East Area 1 Recycled Water

Technical Report

Santa Paula, CA

Prepared for:

LIMONEIRA COMPANY

AND

PARKSTONE COMPANIES

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Introduction

The proposed East Area 1 project is a mixture of new residential, commercial, retail, open space and public facilities. Situated in Ventura County, the 501-acre East Area 1 project is located directly north of Highway 126 at the eastern edge of the City of Santa Paula. The property is bounded by the foothills of the Topatopa Mountains to the north, Main Street and South Pacific Railroad to the south, Santa Paula Creek to the east, and Haun Creek to the west. Figure 1 shows the regional location of the project site.

FIGURE 1 - REGIONAL LOCATION MAP

Access to the site is provided by Highway 126 at the Hallock Drive intersection. Figure 2 shows the project location.

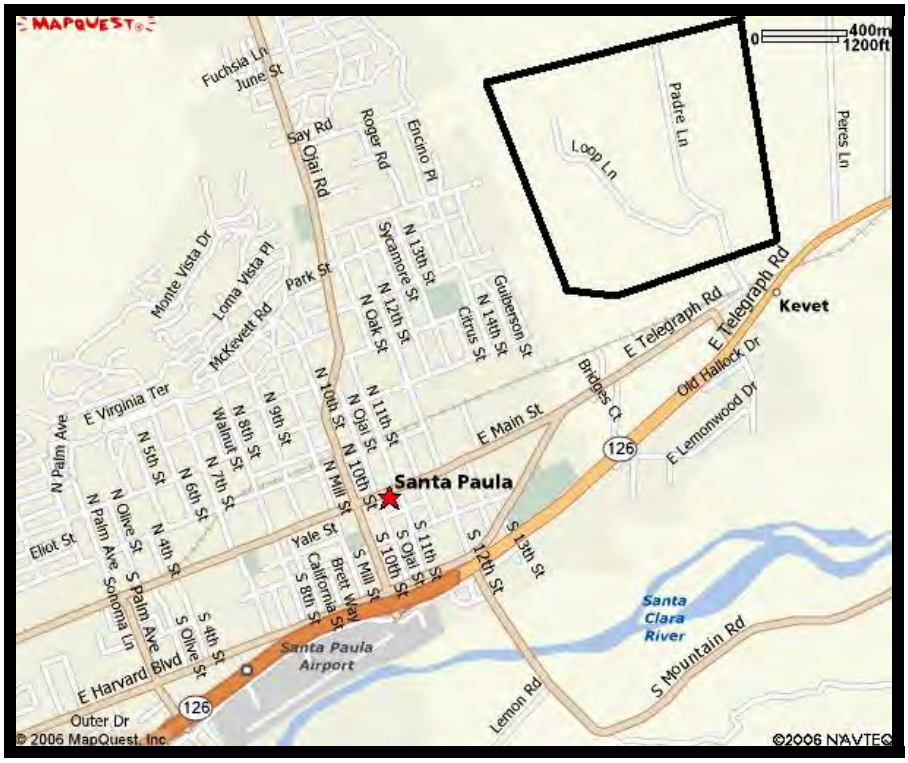

FIGURE 2 – PROJECT LOCATION MAP

Existing Conditions

The East Area 1 project is fairly remote from the core of the City of Santa Paula. Currently, there are no existing recycled systems throughout the city. All of the water supply comes from 5 existing wells that pump from the Santa Paula Groundwater Basin that is recharged by Santa Clara River, Santa Paula Creek, and other local streams. This water supply is either treated at the Steckel Conditioning Facility or has the capacity to remove iron and manganese at the well site. The existing land use at the East Area 1 project site is mainly agricultural and all water needs are met through these existing wells. The City of Santa Paula commissioned a water study for reviewing the City's entire water system, both domestic and recycled. This study, "Potable Water System Master Plan" prepared by Boyle Engineering, was subsequently completed in October 2006. The "Potable Water System Master Plan" identifies the need for a recycled water distribution system. The City has recently approved a new waste water treatment plant that is proposed to be online in 2009.

Objectives

The objective of this study is to provide a blueprint for the design of a recycled water system within the East Area 1 project to be used strictly for landscape irrigation. The East Area 1 project will be designed to meet or exceed the City of Santa Paula's recycled water design criterion as established in the "Potable Water System Master Plan". The design guidelines set forth in this report are consistent with those set forth in the City's "Potable Water System Master Plan". However, due to the complexity, uncertainty, and timing of the system wide upgrades and future projects, this study diverges from some of the main concepts in the City's "Potable Water System Master Plan". For instance the entirety of the City-wide recycled water storage occurs outside of the East Area 1 project. This report assumes that in the future the city will be able to provide a source supply at 100 psi near the Hallock Drive/Telegraph Road intersection.

It should be noted that in the event that East Area 1 is constructed in advance of the City's planned recycled water facilities and there is no source of recycled water existing, the East Area 1 recycled water system can be cross connected into the proposed domestic water system of East Area 1.(Note: City has proposed for a new water treatment plant for 2009) This can be accomplished using several large (typically 10") double detector

check assemblies that would allow domestic water to charge the recycled water system, but prevent the recycled water from flowing backwards into the domestic water system.

Procedure

The East Area 1 recycled water system was developed utilizing the following 6 basic design steps:

1. Define Design Parameters

   Design parameters for the recycled water system were developed from the City's "Potable Water System Master Plan" as set forth in Section 12 – Recycled Water System. The criterion used in this analysis follows those set forth on page 136 found within Section 12. The design parameters used for this report are also referenced on Figure 3. Finished grading elevations are based on Figure 3-8 of the Specific Plan. We also assumed 6' depth to recycled water pipe inverts from finished surface.

2. Define Land Use Types and Locations

   Working in conjunction with the land planning team, the land use types within the Specific Plan were placed geographically throughout the site in accordance with the Specific Plan Regulating Plan (see Figure 5-1). Integrated within this regulating plan are parks, open spaces, medians, agricultural preserves and shared athletic fields that are designated different types and is associated with a consumption rate determined by the "Water Supply Assessment for East Area One Specific Plan" by Impact Sciences, dated April 2007. Later on in the development cycle, typically at a tentative map stage, a more definitive recycled water system model will be developed and processed.

3. Assign Recycled Water Consumption Factors

   Based on the aforementioned design parameters, specific recycled water consumption rates were applied to each land use based on type of land use. The recycled water consumption rates for each land use can be seen in Figure 5. The consumption rates were then logically spread out to junctions (nodes) within the recycled water system. See Figure 8 for junction node locations. The overall demands at each junction can be seen on Figure 6.

4. Model Recycled Water System

   After each individual junction received a recycled water consumption rate, the resultant water demands were logically linked together in a model. Pipes connecting the various junctions were developed based on potential phasing of the project, demand types and locations, and internal system redundancy. Pipe sizes were iterated by peak hour demand (PHD) modeling. The results of these models can be seen in Figure 7 (PHD).

5. Prepare Pump Pressure Estimate

   After consumption rates were developed for the entire project, peak hour demands were calculated. Using these demands we determine the minimum pressure needed to service East Area 1 with recycled water at our assumed point of connection (POC) within Hallock Drive.

6. Prepare Summary Graphic

   After demands were logically linked together in a model, a resultant water system graphic was prepared. The results of this model can be seen in Figure 8.

Proposed Recycled Water System

The East Area 1 Specific Plan anticipates a macro phasing of the project as seen in Figure 4-1 of the Specific Plan. Keeping this in mind, and taking into the consideration the proposed grading of the project (Specific Plan, Fig. 3-8), the following layout of the system is proposed:

Project Backbone Facilities – A looped system in the major north-south road (Hallock Drive) and the major east-west road (Central Boulevard) will serve as the internal backbone recycled water system. These recycled water lines are 6” and 8” diameter facilities. Additionally, a ring around the outside of the project’s five main phases will complete the project backbone looped system. A quick glance at the Specific Plan’s phasing diagram (Figure 4-1) and the proposed water system (Figure 8 herein) shows that the five major phases have been ringed by backbone recycled water facilities, thus creating pods of development that can occur independent of one another.

Project Internal Facilities– Within each of the five major phases are several other recycled water lines. Typically these will be the lines that home owner associations and public agencies will connect to. These internal facilities are typically 6” pipes.

During the implementation of the City's recycled water facility, the water lines for landscape irrigation will be charged via cross connections utilizing double detector check assemblies to the proposed domestic water system. Once the City's recycled water facility and storage facilities are complete, the interim cross connections will be broken.

Proposed Water Recycling Facility

A new water recycling facility is proposed to service the City of Santa Paula. We have preliminarily estimated the pressure needed to service East Area 1 at the point of connection at Hallock Dr. to be 100 psi.

Conclusions

Based on the modeling prepared by Huitt-Zollars the East Area 1 recycled water system depicted in Figure 8 is in accordance with City of Santa Paula design guidelines. Pressures and line losses fall within acceptable ranges. A summary of maximum and minimum pressures, line losses, and velocities can be seen in the following table.

MODELING SUMMARY

East Area 1 RW Technical Report

SCENARIO	Max. Pressure (psi)	Min. Pressure (psi)	Max. Line Loss (ft/K ft)	Max. Velocity (fps)
PHD (Fig 7)	97.76	32.96	3.49	2.41

References

- Boyle Engineering Corporation, September 2005, "City of Santa Paula Wastewater System Master Plan"
- HDR Town Planning, revision date to be determined, "East Area 1 Specific Plan, Santa Paula, California"

List of Preparers

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FIGURE 3

EAST AREA 1

SUMMARY OF RECYCLED WATER DESIGN CRITERIA

Average Recycled Water Consumption Rates

ITEM	TYPE/SIZE	QUANTITY
Open Space: Agricultural Preserve		0.41 AC-FT/YR per ACRE[1]
Open Space: Park, Roads, Medians		2.22 AC-FT/YR per ACRE[1]

Demand Cases

Average Daily Demand (ADD)	
Maximum Daily Demand (MDD)	2.5 x ADD
Peak Hour Demand (PHD)	3.4 x MDD = 8.0 x ADD

Pipeline Design Parameters

Maximum Pressure = 150 PSI in main lines

Maximum Velocity = ±5 fps

Maximum Head Loss = 5ft per 1,000 ft of pipe

Minimum Pipe Size = 6"

Hazen-Williams Coefficient = 120 (6" - 10" pipes)

(1) "Water Supply Assessment for East Area One Specific Plan" by Impact Science, dated April 2007

Figure 4

East Area 1 - Proposed Regulating Plan

Santa Paula, California

04-13-07

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FIGURE 5
EAST AREA 1
SUMMARY OF RECYCLED WATER LAND USES AND DEMANDS

PROPOSED LAND USE	CONSUMPTION RATE		ACRES	KSF	AVERAGE DAILY DEMAND [GPM]	MAXIMUM DAILY DEMAND [GPM]	PEAK HOUR DEMAND [GPM]
PLANNING AREA A - SANTA PAULA CREEK NEIGHBORHOOD							
OPEN SPACE: AGRICULTURAL PRESERVE	0.41 AFY per acre (1)						
O2 9			**11.5**				
O2 12			**2.8**		0.7	1.8	5.7
OPEN SPACE: PARK	2.22 AFY per acre (1)						
O2 9			**3.0**		4.1	10.3	33.0
O2 10			**0.7**		1.0	2.4	7.7
O2 11			**1.4**		1.9	4.8	15.4
OPEN SPACE: ROADS, MEDIANS	2.22 AFY per acre (1)		**21.4**		29.5	73.6	235.6
SUBTOTAL			**40.8**				
PROPOSED LAND USE	**CONSUMPTION RATE**		**ACRES**	**KSF**	**AVERAGE DAILY DEMAND [GPM]**	**MAXIMUM DAILY DEMAND [GPM]**	**PEAK HOUR DEMAND [GPM]**
PLANNING AREA B - FOOTHILL NEIGHBORHOOD							
OPEN SPACE: AGRICULTURAL PRESERVE	0.41 AFY per acre (1)						
O2 7			**120.1**		30.5	76.3	244.2
OPEN SPACE: PARK	2.22 AFY per acre (1)						
O2 8			**11.4**		15.7	39.2	125.5
OPEN SPACE: ROADS, MEDIANS	2.22 AFY per acre (1)		**26.0**		35.8	89.5	286.3
SUBTOTAL			**157.5**				
PROPOSED LAND USE	**CONSUMPTION RATE**		**ACRES**	**KSF**	**AVERAGE DAILY DEMAND [GPM]**	**MAXIMUM DAILY DEMAND [GPM]**	**PEAK HOUR DEMAND [GPM]**
PLANNING AREA C - SANTA PAULA CREEK CIVIC DISTRICT							
OPEN SPACE: PARK	2.22 AFY per acre (1)						
C1			**2.4**				
C2			**2.4**				
OS 1			**1.0**		1.4	3.4	11.0
OS 2			**2.6**		3.6	8.9	28.6
O2 5			**0.9**		1.2	3.1	9.9
O2 12			**2.7**		3.7	9.3	29.7
OPEN SPACE: ROADS, MEDIANS	2.22 AFY per acre (1)		**13.1**		18.0	45.1	144.2
SUBTOTAL			**25.1**				

FIGURE 5
EAST AREA 1
SUMMARY OF RECYCLED WATER LAND USES AND DEMANDS

PROPOSED LAND USE	CONSUMPTION RATE		ACRES	KSF	AVERAGE DAILY DEMAND [GPM]	MAXIMUM DAILY DEMAND [GPM]	PEAK HOUR DEMAND [GPM]
PLANNING AREA D - HAUN CREEK NEIGHBORHOOD							
OPEN SPACE: PARK	2.22 AFY per acre (1)						
O2 6			**35.8**		49.3	123.2	394.2
OS 3			**0.9**		1.2	3.1	9.9
OS 4			**0.6**		0.8	2.1	6.6
OPEN SPACE: ROADS, MEDIANS	2.22 AFY per acre (1)		**21.0**		28.9	72.3	231.2
SUBTOTAL			**58.3**				
PROPOSED LAND USE	**CONSUMPTION RATE**		**ACRES**	**KSF**	**AVERAGE DAILY DEMAND [GPM]**	**MAXIMUM DAILY DEMAND [GPM]**	**PEAK HOUR DEMAND [GPM]**
PLANNING AREA E - HAUN CREEK NEIGHBORHOOD							
OPEN SPACE: ROADS, MEDIANS	2.22 AFY per acre (1)		**2.4**		3.3	8.3	26.4
SUBTOTAL			**2.4**				
TOTAL			**284.1**				

NOTES

(1) 'Water Assessment for the East Area One Specific Plan' by Impact Sciences dated April 2007, pg. 36

FIGURE 6
EAST AREA 1
SUMMARY OF RECYCLED WATER DEMANDS BY NODES

JUNCTION NO.	AVG. DAY DEMAND (GPM)	MAX. DAILY DEMAND (GPM)	PEAK HOUR DEMAND (GPM)
J-14	6.47	16.16	51.72
J-16	6.66	16.66	53.31
J-18	0.41	1.02	3.27
J-20	0.31	0.78	2.49
J-22	6.44	16.09	51.49
J-24	8.08	20.19	64.61
J-26	6.57	16.42	52.56
J-28	6.36	15.91	50.90
J-30	0.62	1.54	4.94
J-34	8.35	20.86	66.76
J-36	0.33	0.82	2.61
J-38	0.26	0.65	2.08
J-40	0.59	1.47	4.71
J-42	0.33	0.84	2.67
J-44	0.45	1.12	3.58
J-48	0.60	1.50	4.79
J-52	0.24	0.61	1.94
J-54	2.14	5.36	17.14
J-56	1.19	2.99	9.56
J-58	0.68	1.70	5.44
J-60	0.63	1.57	5.01
J-64	0.38	0.95	3.05
J-66	0.15	0.37	1.20
J-72	0.24	0.60	1.94
J-74	0.35	0.87	2.79
J-76	0.43	1.07	3.43
J-78	0.36	0.89	2.84
J-80	0.10	0.25	0.81
J-82	0.36	0.90	2.88
J-84	1.49	3.73	11.94
J-86	1.31	3.28	10.50
J-90	0.59	1.47	4.71
J-92	0.11	0.27	0.87
J-106	1.00	2.51	8.02
J-110	0.65	1.62	5.17
J-112	0.10	0.25	0.79
J-114	0.88	2.20	7.05

FIGURE 6
EAST AREA 1
SUMMARY OF RECYCLED WATER DEMANDS BY NODES

JUNCTION NO.	AVG. DAY DEMAND (GPM)	MAX. DAILY DEMAND (GPM)	PEAK HOUR DEMAND (GPM)
J-116	0.24	0.61	1.96
J-184	0.56	1.40	4.48
J-186	1.00	2.51	8.04
J-188	0.88	2.20	7.02
J-192	2.39	5.97	19.12
J-194	2.40	6.00	19.21
J-196	0.69	1.72	5.51
J-198	0.51	1.28	4.10
J-208	0.43	1.07	3.42
J-210	1.03	2.56	8.20
J-212	0.75	1.87	5.97
J-214	0.91	2.27	7.28
J-220	0.91	2.28	7.31
J-222	0.82	2.06	6.58
J-224	0.44	1.10	3.52
J-230	0.49	1.22	3.90
J-232	0.33	0.82	2.61
J-234	2.19	5.48	17.53
J-236	2.13	5.33	17.06
J-238	0.45	1.13	3.63
J-240	0.37	0.92	2.95
J-242	0.80	2.00	6.38
J-244	0.60	1.51	4.83
J-246	0.78	1.94	6.22
J-248	0.90	2.24	7.17
J-250	1.95	4.87	15.57
J-252	0.73	1.82	5.83
J-254	1.07	2.69	8.60
J-256	0.72	1.80	5.75
J-260	0.00	0.00	0.00
J-266	0.43	1.07	3.44
J-270	0.17	0.43	1.37
J-272	0.65	1.63	5.21
J-274	0.37	0.91	2.93
J-276	0.19	0.48	1.53

FIGURE 7
EAST AREA 1
SUMMARY OF DOMESTIC WATER MODELING
PEAK HOUR CASE STUDY

JUNCTION ID NUMBER	JUNCTION PRESSURE (psi)	JUNCTION ELEVATION (ft)	JUNCTION DEMAND (gpm)
J14	**30.18**	450.00	51.72
J16	36.28	435.60	53.31
J18	46.15	413.00	3.27
J20	48.71	408.00	2.49
J22	41.58	422.80	51.49
J24	50.13	404.00	64.61
J26	42.79	420.00	52.56
J28	49.33	405.20	50.90
J30	56.68	389.00	4.94
J34	61.70	378.00	66.76
J36	57.03	389.00	2.61
J38	58.42	386.00	2.08
J40	64.72	371.00	4.71
J42	66.00	368.00	2.67
J44	75.25	347.00	3.58
J48	70.72	358.00	4.79
J52	67.88	365.00	1.94
J54	73.97	352.00	17.14
J56	77.25	345.00	9.56
J58	74.59	350.50	5.44
J60	75.88	347.00	5.01
J64	79.09	339.00	3.05
J66	79.71	337.00	1.20
J72	85.54	327.00	1.94
J74	85.86	326.00	2.79
J76	84.51	329.00	3.43
J78	85.82	326.00	2.84
J80	87.58	322.00	0.81
J82	85.00	328.00	2.88
J84	87.44	323.50	11.94
J86	87.57	323.50	10.50
J90	90.80	315.00	4.71
J92	91.26	314.00	0.87
J106	91.94	312.50	8.02
J110	88.24	322.50	5.17
J112	92.32	315.00	0.79
J114	93.97	309.50	7.05
J116	96.35	303.00	1.96
J184	54.86	396.50	4.48
J186	62.01	380.00	8.04
J188	63.73	376.00	7.02
J192	68.28	365.50	19.12
J194	71.27	358.50	19.21
J196	74.77	350.50	5.51
J198	70.90	359.50	4.10
J208	68.57	365.00	3.42

FIGURE 7
EAST AREA 1
SUMMARY OF DOMESTIC WATER MODELING
PEAK HOUR CASE STUDY

JUNCTION ID NUMBER	JUNCTION PRESSURE (psi)	JUNCTION ELEVATION (ft)	JUNCTION DEMAND (gpm)
J210	70.71	360.00	8.20
J212	71.57	358.00	5.97
J214	74.18	352.00	7.28
J220	80.16	339.00	7.31
J222	78.87	342.00	6.58
J224	77.46	345.00	3.52
J230	70.80	360.00	3.90
J232	73.26	354.50	2.61
J234	76.60	347.00	17.53
J236	88.02	322.00	17.06
J238	89.02	320.00	3.63
J240	84.96	329.00	2.95
J242	83.90	331.50	6.38
J244	85.36	329.00	4.83
J246	88.05	323.00	6.22
J248	89.61	319.00	7.17
J250	87.08	324.50	15.57
J252	92.22	313.50	5.83
J254	95.16	308.50	8.60
J256	**97.55**	304.60	5.75
J260	41.10	424.50	0.00
J266	78.11	343.50	3.44
J270	69.89	361.90	1.37
J272	74.78	350.50	5.21
J274	94.82	306.20	2.93
J276	93.53	309.00	1.53
J278	89.51	318.00	3.13
	MAX / MIN VALUE		

FIGURE 7
EAST AREA 1
SUMMARY OF DOMESTIC WATER MODELING
PEAK HOUR CASE STUDY

PIPE: ID NUMBER	PIPE DIAMETER (inches)	PIPE LENGTH (feet)	PIPE VELOCITY (ft/s)	PIPE HEADLOSS/1000 FT (ft/kft)	PIPE FLOW (gpm)	PIPE RUN: FROM NODE	PIPE RUN: TO NODE
P13	6	635.14	0.67	0.45	-58.87	J260	J14
P15	6	513.72	0.57	0.33	-49.90	J16	J18
P19	6	536.95	1.25	1.46	-110.59	J14	J20
P21	6	1412.00	0.63	0.41	55.45	J16	J22
P25	6	490.89	0.60	0.38	-53.17	J18	J24
P27	6	110.19	0.04	0.00	3.96	J22	J26
P33	6	628.08	1.13	1.20	-99.50	J28	J30
P39	6	564.63	0.62	0.39	-54.23	J34	J36
P41	6	528.07	0.64	0.42	-56.84	J36	J38
P43	6	389.44	1.19	1.31	-104.44	J30	J42
P45	6	672.02	0.22	0.06	19.16	J40	J42
P47	6	527.28	0.27	0.09	-23.87	J40	J34
P51	6	432.22	1.34	1.64	-117.78	J24	J34
P53	6	275.04	1.28	1.52	-113.08	J20	J38
P55	6	249.89	1.95	3.30	-172.00	J38	J52
P57	6	318.24	1.97	3.37	-173.94	J52	J54
P69	6	354.75	1.00	0.95	-87.94	J42	J44
P71	6	300.00	1.75	2.70	-154.18	J34	J48
P73	6	271.28	1.54	2.13	-135.76	J54	J56
P75	6	611.64	1.08	1.11	95.52	J56	J58
P77	6	528.83	1.02	1.00	90.08	J58	J60
P79	6	317.00	1.80	2.85	158.97	J60	J48
P85	6	553.42	1.05	1.05	92.72	J64	J66
P95	6	606.78	0.59	0.36	-51.70	J74	J72
P97	6	277.42	0.55	0.32	48.91	J74	J76
P99	6	293.75	0.49	0.25	-42.89	J76	J78
P101	6	571.00	1.93	3.22	169.68	J76	J60
P103	6	358.17	0.52	0.28	-45.73	J78	J80
P105	6	290.80	0.53	0.29	-46.54	J80	J82
P107	6	442.19	1.88	3.07	-165.39	J82	J84
P109	6	104.35	2.01	3.49	-177.33	J84	J86
P115	6	64.00	0.98	0.92	-86.01	J90	J92
P129	6	281.33	1.04	1.03	-91.52	J44	J66
P143	6	50.00	0.99	0.93	86.88	J106	J92
P151	6	496.00	0.92	0.82	81.30	J90	J76
P155	8	340.34	1.77	1.97	-277.58	J110	J112
P157	6	458.35	1.87	3.06	165.14	J112	J114
P161	6	290.80	1.79	2.82	158.09	J114	J116
P171	6	683.59	0.05	0.00	-4.48	J184	J186
P173	6	228.92	0.23	0.07	20.61	J186	J188
P181	6	641.96	0.34	0.13	29.59	J192	J194
P183	6	290.09	0.51	0.27	-44.94	J194	J196
P187	6	295.81	0.40	0.17	35.12	J198	J192

FIGURE 7
EAST AREA 1
SUMMARY OF DOMESTIC WATER MODELING
PEAK HOUR CASE STUDY

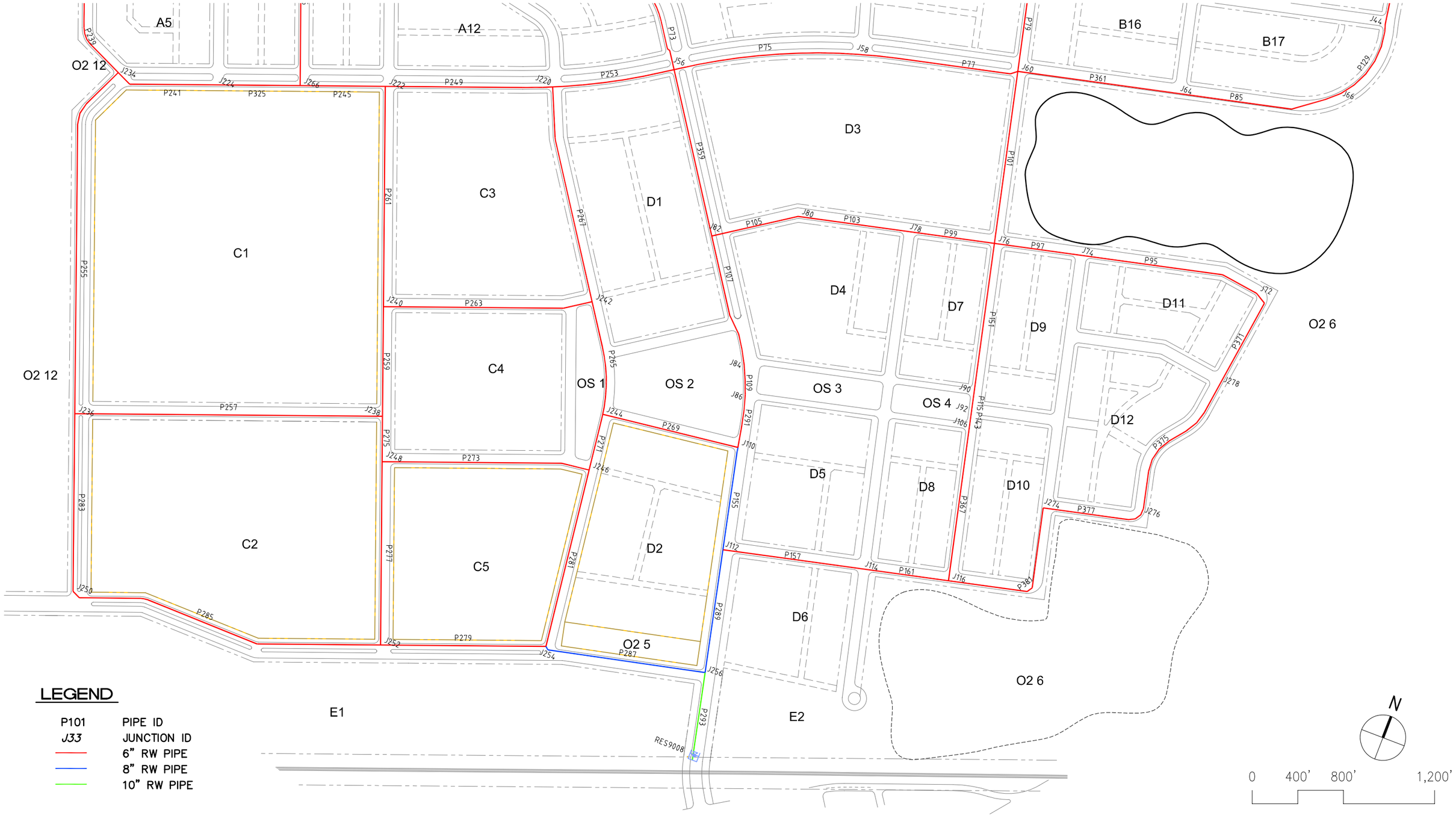
PIPE: ID NUMBER	PIPE DIAMETER (inches)	PIPE LENGTH (feet)	PIPE VELOCITY (ft/s)	PIPE HEADLOSS/1000 FT (ft/kft)	PIPE FLOW (gpm)	PIPE RUN: FROM NODE	PIPE RUN: TO NODE
P203	6	280.00	0.33	0.12	29.01	J208	J270
P207	6	268.49	0.22	0.06	19.44	J210	J212
P209	6	248.45	0.45	0.21	39.22	J212	J198
P211	6	285.21	0.29	0.10	-25.75	J212	J214
P221	6	695.05	0.63	0.40	55.32	J194	J54
P223	6	280.03	0.74	0.55	-65.56	J208	J230
P231	6	279.97	0.79	0.62	-69.46	J230	J232
P239	6	313.93	0.82	0.66	-72.07	J232	J234
P241	6	334.01	0.08	0.01	6.83	J234	J224
P245	6	280.00	1.01	0.97	-88.82	J266	J222
P249	6	550.65	0.18	0.04	15.60	J222	J220
P253	6	403.96	1.42	1.82	124.87	J220	J56
P255	6	1173.65	1.09	1.13	-96.43	J234	J236
P257	6	1011.97	0.57	0.34	-50.39	J236	J238
P259	6	360.58	0.99	0.94	87.27	J238	J240
P261	6	725.00	1.26	1.47	111.00	J240	J222
P263	6	688.92	0.30	0.10	26.67	J242	J240
P265	6	376.08	1.70	2.55	-149.63	J242	J244
P267	6	720.18	1.32	1.61	-116.58	J220	J242
P271	6	188.51	0.79	0.62	-69.89	J244	J246
P273	6	683.79	0.83	0.68	73.47	J246	J248
P275	6	149.42	1.60	2.29	141.29	J248	J238
P277	6	603.00	0.85	0.71	-75.00	J248	J252
P279	6	544.08	1.81	2.87	-159.49	J252	J254
P281	6	597.41	1.70	2.55	149.57	J254	J246
P283	6	584.53	0.72	0.52	-63.10	J236	J250
P285	6	1048.91	0.89	0.78	-78.67	J250	J252
P287	8	535.09	2.03	2.53	-317.67	J254	J256
P289	8	408.20	2.83	**4.70**	443.51	J256	J112
P291	6	165.64	2.13	3.89	-187.83	J86	J110
P309	6	915.30	0.55	0.32	-48.60	J26	J28
P311	6	43.26	0.67	0.45	58.87	J260	J16
P325	6	280.00	0.04	0.00	3.31	J224	J266
P333	6	151.65	0.31	0.11	27.64	J270	J210
P337	6	280.00	0.63	0.41	55.66	J214	J272
P341	6	57.99	0.57	0.34	50.45	J272	J196
P349	6	708.81	0.15	0.03	13.59	J188	J192
P355	6	865.43	0.38	0.16	-33.13	J186	J208
P359	6	561.31	1.32	1.59	-115.97	J56	J82
P361	6	526.46	1.09	1.12	95.77	J60	J64
P365	6	588.41	1.01	0.97	-88.69	J214	J266
P367	6	510.00	1.08	1.10	-94.90	J106	J116
P371	6	346.46	0.61	0.38	-53.64	J72	J278

FIGURE 7
EAST AREA 1
SUMMARY OF DOMESTIC WATER MODELING
PEAK HOUR CASE STUDY

PIPE: ID NUMBER	PIPE DIAMETER (inches)	PIPE LENGTH (feet)	PIPE VELOCITY (ft/s)	PIPE HEADLOSS/1000 FT (ft/kft)	PIPE FLOW (gpm)	PIPE RUN: FROM NODE	PIPE RUN: TO NODE
P375	6	526.64	0.64	0.42	-56.77	J278	J276
P377	6	328.45	0.66	0.45	-58.30	J276	J274
P381	6	547.14	0.69	0.49	-61.23	J274	J116
P269	6	457.68	0.96	0.89	-84.58	J244	J110
P293	10	290.74	**3.13**	4.37	766.93	RES9008	J256

MAX / MIN VALUE

EAST AREA 1 DOMESTIC WATER TECHNICAL REPORT
FIGURE 8



EAST AREA 1 DOMESTIC WATER TECHNICAL REPORT
FIGURE 8