

**PRELIMINARY WATER SYSTEM ANALYSIS
FOR THE 661 BEAR VALLEY PROJECT
IN THE CITY OF ESCONDIDO**

May 29, 2015



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Job No. 571-002

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May 29, 2015

571-002

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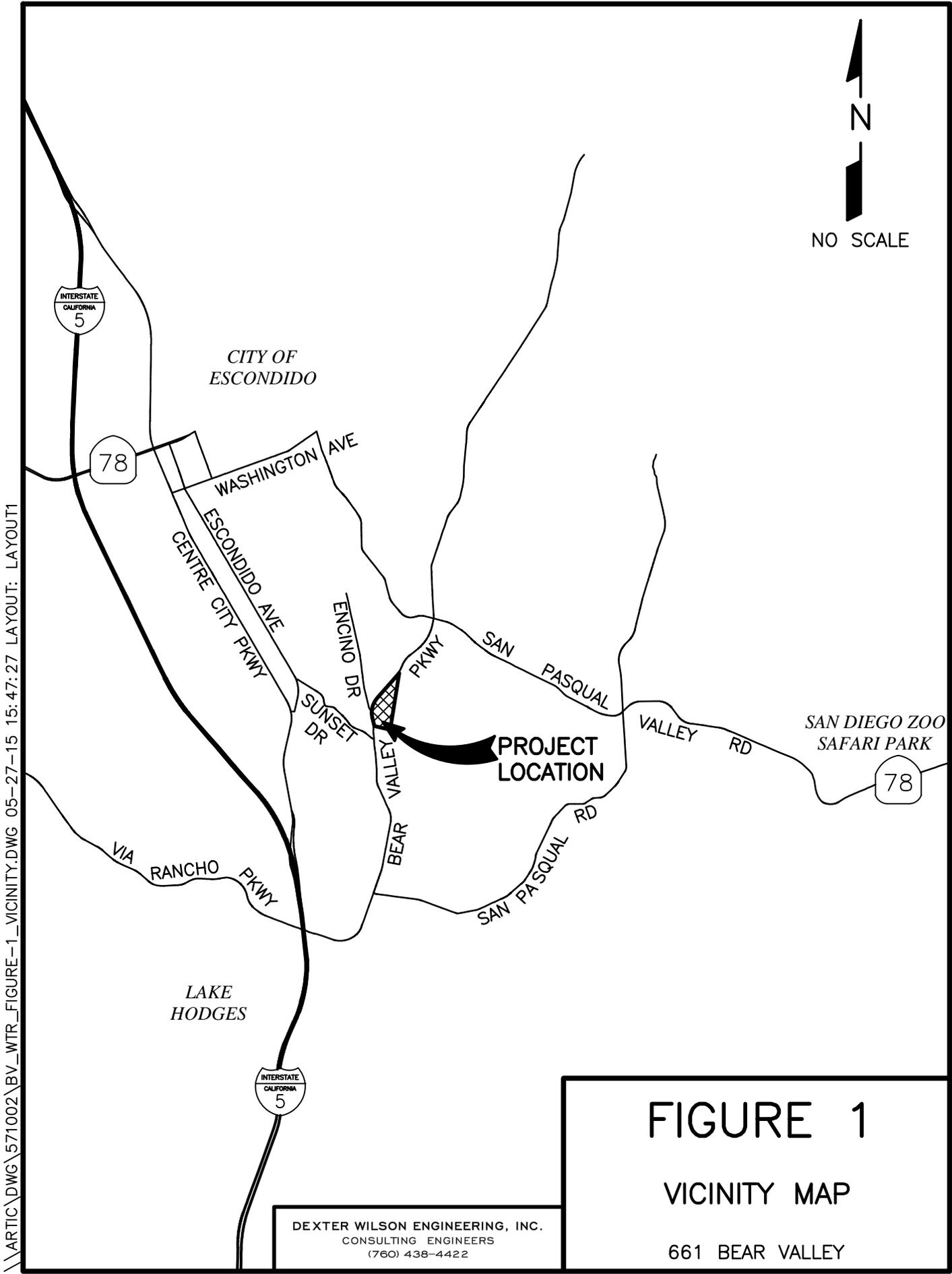
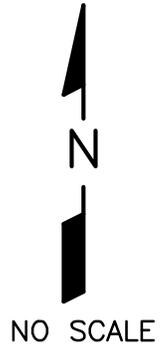
Attention: Jack Henthorn, President

Subject: Water System Analysis for the 661 Bear Valley Project in the City of Escondido

Introduction

The 661 Bear Valley project is presently processing a tentative map/planned development/grading exemption/rezone application in the City of Escondido for a single family residential subdivision of approximately 55 lots on a project site of approximately 40.9 gross acres. This property fronts Bear Valley Parkway immediately east of the Encino Drive and Bear Valley Parkway intersection. Adjacent to the property are existing single family residential properties.

Access to the project will be off of Bear Valley Parkway with primary access proposed across from the existing driveway for Zlatibor Ranch Road. An emergency access road is proposed further south on Bear Valley Parkway. Figure 1 shows the 661 Bear Valley project vicinity map.



\\ARTIC\DWG\571002\BV_WTR_FIGURE-1_VICINITY.DWG 05-27-15 15:47:27 LAYOUT: LAYOUT1

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FIGURE 1
VICINITY MAP
661 BEAR VALLEY

Water service to the 661 Bear Valley project will be provided by the City of Escondido. The property is within the City's existing water service area. There are existing water facilities in the vicinity of the property which will be evaluated for their ability to provide adequate water service to the project.

Purpose of the Water Study

This water study will identify the existing water distribution facilities in the vicinity of the 661 Bear Valley project and determine whether these facilities are adequate to provide domestic service and fire protection to the 661 Bear Valley project. Computer modeling hydraulic analyses will be performed to ascertain the onsite and offsite water facilities necessary to provide potable water service to the proposed development.

Water System Design Criteria

The water system design criteria used for the analysis of water service to the 661 Bear Valley development are based on the City of Escondido Design Standards, dated April 2, 2014.

Water Demands. The criteria for estimating water demands are based on the City of Escondido Design Standards, April 2, 2014. For residential development where lots are expected to be between 7,000 sf and 1 acre in size, a water demand of 800 gpd per Dwelling Unit is used. The total estimated water demand for the project is calculated to be:

$$55 \text{ Dwelling Units} \times 800 \text{ gpd/DU} = 44,000 \text{ gpd average} = 30.6 \text{ gpm}$$

Peaking factors used for this analysis are consistent with the City of Escondido Design Standards, April 2, 2014. We are using a maximum day peaking factor of 1.8 time average day demand, and a peak hour peaking factor of 2.7 times maximum day demand (or 4.86 times average day demand).

$$\text{Maximum Day Demand} = 44,000 \text{ gpd} \times 1.8 = 79,200 \text{ gpd} = 55.0 \text{ gpm}$$

$$\text{Peak Hour Demand} = 79,200 \text{ gpd} \times 2.7 = 213,840 \text{ gpd} = 149 \text{ gpm}$$

Fire Flow. The fire flow requirement for the 661 Bear Valley project is anticipated to be 2,500 gpm because of the open space being preserved within the project boundary and because of the proximity of open space to the east of the property. Minimum residual pressure during a maximum day demand plus fire flow is 20 psi. All homes will be constructed with fire sprinkler systems.

Existing Water Facilities

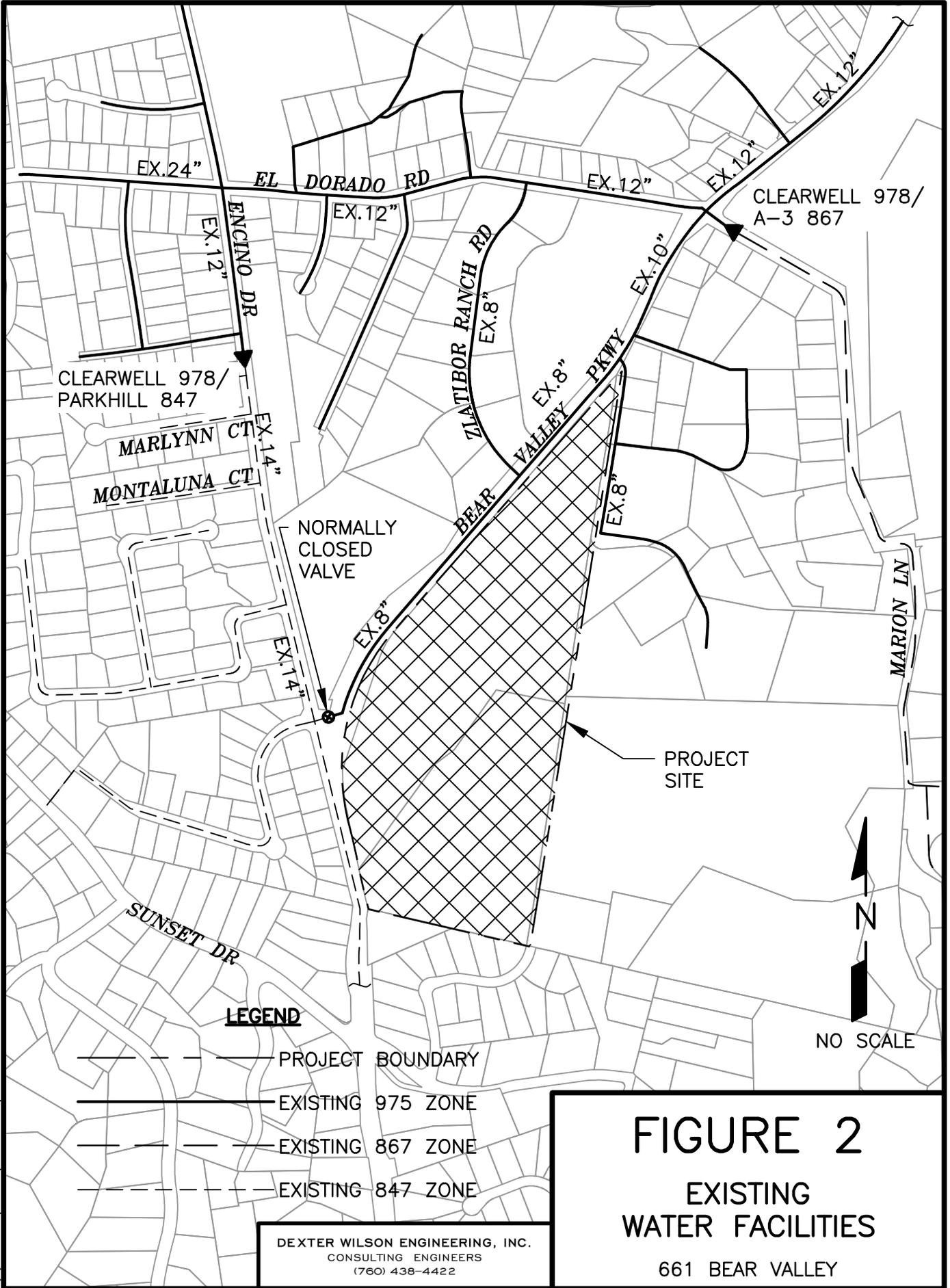
Water service in the vicinity of the 661 Bear Valley property is provided by the City of Escondido. The property is within the southernmost extent of the Clearwell Zone, High Water Line 975 feet. In Bear Valley Parkway fronting the project there is an existing 8" 975 Zone water line. This 8" water line extends south from an existing 10" main in Bear Valley Parkway which increases to 12" diameter north of El Dorado Road. In El Dorado Road there is an existing 12" 975 Zone water line extending west of Bear Valley Parkway to Encino Drive, then south on Encino Drive to a pressure regulating station on Encino Drive north of Marlynn Court. This regulating station drops pressure from the Clearwell 975 Zone to the Parkhill 847 Zone.

Figure 2 shows the existing water facilities in the vicinity of the 661 Bear Valley project.

Proposed Water Service System

The proposed source of water service for the 661 Bear Valley project will be the existing Clearwell 975 Pressure Zone water system. The development of the 661 Bear Valley project will include two connections to the existing 8" 975 Zone water line in Bear Valley Parkway. These two connections will provide a looped water system through the 661 Bear Valley project.

\\ARTIC\DWG\571002\BV_WTR\FIGURE-2_EXWTR.DWG 05-28-15 15:38:15 LAYOUT: LAYOUT



- LEGEND**
- — — — — PROJECT BOUNDARY
 - — — — — EXISTING 975 ZONE
 - — — — — EXISTING 867 ZONE
 - — — — — EXISTING 847 ZONE

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FIGURE 2
 EXISTING
 WATER FACILITIES
 661 BEAR VALLEY

One connection into the 661 Bear Valley project will be at the intersection of Bear Valley Parkway and Zlatibor Ranch Road where an existing 8" water main in Zlatibor Ranch Road tees into the existing 8" water main in Bear Valley Parkway. The second connection to the project will be at the emergency access road driveway into the project. Exhibit A at the back of this report shows the proposed onsite water system configuration for the 661 Bear Valley project.

Expected maximum water service pressures within the 661 Bear Valley project will be 165 psi based on a maximum hydraulic grade line of 975 feet and the lowest building pad elevation of 594.4 feet. The highest pad elevation is 658.4 feet which will have a maximum static pressure of 137 psi.

The next section of this report summarizes the computer hydraulic modelling that was performed to confirm the capability of the proposed water system to provide adequate domestic and fire protection service to the 661 Bear Valley project.

Water System Computer Model

The University of Kentucky KYPIPE program was used to create a computer model of the proposed water system for the 661 Bear Valley project. This computer program utilizes the Hazen-Williams equation for determining head-loss in pipes; the Hazen-Williams "C" value used for all pipes is 120.

The input hydraulic grade line for the computer model at the intersection of Bear Valley Parkway and El Dorado Drive is 910 feet; this is assuming most of the water supply for the 975 Zone in this area comes south in Bear Valley Parkway.

Exhibit A at the back of this report presents the Node and Pipe Diagram for the 975 Pressure Zone analyses showing the source node (the zero node) to be located at the intersection of Bear Valley Parkway and El Dorado Drive.

Water System Analysis and Results

The computer analyses performed for the 661 Bear Valley project served by the 975 Zone are presented Appendix A at the back of this report. Exhibit A at the back of this report presents the Node and Pipe Diagram for the computer model hydraulic analyses completed. The anticipated fire flow of 2,500 gpm is achieved at all critical locations within the proposed project with all 8" diameter piping within the site. The minimum residual pressure under maximum day demands plus 2,500 gpm fire flow is 48 psi at the southeastern cul-de-sac in the project (Node 13).

Conclusions and Recommendations

The following recommendations and conclusions are made based on an analysis of the potable water system for the 661 Bear Valley project.

1. The 661 Bear Valley project will be provided water service by the City of Escondido.
2. Current service in the vicinity of the property is from the Clearwell Pressure Zone with a maximum hydraulic grade line of 975 feet.
3. Maximum water service pressure within the 661 Bear Valley project will be 165 psi static.
4. The onsite water system for the 661 Bear Valley project will consist of 8" diameter piping connected to the existing 8" 975 Zone water line in Bear Valley Parkway at two locations. Exhibit A presents the recommended onsite water system configuration and proposed water system connection points.
5. All new potable water pipelines recommended for the 661 Bear Valley project are to be designed at a minimum to meet AWWA C900 DR 14 Class 305 for PVC pipe. The water system design must conform to the requirements of the City of Escondido Utilities Department.

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6. Individual pressure regulators must be installed on potable water services for all lots in order to maintain building service pressures below 80 psi in accordance with the California Plumbing Code.

Thank you for the opportunity to assist with the potable water planning for the 661 Bear Valley project. If you have any questions about the enclosed information and recommendations, please do not hesitate to call.

Dexter Wilson Engineering, Inc.



Andrew Owen

AO:pjs

Attachments

APPENDIX A

COMPUTER MODELING RESULTS

975 CLEARWELL PRESSURE ZONE SYSTEM ANALYSES

NODE AND PIPE DIAGRAM REFERENCE:

Exhibit A at the back of the report.

CONDITIONS MODELED:

1. Average Day Demands.
2. Maximum Day Demands plus 2,500 gpm Fire Flow at Node 19.
3. Maximum Day Demands plus 2,500 gpm Fire Flow at Node 13.
4. Maximum Day Demands plus 2,500 gpm Fire Flow at Node 10.
5. Peak Hour Demands.

661 Bear Valley Project in the City of Escondido **May 25, 2015**
Public Water System Analysis for Tentative Map Submittal
Analysis of Proposed Project Connected to 975 Clearwell Zone System **File: 751002A**

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
1	0 1	20.0	12.0	120.0	.00	910.00
2	1 2	850.0	10.0	120.0	.00	
3	2 3	750.0	8.0	120.0	.00	
5	3 4	1000.0	8.0	120.0	.00	
8	4 16	530.0	8.0	120.0	.00	
11	16 7	450.0	8.0	120.0	.00	
14	7 10	250.0	8.0	120.0	.00	
17	7 13	400.0	8.0	120.0	.00	
20	22 16	880.0	8.0	120.0	.00	
23	22 19	350.0	8.0	120.0	.00	
26	25 22	400.0	8.0	120.0	.00	
29	25 28	300.0	8.0	120.0	.00	
32	3 25	220.0	8.0	120.0	.00	
35	1 31	900.0	12.0	120.0	.00	
38	31 3	1550.0	8.0	120.0	.00	

JUNCTION NUMBER	DEMAND	ELEVATION	CONNECTING PIPES
1	.00	635.00	1 2 35
2	.00	650.00	2 3
3	.00	633.00	3 5 32 38
4	.00	570.00	5 8
7	4.00	599.00	11 14 17
10	3.00	602.00	14
13	4.00	605.00	17
16	5.00	601.00	8 11 20
19	5.00	660.00	23
22	6.00	650.00	20 23 26
25	.00	630.00	26 29 32
28	4.00	647.00	29
31	.00	670.00	35 38

OUTPUT SELECTION: ALL RESULTS ARE OUTPUT EACH PERIOD
 3 VALUES ARE OUTPUT FOR MAXIMUM AND MINIMUM PRESSURES

THIS SYSTEM HAS 15 PIPES WITH 13 JUNCTIONS , 2 LOOPS AND 1 FGNS

THE RESULTS ARE OBTAINED AFTER 6 TRIALS WITH AN ACCURACY = .00002

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661 Bear Valley Parkway Residential Project
Average Day Demands

571002A

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
1	0 1	31.00	.00	.00	.00	.09	.00
2	1 2	17.50	.00	.00	.00	.07	.00
3	2 3	17.50	.01	.00	.00	.11	.01
5	3 4	11.29	.01	.00	.00	.07	.01
8	4 16	11.29	.00	.00	.00	.07	.01
11	16 7	11.00	.00	.00	.00	.07	.00
14	7 10	3.00	.00	.00	.00	.02	.00
17	7 13	4.00	.00	.00	.00	.03	.00
20	22 16	4.71	.00	.00	.00	.03	.00
23	22 19	5.00	.00	.00	.00	.03	.00
26	25 22	15.71	.00	.00	.00	.10	.01
29	25 28	4.00	.00	.00	.00	.03	.00
32	3 25	19.71	.00	.00	.00	.13	.01
35	1 31	13.50	.00	.00	.00	.04	.00
38	31 3	13.50	.01	.00	.00	.09	.01

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
1	.00	910.00	635.00	119.17
2	.00	910.00	650.00	112.67
3	.00	909.99	633.00	120.03
4	.00	909.98	570.00	147.33
7	4.00	909.98	599.00	134.76
10	3.00	909.98	602.00	133.46
13	4.00	909.98	605.00	132.16
16	5.00	909.98	601.00	133.89
19	5.00	909.98	660.00	108.32
22	6.00	909.98	650.00	112.66
25	.00	909.98	630.00	121.33
28	4.00	909.98	647.00	113.96
31	.00	910.00	670.00	104.00

MAXIMUM PRESSURES

4	.00	909.98	570.00	147.33
7	4.00	909.98	599.00	134.76
16	5.00	909.98	601.00	133.89

MINIMUM PRESSURES

31	.00	910.00	670.00	104.00
19	5.00	909.98	660.00	108.32
22	6.00	909.98	650.00	112.66

THE NET SYSTEM DEMAND = 31.00

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

PIPE NUMBER	FLOWRATE
1	31.00

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 31.00

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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 = 2.00

THE FOLLOWING SPECIFIC DEMAND CHANGES ARE MADE :

JUNCTION NUMBER	DEMAND
19	2509.00

THE RESULTS ARE OBTAINED AFTER 3 TRIALS WITH AN ACCURACY = .00010

661 Bear Valley Parkway
Maximum Day Demands Plus 2500 gpm Fire Flow at Node 19

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
1	0 1	2561.00	.34	.00	.00	7.26	16.78
2	1 2	1445.42	12.02	.00	.00	5.90	14.14
3	2 3	1445.42	31.44	.00	.00	9.23	41.92
5	3 4	837.23	15.25	.00	.00	5.34	15.25
8	4 16	837.23	8.08	.00	.00	5.34	15.25
11	16 7	22.00	.01	.00	.00	.14	.02
14	7 10	6.00	.00	.00	.00	.04	.00
17	7 13	8.00	.00	.00	.00	.05	.00
20	22 16	-805.23	-12.48	.00	.00	-5.14	-14.19
23	22 19	2509.00	40.74	.00	.00	16.01	116.40
26	25 22	1715.77	23.03	.00	.00	10.95	57.58
29	25 28	8.00	.00	.00	.00	.05	.00
32	3 25	1723.77	12.78	.00	.00	11.00	58.08
35	1 31	1115.58	3.24	.00	.00	3.16	3.60
38	31 3	1115.58	40.21	.00	.00	7.12	25.94

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
1	.00	909.66	635.00	119.02
2	.00	897.65	650.00	107.31
3	.00	866.21	633.00	101.06
4	.00	850.96	570.00	121.75
7	8.00	842.87	599.00	105.68
10	6.00	842.87	602.00	104.38
13	8.00	842.87	605.00	103.08
16	10.00	842.88	601.00	104.82
19	2509.00	789.66	660.00	56.19
22	12.00	830.40	650.00	78.17
25	.00	853.43	630.00	96.82
28	8.00	853.43	647.00	89.45
31	.00	906.42	670.00	102.45

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Analysis of Proposed Project Connected to 975 Clearwell Zone System **File: 751002A**

MAXIMUM PRESSURES				
4	.00	850.96	570.00	121.75
1	.00	909.66	635.00	119.02
2	.00	897.65	650.00	107.31
MINIMUM PRESSURES				
19	2509.00	789.66	660.00	56.19
22	12.00	830.40	650.00	78.17
28	8.00	853.43	647.00	89.45

THE NET SYSTEM DEMAND = 2561.00

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

PIPE NUMBER	FLOWRATE
1	2561.00

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 2561.00

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 = 2.00

THE FOLLOWING SPECIFIC DEMAND CHANGES ARE MADE :

JUNCTION NUMBER	DEMAND
13	2508.00

THE RESULTS ARE OBTAINED AFTER 3 TRIALS WITH AN ACCURACY = .00001

661 Bear Valley Parkway
Maximum Day Demands Plus 2500 gpm Fire Flow at Node 13

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
1	0 1	2562.00	.34	.00	.00	7.27	16.80
2	1 2	1445.98	12.03	.00	.00	5.91	14.15
3	2 3	1445.98	31.46	.00	.00	9.23	41.95
5	3 4	1264.36	32.71	.00	.00	8.07	32.71
8	4 16	1264.36	17.34	.00	.00	8.07	32.71
11	16 7	2522.00	52.88	.00	.00	16.10	117.52
14	7 10	6.00	.00	.00	.00	.04	.00
17	7 13	2508.00	46.53	.00	.00	16.01	116.31
20	22 16	1267.64	28.93	.00	.00	8.09	32.87
23	22 19	10.00	.00	.00	.00	.06	.00
26	25 22	1289.64	13.57	.00	.00	8.23	33.94

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29	25	28	8.00	.00	.00	.00	.05	.00
32	3	25	1297.64	7.55	.00	.00	8.28	34.33
35	1	31	1116.02	3.24	.00	.00	3.17	3.60
38	31	3	1116.02	40.24	.00	.00	7.12	25.96

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
1	.00	909.66	635.00	119.02
2	.00	897.64	650.00	107.31
3	.00	866.18	633.00	101.04
4	.00	833.46	570.00	114.17
7	8.00	763.24	599.00	71.17
10	6.00	763.24	602.00	69.87
13	2508.00	716.72	605.00	48.41
16	10.00	816.12	601.00	93.22
19	10.00	845.05	660.00	80.19
22	12.00	845.05	650.00	84.52
25	.00	858.63	630.00	99.07
28	8.00	858.62	647.00	91.70
31	.00	906.42	670.00	102.45

MAXIMUM PRESSURES

1	.00	909.66	635.00	119.02
4	.00	833.46	570.00	114.17
2	.00	897.64	650.00	107.31

MINIMUM PRESSURES

13	2508.00	716.72	605.00	48.41
10	6.00	763.24	602.00	69.87
7	8.00	763.24	599.00	71.17

THE NET SYSTEM DEMAND = 2562.00

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

PIPE NUMBER	FLOWRATE
1	2562.00

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 2562.00

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 = 2.00

THE FOLLOWING SPECIFIC DEMAND CHANGES ARE MADE :

JUNCTION NUMBER	DEMAND
10	2506.00

THE RESULTS ARE OBTAINED AFTER 2 TRIALS WITH AN ACCURACY = .00000

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661 Bear Valley Parkway
Maximum Day Demands Plus 2500 gpm Fire Flow at Node 10

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
1	0 1	2562.00	.34	.00	.00	7.27	16.80
2	1 2	1445.98	12.03	.00	.00	5.91	14.15
3	2 3	1445.98	31.46	.00	.00	9.23	41.95
5	3 4	1264.36	32.71	.00	.00	8.07	32.71
8	4 16	1264.36	17.34	.00	.00	8.07	32.71
11	16 7	2522.00	52.88	.00	.00	16.10	117.52
14	7 10	2506.00	29.04	.00	.00	15.99	116.14
17	7 13	8.00	.00	.00	.00	.05	.00
20	22 16	1267.64	28.93	.00	.00	8.09	32.87
23	22 19	10.00	.00	.00	.00	.06	.00
26	25 22	1289.64	13.57	.00	.00	8.23	33.94
29	25 28	8.00	.00	.00	.00	.05	.00
32	3 25	1297.64	7.55	.00	.00	8.28	34.33
35	1 31	1116.02	3.24	.00	.00	3.17	3.60
38	31 3	1116.02	40.24	.00	.00	7.12	25.96

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
1	.00	909.66	635.00	119.02
2	.00	897.64	650.00	107.31
3	.00	866.18	633.00	101.04
4	.00	833.46	570.00	114.17
7	8.00	763.24	599.00	71.17
10	2506.00	734.21	602.00	57.29
13	8.00	763.24	605.00	68.57
16	10.00	816.12	601.00	93.22
19	10.00	845.05	660.00	80.19
22	12.00	845.05	650.00	84.52
25	.00	858.63	630.00	99.07
28	8.00	858.62	647.00	91.70
31	.00	906.42	670.00	102.45
MAXIMUM PRESSURES				
1	.00	909.66	635.00	119.02
4	.00	833.46	570.00	114.17
2	.00	897.64	650.00	107.31
MINIMUM PRESSURES				
10	2506.00	734.21	602.00	57.29
13	8.00	763.24	605.00	68.57
7	8.00	763.24	599.00	71.17

THE NET SYSTEM DEMAND = 2562.00

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

PIPE NUMBER	FLOWRATE
1	2562.00

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THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 2562.00
 THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = .00

A SUMMARY OF CONDITIONS SPECIFIED FOR THE NEXT SIMULATION FOLLOWS

THE RESULTS ARE OBTAINED AFTER 3 TRIALS WITH AN ACCURACY = .00001

661 Bear Valley Parkway
Peak Hour Demands

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
1	0 1	31.00	.00	.00	.00	.09	.00
2	1 2	17.50	.00	.00	.00	.07	.00
3	2 3	17.50	.01	.00	.00	.11	.01
5	3 4	11.29	.01	.00	.00	.07	.01
8	4 16	11.29	.00	.00	.00	.07	.01
11	16 7	11.00	.00	.00	.00	.07	.00
14	7 10	3.00	.00	.00	.00	.02	.00
17	7 13	4.00	.00	.00	.00	.03	.00
20	22 16	4.71	.00	.00	.00	.03	.00
23	22 19	5.00	.00	.00	.00	.03	.00
26	25 22	15.71	.00	.00	.00	.10	.01
29	25 28	4.00	.00	.00	.00	.03	.00
32	3 25	19.71	.00	.00	.00	.13	.01
35	1 31	13.50	.00	.00	.00	.04	.00
38	31 3	13.50	.01	.00	.00	.09	.01

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
1	.00	910.00	635.00	119.17
2	.00	910.00	650.00	112.67
3	.00	909.99	633.00	120.03
4	.00	909.98	570.00	147.33
7	4.00	909.98	599.00	134.76
10	3.00	909.98	602.00	133.46
13	4.00	909.98	605.00	132.16
16	5.00	909.98	601.00	133.89
19	5.00	909.98	660.00	108.32
22	6.00	909.98	650.00	112.66
25	.00	909.98	630.00	121.33
28	4.00	909.98	647.00	113.96
31	.00	910.00	670.00	104.00

MAXIMUM PRESSURES				
4	.00	909.98	570.00	147.33
7	4.00	909.98	599.00	134.76
16	5.00	909.98	601.00	133.89

	MINIMUM PRESSURES			
31	.00	910.00	670.00	104.00
19	5.00	909.98	660.00	108.32
22	6.00	909.98	650.00	112.66

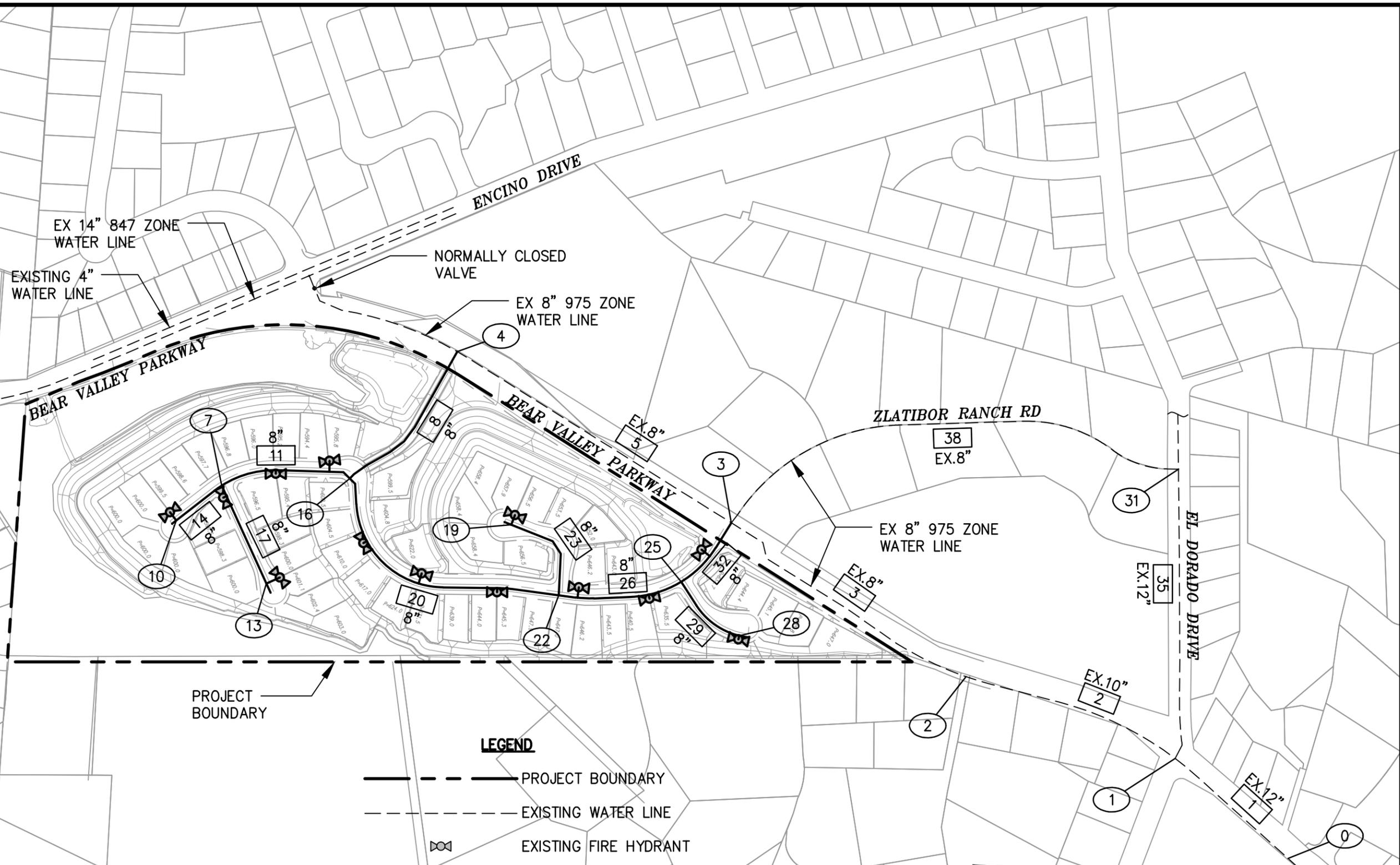
THE NET SYSTEM DEMAND = 31.00

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

PIPE NUMBER	FLOWRATE
1	31.00

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 31.00
 THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = .00

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LEGEND

-  PROJECT BOUNDARY
-  EXISTING WATER LINE
-  EXISTING FIRE HYDRANT
-  PROPOSED WATER LINE
-  PROPOSED FIRE HYDRANT
-  COMPUTER MODEL NODE
-  COMPUTER MODEL PIPE



DEXTER WILSON ENGINEERING, INC.
 CONSULTING ENGINEERS
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EXHIBIT A

NODE AND PIPE DIAGRAM

661 BEAR VALLEY