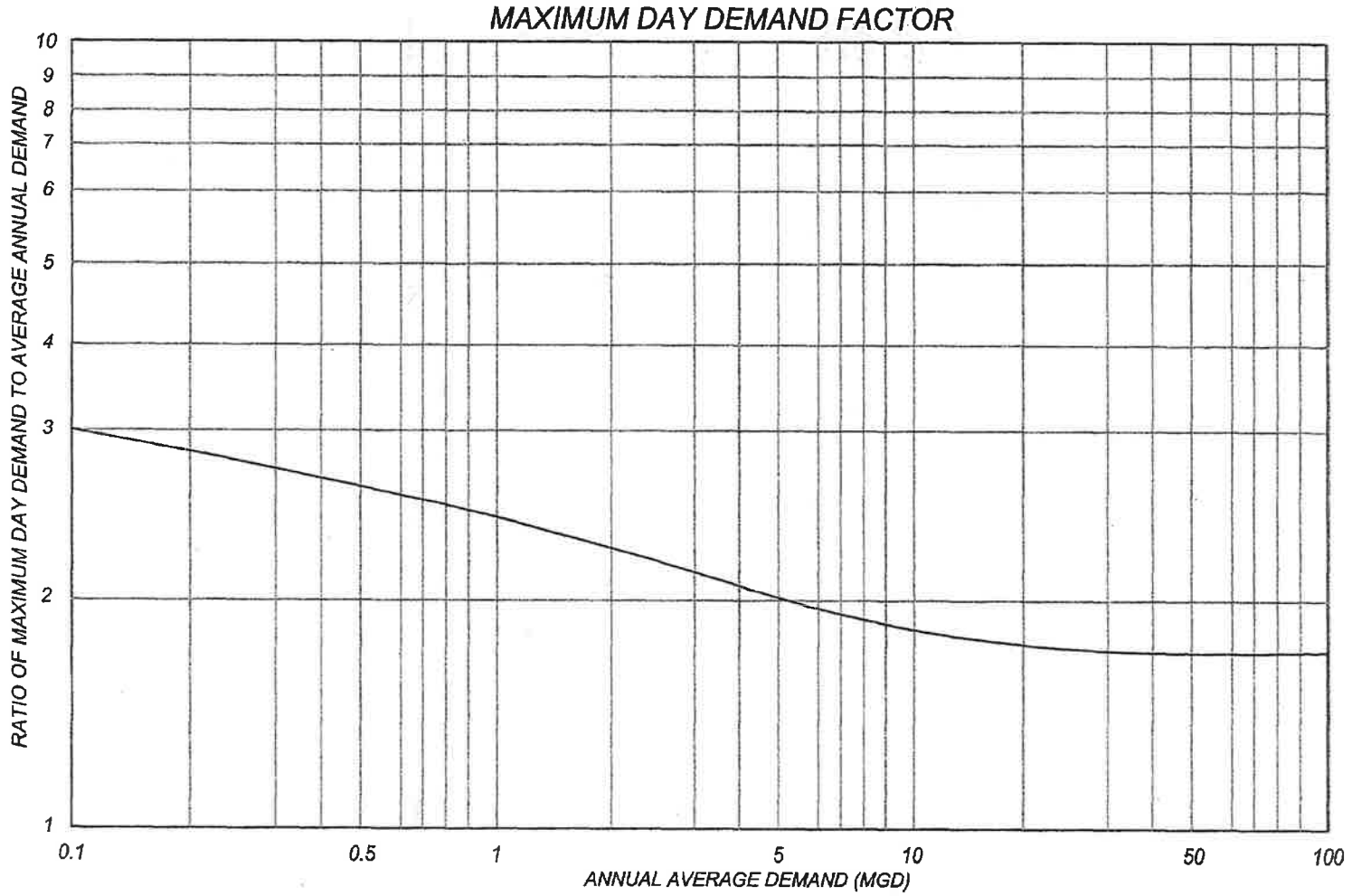
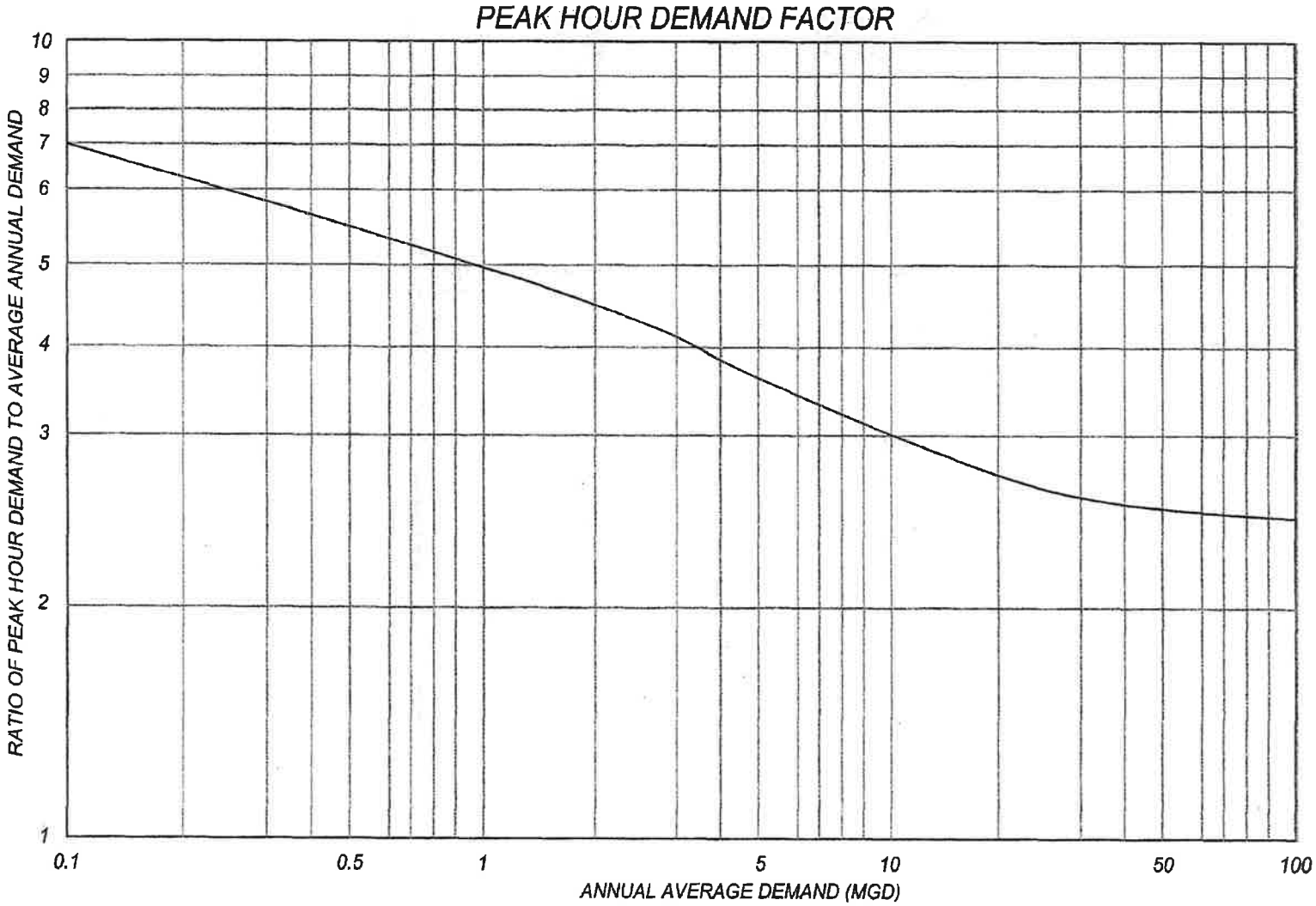


Figure 4-3. Peak Hour Peaking Curve



APPENDIX B

HYDRAULIC ANALYSIS

EASTY OTAY MESA SPECIFIC PLAN AMENDMENT
PROJECTED WATER DEMAND
BY PLANNING AREA

Planning Area	Land Use	Area, acres	Units	Denisty, units/acre	Demand Factor	Demand, gpd
A	Residential	10.1	303	30	300 gpd/DU	90,900
	Tech Park	15.2	--	--	893 gpd/ac	13,574
	Open Space	0.2	--	--	--	0
B	Residential	18.3	586	32	300 gpd/DU	175,800
	Tech Park	1	--	--	893 gpd/ac	893
	Open Space	2.1	--	--	--	0
C	Residential	17.1	548	32	300 gpd/DU	164,400
	Tech Park	0.9	--	--	893 gpd/ac	804
	Open Space	0.3	--	--	--	0
D	Residential	16.9	540	32	300 gpd/DU	162,000
	Tech Park	0.4	--	--	893 gpd/ac	357
	Commercial	0.5	--	--	1,785 gpd/ac	893
E	Residential	4	79	20	300 gpd/DU	23,700
	Tech Park	0.6	--	--	893 gpd/ac	536
	Commercial	6.8	--	--	1,785 gpd/ac	12,138
F	Residential	7.4	148	20	300 gpd/DU	44,400
	Tech Park	11.1	--	--	893 gpd/ac	9,912
G	Residential	10	200	20	300 gpd/DU	60,000
	Commercial	0.5	--	--	1,785 gpd/ac	893
H	Residential	20.6	624	30	300 gpd/DU	187,200
	Tech Park	1.1	--	--	893 gpd/ac	982
I	Tech Park	4	--	--	893 gpd/ac	3,572
J	Residential	6.5	130	20	300 gpd/DU	39,000
	Tech Park	9.8	--	--	893 gpd/ac	8,751
K	Tech Park	3.6	--	--	893 gpd/ac	3,215
M	Open Space	51.3	--	--	--	0
TOTAL		**220.3**	**3,158**			**1,003,919**

KYPIPE

HYDRAULIC ANALYSES

1. Average Day Demand
2. Peak Hour Demand
3. Maximum Day Demand plus 3,500 gpm Fire Flow at Node 32
4. Maximum Day Demand plus 3,500 gpm Fire Flow at Node 28
5. Maximum Day Demand plus 3,500 gpm Fire Flow at Node 8

FLOWRATE IS EXPRESSED IN GPM AND PRESSURE IN PSIG

A SUMMARY OF THE ORIGINAL DATA FOLLOWS

PIPE NO.	NODE NOS.		LENGTH (FEET)	DIAMETER (INCHES)	ROUGHNESS	MINOR LOSS K	FIXED GRADE
101	0	4	600.0	12.0	120.0	.00	840.00
105	4	8	850.0	12.0	120.0	.00	
107	4	24	800.0	12.0	120.0	.00	
109	0	16	650.0	21.0	130.0	.00	840.00
113	12	16	1000.0	21.0	130.0	.00	
117	0	12	525.0	21.0	130.0	.00	840.00
121	16	20	900.0	12.0	120.0	.00	
125	20	24	1000.0	12.0	120.0	.00	
129	24	28	1150.0	12.0	120.0	.00	
133	28	32	1750.0	12.0	120.0	.00	
137	0	36	1650.0	24.0	130.0	.00	840.00
141	36	40	650.0	12.0	120.0	.00	
145	40	44	550.0	12.0	120.0	.00	
149	44	48	1100.0	12.0	120.0	.00	
153	48	32	1550.0	12.0	120.0	.00	
157	20	40	800.0	12.0	120.0	.00	
161	24	44	700.0	12.0	120.0	.00	
165	28	48	1050.0	12.0	120.0	.00	
169	36	52	1400.0	24.0	130.0	.00	
173	52	48	1500.0	12.0	120.0	.00	

JUNCTION NUMBER	DEMAND	ELEVATION	CONNECTING PIPES
4	.00	596.00	101 105 107
8	57.40	612.00	105
12	.00	574.00	113 117
16	4.70	575.00	109 113 121
20	82.00	562.00	121 125 157
24	86.50	580.00	107 125 129 161
28	175.40	590.00	129 133 165
32	134.00	538.00	133 153
36	.00	551.00	137 141 169
40	29.20	557.00	141 145 157
44	33.70	566.00	145 149 161
48	69.30	586.00	149 153 165 173
52	25.30	538.00	169 173

OUTPUT SELECTION: ALL RESULTS ARE OUTPUT EACH PERIOD

THIS SYSTEM HAS 20 PIPES WITH 13 JUNCTIONS , 4 LOOPS AND 4 FGNS

THE RESULTS ARE OBTAINED AFTER 6 TRIALS WITH AN ACCURACY = .00449

OTAY MESA SPECIFIC PLAN AMENDMENDMENT WATER ANALYSIS
AVERAGE DAY DEMAND

PIPE NO.	NODE NOS.		FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
101	0	4	182.75	.08	.00	.00	.52	.13
105	4	8	57.40	.01	.00	.00	.16	.01
107	4	24	125.35	.05	.00	.00	.36	.06
109	0	16	101.51	.00	.00	.00	.09	.00
113	12	16	64.10	.00	.00	.00	.06	.00
117	0	12	64.10	.00	.00	.00	.06	.00
121	16	20	160.91	.09	.00	.00	.46	.10
125	20	24	90.94	.03	.00	.00	.26	.03
129	24	28	129.25	.08	.00	.00	.37	.07
133	28	32	44.44	.02	.00	.00	.13	.01
137	0	36	349.14	.02	.00	.00	.25	.01
141	36	40	168.11	.07	.00	.00	.48	.11
145	40	44	126.87	.04	.00	.00	.36	.06
149	44	48	93.71	.04	.00	.00	.27	.04
153	48	32	89.56	.05	.00	.00	.25	.03
157	20	40	-12.03	.00	.00	.00	-.03	.00
161	24	44	.54	.00	.00	.00	.00	.00
165	28	48	-90.58	-.04	.00	.00	-.26	-.03
169	36	52	181.03	.01	.00	.00	.13	.00
173	52	48	155.73	.14	.00	.00	.44	.09

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
4	.00	839.92	596.00	105.70
8	57.40	839.91	612.00	98.76
12	.00	840.00	574.00	115.27
16	4.70	840.00	575.00	114.83
20	82.00	839.91	562.00	120.43
24	86.50	839.87	580.00	112.61
28	175.40	839.80	590.00	108.25
32	134.00	839.78	538.00	130.77
36	.00	839.98	551.00	125.22
40	29.20	839.91	557.00	122.59
44	33.70	839.87	566.00	118.68
48	69.30	839.83	586.00	109.99
52	25.30	839.97	538.00	130.86

THE NET SYSTEM DEMAND = 697.50

SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
101	182.75
109	101.51
117	64.10
137	349.14

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 697.50
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = .00

A SUMMARY OF CONDITIONS SPECIFIED FOR THE NEXT SIMULATION FOLLOWS

THE DEMANDS ARE CHANGED FROM ORIGINAL VALUES BY A FACTOR = 5.00

THE RESULTS ARE OBTAINED AFTER 2 TRIALS WITH AN ACCURACY = .00003

PEAK HOUR DEMAND

PIPE NO.	NODE NOS.		FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
101	0	4	913.75	1.49	.00	.00	2.59	2.49
105	4	8	287.00	.25	.00	.00	.81	.29
107	4	24	626.75	.99	.00	.00	1.78	1.24
109	0	16	507.70	.03	.00	.00	.47	.05
113	12	16	320.36	.02	.00	.00	.30	.02
117	0	12	320.36	.01	.00	.00	.30	.02
121	16	20	804.55	1.77	.00	.00	2.28	1.97
125	20	24	454.72	.68	.00	.00	1.29	.68
129	24	28	646.27	1.51	.00	.00	1.83	1.31
133	28	32	222.17	.32	.00	.00	.63	.18
137	0	36	1745.70	.40	.00	.00	1.24	.24
141	36	40	840.53	1.39	.00	.00	2.38	2.13
145	40	44	634.36	.70	.00	.00	1.80	1.27
149	44	48	468.57	.79	.00	.00	1.33	.72
153	48	32	447.83	1.03	.00	.00	1.27	.66
157	20	40	-60.17	-.01	.00	.00	-.17	-.02
161	24	44	2.70	.00	.00	.00	.01	.00
165	28	48	-452.91	-.71	.00	.00	-1.28	-.68
169	36	52	905.17	.10	.00	.00	.64	.07
173	52	48	778.67	2.78	.00	.00	2.21	1.85

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
4	.00	838.51	596.00	105.09
8	287.00	838.26	612.00	98.05
12	.00	839.99	574.00	115.26
16	23.50	839.97	575.00	114.82
20	410.00	838.20	562.00	119.69
24	432.50	837.52	580.00	111.59
28	877.00	836.01	590.00	106.60
32	670.00	835.69	538.00	129.00
36	.00	839.60	551.00	125.06
40	146.00	838.21	557.00	121.86
44	168.50	837.52	566.00	117.66
48	346.50	836.72	586.00	108.65
52	126.50	839.50	538.00	130.65

THE NET SYSTEM DEMAND = 3487.50

SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
101	913.75
109	507.70
117	320.36
137	1745.70

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 3487.50
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = .00

A SUMMARY OF CONDITIONS SPECIFIED FOR THE NEXT SIMULATION FOLLOWS

THE DEMANDS ARE CHANGED FROM ORIGINAL VALUES BY A FACTOR = 2.50

THE FOLLOWING SPECIFIC DEMAND CHANGES ARE MADE :

JUNCTION NUMBER	DEMAND
32	3835.00

THE RESULTS ARE OBTAINED AFTER 3 TRIALS WITH AN ACCURACY = .00084

MAXIMUM DAY DEMAND PLUS 3500 GPM FIRE FLOW AT NODE 32

PIPE NO.	NODE NOS.		FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
101	0	4	1269.91	2.75	.00	.00	3.60	4.58
105	4	8	143.50	.07	.00	.00	.41	.08
107	4	24	1126.41	2.93	.00	.00	3.20	3.67
109	0	16	714.81	.06	.00	.00	.66	.09
113	12	16	451.04	.04	.00	.00	.42	.04
117	0	12	451.04	.02	.00	.00	.42	.04
121	16	20	1154.10	3.45	.00	.00	3.27	3.84
125	20	24	848.69	2.17	.00	.00	2.41	2.17
129	24	28	1527.78	7.41	.00	.00	4.33	6.45
133	28	32	1801.89	15.32	.00	.00	5.11	8.75
137	0	36	2808.00	.97	.00	.00	1.99	.59
141	36	40	1174.39	2.57	.00	.00	3.33	3.96
145	40	44	1201.80	2.27	.00	.00	3.41	4.13
149	44	48	1348.61	5.63	.00	.00	3.83	5.12
153	48	32	2033.11	16.97	.00	.00	5.77	10.95
157	20	40	100.41	.03	.00	.00	.28	.04
161	24	44	231.06	.14	.00	.00	.66	.20
165	28	48	-712.61	-1.65	.00	.00	-2.02	-1.57
169	36	52	1633.61	.30	.00	.00	1.16	.22
173	52	48	1570.36	10.18	.00	.00	4.45	6.78

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
4	.00	837.25	596.00	104.54
8	143.50	837.18	612.00	97.58

12	.00	839.98	574.00	115.26
16	11.75	839.94	575.00	114.81
20	205.00	836.49	562.00	118.95
24	216.25	834.32	580.00	110.21
28	438.50	826.91	590.00	102.66
32	3835.00	811.59	538.00	118.56
36	.00	839.03	551.00	124.81
40	73.00	836.46	557.00	121.10
44	84.25	834.18	566.00	116.21
48	173.25	828.55	586.00	105.11
52	63.25	838.73	538.00	130.32

THE NET SYSTEM DEMAND = 5243.75

SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
101	1269.91
109	714.81
117	451.04
137	2808.00

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 5243.75
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = .00

A SUMMARY OF CONDITIONS SPECIFIED FOR THE NEXT SIMULATION FOLLOWS

THE DEMANDS ARE CHANGED FROM ORIGINAL VALUES BY A FACTOR = 2.50

THE FOLLOWING SPECIFIC DEMAND CHANGES ARE MADE :

JUNCTION NUMBER	DEMAND
28	3938.50

THE RESULTS ARE OBTAINED AFTER 4 TRIALS WITH AN ACCURACY = .00237

MAXIMUM DAY DEMAND PLUS 3500 GPM FIRE FLOW AT NODE 28

PIPE NO.	NODE NOS.		FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
101	0	4	1308.68	2.90	.00	.00	3.71	4.84
105	4	8	143.50	.07	.00	.00	.41	.08
107	4	24	1165.18	3.12	.00	.00	3.31	3.90
109	0	16	729.90	.06	.00	.00	.68	.09
113	12	16	460.56	.04	.00	.00	.43	.04
117	0	12	460.56	.02	.00	.00	.43	.04
121	16	20	1178.71	3.59	.00	.00	3.34	3.99
125	20	24	891.53	2.38	.00	.00	2.53	2.38
129	24	28	1840.71	10.47	.00	.00	5.22	9.10
133	28	32	-622.52	-2.14	.00	.00	-1.77	-1.22
137	0	36	2744.61	.93	.00	.00	1.95	.56

141	36	40	1215.54	2.74	.00	.00	3.45	4.22
145	40	44	1224.72	2.35	.00	.00	3.47	4.28
149	44	48	1140.22	4.13	.00	.00	3.23	3.75
153	48	32	957.52	4.21	.00	.00	2.72	2.71
157	20	40	82.18	.02	.00	.00	.23	.03
161	24	44	-.25	.00	.00	.00	.00	.00
165	28	48	-1475.27	-6.35	.00	.00	-4.18	-6.04
169	36	52	1529.07	.27	.00	.00	1.08	.19
173	52	48	1465.82	8.96	.00	.00	4.16	5.97

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
4	.00	837.10	596.00	104.47
8	143.50	837.03	612.00	97.51
12	.00	839.98	574.00	115.26
16	11.75	839.94	575.00	114.81
20	205.00	836.35	562.00	118.89
24	216.25	833.97	580.00	110.05
28	3938.50	823.50	590.00	101.18
32	335.00	825.64	538.00	124.64
36	.00	839.07	551.00	124.83
40	73.00	836.33	557.00	121.04
44	84.25	833.97	566.00	116.12
48	173.25	829.85	586.00	105.67
52	63.25	838.81	538.00	130.35

THE NET SYSTEM DEMAND = 5243.75

SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
101	1308.68
109	729.90
117	460.56
137	2744.61

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 5243.75
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = .00

A SUMMARY OF CONDITIONS SPECIFIED FOR THE NEXT SIMULATION FOLLOWS

THE DEMANDS ARE CHANGED FROM ORIGINAL VALUES BY A FACTOR = 2.50

THE FOLLOWING SPECIFIC DEMAND CHANGES ARE MADE :

JUNCTION NUMBER	DEMAND
8	3643.50

THE RESULTS ARE OBTAINED AFTER 4 TRIALS WITH AN ACCURACY = .00140

MAXIMUM DAY DEMAND PLUS 3500 GPM FIRE FLOW AT NODE 8

PIPE NO.	NODE NOS.		FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
101	0	4	2334.50	8.48	.00	.00	6.62	14.14
105	4	8	3643.50	27.41	.00	.00	10.34	32.24
107	4	24	-1309.00	-3.87	.00	.00	-3.71	-4.84
109	0	16	596.80	.04	.00	.00	.55	.06
113	12	16	376.57	.03	.00	.00	.35	.03
117	0	12	376.57	.01	.00	.00	.35	.03
121	16	20	961.62	2.46	.00	.00	2.73	2.74
125	20	24	834.90	2.11	.00	.00	2.37	2.11
129	24	28	-62.05	-.02	.00	.00	-.18	-.02
133	28	32	-37.28	-.01	.00	.00	-.11	-.01
137	0	36	1935.88	.49	.00	.00	1.37	.29
141	36	40	1023.61	2.00	.00	.00	2.90	3.07
145	40	44	872.33	1.26	.00	.00	2.47	2.28
149	44	48	159.77	.11	.00	.00	.45	.10
153	48	32	372.28	.73	.00	.00	1.06	.47
157	20	40	-78.28	-.02	.00	.00	-.22	-.03
161	24	44	-628.30	-.87	.00	.00	-1.78	-1.24
165	28	48	-463.27	-.74	.00	.00	-1.31	-.71
169	36	52	912.27	.10	.00	.00	.65	.07
173	52	48	849.02	3.26	.00	.00	2.41	2.17

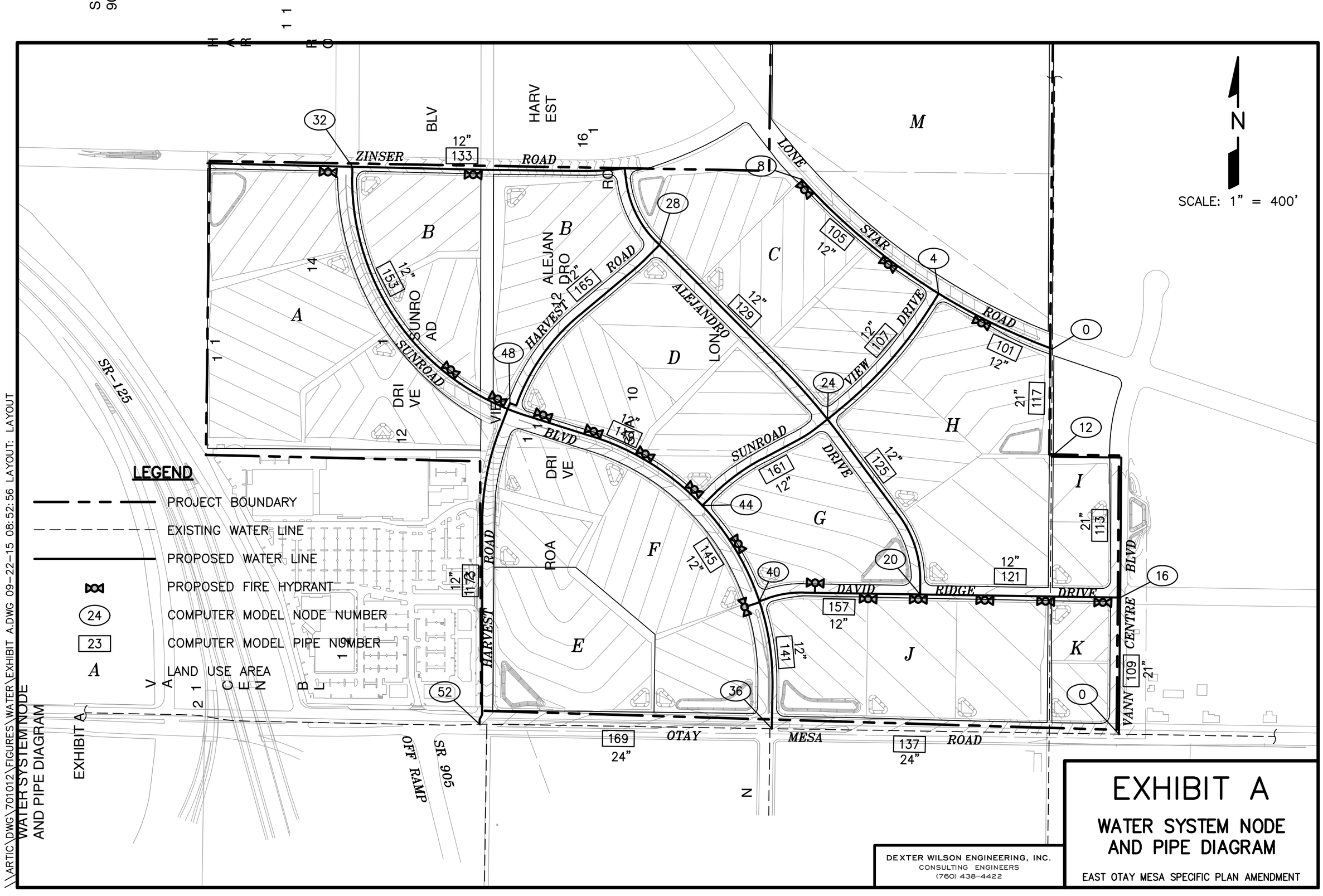
JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
4	.00	831.52	596.00	102.06
8	3643.50	804.11	612.00	83.25
12	.00	839.99	574.00	115.26
16	11.75	839.96	575.00	114.82
20	205.00	837.50	562.00	119.38
24	216.25	835.39	580.00	110.67
28	438.50	835.41	590.00	106.34
32	335.00	835.42	538.00	128.88
36	.00	839.51	551.00	125.02
40	73.00	837.52	557.00	121.56
44	84.25	836.26	566.00	117.11
48	173.25	836.15	586.00	108.40
52	63.25	839.41	538.00	130.61

THE NET SYSTEM DEMAND = 5243.75

SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
101	2334.50
109	596.80
117	376.57
137	1935.88

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 5243.75
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = .00



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

EXHIBIT A

WATER SYSTEM NODE AND PIPE DIAGRAM

EAST OTAY MESA SPECIFIC PLAN AMENDMENT