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WATER SUPPLY ASSESSMENT
FOR THE
KISS LOGISTICS CENTER PROJECT
IN THE CITY OF HESPERIA

September 23, 2022

2234 FARADAY AVENUE • CARLSBAD, CA • (760) 438-4422

WATER SUPPLY ASSESSMENT
FOR THE
KISS LOGISTICS CENTER PROJECT
IN THE CITY OF HESPERIA

September 23, 2022

Prepared by:
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Job No. 528-062

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September 23, 2022 528-062

KISS Hesperia Venture, LLC
24 Harbor Park Drive
Port Washington, New York 11050

Attention: Jin Kim, Project Manager

Subject: Water Supply Assessment for the Kiss Logistics Center Project in the City of Hesperia

Introduction

The Kiss Logistics Center project is located in the City of Hesperia, west of Interstate 395, north of Phelan Road, and south of Yucca Terrace Drive. The project proposes to construct a new industrial/warehouse building on the property. See Figure 1 for the location of the project.

The Kiss Logistics Center project encompasses 29.5 acres and proposes to construct one 655,520 square foot building. The City of Hesperia's zoning designation for this site is Commercial/Industrial Business Park. The purpose of the report is to provide a water supply assessment for the Kiss Logistics Center to determine if adequate water service can be provided to the site.

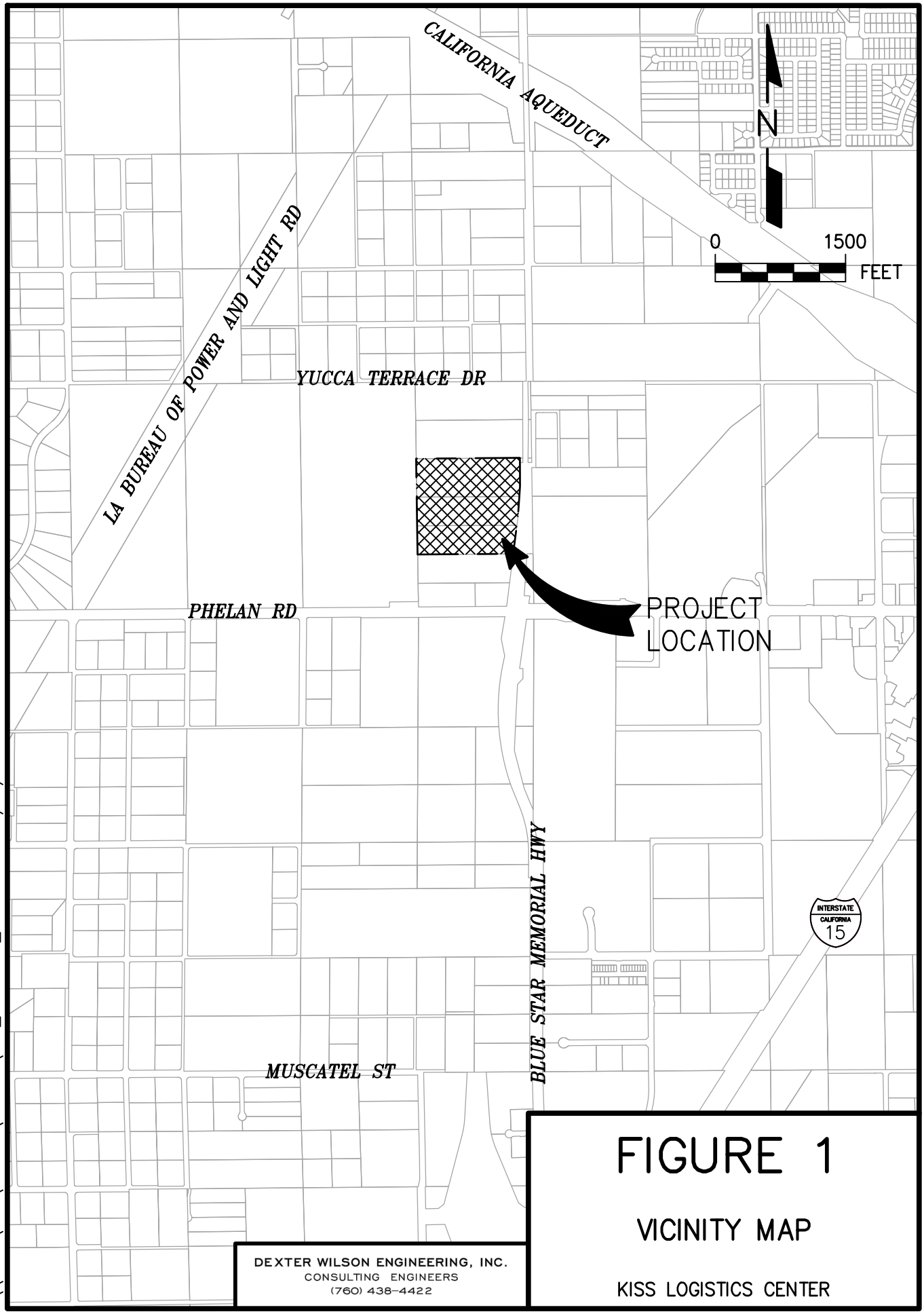

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FIGURE 1

VICINITY MAP

KISS LOGISTICS CENTER

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Purpose of the Water Supply Assessment

The California Water Code section 10910, commonly known as Senate Bill (SB) 610, requires preparation of a Water Supply Assessment for a proposed project. The purpose of the water supply assessment is to determine whether the public water system's total project water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses.

The California Water Code section 10912 determines the meaning of a project for which a Water Supply Assessment must be prepared. A project is defined as any of the following:

1. A proposed residential development of more than 500 dwelling units.
2. A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.
3. A proposed commercial office building employing more than 1,000 persons or having more than 250,000 feet of floor space.
4. A proposed hotel or motel, or both, having more than 500 rooms.
5. A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.
6. A mixed-use project that includes one or more of the projects specified in this subdivision.
7. A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.

The proposed Kiss Logistics Center meets the project criteria of being a proposed industrial building with more than 650,000 square feet of floor area. Per California Water Code Section 10912, a water supply assessment in accordance with California Water Code 10910 must be prepared.

Hesperia Water District Overview

The City of Hesperia is within the high desert region in the north portion of San Bernardino County. The sole source of water supply for the Hesperia Water District is groundwater pulled from the Mojave River Groundwater Basin. The District encompasses 74 square miles including a distribution system of 550 miles of pipelines, 16 wells, 6 booster pumping stations, 14 water storage reservoirs, and 44 pressure-regulating stations. Currently, the District has a total capacity of 64 million gallons per day of water distribution for its approximately 27,000 customers.

Hesperia Water District's Water Supply

The primary water source for the Hesperia Water District is groundwater. The groundwater is pumped from the Upper Mojave River Valley subbasin which is a part of the Mojave region. The groundwater is located within the Alto Subarea of the Mojave Basin Area which is defined in the Mojave Basin Adjudication. The Adjudication is the primary governing structure that allocates water supplies among the regional water purveyors and individual water users to meet regional water needs.

Base Annual Production (BAP) rights were assigned by the Adjudication to each producer using 10 acre-feet or more of groundwater. Parties to the Adjudication are assigned a variable Free Production Allowance (FPA), which is a percentage of the BAP set annually by the Court. The BAP is reduced over time until FPA comes within 5% of the Production Safe Yield (PSY) as defined by the Adjudication. For the 2020-21 water, the Alto FPA was set at 55% of BAP.

In addition, the Adjudication has other components that allow Hesperia to capture water supplies to serve customers. The Mojave Water Agency acts as the Watermaster for managing supplies and importing water supplies to the Hesperia Water District. The Watermaster is charged with finding additional sources of supplies if entities use more water than their annual FPA. Also, the Watermaster helps assist water users to identify and secure long-term water supplies through permanent and temporary water transfers. Furthermore, the Mojave Water Agency imports water supplies into the Mojave Basin Area to supplement natural supplies in the region.

The Mojave Water Agency entered a State Water Project water service contract with the State of California Department of Water Resources in June of 1963. The contract authorizes the Department of Water Resources to deliver State Water Project water to the Mojave Water Agency, this water is then delivered to designed recharge sites within the Mojave Adjudication and Warren Adjudication.

Also, the Mojave Water Agency is a part of the Regional Recharge and Recovery Project. This project stores State Water Project water underground in the local aquifer which is then later recovered and distributed to local retail water purveyors, such as the Hesperia Water District. The State Water Project water comes from the California Aqueduct which recharges the aquifer, then Mojave Water Agency owned production wells will recover and deliver the water.

Overall, the Hesperia Water District's water asset portfolio consists of the annual FPA, the Watermaster's replacement and make-up water supplies, return flow, the district's permanent and temporary water acquisitions, and the Regional Recharge and Recovery Project.

Existing Water Demands

The 2020 Urban Water Management Plan by the Hesperia Water District, dated June 2021, summarized the customer water usage for the year 2020. The water usage was categorized into five different sectors: single-family residential, multi-family residential, commercial/institutional, landscape irrigation, and other. Shown in Table 1 is the potable customer water usage in the year 2020; however distribution system losses are not included.

TABLE 1 CITY OF HESPERIA POTABLE CUSTOMER WATER USE FOR THE YEAR 2020	
Use Category	**Volume (ac-ft)**
Single-Family Residential	9,812
Multi-Family Residential	1,052
Commercial/Industrial	1,629
Landscape Irrigation	403
Other	87
TOTAL	**12,983**

Existing Water System

Figure 2 presents the existing water facilities in the vicinity of project. There are two pressure zones pertinent to this project: the Zone 3 Pressure Zone, 3,592 feet HGL and the Zone 4 Pressure Zone, 3,852 feet HGL. Shown in Table 2, are the pressure zones' water storage reservoirs.

TABLE 2 CITY OF HESPERIA WATER STORAGE RESERVOIRS				
Reservoir	**Base Elevation (ft)**	**Maximum Water Depth (ft)**	**Pressure Zone**	**Capacity (MG)**
Plant #19A	3,560	32	3	5.0
Plant #19B	3,560	32	3	5.0
Plant #23	3,549	32	3	5.0
Plant #30	3,820	32	4	5.0
Plant #30B	3,820	32	4	5.0
Plant #30C	3,820	32	4	5.0
			TOTAL	**30.0**

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LEGEND

PROJECT BOUNDARY

EXISTING PUBLIC WATER LINE

YUCCA TERRACE DR
LABP&L RD
PHELAN RD
LOS BANOS AVE
GRANDVIEW RD
SULTANA ST
HIGHWAY 395
LASSEN RD
MESA LINDA AVE
ESCONDIDO AVE
MUSCATEL ST
VINCENT DR
CEDAR ST
FOLEY RD
SAGE ST
AMESTOY RD
CORIANDER DR
GARLOCK RD
KUKI ST
EL CENTRO RD
OUTPOST RD
RODEO RD
RANCHERO RD
CATABA RD
TOPAZ AVE

EX.6" EX.8" EX.12" EX.16" EX.18" EX.24"

INTERSTATE CALIFORNIA 15

PLANT #23

PLANT #30

PLANT #19

MATCHPOINT TO FIGURE 2

MATCHPOINT TO ENLARGEMENT DETAIL

N

0 1500 FEET

PLANT #19 ENLARGEMENT DETAIL
SCALE: 1" = 2,000'

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FIGURE 2

EXISTING PUBLIC WATER SYSTEM

KISS LOGISTICS CENTER

There are seven booster pumping stations in Pressure Zone 3 that deliver water to Pressure Zone 4. Shown in Table 3, are the booster pumping stations that deliver water to Pressure Zone 4 from Pressure Zone 3.

TABLE 3
CITY OF HESPERIA
BOOSTER PUMPING STATIONS

Facility Name	Pump Type	Backup Power Source	Ground Elevation (ft)	Nameplate Horsepower (hp)	Design Head (ft)	Design Capacity (gpm)
Plant #19A B-1	Turbine	No	3,560	150	270	1,243
Plant #19A B-2	Turbine	No	3,560	150	270	1,346
Plant #19A B-3	Turbine	No	3,560	150	273	1,282
Plant #19A B-4	Turbine	No	3,560	150	273	1,302
Plant #23 B-1	Turbine	Diesel Generator	3,549	20	58	696
Plant #23 B-2	Turbine	Diesel Generator	3,549	20	59	654
Plant #23 Fire Pump	Centrifugal	Diesel Generator	3,549	100	99	2,524

The proposed Kiss Logistics Center project will be served by Plant #19, 23, and 30 reservoirs as well as the Plant #19 and #23 booster pumping stations. These reservoirs and booster pumping stations will distribute the needed water to meet the proposed site demands and provide adequate flow and pressure to the site.

Future Water Demands

Per the 2020 Urban Water Management Plan, the future water use was forecasted to the year 2045. This forecast took to into account the estimated use of the existing and new customers within the district. Shown in Table 4, is the projected water usage in the Hesperia Water District from 2020 to 2045.

TABLE 4 CITY OF HESPERIA FORECAST FUTURE WATER USE	
Year	**Water Use (acre-feet)**
2020	14,040
2025	15,250
2030	16,290
2035	16,990
2040	17,740
2045	18,420

Project Description

The Kiss Logistics Center is in the proposed zone of industrial and is located in the Zone 4 Pressure Zone. The project will be served by Plant #30, #30B, and #30 Reservoirs under average day, maximum day demand, and peak hour demand. The total capacity of the three reservoirs is 15 million gallons with a base and highwater elevation (HWL) of 3,820 feet and 3,852 feet, respectively. The pad elevation of the proposed building is 3,552.53 feet, resulting in a maximum static pressure of 130 psi. Per the California Plumbing Code, when maximum static pressures exceed 80 psi then individual pressure regulators need to be installed.

Water supply to Zone 4 is provided by Plant #19A, #19B and #23 reservoirs and the water booster pump stations which lift the Zone 3 water to Zone 4. The total capacity of the Zone 3 Reservoirs #19A and #19B is 10 million gallons with a base and HWL of 3,560 feet and 3,592 feet, respectively. The total capacity of reservoir #23 is 5 million gallons with a base and HWL of 3,549 feet and 3,581 feet, respectively.

Figure 3 presents the proposed public water system for the Kiss Logistics Center project. The proposed water facilities for the project will include offsite public water system improvements and private water facilities internal to the project.

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LEGEND

PROJECT BOUNDARY

EXISTING PUBLIC WATER LINE

PROPOSED PUBLIC WATER LINE BY HESPERIA COMMERCE CENTER II

PROPOSED PUBLIC WATER LINE BY KISS LOGISTICS CENTER

LOS BANOS AVE

YUCCA TERRACE DR

EX.6"

EX.6"

EX.6"

16"

CALIENTE RD

PAD 3,552.53'

FF 3,553.20'

16"

16"

PROJECT BOUNDARY

EX.8"

LASSEN RD

N

0 500 FEET

16"

EX.8"

EX.12"

EX.12"

PHELAN RD

HIGHWAY 395

EX.8"

16"

LOS BANOS AVE

SULTANA ST

16"

EX.12"

EX.12"

EX.8"

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FIGURE 3

PROPOSED PUBLIC WATER SYSTEM

KISS LOGISTICS CENTER

Project Water Demands

The water demands and corresponding public water facilities were developed in accordance with the Water Master Plan of the City of Hesperia dated July 2008. Industrial water demand is based on acreage and a water use factor of 3,000 gpd/acre. The average water demand for the proposed industrial building is 88,500 gpd.

The fire flow requirement for industrial land use is set by the San Bernardino County Fire Department and is summarized the Water Master Plan. For an industrial land use the minimum fire flow required is 4,000 gpm, the minimum residual pressure is 20 psi, the minimum duration is 4 hours, and the required fire storage volume is 0.96 MG.

From the Water Master Plan, the maximum day demand peaking factor (MDD/ADD) is 1.74, resulting in an estimated maximum day demand of 153,990 gpd. The peak hour demand peaking factor (PHD/ADD) is 2.90, resulting in an estimated peak hour demand of 256,650 gpd. Shown in Table 5, are Kiss Logistics Center's proposed water demands.

TABLE 5
KISS LOGISTICS CENTER
PROPOSED WATER DEMANDS

Demand Scenario	Water Use
Average Water Demand	88,500 gpd
Maximum Day Demand	153,990 gpd
Peak Hour Demand	256,650 gpd
Fire Flow	4,000 gpm
Maximum Day Demand + Fire Flow	4,107 gpm

City of Hesperia Water System Design Criteria

The City of Hesperia's Water Master Plan was used to analyze the water system. A summary of the design criteria from the Water Master Plan is presented in Table 6.

TABLE 6
CITY OF HESPERIA
WATER SYSTEM DESIGN CRITERIA

Criteria	Design Requirement
Maximum Static Pressure	150 psi
Minimum Pressure – Peak Hour	40 psi
Minimum Pressure – Max Day plus Fire	20 psi
Maximum Pipeline Velocity (Fire Flow)	15 fps
Maximum Pipeline Velocity (ADD)	7 fps
Maximum Pipeline Velocity (MDD and PHD)	10 fps

The water demands from the Kiss Logistics Center project will be analyzed using computer software to determine if the project meets the city's design criteria.

Water System Computer Model

The University of Kentucky KYPIPE computer program was used to conduct hydraulic models of the proposed water system. This computer program utilizes the Hazen-Williams equation for determining headloss in pipes; the Hazen-Williams "C" value used for all pipes is 120.

Water system hydraulic modeling was performed to evaluate the ability of the public water system to deliver adequate flow and pressure to the proposed project connection points for fire protection service as the fire flow demand will govern the need for offsite improvements. Private water systems internal to the project are not included in these models as they are intended to be addressed in a separate report.

Average day demand, peak hour demand, and maximum day plus fire flow were modeled for existing development and the Kiss Logistics Center project. Exhibit A in the back of the report provides a schematic of the computer nodes and pipes modeled to analyze the system. Appendix A in the back of the report provides the output of the analyzed system.

Per the output, at Node 98, the location of the connection point to the public water system, the pressure under maximum day plus fire flow conditions was 23 psi. Under average day demand and peak hour demand the pressures at Node 98 are 110 psi and 76 psi, respectively. The project satisfies the minimum pressures required per the City of Hesperia's Water Master Plan.

Proposed Public Water System Improvements

The KYPIPE computer program was modeled with two proposed public water system improvements to achieve the Hesperia Water District's design criteria. Figure 3 shows the proposed public water system improvements to be completed by the Hesperia Commerce Center II and Kiss Logistics Center projects.

The first improvement would be completed by the Hesperia Commerce Center II project. The Hesperia Commerce Center II project proposes to construct a new 16-inch public water line at the intersection of Highway 395 and Sultana Street. The 16-inch public water line would traverse west along Sultana Street until its intersection with Los Banos Avenue. Then the 16-inch public water line would traverse north along Los Banos Avenue until its intersection with Phelan Road.

The second improvement would be completed by the Kiss Logistics Center project. The Kiss Logistics Center should construct a new 16-inch public water line starting at the intersection of Phelan Road and Los Banos Avenue. The 16-inch public water line would traverse east along Phelan Road until its intersection with Caliente Road. Then the 16-inch public water line would traverse north on Caliente Road until its intersection with Yucca Terrace Drive. The Kiss Logistics Center project would have one connection point to the proposed 16-inch public water line along Caliente Road located on the west side of the site.

These improvements are needed to achieve fire flow, maximum day demand, maximum day demand plus fire flow, and peak hour demand requirements.

City of Hesperia Water System Storage Criteria

The City of Hesperia's Water Master Plan was used to analyze the water system's storage. Per the Water Master Plan, the water system shall have adequate storage for operational storage, fire flow, and emergency storage.

Per the Water Master Plan, the operational storage of the proposed water system will be 30% of the maximum day demands, resulting in an operational storage of 46,197 gallons (0.046 MG).

The fire flow storage of the proposed water system will be at least the largest volume determined for any fire flow and shall be available within each pressure (either directly or from a higher zone). The proposed project is located in the Zone 4 pressure zone with the governing land use of industrial. The Zone 4 pressure zone has a fire flow requirement of 4,000 gpm at a minimum duration of 4 hours. The Zone 4 pressure zone has a fire flow storage of 0.96 MG. The Kiss Logistics Center does not have fire storage requirements greater than the existing zone 4 requirements, thus the fire flow storage is adequate.

The emergency storage of the proposed water system is calculated by subtracting the operational storage and fire flow storage from the existing storage capacity. Per the Water Master Plan, the existing storage available for the planning year of 2022 under maximum day demands is 59.5 MG. The operational storage and fire flow storage available for the planning year of 2022 under maximum day demands is 23.6 MG and 5.3 MG, thus resulting in an emergency storage availability of 30.6 MG.

Booster Pump Stations

The Water Master Plan evaluated pump stations to the build-out year of 2032. The evaluation of the existing pumping capacity compared with the expected growth in water demand resulted in recommendations for pumping station upgrades. The Water Master Plan recommends an upgrade schedule related to the increase in water demand. There are no pumping system upgrades needed specifically for the Kiss Logistics Center project.

Conclusions and Recommendations

The following recommendations and conclusions are presented based upon the public water study prepared for the Kiss Logistics Center project.

1. The Kiss Logistics Center project will be supplied water from the Zone 4 Pressure Zone under all demand conditions.

2. Maximum static pressure onsite is expected to be 130 psi.

3. When maximum static pressures exceed 80 psi, individual pressure regulators need to be installed for services on all pads in order to comply with the California Plumbing Code which limits building supply pressures to a maximum of 80 psi.

4. Figure 3 presents the proposed public water system improvements and point of connection for the private onsite water system for the Kiss Logistics Center Project.

5. The offsite public water line improvement needed for Kiss Logistics Center is a new 16-inch Zone 4 Pressure Zone pipeline in Phelan Road from Los Banos Avenue to east Caliente Road and in Caliente Road north to the existing 6" water line along the west project frontage.

6. The onsite domestic and fire protection systems for the project will be private systems.

7. The operational storage required for the project is 0.05 MG. This is not significant enough to require the construction of additional storage capacity.

Thank you for the opportunity to assist you with the public water system planning for this project. If you have any questions regarding the information presented in this report, please do not hesitate to call.

Dexter Wilson Engineering, Inc.

Wm Todd for

Andrew Oven, P.E.

AO:WT:ah

Attachments

APPENDIX A

COMPUTER MODELING OUTPUT

NODE AND PIPE DIAGRAM REFERENCE:

Exhibit A

CONDITIONS MODELED:

1. Maximum Day Demand Plus Fire Flow
2. Average Day Demand
3. Peak Hour Demand

U N I T S S P E C I F I E D

FLOWRATE ..... = gallons/minute
HEAD (HGL) ..... = feet
PRESSURE ..... = psig

P I P E L I N E D A T A

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
1	0	4	1210.50	24.00	120.0000	1.40
5	4	122	4271.30	18.00	120.0000	3.35
7	122	8	281.10	18.00	120.0000	0.00
9	8	12	7521.90	16.00	120.0000	2.80
13	12	16	1403.00	16.00	120.0000	1.41
17	16	20	1227.50	12.00	120.0000	0.80
19	28	16	334.30	8.00	120.0000	1.05
21	20	24	998.00	12.00	120.0000	1.23
23	20	32	330.20	12.00	120.0000	1.05
25	24	40	661.30	12.00	120.0000	0.30
29	28	32	1250.20	8.00	120.0000	1.05
31	44	28	964.40	8.00	120.0000	1.60
33	32	36	372.30	12.00	120.0000	0.60
37	36	40	1287.30	12.00	120.0000	1.05
39	36	48	618.00	12.00	120.0000	0.60
41	40	68	766.80	12.00	120.0000	0.90
45	48	44	1249.40	12.00	120.0000	1.05
47	56	44	1358.50	8.00	120.0000	0.60
49	48	52	1338.70	12.00	120.0000	1.05
51	48	60	1348.70	12.00	120.0000	1.05
53	52	68	372.20	12.00	120.0000	0.50
55	52	64	1330.90	12.00	120.0000	0.75
57	60	56	1232.50	12.00	120.0000	0.30
59	56	120	2647.80	8.00	120.0000	0.20
61	64	60	1304.00	12.00	120.0000	0.25
69	72	68	4219.80	12.00	120.0000	0.20
73	120	72	3950.40	12.00	120.0000	0.60
81	84	56	2739.30	16.00	120.0000	1.05
85	84	88	2674.80	16.00	120.0000	0.25
89	88	92	1289.60	16.00	120.0000	0.25
93	92	96	749.30	16.00	120.0000	0.60
97	96	98	187.50	12.00	120.0000	0.75
99	96	100	1878.00	16.00	120.0000	0.60
101	100	104	1253.10	6.00	120.0000	0.75
105	104	108	352.40	6.00	120.0000	0.60
109	112	108	679.00	6.00	120.0000	0.50
113	116	112	1817.90	8.00	120.0000	0.70
117	120	116	55.50	12.00	120.0000	1.05
123	122	126	2955.60	18.00	120.0000	1.85
127	126	130	3145.50	8.00	120.0000	0.90
131	130	134	2551.70	8.00	120.0000	0.75
133	130	168	2870.30	8.00	120.0000	1.10
135	134	138	828.30	8.00	120.0000	0.70
137	134	142	1369.30	8.00	120.0000	2.15
139	138	16	659.50	8.00	120.0000	1.05

141	138	142	1026.10	12.00	120.0000	0.93
143	142	20	869.00	12.00	120.0000	0.18
145	148	4	8151.90	18.00	120.0000	1.05
149	148	152	7925.70	12.00	120.0000	3.39
151	148	184	7242.10	18.00	120.0000	1.50
153	152	156	2580.60	12.00	120.0000	1.95
155	152	160	2619.50	8.00	120.0000	1.80
157	156	164	2624.70	16.00	120.0000	2.95
161	160	164	2581.90	12.00	120.0000	2.10
165	168	164	2923.50	12.00	120.0000	1.35
169	168	172	5269.20	8.00	120.0000	1.45
171	168	24	240.40	12.00	120.0000	1.05
173	172	176	1306.70	12.00	120.0000	1.66
175	180	172	2280.60	12.00	120.0000	2.55
177	176	72	666.80	12.00	120.0000	0.00
185	184	188	1202.00	24.00	120.0000	1.30

N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
4		155.00	3820.00	
8		155.00	3800.00	
12		155.00	3650.00	
16		155.00	3650.00	
20		155.00	3640.00	
24		155.00	3630.00	
28		155.00	3645.00	
32		155.00	3635.00	
36		155.00	3630.00	
40		155.00	3616.00	
44		155.00	3640.00	
48		155.00	3620.00	
52		155.00	3605.00	
56		155.00	3630.00	
60		155.00	3620.00	
64		155.00	3615.00	
68		155.00	3600.00	
72		155.00	3600.00	
84		155.00	3630.00	
88		211.00	3600.00	
92		155.00	3575.00	
96		155.00	3553.20	
98		4107.00	3553.20	
100		155.00	3550.00	
104		155.00	3550.00	
108		155.00	3530.00	
112		155.00	3553.20	
116		155.00	3550.00	
120		155.00	3550.00	
122		155.00	3775.00	
126		155.00	3748.00	
130		155.00	3690.00	
134		155.00	3680.00	
138		155.00	3660.00	
142		155.00	3660.00	

148	155.00	3681.00	
152	155.00	3600.00	
156	155.00	3640.00	
160	155.00	3570.00	
164	155.00	3600.00	
168	155.00	3640.00	
172	155.00	3600.00	
176	155.00	3600.00	
180	-3874.00	3549.00	
184	0.00	3560.00	
188	-3827.00	3560.00	
0	----	0.00	3852.00

O U T P U T O P T I O N D A T A

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT
MAXIMUM AND MINIMUM PRESSURES = 5
MAXIMUM AND MINIMUM VELOCITIES = 5

S Y S T E M C O N F I G U R A T I O N

NUMBER OF PIPES .....(P) = 61
NUMBER OF END NODES .....(J) = 46
NUMBER OF PRIMARY LOOPS .....(L) = 15
NUMBER OF SUPPLY NODES .....(F) = 1
NUMBER OF SUPPLY ZONES .....(Z) = 1

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Case: 1

Kiss Logistics Center Project
Public Water System Analysis
4,107 gpm Max Day Demand Plus Fire Flow at Node 98

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
1	0	4	2972.00	0.92	0.10	2.11	0.84	0.76
5	4	122	4612.19	29.58	1.76	5.81	7.34	6.93
7	122	8	3418.37	1.12	0.00	4.31	3.98	3.98
9	8	12	3263.37	48.72	1.18	5.21	6.63	6.48
13	12	16	3108.37	8.30	0.54	4.96	6.30	5.92
17	16	20	1333.61	6.15	0.18	3.78	5.16	5.01
19	28	16	-1067.14	7.99	0.76	6.81	26.16	23.90
21	20	24	-120.30	0.06	0.00	0.34	0.06	0.06
23	20	32	1781.19	2.83	0.42	5.05	9.83	8.57
25	24	40	1786.26	5.70	0.12	5.07	8.79	8.61
29	28	32	152.65	0.82	0.02	0.97	0.66	0.65
31	44	28	-759.49	12.28	0.58	4.85	13.33	12.73
33	32	36	1778.84	3.18	0.24	5.05	9.18	8.55

37	36	40	-455.41	0.88	0.03	1.29	0.71	0.69
39	36	48	2079.25	7.05	0.32	5.90	11.93	11.41
41	40	68	1175.85	3.04	0.16	3.34	4.17	3.97
45	48	44	545.45	1.20	0.04	1.55	0.99	0.96
47	56	44	-1149.93	37.28	0.50	7.34	27.81	27.44
49	48	52	-440.67	0.86	0.03	1.25	0.66	0.64
51	48	60	1819.48	12.02	0.43	5.16	9.23	8.91
53	52	68	-1998.63	3.95	0.25	5.67	11.27	10.60
55	52	64	1402.96	7.33	0.18	3.98	5.64	5.51
57	60	56	2912.44	26.25	0.32	8.26	21.55	21.30
59	56	120	-588.82	21.04	0.04	3.76	7.96	7.94
61	64	60	1247.96	5.78	0.05	3.54	4.47	4.43
69	72	68	977.77	11.90	0.02	2.77	2.83	2.82
73	120	72	-1805.63	34.71	0.24	5.12	8.85	8.79
81	84	56	-4496.19	32.12	0.84	7.17	12.03	11.73
85	84	88	4341.19	29.39	0.19	6.93	11.06	10.99
89	88	92	4130.19	12.92	0.17	6.59	10.15	10.02
93	92	96	3975.19	6.99	0.37	6.34	9.83	9.33
97	96	98	4107.00	7.55	1.58	11.65	48.68	40.25
99	96	100	-286.81	0.13	0.00	0.46	0.07	0.07
101	100	104	-441.81	23.74	0.29	5.01	19.18	18.95
105	104	108	-596.81	11.65	0.43	6.77	34.28	33.07
109	112	108	751.81	34.43	0.56	8.53	51.54	50.71
113	116	112	906.81	32.13	0.36	5.79	17.88	17.68
117	120	116	1061.81	0.18	0.15	3.01	5.95	3.29
123	122	126	1038.82	1.29	0.05	1.31	0.45	0.44
127	126	130	883.82	53.02	0.44	5.64	17.00	16.86
131	130	134	394.66	9.66	0.07	2.52	3.82	3.79
133	130	168	334.15	7.99	0.08	2.13	2.81	2.78
135	134	138	82.39	0.17	0.00	0.53	0.21	0.21
137	134	142	157.28	0.94	0.03	1.00	0.71	0.69
139	138	16	-552.62	4.66	0.20	3.53	7.37	7.06
141	138	142	480.00	0.78	0.03	1.36	0.78	0.76
143	142	20	482.28	0.66	0.01	1.37	0.77	0.76
145	148	4	1795.19	9.84	0.08	2.26	1.22	1.21
149	148	152	1876.81	74.80	1.49	5.32	9.63	9.44
151	148	184	-3827.00	35.50	0.54	4.82	4.98	4.90
153	152	156	1259.11	11.63	0.39	3.57	4.66	4.51
155	152	160	462.70	13.32	0.24	2.95	5.18	5.08
157	156	164	1104.11	2.28	0.14	1.76	0.92	0.87
161	160	164	307.70	0.86	0.02	0.87	0.34	0.33
165	168	164	-1256.81	13.13	0.27	3.57	4.58	4.49
169	168	172	-625.60	46.83	0.36	3.99	8.96	8.89
171	168	24	2061.56	2.70	0.56	5.85	13.55	11.23
173	172	176	3093.40	31.12	1.98	8.77	25.33	23.81
175	180	172	3874.00	82.38	4.78	10.99	38.22	36.12
177	176	72	2938.40	14.44	0.00	8.34	21.65	21.65
185	184	188	-3827.00	1.45	0.15	2.71	1.33	1.21

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
4		155.00	3850.99	3820.00	30.99	13.43
8		155.00	3818.53	3800.00	18.53	8.03
12		155.00	3768.63	3650.00	118.63	51.41
16		155.00	3759.79	3650.00	109.79	47.57

20	155.00	3753.46	3640.00	113.46	49.16
24	155.00	3753.52	3630.00	123.52	53.52
28	155.00	3751.04	3645.00	106.04	45.95
32	155.00	3750.21	3635.00	115.21	49.93
36	155.00	3746.79	3630.00	116.79	50.61
40	155.00	3747.70	3616.00	131.70	57.07
44	155.00	3738.18	3640.00	98.18	42.55
48	155.00	3739.42	3620.00	119.42	51.75
52	155.00	3740.31	3605.00	135.31	58.63
56	155.00	3700.40	3630.00	70.40	30.51
60	155.00	3726.97	3620.00	106.97	46.35
64	155.00	3732.79	3615.00	117.79	51.04
68	155.00	3744.50	3600.00	144.50	62.62
72	155.00	3756.43	3600.00	156.43	67.79
84	155.00	3667.44	3630.00	37.44	16.22
88	211.00	3637.87	3600.00	37.87	16.41
92	155.00	3624.78	3575.00	49.78	21.57
96	155.00	3617.41	3553.20	64.21	27.82
98	4107.00	3608.28	3553.20	55.08	23.87
100	155.00	3617.54	3550.00	67.54	29.27
104	155.00	3641.58	3550.00	91.58	39.68
108	155.00	3653.66	3530.00	123.66	53.58
112	155.00	3688.65	3553.20	135.45	58.70
116	155.00	3721.15	3550.00	171.15	74.16
120	155.00	3721.48	3550.00	171.48	74.31
122	155.00	3819.65	3775.00	44.65	19.35
126	155.00	3818.30	3748.00	70.30	30.46
130	155.00	3764.84	3690.00	74.84	32.43
134	155.00	3755.10	3680.00	75.10	32.54
138	155.00	3754.93	3660.00	94.93	41.13
142	155.00	3754.12	3660.00	94.12	40.79
148	155.00	3860.91	3681.00	179.91	77.96
152	155.00	3784.61	3600.00	184.61	80.00
156	155.00	3772.60	3640.00	132.60	57.46
160	155.00	3771.05	3570.00	201.05	87.12
164	155.00	3770.17	3600.00	170.17	73.74
168	155.00	3756.77	3640.00	116.77	50.60
172	155.00	3803.97	3600.00	203.97	88.39
176	155.00	3770.87	3600.00	170.87	74.04
180	-3874.00	3891.13	3549.00	342.13	148.26
184	0.00	3896.95	3560.00	336.95	146.01
188	-3827.00	3898.55	3560.00	338.55	146.71
0	----	3852.00			

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
180	148.26	8	8.03
188	146.71	4	13.43
184	146.01	84	16.22
172	88.39	88	16.41
160	87.12	122	19.35

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
97	11.65	21	0.34
175	10.99	99	0.46
173	8.77	135	0.53
109	8.53	161	0.87
177	8.34	29	0.97

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE gpm	NODE TITLE
0	2972.00	

NET SYSTEM INFLOW = 2972.00
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 2972.00

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Case: 2

Kiss Logistics Center Project
Public Water System Analysis
62 gpm Average Day Demand at Node 98

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
1	0	4	3833.00	1.47	0.16	2.72	1.34	1.21
5	4	122	2664.52	10.71	0.59	3.36	2.64	2.51
7	122	8	1968.48	0.40	0.00	2.48	1.43	1.43
9	8	12	1879.48	17.53	0.39	3.00	2.38	2.33
13	12	16	1790.48	2.99	0.18	2.86	2.26	2.13
17	16	20	816.13	2.48	0.07	2.32	2.07	2.02
19	28	16	-544.23	2.30	0.20	3.47	7.45	6.87
21	20	24	258.26	0.24	0.01	0.73	0.25	0.24
23	20	32	755.20	0.58	0.07	2.14	1.98	1.75
25	24	40	757.93	1.16	0.02	2.15	1.79	1.76
29	28	32	139.69	0.69	0.01	0.89	0.56	0.55
31	44	28	-315.54	2.41	0.10	2.01	2.61	2.50
33	32	36	805.89	0.73	0.05	2.29	2.10	1.97
37	36	40	-1.59	0.00	0.00	0.00	0.00	0.00
39	36	48	718.48	0.99	0.04	2.04	1.66	1.59
41	40	68	667.34	1.07	0.05	1.89	1.46	1.39

45	48	44	18.50	0.00	0.00	0.05	0.00	0.00
47	56	44	-245.03	2.13	0.02	1.56	1.58	1.57
49	48	52	177.39	0.16	0.00	0.50	0.12	0.12
51	48	60	433.60	0.84	0.02	1.23	0.64	0.63
53	52	68	-224.22	0.07	0.00	0.64	0.19	0.18
55	52	64	312.61	0.45	0.01	0.89	0.35	0.34
57	60	56	568.21	1.27	0.01	1.61	1.04	1.03
59	56	120	95.55	0.72	0.00	0.61	0.27	0.27
61	64	60	223.61	0.24	0.00	0.63	0.18	0.18
69	72	68	-354.12	1.81	0.00	1.00	0.43	0.43
73	120	72	-260.76	0.96	0.01	0.74	0.25	0.24
81	84	56	-628.69	0.84	0.02	1.00	0.31	0.31
85	84	88	539.69	0.62	0.00	0.86	0.23	0.23
89	88	92	417.69	0.19	0.00	0.67	0.15	0.14
93	92	96	328.69	0.07	0.00	0.52	0.10	0.09
97	96	98	62.00	0.00	0.00	0.18	0.02	0.02
99	96	100	177.69	0.06	0.00	0.28	0.03	0.03
101	100	104	88.69	1.21	0.01	1.01	0.98	0.97
105	104	108	-0.31	0.00	0.00	0.00	0.00	0.00
109	112	108	89.31	0.67	0.01	1.01	0.99	0.98
113	116	112	178.31	1.58	0.01	1.14	0.88	0.87
117	120	116	267.31	0.01	0.01	0.76	0.42	0.26
123	122	126	607.04	0.48	0.02	0.77	0.17	0.16
127	126	130	518.04	19.71	0.15	3.31	6.32	6.27
131	130	134	212.21	3.06	0.02	1.35	1.21	1.20
133	130	168	216.83	3.59	0.03	1.38	1.26	1.25
135	134	138	34.02	0.03	0.00	0.22	0.04	0.04
137	134	142	89.19	0.33	0.01	0.57	0.25	0.24
139	138	16	-341.12	1.91	0.08	2.18	3.01	2.89
141	138	142	286.14	0.30	0.01	0.81	0.30	0.29
143	142	20	286.33	0.25	0.00	0.81	0.29	0.29
145	148	4	-1079.48	3.83	0.03	1.36	0.47	0.47
149	148	152	990.48	22.90	0.42	2.81	2.94	2.89
151	148	184	0.00	0.00	0.00	0.00	0.00	0.00
153	152	156	659.27	3.51	0.11	1.87	1.40	1.36
155	152	160	242.21	4.02	0.07	1.55	1.56	1.53
157	156	164	570.27	0.67	0.04	0.91	0.27	0.26
161	160	164	153.21	0.24	0.01	0.43	0.09	0.09
165	168	164	-634.48	3.70	0.07	1.80	1.29	1.27
169	168	172	173.64	4.36	0.03	1.11	0.83	0.83
171	168	24	588.67	0.27	0.05	1.67	1.29	1.10
173	172	176	84.64	0.04	0.00	0.24	0.03	0.03
175	180	172	0.00	0.00	0.00	0.00	0.00	0.00
177	176	72	-4.36	0.00	0.00	0.01	0.00	0.00
185	184	188	0.00	0.00	0.00	0.00	0.00	0.00

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
4		89.00(0.57)	3850.37	3820.00	30.37	13.16
8		89.00(0.57)	3838.68	3800.00	38.68	16.76
12		89.00(0.57)	3820.75	3650.00	170.75	73.99
16		89.00(0.57)	3817.58	3650.00	167.58	72.62
20		89.00(0.57)	3815.04	3640.00	175.04	75.85
24		89.00(0.57)	3814.79	3630.00	184.79	80.07
28		89.00(0.57)	3815.09	3645.00	170.09	73.71

32	89.00	(0.57)	3814.38	3635.00	179.38	77.73
36	89.00	(0.57)	3813.60	3630.00	183.60	79.56
40	89.00	(0.57)	3813.60	3616.00	197.60	85.63
44	89.00	(0.57)	3812.57	3640.00	172.57	74.78
48	89.00	(0.57)	3812.58	3620.00	192.58	83.45
52	89.00	(0.57)	3812.41	3605.00	207.41	89.88
56	89.00	(0.57)	3810.42	3630.00	180.42	78.18
60	89.00	(0.57)	3811.71	3620.00	191.71	83.07
64	89.00	(0.57)	3811.95	3615.00	196.95	85.34
68	89.00	(0.57)	3812.49	3600.00	212.49	92.08
72	89.00	(0.57)	3810.67	3600.00	210.67	91.29
84	89.00	(0.57)	3809.57	3630.00	179.57	77.81
88	122.00	(0.58)	3808.95	3600.00	208.95	90.54
92	89.00	(0.57)	3808.76	3575.00	233.76	101.30
96	89.00	(0.57)	3808.69	3553.20	255.49	110.71
98	62.00	(0.02)	3808.68	3553.20	255.48	110.71
100	89.00	(0.57)	3808.63	3550.00	258.63	112.07
104	89.00	(0.57)	3807.41	3550.00	257.41	111.54
108	89.00	(0.57)	3807.41	3530.00	277.41	120.21
112	89.00	(0.57)	3808.08	3553.20	254.88	110.45
116	89.00	(0.57)	3809.67	3550.00	259.67	112.53
120	89.00	(0.57)	3809.70	3550.00	259.70	112.54
122	89.00	(0.57)	3839.08	3775.00	64.08	27.77
126	89.00	(0.57)	3838.58	3748.00	90.58	39.25
130	89.00	(0.57)	3818.72	3690.00	128.72	55.78
134	89.00	(0.57)	3815.63	3680.00	135.63	58.77
138	89.00	(0.57)	3815.60	3660.00	155.60	67.43
142	89.00	(0.57)	3815.29	3660.00	155.29	67.29
148	89.00	(0.57)	3846.51	3681.00	165.51	71.72
152	89.00	(0.57)	3823.19	3600.00	223.19	96.72
156	89.00	(0.57)	3819.58	3640.00	179.58	77.82
160	89.00	(0.57)	3819.11	3570.00	249.11	107.95
164	89.00	(0.57)	3818.87	3600.00	218.87	94.84
168	89.00	(0.57)	3815.10	3640.00	175.10	75.88
172	89.00	(0.57)	3810.71	3600.00	210.71	91.31
176	89.00	(0.57)	3810.67	3600.00	210.67	91.29
180	0.00	(0.00)	3810.71	3549.00	261.71	113.41
184	0.00		3846.51	3560.00	286.51	124.15
188	0.00	(0.00)	3846.51	3560.00	286.51	124.15
0	----		3852.00			

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
184	124.15	4	13.16
188	124.15	8	16.76
108	120.21	122	27.77
180	113.41	126	39.25
120	112.54	130	55.78

V E L O C I T I E S

PIPE	MAXIMUM	PIPE	MINIMUM

NUMBER	VELOCITY (ft/s)	NUMBER	VELOCITY (ft/s)
19	3.47	105	0.00
5	3.36	37	0.00
127	3.31	177	0.01
9	3.00	45	0.05
13	2.86	97	0.18

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE gpm	NODE TITLE
0	3833.00	

NET SYSTEM INFLOW = 3833.00
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 3833.00

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Case: 3

Kiss Logistics Center Project
Public Water System Analysis
178 gpm Peak Hour Demand at Node 98

P I P E L I N E R E S U L T S

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

PIPE NAME	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
1	0	4	3421.00	1.19	0.13	2.43	1.09	0.98
5	4	122	4798.74	31.84	1.90	6.05	7.90	7.45
7	122	8	3412.96	1.11	0.00	4.30	3.97	3.97
9	8	12	3154.96	45.76	1.10	5.03	6.23	6.08
13	12	16	2895.96	7.28	0.47	4.62	5.52	5.19
17	16	20	1205.82	5.11	0.15	3.42	4.28	4.16
19	28	16	-877.80	5.56	0.51	5.60	18.17	16.64
21	20	24	-159.84	0.10	0.00	0.45	0.10	0.10
23	20	32	1224.11	1.41	0.20	3.47	4.87	4.28
25	24	40	1153.35	2.53	0.05	3.27	3.91	3.83
29	28	32	148.01	0.77	0.01	0.94	0.63	0.62
31	44	28	-471.79	5.08	0.23	3.01	5.50	5.27
33	32	36	1114.12	1.34	0.09	3.16	3.84	3.59
37	36	40	-350.33	0.54	0.02	0.99	0.43	0.42
39	36	48	1205.45	2.57	0.11	3.42	4.33	4.16
41	40	68	545.03	0.73	0.03	1.55	1.00	0.96
45	48	44	303.20	0.40	0.01	0.86	0.33	0.32
47	56	44	-516.99	8.48	0.10	3.30	6.32	6.24
49	48	52	-291.59	0.40	0.01	0.83	0.31	0.30

51	48	60	934.84	3.50	0.11	2.65	2.68	2.60
53	52	68	-1362.66	1.94	0.12	3.87	5.53	5.22
55	52	64	813.07	2.67	0.06	2.31	2.05	2.00
57	60	56	1230.91	5.33	0.06	3.49	4.37	4.32
59	56	120	-267.46	4.88	0.01	1.71	1.85	1.84
61	64	60	555.07	1.29	0.01	1.57	1.00	0.99
69	72	68	1075.63	14.20	0.03	3.05	3.37	3.37
73	120	72	-1365.10	20.68	0.14	3.87	5.27	5.23
81	84	56	-1757.36	5.64	0.13	2.80	2.11	2.06
85	84	88	1499.36	4.10	0.02	2.39	1.54	1.53
89	88	92	1147.36	1.21	0.01	1.83	0.94	0.93
93	92	96	888.36	0.44	0.02	1.42	0.61	0.58
97	96	98	178.00	0.02	0.00	0.50	0.14	0.12
99	96	100	452.36	0.31	0.00	0.72	0.17	0.17
101	100	104	193.36	5.14	0.06	2.19	4.15	4.10
105	104	108	-64.64	0.19	0.01	0.73	0.55	0.54
109	112	108	322.64	7.19	0.10	3.66	10.74	10.58
113	116	112	581.64	14.12	0.15	3.71	7.85	7.77
117	120	116	839.64	0.12	0.09	2.38	3.79	2.13
123	122	126	1126.78	1.51	0.06	1.42	0.53	0.51
127	126	130	868.78	51.36	0.43	5.54	16.46	16.33
131	130	134	337.11	7.22	0.05	2.15	2.85	2.83
133	130	168	273.66	5.52	0.05	1.75	1.94	1.92
135	134	138	-6.89	0.00	0.00	0.04	0.00	0.00
137	134	142	85.00	0.30	0.01	0.54	0.23	0.22
139	138	16	-554.34	4.69	0.20	3.54	7.41	7.10
141	138	142	289.45	0.30	0.01	0.82	0.31	0.30
143	142	20	116.46	0.05	0.00	0.33	0.06	0.05
145	148	4	1635.74	8.28	0.07	2.06	1.02	1.02
149	148	152	1932.26	78.95	1.58	5.48	10.16	9.96
151	148	184	-3827.00	35.50	0.54	4.82	4.98	4.90
153	152	156	1223.54	11.03	0.36	3.47	4.41	4.27
155	152	160	450.72	12.69	0.23	2.88	4.93	4.84
157	156	164	965.54	1.78	0.11	1.54	0.72	0.68
161	160	164	191.72	0.36	0.01	0.54	0.14	0.14
165	168	164	-899.26	7.06	0.14	2.55	2.46	2.42
169	168	172	-657.27	51.32	0.40	4.19	9.81	9.74
171	168	24	1572.19	1.63	0.32	4.46	8.15	6.80
173	172	176	2957.73	28.64	1.81	8.39	23.30	21.91
175	180	172	3874.00	82.38	4.78	10.99	38.22	36.12
177	176	72	2699.73	12.34	0.00	7.66	18.51	18.51
185	184	188	-3827.00	1.45	0.15	2.71	1.33	1.21

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
4		258.00	(1.66) 3850.68	3820.00	30.68	13.30
8		258.00	(1.66) 3815.83	3800.00	15.83	6.86
12		259.00	(1.67) 3768.96	3650.00	118.96	51.55
16		258.00	(1.66) 3761.21	3650.00	111.21	48.19
20		258.00	(1.66) 3755.96	3640.00	115.96	50.25
24		259.00	(1.67) 3756.06	3630.00	126.06	54.63
28		258.00	(1.66) 3755.14	3645.00	110.14	47.73
32		258.00	(1.66) 3754.35	3635.00	119.35	51.72
36		259.00	(1.67) 3752.92	3630.00	122.92	53.27
40		258.00	(1.66) 3753.48	3616.00	137.48	59.57

44	258.00(1.66)	3749.83	3640.00	109.83	47.59
48	259.00(1.67)	3750.24	3620.00	130.24	56.44
52	258.00(1.66)	3750.65	3605.00	145.65	63.12
56	258.00(1.66)	3741.24	3630.00	111.24	48.21
60	259.00(1.67)	3746.63	3620.00	126.63	54.87
64	258.00(1.66)	3747.92	3615.00	132.92	57.60
68	258.00(1.66)	3752.71	3600.00	152.71	66.18
72	259.00(1.67)	3766.95	3600.00	166.95	72.34
84	258.00(1.66)	3735.48	3630.00	105.48	45.71
88	352.00(1.67)	3731.35	3600.00	131.35	56.92
92	259.00(1.67)	3730.13	3575.00	155.13	67.22
96	258.00(1.66)	3729.68	3553.20	176.48	76.47
98	178.00(0.04)	3729.65	3553.20	176.45	76.46
100	259.00(1.67)	3729.36	3550.00	179.36	77.72
104	258.00(1.66)	3724.17	3550.00	174.17	75.47
108	258.00(1.66)	3724.36	3530.00	194.36	84.22
112	259.00(1.67)	3731.65	3553.20	178.45	77.33
116	258.00(1.66)	3745.92	3550.00	195.92	84.90
120	258.00(1.66)	3746.13	3550.00	196.13	84.99
122	259.00(1.67)	3816.94	3775.00	41.94	18.17
126	258.00(1.66)	3815.38	3748.00	67.38	29.20
130	258.00(1.66)	3763.59	3690.00	73.59	31.89
134	259.00(1.67)	3756.32	3680.00	76.32	33.07
138	258.00(1.66)	3756.32	3660.00	96.32	41.74
142	258.00(1.66)	3756.01	3660.00	96.01	41.60
148	259.00(1.67)	3859.03	3681.00	178.03	77.15
152	258.00(1.66)	3778.50	3600.00	178.50	77.35
156	258.00(1.66)	3767.11	3640.00	127.11	55.08
160	259.00(1.67)	3765.59	3570.00	195.59	84.75
164	258.00(1.66)	3765.22	3600.00	165.22	71.60
168	258.00(1.66)	3758.02	3640.00	118.02	51.14
172	259.00(1.67)	3809.74	3600.00	209.74	90.89
176	258.00(1.66)	3779.29	3600.00	179.29	77.69
180	-3874.00	3896.90	3549.00	347.90	150.76
184	0.00	3895.08	3560.00	335.08	145.20
188	-3827.00	3896.68	3560.00	336.68	145.89
0	----	3852.00			

M A X I M U M A N D M I N I M U M V A L U E S

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
180	150.76	8	6.86
188	145.89	4	13.30
184	145.20	122	18.17
172	90.89	126	29.20
120	84.99	130	31.89

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)

175	10.99	135	0.04
173	8.39	143	0.33
177	7.66	21	0.45
5	6.05	97	0.50
19	5.60	137	0.54

S U M M A R Y O F I N F L O W S A N D O U T F L O W S

(+) INFLOWS INTO THE SYSTEM FROM SUPPLY NODES
(-) OUTFLOWS FROM THE SYSTEM INTO SUPPLY NODES

NODE NAME	FLOWRATE gpm	NODE TITLE
0	3421.00	

NET SYSTEM INFLOW = 3421.00
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 3421.00

EXHIBIT A

PUBLIC WATER SYSTEM
NODE AND PIPE DIAGRAM

LEGEND

PROJECT BOUNDARY

EXISTING PUBLIC WATER LINE

PROPOSED PUBLIC WATER LINE BY HESPERIA COMMERCE CENTER II

PROPOSED PUBLIC WATER LINE BY KISS LOGISTICS CENTER

2 COMPUTER MODEL NODE

3 COMPUTER MODEL PIPE

N

0 700 FEET

PAD 3,552.53'

FF 3,553.20'

RESERVOIR 19
ENLARGEMENT DETAIL
SCALE: 1" = 700'

MATCHPOINT TO EXHIBIT A

MATCHPOINT TO ENLARGEMENT DETAIL

DEXTER WILSON ENGINEERING, INC.
CONSULTING ENGINEERS
2234 FARADAY AVENUE
CARLSBAD, CA 92008
(760) 438-4422

EXHIBIT A

NODE AND PIPE DIAGRAM

KISS LOGISTICS CENTER

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