

HARMONY GROVE VILLAGE SOUTH

APPENDIX P

POTABLE WATER STUDY

for the

FINAL ENVIRONMENTAL IMPACT REPORT

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PDS2015-SP-15-002

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**HARMONY GROVE VILLAGE SOUTH
POTABLE WATER STUDY**

March 9, 2015



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Job No. 986-001

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CHAPTER 1

INTRODUCTION

The purpose of this study is to develop a potable water system to serve the proposed Harmony Grove Village South project. The project is in the Rincon del Diablo Municipal Water District (District). Figure 1-1 shows the project location.

Study Area

The project is located south of Escondido Creek and east of Country Club Drive. The project is a residential development with 453 single family detached and attached units on 111 gross acres. A recycled water system will serve all irrigation of common areas. The elevations of development pads on the project site range from 629 to 728 feet above mean sea level (AMSL).

Existing System

Figure 1-2 shows the water facilities around the project. The figure includes facilities being constructed by Standard Pacific as part of the Harmony Grove Village project. The Harmony Grove Village South project will be supplied from the R-1A and R-1B reservoirs which have a high water level of 959 feet above mean sea level (AMSL). The project will provide a connection to the 12-inch line in Harmony Grove Road and the 8-inch line to the west of Country Club Drive, both of which can be seen in Figure 1-2. Pipe sizes are also shown on Figure 1-2.

\\PACIFIC\DWG\986001\FIGURE 1-1.DWG 02-09-15 08:18:21 LAYOUT: LAYOUT1

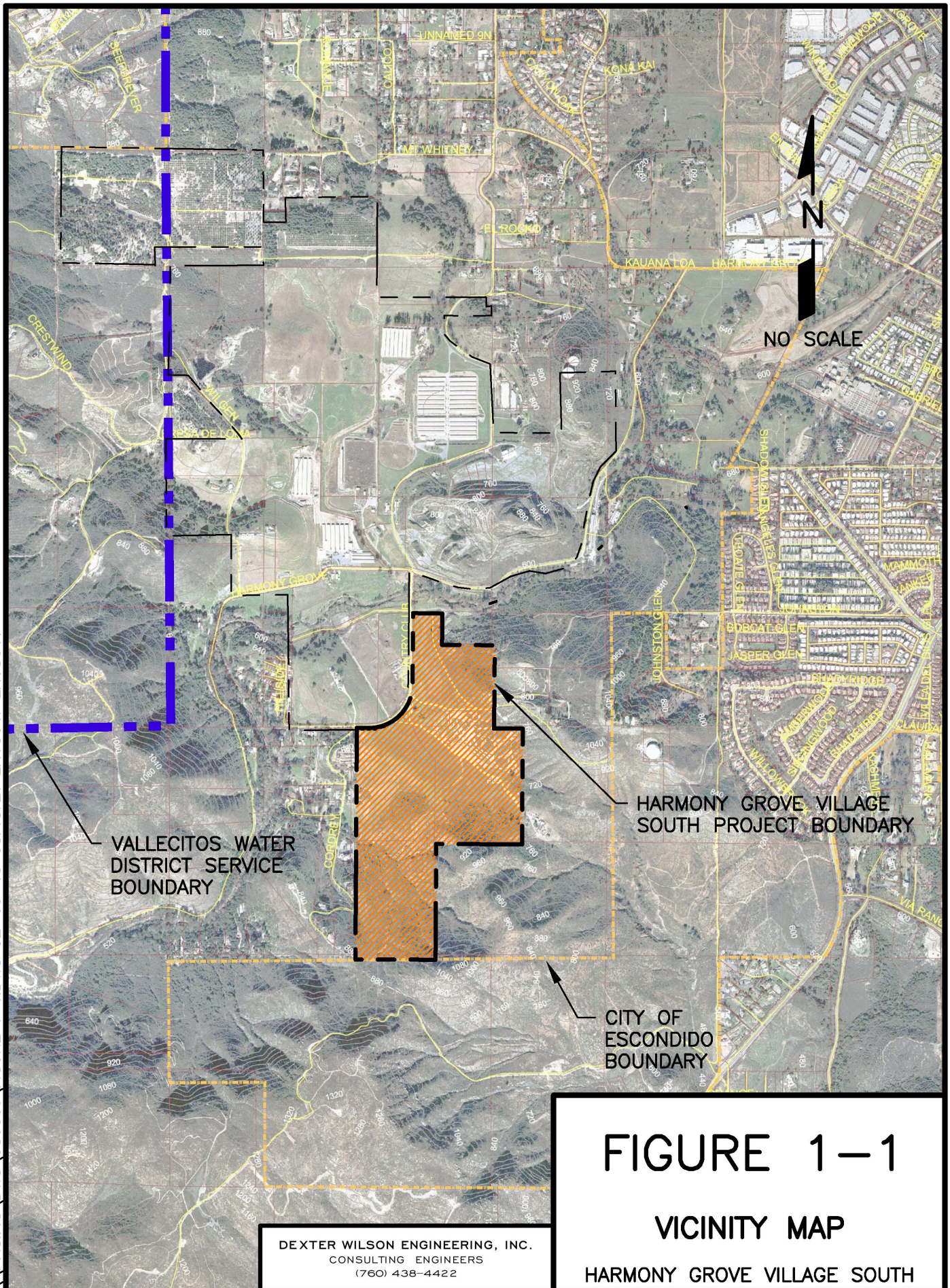


FIGURE 1-1

VICINITY MAP

HARMONY GROVE VILLAGE SOUTH

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\\PACIFIC\DWG\986001\WATER\FIGURE 1-2.DWG 03-09-15 13:38:44 LAYOUT: FIGURE

LEGEND

- — — — — PROJECT BOUNDARY
- - - - - EXISTING WATER LINE

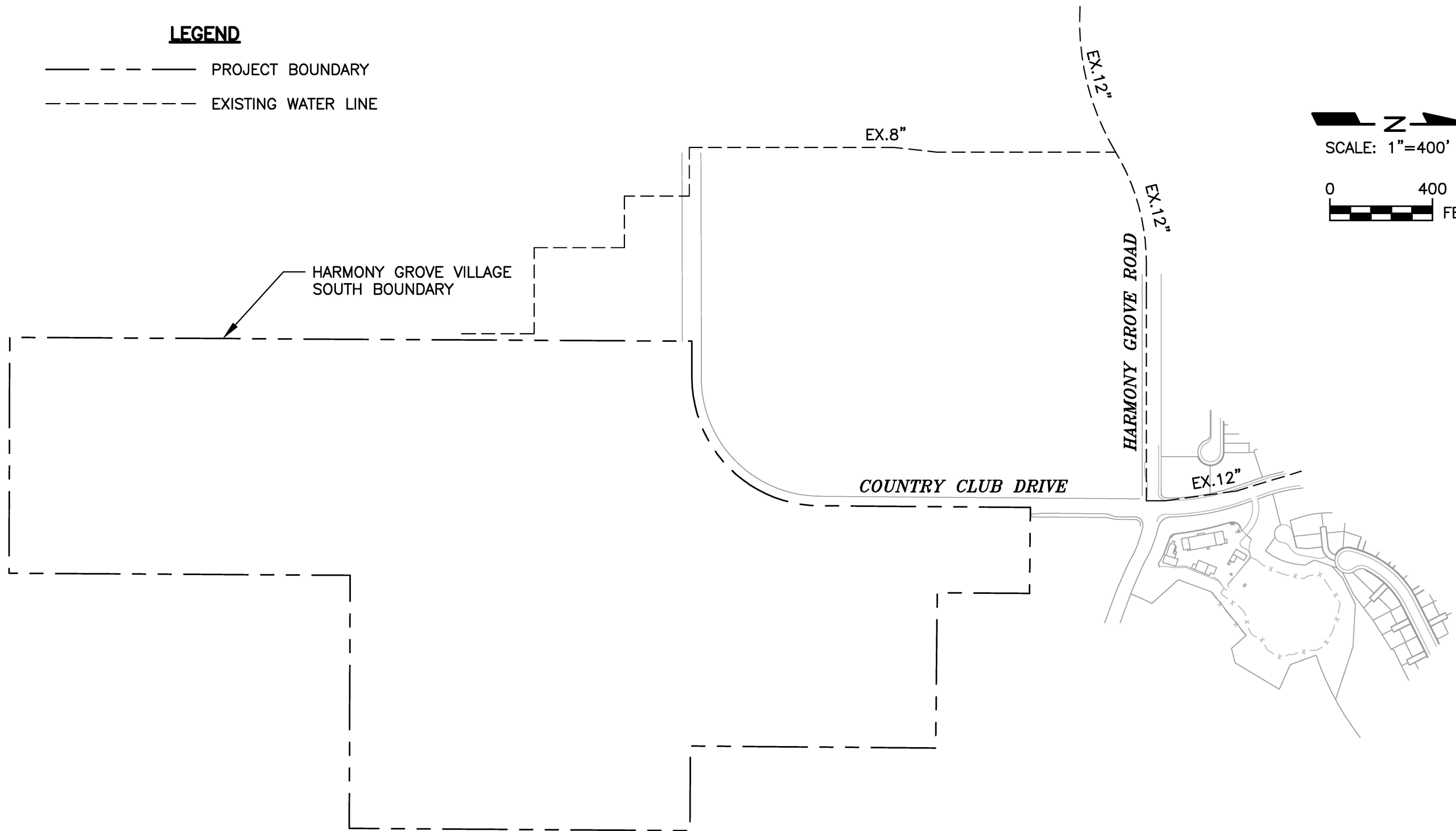
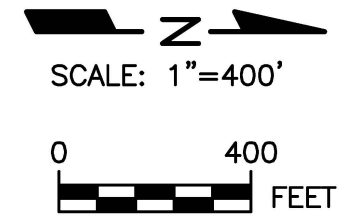


FIGURE 1-2
EXISTING FACILITIES IN
PROJECT VICINITY

HARMONY GROVE VILLAGE SOUTH

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CHAPTER 2

DESIGN CRITERIA AND PROJECTED WATER DEMANDS

This chapter presents the design criteria used to evaluate the water system for the Harmony Grove Village South project. The design criteria are utilized for analysis of the existing system as well as for design and sizing of proposed facilities to accommodate demands in the study area. The criteria used are from the Rincon del Diablo Municipal Water District Water Master Plan Update, June 2014.

Duty Factors and Peaking Factors

The design criteria used for water duty factors and peaking factors are shown in Table 2-1. The average day demand factor for residential units is based on the Rincon del Diablo factor for multi-family residential and a density greater than 5.5 EDU/acre.

TABLE 2-1 WATER DEMAND DESIGN CRITERIA	
Design Criteria	Factor
Residential Average Day Demand	400 gpd/EDU
Maximum Day Demand	1.7
Peak Hour Demand	2.9

Projected Potable Water Demands

Table 2-2 shows the average day, maximum day and peak hour use. The total projected potable water demand is 0.18 MGD.

TABLE 2-2 POTABLE WATER DEMAND CRITERIA							
Site	Units/ Acres	Unit Demand	Average Demand		Max Day Demand		Peak Hour Demand
			(gpd)	(gpm)	(gpd)	(gpm)	(gpm)
Residential	453	400 gpd/DU	181,200	126	308,000	214	365

Fire Flow Requirements

The District requires dual simultaneous 2,500 gpm fire flows within one pressure zone.

CHAPTER 3

RECOMMENDED WATER FACILITIES

This chapter presents the proposed potable water system as well as the conventions and assumptions used in the analysis and design of the system.

Water System Computer Model

The University of Kentucky KYPIPE computer program was used to conduct a hydraulic model of the proposed water system within the study area. This computer program utilizes the Hazen-Williams equation for determining headloss in pipes; the Hazen-Williams “C” value used for all pipes is 120.

The model for this analysis includes existing and proposed lines that are part of the Harmony Grove Village Project as well as the proposed facilities and improvements as part of the Harmony Grove Village South Project. Exhibit A displays the node and pipe diagram that was used for hydraulic modeling.

Hydraulic grade lines at the zero nodes were based on the values of those nodes for corresponding scenarios from the Harmony Grove Village Potable Water Study from August 2011 for Peak Hour and Maximum Day Demand plus Fire Flow scenarios. For Average Day Demand, a hydraulic grade line of 940 was assumed at the zero nodes, this is based on the high water level of 959 feet AMSL in the nearby reservoirs.

Fire Flow Analysis

For the analysis of the proposed system multiple maximum day demand plus fire flow scenarios were considered in order to ensure the District’s criteria were met. In all fire flow scenarios it was assumed that one fire would be offsite and on fire would be onsite. The offsite location of the fire was modeled at node 4, while the onsite location of the fire varied for each scenario.

It should be noted that the fire flow analysis did not account for the possible inclusion of a backflow preventer at node 136. In the event that the hydrants associated with node 136 are designed as part of a private fire service system, further analysis of the system is recommended.

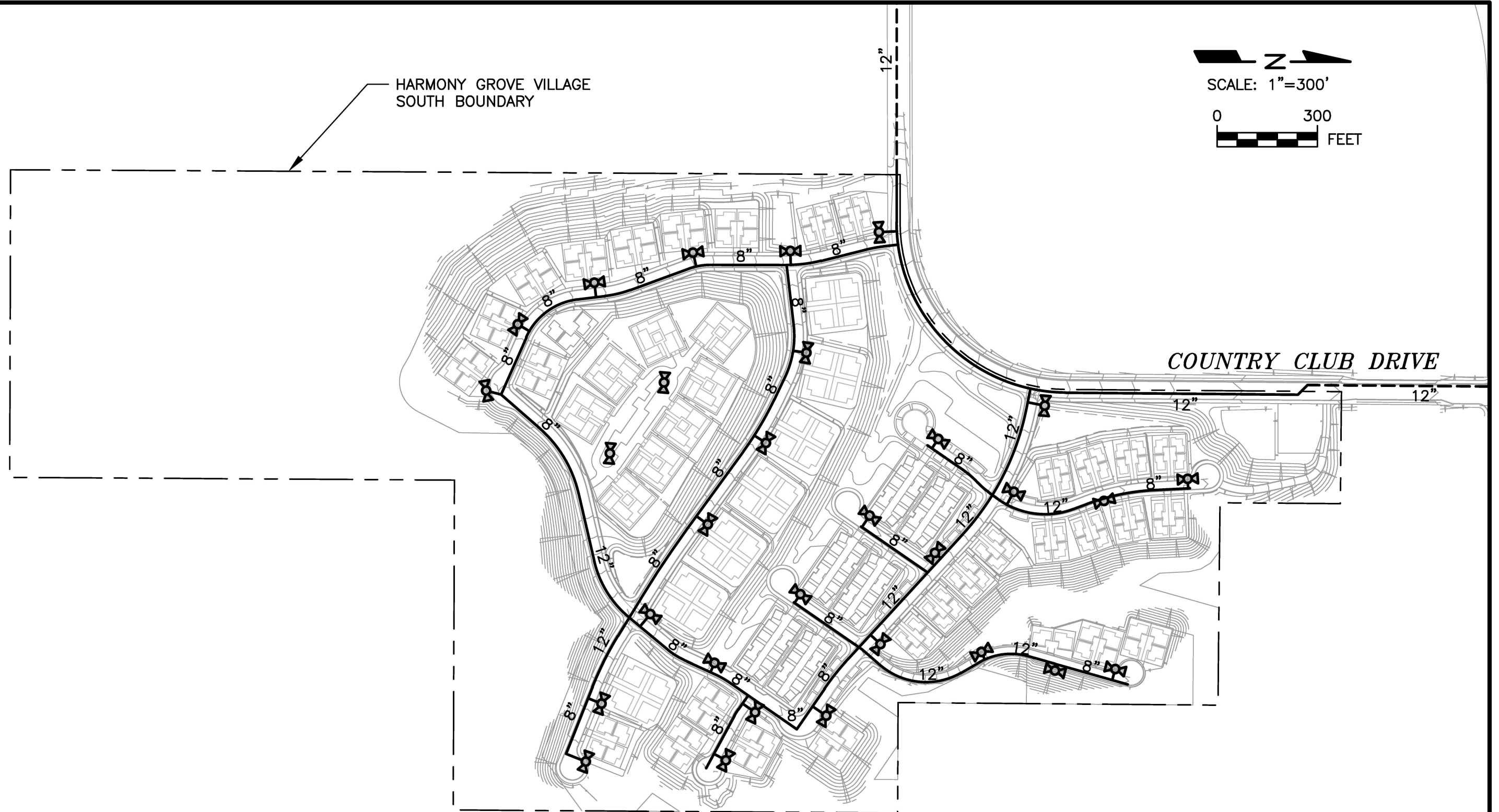
Proposed Potable Water System

As stated previously the project will be supplied through a connection to the 12-inch pipe in Harmony Grove Road and the 8-inch pipe that extends south from harmony grove road. The project proposes to connect to the 12-inch line in Harmony Grove Road with a new 12-inch line that will extend south along Country Club Drive. The 12-inch will connect to two points on the project following the 90-degree turn in Country Club Drive. A new 8-inch is proposed to be connected to the 8-inch that extends south from Harmony Grove Road and connect this line to the end of the 12-inch in Country Club Drive. The proposed facilities can be seen on Figure 3-1.

Recycled Water System

In addition to the proposed water system, the project will be supplied recycled water for irrigation of common areas. The recycled water will also be delivered from the Rincon Del Diablo Municipal Water District.

\\PACIFIC\DWG\986001\WATER\FIGURE 3-1.DWG 03-10-15 09:07:45 LAYOUT: FIGURE



LEGEND

- — — — — PROJECT BOUNDARY
- PROPOSED ONSITE WATER LINE
- - - - - PROPOSED OFFSITE WATER LINE
- ⊠ PROPOSED FIRE HYDRANT

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FIGURE 3-1 PROPOSED WATER FACILITIES

HARMONY GROVE VILLAGE SOUTH

APPENDIX A

KYPIPE MODEL RESULTS

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
301	0 8	400.0	12.0	120.0	.00	940.00
303	0 2	720.0	12.0	120.0	.00	940.00
305	2 4	460.0	12.0	120.0	.00	
309	4 8	800.0	12.0	120.0	.00	
313	8 104	500.0	12.0	120.0	.00	
315	2 112	2700.0	8.0	120.0	.00	
501	104 108	900.0	12.0	120.0	.00	
505	108 112	660.0	8.0	120.0	.00	
509	112 116	350.0	8.0	120.0	.00	
513	116 120	350.0	8.0	120.0	.00	
517	120 124	380.0	8.0	120.0	.00	
521	124 128	260.0	8.0	120.0	.00	
525	128 132	220.0	8.0	120.0	.00	
529	132 136	390.0	8.0	120.0	.00	
533	136 140	450.0	12.0	120.0	.00	
537	142 140	310.0	8.0	120.0	.00	
539	144 142	140.0	8.0	120.0	.00	
541	148 144	280.0	8.0	120.0	.00	
545	152 148	220.0	8.0	120.0	.00	
549	156 152	300.0	12.0	120.0	.00	
553	160 156	360.0	12.0	120.0	.00	
557	108 160	360.0	12.0	120.0	.00	
561	160 162	250.0	12.0	120.0	.00	
565	162 164	280.0	8.0	120.0	.00	
569	152 168	530.0	12.0	120.0	.00	
573	168 170	230.0	12.0	120.0	.00	
577	170 172	220.0	8.0	120.0	.00	
581	160 176	240.0	8.0	120.0	.00	
585	156 180	240.0	8.0	120.0	.00	
589	152 184	235.0	8.0	120.0	.00	
593	144 188	250.0	8.0	120.0	.00	
597	116 192	240.0	8.0	120.0	.00	
601	192 196	340.0	8.0	120.0	.00	
605	196 200	290.0	8.0	120.0	.00	
609	200 140	370.0	8.0	120.0	.00	
613	140 202	270.0	12.0	120.0	.00	
617	202 204	190.0	8.0	120.0	.00	

JUNCTION NUMBER	DEMAND	ELEVATION	CONNECTING PIPES
2	.00	575.00	303 305 315
4	.00	575.00	305 309
8	.00	575.00	301 309 313
104	.00	583.00	313 501
108	.00	612.00	501 505 557
112	.00	646.00	315 505 509

116	2.22	661.00	509	513	597	
120	2.22	682.00	513	517		
124	2.22	698.00	517	521		
128	3.06	711.00	521	525		
132	2.22	717.00	525	529		
136	33.33	726.00	529	533		
140	.00	697.00	533	537	609	613
142	.00	682.00	537	539		
144	.00	679.00	539	541	593	
148	1.11	674.00	541	545		
152	.00	668.00	545	549	569	589
156	4.44	652.00	549	553	585	
160	.00	632.00	553	557	561	581
162	.00	633.00	561	565		
164	8.89	627.00	565			
168	.00	716.00	569	573		
170	.00	716.00	573	577		
172	2.78	722.00	577			
176	6.67	637.00	581			
180	6.67	652.00	585			
184	6.67	665.00	589			
188	3.33	686.00	593			
192	11.11	672.00	597	601		
196	11.11	682.00	601	605		
200	11.11	695.00	605	609		
202	5.56	710.00	613	617		
204	1.11	720.00	617			

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

THIS SYSTEM HAS 37 PIPES WITH 33 JUNCTIONS , 3 LOOPS AND 2 FGNS

THE RESULTS ARE OBTAINED AFTER 7 TRIALS WITH AN ACCURACY = .00011

Harmony Grove South Water System Analysis
Average Day Demands

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
301	0 8	77.87	.01	.00	.00	.22	.03
303	0 2	47.96	.01	.00	.00	.14	.01
305	2 4	20.51	.00	.00	.00	.06	.00
309	4 8	20.51	.00	.00	.00	.06	.00
313	8 104	98.38	.02	.00	.00	.28	.04
315	2 112	27.45	.07	.00	.00	.18	.03
501	104 108	98.38	.04	.00	.00	.28	.04
505	108 112	24.43	.01	.00	.00	.16	.02
509	112 116	51.88	.03	.00	.00	.33	.09
513	116 120	19.41	.01	.00	.00	.12	.01
517	120 124	17.19	.00	.00	.00	.11	.01

Harmony Grove Village South Project
Public Water System Analysis

Job No. 986-001
File Name: 986001A1
March 9, 2015

521	124	128	14.97	.00	.00	.00	.10	.01
525	128	132	11.91	.00	.00	.00	.08	.01
529	132	136	9.69	.00	.00	.00	.06	.00
533	136	140	-23.64	.00	.00	.00	-.07	.00
537	142	140	33.39	.01	.00	.00	.21	.04
539	144	142	33.39	.01	.00	.00	.21	.04
541	148	144	36.72	.01	.00	.00	.23	.05
545	152	148	37.83	.01	.00	.00	.24	.05
549	156	152	47.28	.00	.00	.00	.13	.01
553	160	156	58.39	.01	.00	.00	.17	.02
557	108	160	73.95	.01	.00	.00	.21	.02
561	160	162	8.89	.00	.00	.00	.03	.00
565	162	164	8.89	.00	.00	.00	.06	.00
569	152	168	2.78	.00	.00	.00	.01	.00
573	168	170	2.78	.00	.00	.00	.01	.00
577	170	172	2.78	.00	.00	.00	.02	.00
581	160	176	6.67	.00	.00	.00	.04	.00
585	156	180	6.67	.00	.00	.00	.04	.00
589	152	184	6.67	.00	.00	.00	.04	.00
593	144	188	3.33	.00	.00	.00	.02	.00
597	116	192	30.25	.01	.00	.00	.19	.03
601	192	196	19.14	.00	.00	.00	.12	.01
605	196	200	8.03	.00	.00	.00	.05	.00
609	200	140	-3.08	.00	.00	.00	-.02	.00
613	140	202	6.67	.00	.00	.00	.02	.00
617	202	204	1.11	.00	.00	.00	.01	.00

JUNCTION	NUMBER	DEMAND	GRADE	LINE	ELEVATION	PRESSURE
	2	.00	939.99		575.00	158.16
	4	.00	939.99		575.00	158.16
	8	.00	939.99		575.00	158.16
	104	.00	939.97		583.00	154.69
	108	.00	939.93		612.00	142.10
	112	.00	939.92		646.00	127.36
	116	2.22	939.89		661.00	120.85
	120	2.22	939.88		682.00	111.75
	124	2.22	939.88		698.00	104.81
	128	3.06	939.88		711.00	99.18
	132	2.22	939.88		717.00	96.58
	136	33.33	939.87		726.00	92.68
	140	.00	939.87		697.00	105.25
	142	.00	939.89		682.00	111.75
	144	.00	939.89		679.00	113.05
	148	1.11	939.91		674.00	115.23
	152	.00	939.92		668.00	117.83
	156	4.44	939.92		652.00	124.77
	160	.00	939.92		632.00	133.43
	162	.00	939.92		633.00	133.00
	164	8.89	939.92		627.00	135.60
	168	.00	939.92		716.00	97.03
	170	.00	939.92		716.00	97.03
	172	2.78	939.92		722.00	94.43
	176	6.67	939.92		637.00	131.27
	180	6.67	939.92		652.00	124.76
	184	6.67	939.92		665.00	119.13
	188	3.33	939.89		686.00	110.02

192	11.11	939.88	672.00	116.08
196	11.11	939.88	682.00	111.75
200	11.11	939.87	695.00	106.11
202	5.56	939.87	710.00	99.61
204	1.11	939.87	720.00	95.28

MAXIMUM PRESSURES

2	.00	939.99	575.00	158.16
4	.00	939.99	575.00	158.16
8	.00	939.99	575.00	158.16
104	.00	939.97	583.00	154.69
108	.00	939.93	612.00	142.10
164	8.89	939.92	627.00	135.60
160	.00	939.92	632.00	133.43
162	.00	939.92	633.00	133.00
176	6.67	939.92	637.00	131.27
112	.00	939.92	646.00	127.36

MINIMUM PRESSURES

136	33.33	939.87	726.00	92.68
172	2.78	939.92	722.00	94.43
204	1.11	939.87	720.00	95.28
132	2.22	939.88	717.00	96.58
168	.00	939.92	716.00	97.03
170	.00	939.92	716.00	97.03
128	3.06	939.88	711.00	99.18
202	5.56	939.87	710.00	99.61
124	2.22	939.88	698.00	104.81
140	.00	939.87	697.00	105.25

THE NET SYSTEM DEMAND = 125.83

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

PIPE NUMBER	FLOWRATE
301	77.87
303	47.96

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 125.83
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 = 2.90

THE FOLLOWING CHANGES IN PIPE DATA ARE SPECIFIED

FOR PIPE NUMBER 301 THE VALUE OF THE FIXED GRADE IS CHANGED TO 928.0

FOR PIPE NUMBER 303 THE VALUE OF THE FIXED GRADE IS CHANGED TO 928.0

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

Peak Hour Demands

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
301	0 8	225.81	.07	.00	.00	.64	.19
303	0 2	139.09	.05	.00	.00	.39	.08
305	2 4	59.48	.01	.00	.00	.17	.02
309	4 8	59.48	.01	.00	.00	.17	.02
313	8 104	285.30	.14	.00	.00	.81	.29
315	2 112	79.61	.53	.00	.00	.51	.20
501	104 108	285.30	.26	.00	.00	.81	.29
505	108 112	70.84	.10	.00	.00	.45	.16
509	112 116	150.45	.22	.00	.00	.96	.63
513	116 120	56.30	.04	.00	.00	.36	.10
517	120 124	49.86	.03	.00	.00	.32	.08
521	124 128	43.42	.02	.00	.00	.28	.06
525	128 132	34.55	.01	.00	.00	.22	.04
529	132 136	28.11	.01	.00	.00	.18	.03
533	136 140	-68.55	-.01	.00	.00	-.19	-.02
537	142 140	96.83	.09	.00	.00	.62	.28
539	144 142	96.83	.04	.00	.00	.62	.28
541	148 144	106.49	.09	.00	.00	.68	.33
545	152 148	109.71	.08	.00	.00	.70	.35
549	156 152	137.11	.02	.00	.00	.39	.07
553	160 156	169.33	.04	.00	.00	.48	.11
557	108 160	214.45	.06	.00	.00	.61	.17
561	160 162	25.78	.00	.00	.00	.07	.00
565	162 164	25.78	.01	.00	.00	.16	.02
569	152 168	8.06	.00	.00	.00	.02	.00
573	168 170	8.06	.00	.00	.00	.02	.00
577	170 172	8.06	.00	.00	.00	.05	.00
581	160 176	19.34	.00	.00	.00	.12	.01
585	156 180	19.34	.00	.00	.00	.12	.01
589	152 184	19.34	.00	.00	.00	.12	.01
593	144 188	9.66	.00	.00	.00	.06	.00
597	116 192	87.72	.06	.00	.00	.56	.23
601	192 196	55.50	.03	.00	.00	.35	.10
605	196 200	23.28	.01	.00	.00	.15	.02
609	200 140	-8.94	.00	.00	.00	-.06	.00
613	140 202	19.34	.00	.00	.00	.05	.00

617 202 204 3.22 .00 .00 .00 .02 .00

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
2	.00	927.95	575.00	152.94
4	.00	927.94	575.00	152.94
8	.00	927.93	575.00	152.93
104	.00	927.78	583.00	149.41
108	.00	927.52	612.00	136.73
112	.00	927.42	646.00	121.95
116	6.44	927.20	661.00	115.35
120	6.44	927.16	682.00	106.24
124	6.44	927.13	698.00	99.29
128	8.87	927.11	711.00	93.65
132	6.44	927.10	717.00	91.04
136	96.66	927.09	726.00	87.14
140	.00	927.10	697.00	99.71
142	.00	927.19	682.00	106.25
144	.00	927.23	679.00	107.57
148	3.22	927.32	674.00	109.77
152	.00	927.40	668.00	112.41
156	12.88	927.42	652.00	119.35
160	.00	927.46	632.00	128.03
162	.00	927.46	633.00	127.60
164	25.78	927.45	627.00	130.20
168	.00	927.40	716.00	91.61
170	.00	927.40	716.00	91.61
172	8.06	927.40	722.00	89.01
176	19.34	927.46	637.00	125.86
180	19.34	927.42	652.00	119.35
184	19.34	927.40	665.00	113.70
188	9.66	927.23	686.00	104.53
192	32.22	927.14	672.00	110.56
196	32.22	927.11	682.00	106.21
200	32.22	927.10	695.00	100.58
202	16.12	927.10	710.00	94.08
204	3.22	927.10	720.00	89.74

MAXIMUM PRESSURES

2	.00	927.95	575.00	152.94
4	.00	927.94	575.00	152.94
8	.00	927.93	575.00	152.93
104	.00	927.78	583.00	149.41
108	.00	927.52	612.00	136.73
164	25.78	927.45	627.00	130.20
160	.00	927.46	632.00	128.03
162	.00	927.46	633.00	127.60
176	19.34	927.46	637.00	125.86
112	.00	927.42	646.00	121.95

MINIMUM PRESSURES

136	96.66	927.09	726.00	87.14
172	8.06	927.40	722.00	89.01
204	3.22	927.10	720.00	89.74
132	6.44	927.10	717.00	91.04
170	.00	927.40	716.00	91.61
168	.00	927.40	716.00	91.61

128	8.87	927.11	711.00	93.65
202	16.12	927.10	710.00	94.08
124	6.44	927.13	698.00	99.29
140	.00	927.10	697.00	99.71

THE NET SYSTEM DEMAND = 364.91

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

PIPE NUMBER	FLOWRATE
301	225.81
303	139.09

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 364.91
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 = 1.70

THE FOLLOWING SPECIFIC DEMAND CHANGES ARE MADE :

JUNCTION NUMBER	DEMAND
4	2500.00
172	1255.00
170	1250.00

THE FOLLOWING CHANGES IN PIPE DATA ARE SPECIFIED

FOR PIPE NUMBER 301 THE VALUE OF THE FIXED GRADE IS CHANGED TO 865.0

FOR PIPE NUMBER 303 THE VALUE OF THE FIXED GRADE IS CHANGED TO 865.0

THE RESULTS ARE OBTAINED AFTER 4 TRIALS WITH AN ACCURACY = .00053

Maximum Day Demand Plus Two 2500 Fire Flows

Fire Flow 1: 2500 gpm at node 4

Fire Flow 2: 2500 gpm split at nodes 170 172

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
301	0 8	3098.84	9.56	.00	.00	8.79	23.89
303	0 2	2115.35	8.48	.00	.00	6.00	11.78
305	2 4	1571.59	3.13	.00	.00	4.46	6.79
309	4 8	-928.41	-2.05	.00	.00	-2.63	-2.56
313	8 104	2170.44	6.18	.00	.00	6.16	12.35
315	2 112	543.75	18.51	.00	.00	3.47	6.86
501	104 108	2170.44	11.12	.00	.00	6.16	12.35
505	108 112	83.20	.14	.00	.00	.53	.21
509	112 116	626.95	3.12	.00	.00	4.00	8.92
513	116 120	278.43	.69	.00	.00	1.78	1.98
517	120 124	274.66	.74	.00	.00	1.75	1.94
521	124 128	270.88	.49	.00	.00	1.73	1.89
525	128 132	265.68	.40	.00	.00	1.70	1.82
529	132 136	261.91	.69	.00	.00	1.67	1.77
533	136 140	205.25	.07	.00	.00	.58	.16
537	142 140	-481.99	-1.70	.00	.00	-3.08	-5.48
539	144 142	-481.99	-.77	.00	.00	-3.08	-5.48
541	148 144	-476.33	-1.50	.00	.00	-3.04	-5.36
545	152 148	-474.44	-1.17	.00	.00	-3.03	-5.33
549	156 152	2041.90	3.31	.00	.00	5.79	11.03
553	160 156	2060.78	4.04	.00	.00	5.85	11.22
557	108 160	2087.23	4.14	.00	.00	5.92	11.49
561	160 162	15.11	.00	.00	.00	.04	.00
565	162 164	15.11	.00	.00	.00	.10	.01
569	152 168	2505.00	8.54	.00	.00	7.11	16.11
573	168 170	2505.00	3.71	.00	.00	7.11	16.11
577	170 172	1255.00	7.10	.00	.00	8.01	32.27
581	160 176	11.34	.00	.00	.00	.07	.01
585	156 180	11.34	.00	.00	.00	.07	.01
589	152 184	11.34	.00	.00	.00	.07	.01
593	144 188	5.66	.00	.00	.00	.04	.00

Harmony Grove Village South Project
Public Water System Analysis

Job No. 986-001
File Name: 986001A1
March 9, 2015

597	116	192	344.75	.71	.00	.00	2.20	2.95
601	192	196	325.86	.90	.00	.00	2.08	2.66
605	196	200	306.97	.69	.00	.00	1.96	2.38
609	200	140	288.09	.78	.00	.00	1.84	2.11
613	140	202	11.34	.00	.00	.00	.03	.00
617	202	204	1.89	.00	.00	.00	.01	.00

JUNCTION	NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
	2	.00	856.52	575.00	121.99
	4	2500.00	853.39	575.00	120.64
	8	.00	855.44	575.00	121.53
	104	.00	849.27	583.00	115.38
	108	.00	838.15	612.00	98.00
	112	.00	838.01	646.00	83.20
	116	3.77	834.89	661.00	75.35
	120	3.77	834.19	682.00	65.95
	124	3.77	833.46	698.00	58.70
	128	5.20	832.97	711.00	52.85
	132	3.77	832.57	717.00	50.08
	136	56.66	831.87	726.00	45.88
	140	.00	831.80	697.00	58.41
	142	.00	830.10	682.00	64.18
	144	.00	829.34	679.00	65.15
	148	1.89	827.83	674.00	66.66
	152	.00	826.66	668.00	68.75
	156	7.55	829.97	652.00	77.12
	160	.00	834.01	632.00	87.54
	162	.00	834.01	633.00	87.11
	164	15.11	834.01	627.00	89.70
	168	.00	818.12	716.00	44.25
	170	1250.00	814.42	716.00	42.65
	172	1255.00	807.32	722.00	36.97
	176	11.34	834.01	637.00	85.37
	180	11.34	829.97	652.00	77.12
	184	11.34	826.66	665.00	70.05
	188	5.66	829.34	686.00	62.11
	192	18.89	834.18	672.00	70.28
	196	18.89	833.28	682.00	65.55
	200	18.89	832.59	695.00	59.62
	202	9.45	831.80	710.00	52.78
	204	1.89	831.80	720.00	48.45

MAXIMUM PRESSURES

	2	.00	856.52	575.00	121.99
	8	.00	855.44	575.00	121.53
	4	2500.00	853.39	575.00	120.64
	104	.00	849.27	583.00	115.38
	108	.00	838.15	612.00	98.00
	164	15.11	834.01	627.00	89.70
	160	.00	834.01	632.00	87.54
	162	.00	834.01	633.00	87.11
	176	11.34	834.01	637.00	85.37
	112	.00	838.01	646.00	83.20

MINIMUM PRESSURES

	172	1255.00	807.32	722.00	36.97
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170	1250.00	814.42	716.00	42.65
168	.00	818.12	716.00	44.25
136	56.66	831.87	726.00	45.88
204	1.89	831.80	720.00	48.45
132	3.77	832.57	717.00	50.08
202	9.45	831.80	710.00	52.78
128	5.20	832.97	711.00	52.85
140	.00	831.80	697.00	58.41
124	3.77	833.46	698.00	58.70

THE NET SYSTEM DEMAND = 5214.19

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

PIPE NUMBER	FLOWRATE
301	3098.84
303	2115.35

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 5214.19

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 = 1.70

THE FOLLOWING SPECIFIC DEMAND CHANGES ARE MADE :

JUNCTION NUMBER	DEMAND
4	2500.00
204	1252.00
202	1259.00

THE FOLLOWING CHANGES IN PIPE DATA ARE SPECIFIED

FOR PIPE NUMBER 301 THE VALUE OF THE FIXED GRADE IS CHANGED TO 865.0

FOR PIPE NUMBER 303 THE VALUE OF THE FIXED GRADE IS CHANGED TO 865.0

THE RESULTS ARE OBTAINED AFTER 3 TRIALS WITH AN ACCURACY = .00210

Maximum Day Demand Plus Two Fire Flows

Fire Flow 1: 2500 gpm at node 4

Fire Flow 2: 2400 gpm split at nodes 202 and 204

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
301	0 8	3064.08	9.36	.00	.00	8.69	23.40
303	0 2	2149.49	8.74	.00	.00	6.10	12.13
305	2 4	1513.71	2.92	.00	.00	4.29	6.34
309	4 8	-986.29	-2.29	.00	.00	-2.80	-2.87
313	8 104	2077.79	5.70	.00	.00	5.89	11.39
315	2 112	635.78	24.73	.00	.00	4.06	9.16
501	104 108	2077.79	10.26	.00	.00	5.89	11.39
505	108 112	747.22	8.15	.00	.00	4.77	12.35
509	112 116	1383.00	13.52	.00	.00	8.83	38.63
513	116 120	626.53	3.12	.00	.00	4.00	8.91
517	120 124	622.76	3.35	.00	.00	3.97	8.81
521	124 128	618.98	2.27	.00	.00	3.95	8.71
525	128 132	613.78	1.89	.00	.00	3.92	8.58
529	132 136	610.01	3.31	.00	.00	3.89	8.48
533	136 140	553.35	.44	.00	.00	1.57	.98
537	142 140	1261.62	10.10	.00	.00	8.05	32.58
539	144 142	1261.62	4.56	.00	.00	8.05	32.58
541	148 144	1267.29	9.20	.00	.00	8.09	32.85
545	152 148	1269.17	7.25	.00	.00	8.10	32.95
549	156 152	1285.24	1.40	.00	.00	3.65	4.68
553	160 156	1304.12	1.73	.00	.00	3.70	4.81
557	108 160	1330.58	1.80	.00	.00	3.77	4.99
561	160 162	15.11	.00	.00	.00	.04	.00
565	162 164	15.11	.00	.00	.00	.10	.01
569	152 168	4.73	.00	.00	.00	.01	.00
573	168 170	4.73	.00	.00	.00	.01	.00
577	170 172	4.73	.00	.00	.00	.03	.00
581	160 176	11.34	.00	.00	.00	.07	.01
585	156 180	11.34	.00	.00	.00	.07	.01
589	152 184	11.34	.00	.00	.00	.07	.01
593	144 188	5.66	.00	.00	.00	.04	.00

Harmony Grove Village South Project
Public Water System Analysis

Job No. 986-001
File Name: 986001A1
March 9, 2015

597	116	192	752.69	3.00	.00	.00	4.80	12.52
601	192	196	733.80	4.06	.00	.00	4.68	11.94
605	196	200	714.91	3.30	.00	.00	4.56	11.38
609	200	140	696.03	4.01	.00	.00	4.44	10.83
613	140	202	2511.00	4.37	.00	.00	7.12	16.18
617	202	204	1252.00	6.10	.00	.00	7.99	32.12

JUNCTION	NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
	2	.00	856.26	575.00	121.88
	4	2500.00	853.35	575.00	120.62
	8	.00	855.64	575.00	121.61
	104	.00	849.94	583.00	115.68
	108	.00	839.69	612.00	98.67
	112	.00	831.54	646.00	80.40
	116	3.77	818.02	661.00	68.04
	120	3.77	814.90	682.00	57.59
	124	3.77	811.55	698.00	49.20
	128	5.20	809.28	711.00	42.59
	132	3.77	807.40	717.00	39.17
	136	56.66	804.09	726.00	33.84
	140	.00	803.65	697.00	46.21
	142	.00	813.75	682.00	57.09
	144	.00	818.31	679.00	60.37
	148	1.89	827.51	674.00	66.52
	152	.00	834.76	668.00	72.26
	156	7.55	836.16	652.00	79.80
	160	.00	837.89	632.00	89.22
	162	.00	837.89	633.00	88.79
	164	15.11	837.89	627.00	91.39
	168	.00	834.76	716.00	51.46
	170	.00	834.76	716.00	51.46
	172	4.73	834.76	722.00	48.86
	176	11.34	837.89	637.00	87.05
	180	11.34	836.16	652.00	79.80
	184	11.34	834.76	665.00	73.56
	188	5.66	818.31	686.00	57.33
	192	18.89	815.01	672.00	61.97
	196	18.89	810.95	682.00	55.88
	200	18.89	807.65	695.00	48.82
	202	1259.00	799.28	710.00	38.69
	204	1252.00	793.17	720.00	31.71

MAXIMUM PRESSURES

	2	.00	856.26	575.00	121.88
	8	.00	855.64	575.00	121.61
	4	2500.00	853.35	575.00	120.62
	104	.00	849.94	583.00	115.68
	108	.00	839.69	612.00	98.67
	164	15.11	837.89	627.00	91.39
	160	.00	837.89	632.00	89.22
	162	.00	837.89	633.00	88.79
	176	11.34	837.89	637.00	87.05
	112	.00	831.54	646.00	80.40

MINIMUM PRESSURES

	204	1252.00	793.17	720.00	31.71
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136	56.66	804.09	726.00	33.84
202	1259.00	799.28	710.00	38.69
132	3.77	807.40	717.00	39.17
128	5.20	809.28	711.00	42.59
140	.00	803.65	697.00	46.21
200	18.89	807.65	695.00	48.82
172	4.73	834.76	722.00	48.86
124	3.77	811.55	698.00	49.20
170	.00	834.76	716.00	51.46

THE NET SYSTEM DEMAND = 5213.57

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

PIPE NUMBER	FLOWRATE
301	3064.08
303	2149.49

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 5213.57

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 = 1.70

THE FOLLOWING SPECIFIC DEMAND CHANGES ARE MADE :

JUNCTION NUMBER	DEMAND
4	2500.00
136	2557.00

THE FOLLOWING CHANGES IN PIPE DATA ARE SPECIFIED

FOR PIPE NUMBER 301 THE VALUE OF THE FIXED GRADE IS CHANGED TO 865.0

FOR PIPE NUMBER 303 THE VALUE OF THE FIXED GRADE IS CHANGED TO 865.0

THE RESULTS ARE OBTAINED AFTER 3 TRIALS WITH AN ACCURACY = .00002

Maximum Day Demand Plus Two 2500 Fire Flows

Fire Flow 1: 2500 gpm at node 4

Fire Flow 2: 2500 gpm at node 136

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
301	0 8	3063.16	9.35	.00	.00	8.69	23.38
303	0 2	2151.09	8.75	.00	.00	6.10	12.15
305	2 4	1511.53	2.91	.00	.00	4.29	6.32
309	4 8	-988.47	-2.30	.00	.00	-2.80	-2.88
313	8 104	2074.69	5.68	.00	.00	5.89	11.36
315	2 112	639.56	25.00	.00	.00	4.08	9.26
501	104 108	2074.69	10.23	.00	.00	5.89	11.36
505	108 112	763.61	8.49	.00	.00	4.87	12.86
509	112 116	1403.17	13.89	.00	.00	8.96	39.68
513	116 120	694.75	3.78	.00	.00	4.43	10.79
517	120 124	690.98	4.06	.00	.00	4.41	10.68
521	124 128	687.20	2.75	.00	.00	4.39	10.58
525	128 132	682.00	2.29	.00	.00	4.35	10.43
529	132 136	678.23	4.03	.00	.00	4.33	10.32
533	136 140	-1878.77	-4.26	.00	.00	-5.33	-9.46
537	142 140	1242.13	9.81	.00	.00	7.93	31.66
539	144 142	1242.13	4.43	.00	.00	7.93	31.66
541	148 144	1247.79	8.94	.00	.00	7.96	31.92
545	152 148	1249.67	7.04	.00	.00	7.98	32.01
549	156 152	1265.74	1.37	.00	.00	3.59	4.55
553	160 156	1284.63	1.68	.00	.00	3.64	4.68
557	108 160	1311.08	1.75	.00	.00	3.72	4.86
561	160 162	15.11	.00	.00	.00	.04	.00
565	162 164	15.11	.00	.00	.00	.10	.01
569	152 168	4.73	.00	.00	.00	.01	.00
573	168 170	4.73	.00	.00	.00	.01	.00
577	170 172	4.73	.00	.00	.00	.03	.00
581	160 176	11.34	.00	.00	.00	.07	.01
585	156 180	11.34	.00	.00	.00	.07	.01
589	152 184	11.34	.00	.00	.00	.07	.01
593	144 188	5.66	.00	.00	.00	.04	.00
597	116 192	704.65	2.66	.00	.00	4.50	11.08

Harmony Grove Village South Project
Public Water System Analysis

Job No. 986-001
File Name: 986001A1
March 9, 2015

601	192	196	685.76	3.58	.00	.00	4.38	10.54
605	196	200	666.87	2.90	.00	.00	4.26	10.00
609	200	140	647.99	3.51	.00	.00	4.14	9.49
613	140	202	11.34	.00	.00	.00	.03	.00
617	202	204	1.89	.00	.00	.00	.01	.00

JUNCTION	NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
	2	.00	856.25	575.00	121.88
	4	2500.00	853.34	575.00	120.62
	8	.00	855.65	575.00	121.61
	104	.00	849.97	583.00	115.68
	108	.00	839.74	612.00	98.69
	112	.00	831.25	646.00	80.28
	116	3.77	817.37	661.00	67.76
	120	3.77	813.59	682.00	57.02
	124	3.77	809.53	698.00	48.33
	128	5.20	806.78	711.00	41.50
	132	3.77	804.48	717.00	37.91
	136	2557.00	800.46	726.00	32.27
	140	.00	804.71	697.00	46.68
	142	.00	814.53	682.00	57.43
	144	.00	818.96	679.00	60.65
	148	1.89	827.90	674.00	66.69
	152	.00	834.94	668.00	72.34
	156	7.55	836.31	652.00	79.87
	160	.00	837.99	632.00	89.26
	162	.00	837.99	633.00	88.83
	164	15.11	837.99	627.00	91.43
	168	.00	834.94	716.00	51.54
	170	.00	834.94	716.00	51.54
	172	4.73	834.94	722.00	48.94
	176	11.34	837.99	637.00	87.10
	180	11.34	836.30	652.00	79.87
	184	11.34	834.94	665.00	73.64
	188	5.66	818.96	686.00	57.62
	192	18.89	814.71	672.00	61.84
	196	18.89	811.12	682.00	55.95
	200	18.89	808.22	695.00	49.06
	202	9.45	804.71	710.00	41.04
	204	1.89	804.71	720.00	36.71

MAXIMUM PRESSURES

	2	.00	856.25	575.00	121.88
	8	.00	855.65	575.00	121.61
	4	2500.00	853.34	575.00	120.62
	104	.00	849.97	583.00	115.68
	108	.00	839.74	612.00	98.69
	164	15.11	837.99	627.00	91.43
	160	.00	837.99	632.00	89.26
	162	.00	837.99	633.00	88.83
	176	11.34	837.99	637.00	87.10
	112	.00	831.25	646.00	80.28

MINIMUM PRESSURES

	136	2557.00	800.46	726.00	32.27
	204	1.89	804.71	720.00	36.71

132	3.77	804.48	717.00	37.91
202	9.45	804.71	710.00	41.04
128	5.20	806.78	711.00	41.50
140	.00	804.71	697.00	46.68
124	3.77	809.53	698.00	48.33
172	4.73	834.94	722.00	48.94
200	18.89	808.22	695.00	49.06
170	.00	834.94	716.00	51.54

THE NET SYSTEM DEMAND = 5214.25

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

PIPE NUMBER	FLOWRATE
301	3063.16
303	2151.09

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 5214.25

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 = 1.70

THE FOLLOWING SPECIFIC DEMAND CHANGES ARE MADE :

JUNCTION NUMBER	DEMAND
4	2500.00
132	1254.00
128	1255.00

THE FOLLOWING CHANGES IN PIPE DATA ARE SPECIFIED

FOR PIPE NUMBER 301 THE VALUE OF THE FIXED GRADE IS CHANGED TO 865.0

FOR PIPE NUMBER 303 THE VALUE OF THE FIXED GRADE IS CHANGED TO 865.0

THE RESULTS ARE OBTAINED AFTER 3 TRIALS WITH AN ACCURACY = .00027

Maximum Day demand Plus Two 2500 gpm Fire Flows

Fire Flow 1: 2500 gpm at node 4

Fire Flow 2: 2500 gpm split at nodes 128 132

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
301	0 8	3056.35	9.31	.00	.00	8.67	23.29
303	0 2	2157.59	8.80	.00	.00	6.12	12.22
305	2 4	1500.43	2.87	.00	.00	4.26	6.24
309	4 8	-999.57	-2.35	.00	.00	-2.84	-2.94
313	8 104	2056.78	5.59	.00	.00	5.83	11.18
315	2 112	657.16	26.29	.00	.00	4.19	9.74
501	104 108	2056.78	10.06	.00	.00	5.83	11.18
505	108 112	839.61	10.12	.00	.00	5.36	15.33
509	112 116	1496.77	15.65	.00	.00	9.55	44.72
513	116 120	1074.72	8.47	.00	.00	6.86	24.21
517	120 124	1070.94	9.14	.00	.00	6.84	24.05
521	124 128	1067.17	6.21	.00	.00	6.81	23.90
525	128 132	-187.83	-.21	.00	.00	-1.20	-.96
529	132 136	-1441.83	-16.27	.00	.00	-9.20	-41.72
533	136 140	-1498.49	-2.80	.00	.00	-4.25	-6.22
537	142 140	1148.21	8.48	.00	.00	7.33	27.37
539	144 142	1148.21	3.83	.00	.00	7.33	27.37
541	148 144	1153.88	7.73	.00	.00	7.36	27.62
545	152 148	1155.76	6.09	.00	.00	7.38	27.70
549	156 152	1171.83	1.18	.00	.00	3.32	3.94
553	160 156	1190.71	1.46	.00	.00	3.38	4.06
557	108 160	1217.17	1.52	.00	.00	3.45	4.23
561	160 162	15.11	.00	.00	.00	.04	.00
565	162 164	15.11	.00	.00	.00	.10	.01
569	152 168	4.73	.00	.00	.00	.01	.00
573	168 170	4.73	.00	.00	.00	.01	.00
577	170 172	4.73	.00	.00	.00	.03	.00
581	160 176	11.34	.00	.00	.00	.07	.01
585	156 180	11.34	.00	.00	.00	.07	.01
589	152 184	11.34	.00	.00	.00	.07	.01
593	144 188	5.66	.00	.00	.00	.04	.00

Harmony Grove Village South Project
Public Water System Analysis

Job No. 986-001
File Name: 986001A1
March 9, 2015

597	116	192	418.28	1.01	.00	.00	2.67	4.22
601	192	196	399.39	1.32	.00	.00	2.55	3.87
605	196	200	380.50	1.03	.00	.00	2.43	3.54
609	200	140	361.62	1.19	.00	.00	2.31	3.22
613	140	202	11.34	.00	.00	.00	.03	.00
617	202	204	1.89	.00	.00	.00	.01	.00

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
2	.00	856.20	575.00	121.85
4	2500.00	853.33	575.00	120.61
8	.00	855.69	575.00	121.63
104	.00	850.09	583.00	115.74
108	.00	840.03	612.00	98.81
112	.00	829.91	646.00	79.70
116	3.77	814.26	661.00	66.41
120	3.77	805.79	682.00	53.64
124	3.77	796.65	698.00	42.75
128	1255.00	790.44	711.00	34.42
132	1254.00	790.65	717.00	31.91
136	56.66	806.92	726.00	35.06
140	.00	809.72	697.00	48.84
142	.00	818.20	682.00	59.02
144	.00	822.03	679.00	61.98
148	1.89	829.77	674.00	67.50
152	.00	835.86	668.00	72.74
156	7.55	837.04	652.00	80.19
160	.00	838.51	632.00	89.49
162	.00	838.51	633.00	89.05
164	15.11	838.50	627.00	91.65
168	.00	835.86	716.00	51.94
170	.00	835.86	716.00	51.94
172	4.73	835.86	722.00	49.34
176	11.34	838.51	637.00	87.32
180	11.34	837.04	652.00	80.19
184	11.34	835.86	665.00	74.04
188	5.66	822.03	686.00	58.95
192	18.89	813.25	672.00	61.21
196	18.89	811.94	682.00	56.31
200	18.89	810.91	695.00	50.23
202	9.45	809.72	710.00	43.21
204	1.89	809.72	720.00	38.88

MAXIMUM PRESSURES

2	.00	856.20	575.00	121.85
8	.00	855.69	575.00	121.63
4	2500.00	853.33	575.00	120.61
104	.00	850.09	583.00	115.74
108	.00	840.03	612.00	98.81
164	15.11	838.50	627.00	91.65
160	.00	838.51	632.00	89.49
162	.00	838.51	633.00	89.05
176	11.34	838.51	637.00	87.32
156	7.55	837.04	652.00	80.19

MINIMUM PRESSURES

132	1254.00	790.65	717.00	31.91
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128	1255.00	790.44	711.00	34.42
136	56.66	806.92	726.00	35.06
204	1.89	809.72	720.00	38.88
124	3.77	796.65	698.00	42.75
202	9.45	809.72	710.00	43.21
140	.00	809.72	697.00	48.84
172	4.73	835.86	722.00	49.34
200	18.89	810.91	695.00	50.23
170	.00	835.86	716.00	51.94

THE NET SYSTEM DEMAND = 5213.94

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

PIPE NUMBER	FLOWRATE
301	3056.35
303	2157.59

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 5213.94

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 = 1.70

THE FOLLOWING SPECIFIC DEMAND CHANGES ARE MADE :

JUNCTION NUMBER	DEMAND
4	2500.00
196	1269.00
200	1269.00

THE FOLLOWING CHANGES IN PIPE DATA ARE SPECIFIED

FOR PIPE NUMBER 301 THE VALUE OF THE FIXED GRADE IS CHANGED TO 865.0

FOR PIPE NUMBER 303 THE VALUE OF THE FIXED GRADE IS CHANGED TO 865.0

THE RESULTS ARE OBTAINED AFTER 4 TRIALS WITH AN ACCURACY = .00013

Maximum Day demand Plus Two 2500 gpm Fire Flows

Fire Flow 1: 2500 gpm at node 4

Fire Flow 2: 2500 gpm split at nodes 196 200

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
301	0 8	3055.57	9.31	.00	.00	8.67	23.28
303	0 2	2158.56	8.80	.00	.00	6.12	12.23
305	2 4	1498.94	2.86	.00	.00	4.25	6.22
309	4 8	-1001.06	-2.36	.00	.00	-2.84	-2.95
313	8 104	2054.52	5.58	.00	.00	5.83	11.16
315	2 112	659.62	26.47	.00	.00	4.21	9.80
501	104 108	2054.52	10.04	.00	.00	5.83	11.16
505	108 112	849.69	10.34	.00	.00	5.42	15.67
509	112 116	1509.31	15.89	.00	.00	9.63	45.41
513	116 120	296.67	.78	.00	.00	1.89	2.23
517	120 124	292.90	.83	.00	.00	1.87	2.18
521	124 128	289.13	.55	.00	.00	1.85	2.13
525	128 132	283.92	.45	.00	.00	1.81	2.06
529	132 136	280.15	.78	.00	.00	1.79	2.01
533	136 140	223.49	.08	.00	.00	.63	.18
537	142 140	1135.88	8.32	.00	.00	7.25	26.83
539	144 142	1135.88	3.76	.00	.00	7.25	26.83
541	148 144	1141.54	7.58	.00	.00	7.29	27.07
545	152 148	1143.43	5.97	.00	.00	7.30	27.16
549	156 152	1159.49	1.16	.00	.00	3.29	3.87
553	160 156	1178.38	1.43	.00	.00	3.34	3.99
557	108 160	1204.83	1.50	.00	.00	3.42	4.15
561	160 162	15.11	.00	.00	.00	.04	.00
565	162 164	15.11	.00	.00	.00	.10	.01
569	152 168	4.73	.00	.00	.00	.01	.00
573	168 170	4.73	.00	.00	.00	.01	.00
577	170 172	4.73	.00	.00	.00	.03	.00
581	160 176	11.34	.00	.00	.00	.07	.01
585	156 180	11.34	.00	.00	.00	.07	.01
589	152 184	11.34	.00	.00	.00	.07	.01
593	144 188	5.66	.00	.00	.00	.04	.00

Harmony Grove Village South Project
Public Water System Analysis

Job No. 986-001
File Name: 986001A1
March 9, 2015

597	116	192	1208.86	7.23	.00	.00	7.72	30.10
601	192	196	1189.97	9.94	.00	.00	7.59	29.24
605	196	200	-79.03	-.06	.00	.00	-.50	-.19
609	200	140	-1348.03	-13.63	.00	.00	-8.60	-36.84
613	140	202	11.34	.00	.00	.00	.03	.00
617	202	204	1.89	.00	.00	.00	.01	.00

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
2	.00	856.20	575.00	121.85
4	2500.00	853.33	575.00	120.61
8	.00	855.69	575.00	121.63
104	.00	850.11	583.00	115.75
108	.00	840.07	612.00	98.83
112	.00	829.72	646.00	79.61
116	3.77	813.83	661.00	66.23
120	3.77	813.05	682.00	56.79
124	3.77	812.22	698.00	49.50
128	5.20	811.67	711.00	43.62
132	3.77	811.21	717.00	40.83
136	56.66	810.43	726.00	36.59
140	.00	810.35	697.00	49.12
142	.00	818.67	682.00	59.22
144	.00	822.42	679.00	62.15
148	1.89	830.00	674.00	67.60
152	.00	835.98	668.00	72.79
156	7.55	837.14	652.00	80.23
160	.00	838.57	632.00	89.51
162	.00	838.57	633.00	89.08
164	15.11	838.57	627.00	91.68
168	.00	835.98	716.00	51.99
170	.00	835.98	716.00	51.99
172	4.73	835.98	722.00	49.39
176	11.34	838.57	637.00	87.35
180	11.34	837.14	652.00	80.23
184	11.34	835.97	665.00	74.09
188	5.66	822.42	686.00	59.12
192	18.89	806.61	672.00	58.33
196	1269.00	796.66	682.00	49.69
200	1269.00	796.72	695.00	44.08
202	9.45	810.35	710.00	43.48
204	1.89	810.35	720.00	39.15

MAXIMUM PRESSURES

2	.00	856.20	575.00	121.85
8	.00	855.69	575.00	121.63
4	2500.00	853.33	575.00	120.61
104	.00	850.11	583.00	115.75
108	.00	840.07	612.00	98.83
164	15.11	838.57	627.00	91.68
160	.00	838.57	632.00	89.51
162	.00	838.57	633.00	89.08
176	11.34	838.57	637.00	87.35
156	7.55	837.14	652.00	80.23

MINIMUM PRESSURES

136	56.66	810.43	726.00	36.59
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204	1.89	810.35	720.00	39.15
132	3.77	811.21	717.00	40.83
202	9.45	810.35	710.00	43.48
128	5.20	811.67	711.00	43.62
200	1269.00	796.72	695.00	44.08
140	.00	810.35	697.00	49.12
172	4.73	835.98	722.00	49.39
124	3.77	812.22	698.00	49.50
196	1269.00	796.66	682.00	49.69

THE NET SYSTEM DEMAND = 5214.14

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

PIPE NUMBER	FLOWRATE
301	3055.57
303	2158.56

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 5214.14

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