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MASTER PLAN OF WATER
FOR THE
NEWLAND SIERRA PROJECT

August 31, 2016

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MASTER PLAN OF WATER
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CHAPTER 1

INTRODUCTION

This report provides a master plan of water for the Newland Sierra project. This report will provide information concerning projected water demands, existing facilities, proposed major facilities and onsite improvements necessary to provide adequate water service to the project.

PROJECT OVERVIEW

The Newland Sierra project is located within an unincorporated portion of the County of San Diego. The project is located on the north side of Deer Springs Road, just west of Interstate 15. Figure 1-1 provides a location map of the project. The project application includes a general plan amendment, specific plan, rezone, EIR, and tentative map.

DEVELOPMENT PLAN

The Newland Sierra project encompasses a total of approximately 1,985 acres. The development plan for the project includes seven neighborhoods (also called planning areas). The land planning for the project includes a variety of housing types with a total of 2,135 residential units. The project will also include parks, commercial, school, and open space land uses. Table 1-1 summarizes the proposed land use plan for the project and Figure 1-2 graphically shows the land use plan.

TABLE 1-1
NEWLAND SIERRA
PROPOSED LAND USE SUMMARY

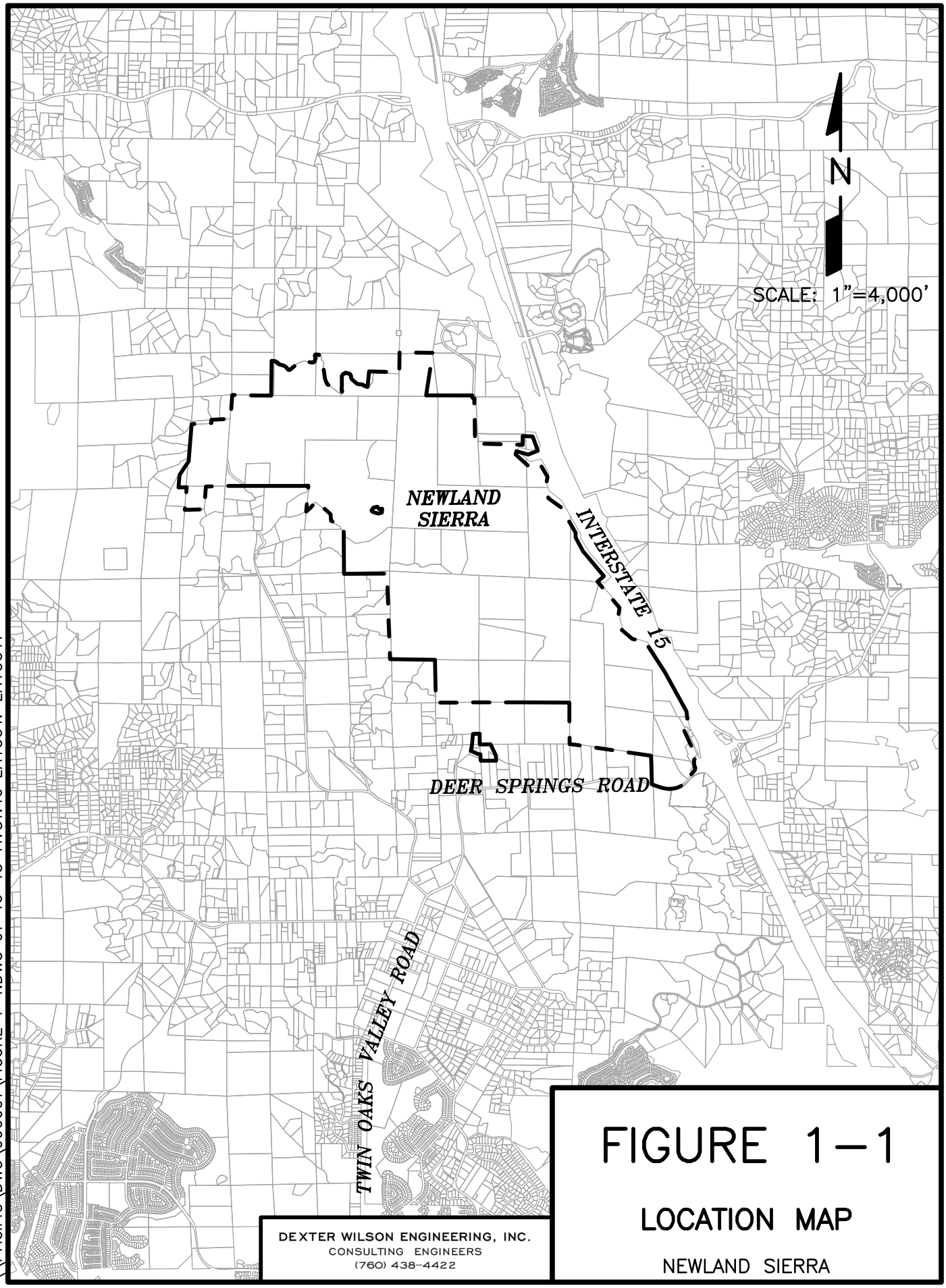
Neighborhood	Land Use	Acres	Units
Town Center	Commercial	7.4	---
	School	3.6	---
	Park	5.7	---
	Multi-Family	7.2	95
Subtotal		**23.9**	**95**
Valley	Multi-Family	23.8	317
	Single Family	32	188
	Park	12.3	---
Subtotal		**68.1**	**505**
Terraces	Multi-Family	28.4	446
	Water Tank	1.3	---
Subtotal		**29.7**	**446**
Hillside	Single Family	36.5	241
	Park	2.3	---
Subtotal		**38.8**	**241**
Mesa	Multi-Family	6.1	60
	Single Family	53.6	265
	Park	4.1	---
Subtotal		**63.8**	**325**
Lower Knoll	Multi-Family	4.8	30
	Single Family	44.5	203
	Park	8.9	---
Subtotal		**58.2**	**233**
Upper Knoll	Single Family	26.1	139
	Park	0.6	--
Subtotal		**26.7**	**139**
Summit	Multi-Family	14.9	50
	Single Family	35.4	101
	Water Tank	2.9	---
	Park	2.0	---
Subtotal		**55.2**	**151**
---	Backbone Roads	34.0	---
---	Fuel Modification	378.2	---
---	Open Space	1209.0	---
TOTAL		**1,985.6**	**2,135**

STUDY AREA

The entire project is within the boundaries of the Vallecitos Water District for water service. A series of reservoirs and pipelines were constructed on the property from an assessment district that was formed in the 1970s.

PURPOSE OF STUDY

The purpose of this report is to provide the recommended water facilities that are necessary to provide water service to Newland Sierra. This plan will be compatible with the Vallecitos Water District Master Plan.



\\PACIFIC\DWG\990001\FIGURE 1-1.DWG 01-16-15 11:51:16 LAYOUT: LAYOUT1

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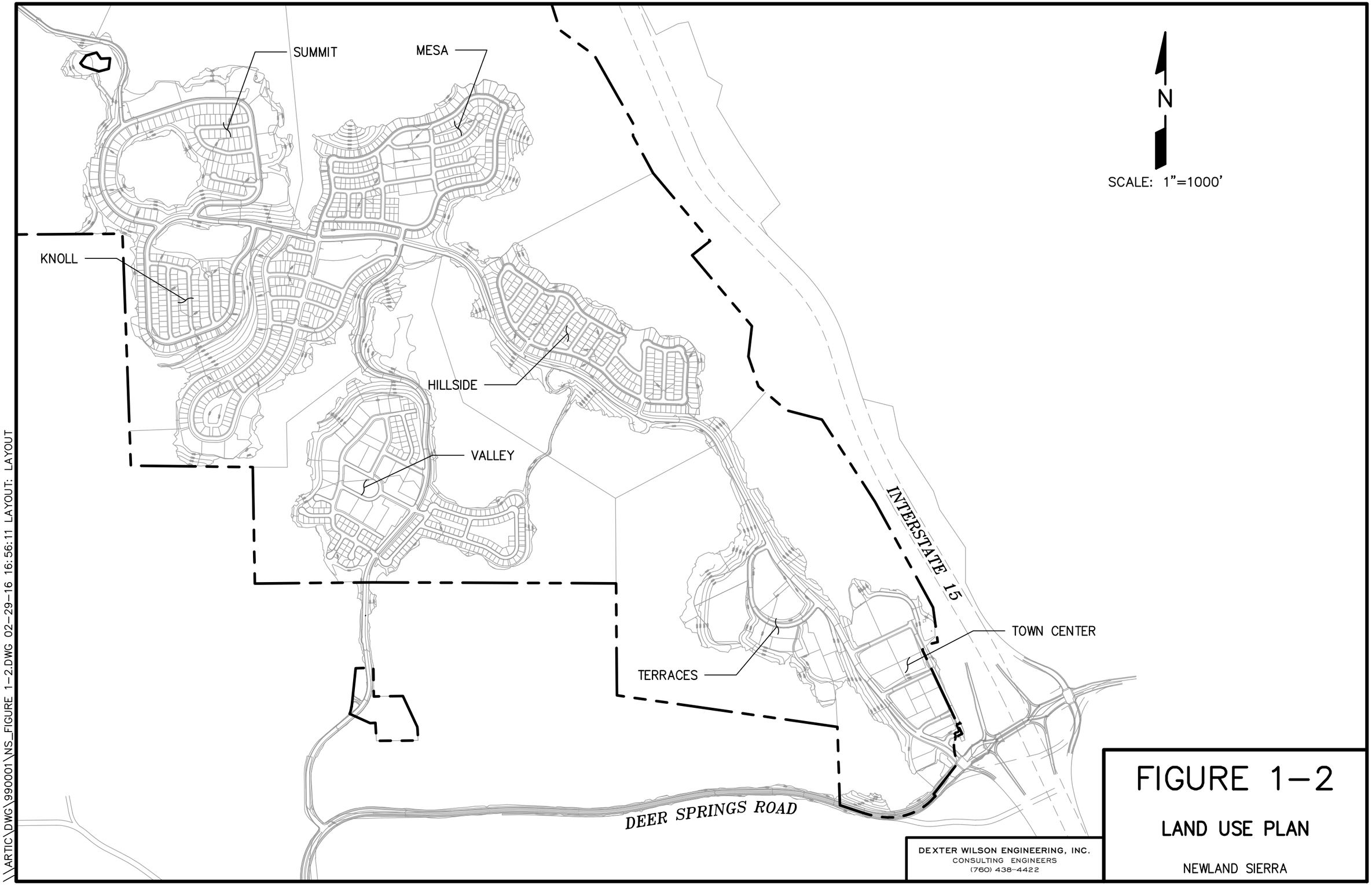
FIGURE 1-1

LOCATION MAP

NEWLAND SIERRA



\\ARTIC\DWG\990001\NS_FIGURE 1-2.DWG 02-29-16 16:56:11 LAYOUT: LAYOUT

FIGURE 1-2

LAND USE PLAN

NEWLAND SIERRA

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CHAPTER 2

DESIGN CRITERIA

This chapter presents the design criteria used to evaluate recommended water system improvements for the Newland Sierra project. The criteria utilized in this study are in accordance with the Vallecitos Water District 2008 Water, Wastewater, and Recycled Water Master Plan, unless otherwise noted. This report was prepared by PBS&J and is dated November 2010. The design criteria are used for evaluating the existing system as well as for design and sizing of proposed improvements to accommodate development in the study area.

WATER SYSTEM

Water Duty Factors and Peaking Factors

Table 2-1 presents the water duty factors from the Draft 2014 VWD Master Plan that were used in projecting water demands for the Newland Sierra project. Table 2-1 also provides the required fire flow and duration for each land use category. To determine the required fire flow from the Uniform Fire Code requires specific information on the building type and square footage which is not typically available at the planning level. The fire flow values used in this report are consistent with the Vallecitos Water District's Master Plan. To convert average day water demands to maximum day demands and peak hour demands, Figure 3-1 from the District Master Plan was utilized. This figure has been included in Appendix A for reference.

TABLE 2-1 RECOMMENDED UNIT WATER DUTY FACTORS[1]			
Land Use Category	**Water Duty Factor, gpd/ac**	**Required Fire Flow[2], gpm**	**Fire Flow Duration, Hours**
Residential (2-4 du/ac)	1,800	1,500	2
Residential (4-8 du/ac)	2,500	1,500	2
Residential (8-12 du/ac)	2,800	2,500	2
Residential (12-15 du/ac)	4,500	2,500	2
Residential (15-20 du/ac)	5,000	2,500	2
Residential (20-30 du/ac)	6,000	2,500	2
Commercial	1,500	2,500	2
Schools and Public Facilities	1,000	3,500	4
Parks	1,500	---	---
Open Space	200	---	---
Right of Way	200	---	---

[1] Per Draft 2014 VWD Master Plan.

[2] Final determination of fire flow will be made by the Fire Department.

System Pressure

The water distribution system has been designed to maintain static pressures between 65 psi and 150 psi. This criteria is used to initially divide a project between water service zones. Computer modeling is then performed to ensure that adequate residual pressures are obtained under all demand conditions. The system has been designed to yield minimum residual pressures of 40 psi during peak hour demands and 20 psi during maximum day demand plus fire flow conditions. Water lines were sized for a maximum velocity of 7.0 feet per second during any demand condition. Headloss in water lines are calculated using the Hazen-Williams equation with a "C" value of 130.

Reservoir Storage

Treated water storage reservoirs, or water storage tanks, within the District are sized for operational storage, emergency storage (within the District), and fire flow storage. The District requires storage tanks to be sized for the greater of 450 percent of average daily demand plus fire flow storage or 500 percent of average daily demand.

CHAPTER 3

PROJECTED WATER DEMANDS AND RESERVOIR STORAGE

This chapter provides the projected water demands and storage tank requirements by service zone for the Newland Sierra project. Storage tank requirements are provided for development within the project. The final sizing of new storage tanks will be determined by the District Master Plan.

Newland Sierra Water Demand

Due to the range of topography on the project, the project falls within four of the Vallecitos Water District's water service zones and a new pressure zone with a gradeline of 1,475 feet is being proposed by pressure reducing off the Coggan 1608 Zone. Table 3-1 provides the projected water demands by water service zone. As evidenced by Table 3-1, no residential development is proposed to be served by the Twin Oaks 1028 or North 1228 pressure zones. Table 3-2 provides a summary of the average and maximum daily water demands within each pressure zone for the Newland Sierra project. Figure 3-1 provides a pressure zone map for the project.

TABLE 3-1
NEWLAND SIERRA
WATER DEMAND ESTIMATE

Neighborhood	Land Use	Acres	Dwelling Units	Density, du/ac	Water Duty Factor, gpd/ac	Average Water Demand, gpd
Twin Oaks 1028 Zone						
---	Open Space	195.7	---	---	200	39,140
---	Backbone Roads	4.5	---	---	200	900
Twin Oaks 1028 Zone Subtotal		**200.2**				**40,040**
North 1228 Zone						
	Open Space	349	---	---	200	69,800
North 1228 Zone Subtotal		**349**			**200**	**69,800**
Deer Springs 1235 Zone						
Town Center	Commercial	7.4	---	---	1,500	11,100
	School	3.6	---	---	1,000	3,600
	Park	5.7	---	---	1,500	8,550
	Multi-Family	7.2	95	13.2	4,500	32,400
Valley	Multi-Family	23.8	317	13.3	4,500	107,100
	Single Family	32	188	5.9	2,500	80,000
	Park	12.3	---	---	1,500	18,450
---	Backbone Roads	9	---	---	200	1,800
---	Fuel Modification - Irrigated	32.4	---	---	1,500	48,600
---	Fuel Modification - Non Irrigated	60.5	---	---	200	12,100
Deer Springs 1235 Zone Subtotal		**193.9**	**600**			**323,700**
Proposed 1475 Zone						
Terraces	Multi-Family	28.4	446	15.7	5,000	142,000
	Water Tank	1.3	---	---	1,000	1,300
Hillside	Single Family	36.5	241	6.6	2,500	91,250
	Park	2.3	---	---	1,500	3,450
Mesa	Multi-Family	6.1	60	9.8	2,800	17,080
	Single Family	53.6	265	4.9	2,500	134,000
	Park	4.1	---	---	1,500	6,150
Lower Knoll	Multi-Family	4.8	30	6.3	2,500	12,000
	Single Family	44.5	203	4.6	2,500	111,250
	Park	8.9	---	---	1,500	13,350
---	Backbone Roads	15.8	---	---	200	3,160
---	Fuel Modification - Irrigated	72.4	---	---	1,500	108,600
---	Fuel Modification - Non Irrigated	147.8	---	---	200	29,560
---	Open Space	200.9	---	---	200	40,180
Proposed 1475 Zone Subtotal		**627.4**	**1,245**		**–**	**713,330**

TABLE 3-1
NEWLAND SIERRA
WATER DEMAND ESTIMATE

Neighborhood	Land Use	Acres	Dwelling Units	Density, du/ac	Water Duty Factor, gpd/ac	Average Water Demand, gpd
Coggan 1608 Zone						
Upper Knoll	Single Family	26.1	139	5.3	2,500	65,250
	Park	0.6	--		1,500	900
Summit	Multi-Family	14.9	50	3.4	1,800	26,820
	Single Family	35.4	101	2.9	1,800	63,720
	Water Tank	2.9	---	---	1,000	2,900
	Park	2.0	---	---	1,500	3,000
---	Backbone Roads	4.7	---	---	200	940
---	Fuel Modification - Irrigated	26.2	---	---	1,500	39,300
---	Fuel Modification - Non Irrigated	38.9	---	---	200	7,780
---	Open Space	463.4	---	---	200	92,680
Coggan 1608 Zone Subtotal		**615.1**	**290**			**303,290**
TOTAL		**1,985.6**	**2,135**			**1,450,160**

TABLE 3-2
NEWLAND SIERRA PROJECT
WATER DEMAND SUMMARY

Pressure Zone	Average Daily Demand, mgd	Maximum Daily, Demand, mgd	Peak Hour Demand, mgd
Twin Oaks 1028	0.040	0.120	0.260
North 1228	0.070	0.209	0.454
Deer Springs 1235	0.324	0.906	1.845
Proposed 1475	0.713	1.926	3.638
Coggan 1608	0.303	0.864	1.759

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SCALE: 1"=2000'

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INTERSTATE 15

NEWLAND SIERRA
PROJECT BOUNDARY

DEER SPRINGS ROAD

TWIN OAKS VALLEY ROAD

LEGEND

- PROJECT BOUNDARY
- TWIN OAKS 1028 ZONE
- NORTH 1228 ZONE
- DEER SPRINGS 1235 ZONE
- PROPOSED 1475 ZONE
- COGGAN 1608 ZONE

FIGURE 3-1

PRESSURE ZONE MAP

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Water Storage

Based on the water demand projections provided in Table 3-2. Table 3-3 summarizes the required water storage for development within Newland Sierra. Water storage requirements for the Twin Oaks 1028 and North 1228 Zones were not evaluated as part of this study since the project is not proposing any development within these pressure zones.

TABLE 3-3
NEWLAND SIERRA WATER STORAGE REQUIREMENTS

Pressure Zone	Average Demand, mgd	Operational & Emergency Storage, MG	Fire Flow Storage, MG	Total Storage Required, MG
Deer Springs 1235	0.324	1.46[3]	0.30[1]	1.76[3]
Coggan 1608[2]	1.086[2]	5.43[3]	0.30[1]	5.43[3]

[1] From VWD 2008 Master Plan.
[2] Includes demands within the North 1228 Zone and proposed 1475 Zone.
[3] 500 Percent of average daily demand governs in the Coggan 1608 Zone. There is 1.3 MG of existing water storage capacity in the Coggan 1608 Zone. 450 percent of average daily demand plus fire flow governs in the Deer Springs 1235 Zone.

CHAPTER 4

EXISTING WATER FACILITIES

This chapter provides a description of existing water facilities in the vicinity of the Newland Sierra project. Figure 4-1 graphically shows the location of existing major facilities.

Existing Water Facilities

The Newland Sierra project is within the boundaries of the Vallecitos Water District. There are numerous existing major water facilities within and around the project. A number of major facilities within the project were constructed in 1975 as part of Assessment District 75-1. A description of major water facilities by water service zone is provided below.

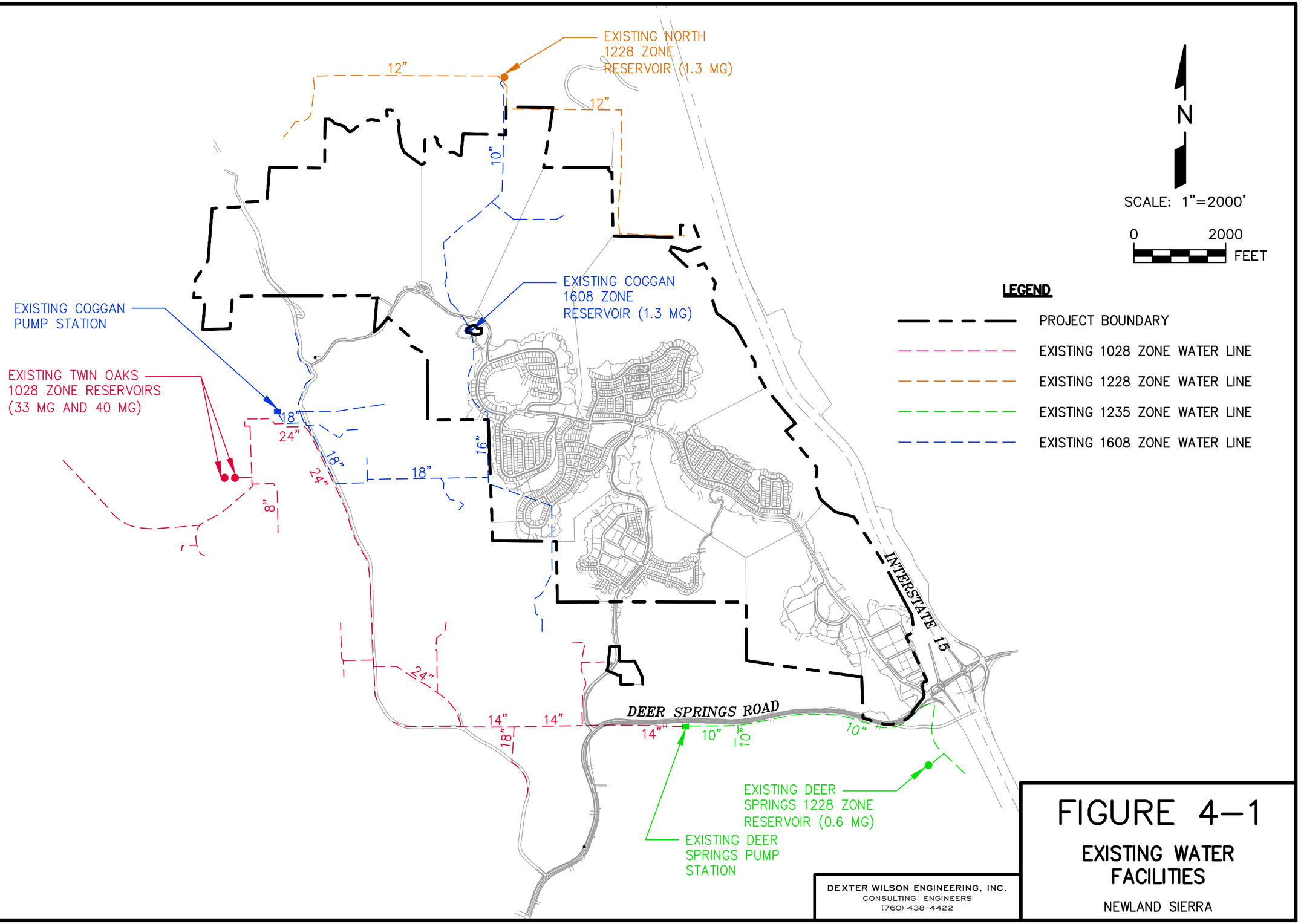
Twin Oaks 1028 Zone. The Vallecitos Water District has historically relied on the purchase of treated water from the San Diego County Water Authority (CWA) for its entire supply of water. Starting in 2016, VWD began receiving water from the Carlsbad Desalination project. This supply can provide up to 4,083 acre-feet per year to VWD which represents approximately 27 percent of the current overall supply.

The VWD Number 10 turnout off the CWA aqueduct is located just west of Twin Oaks Valley Road and provides the District with a capacity of 38.8 million gallons per day at this location. This aqueduct connection allows the adjacent Twin Oaks 1028 Reservoirs to be filled by gravity. There is a 33 million gallon tank and 40 million gallon tank in this zone. Although the Twin Oaks 1028 Zone will not provide direct service to any of the developed area within Newland Sierra project, it will provide the source of water supply for the entire project.

North 1228 Zone. The North 1228 Zone consists of a 1.3 million gallon reservoir just north of the Newland Sierra project that was constructed as part of Assessment District 75-1. The North tank is supplied by the Coggan 1608 Zone via the North Pressure Reducing Station which has an outlet hydraulic gradeline setting of 1,243 feet. This tank has recently been abandoned such that the limited connections in this zone can be served directly from the pressure reducing station. There are some existing 8-inch through 12-inch water lines that have been constructed in the North 1228 Zone.

Deer Springs 1235 Zone. The Deer Springs 1235 Zone is formed by the Deer Springs Pump Station and Deer Springs Water Storage Tank. The Deer Springs Pump Station is located along the south side of Deer Springs Road and is supplied by the Twin Oaks 1028 Zone. This pump station has a firm capacity of 1,200 gpm. The Deer Springs Tank is located just southeast of the Newland Sierra project and has a capacity of 0.6 million gallons. This reservoir does not have current capacity to serve existing system demands, including emergency and fire flow storage requirements, and the need for construction of additional storage in this zone has been identified by the District.

Coggan 1608 Zone. The Coggan 1608 Zone Reservoir is located within the Newland Sierra project and was constructed as part of Assessment District 75-1. The Coggan Reservoir has a capacity of 1.3 million gallons and provides service to a few customers west and north of the Newland Sierra project. The Coggan Pump Station is located near the Twin Oaks 1028 Zone Reservoirs and pumps water from the 1028 Zone to the Coggan Reservoir. This pump station has three pumps, each with a rated capacity of 2,000 gpm. There are numerous 1608 Zone transmission and distribution lines within the Newland Sierra project.



\\ARTIC\DWG\990001\WATER\NS_WATER_FIGURE 4-1.DWG 02-29-16 16:52:51 LAYOUT: LAYOUT

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FIGURE 4-1

EXISTING WATER FACILITIES

NEWLAND SIERRA

CHAPTER 5

RECOMMENDED WATER FACILITIES

This chapter provides the recommended water system improvements necessary to provide service to the Newland Sierra project. A new 1475 Zone is proposed via pressure reducing stations off the Coggan 1608 Zone system. The 1475 Zone will provide service to development that could not receive sufficient pressure from the Deer Springs 1235 Zone and would receive pressures of greater than 150 psi from the Coggan 1608 Zone. Table 5-1 summarizes the anticipated range of static pressures on the project. Figure 5-1 graphically shows the location of proposed facilities. A brief discussion of facilities by water service zone as well as a description of the computer modeling is provided below.

TABLE 5-1
NEWLAND SIERRA PROJECT
WATER SERVICE SUMMARY

Pressure Zone	Pad Elevation, Ft.		Static Pressure[1], psi	
	Minimum	Maximum	Minimum	Maximum
Deer Springs 1235	875	1080	67	170
Proposed 1475	1175	1295	78	130
Coggan 1608	1320	1495	49	142

[1] Maximum static pressure is calculated with reservoir full. Minimum static pressure is calculated with reservoir empty. Maximum static pressures are for development pads only and higher pressures may occur in sections of the piping where there are no service connections.

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 130.

Computer modeling was only applied to portions of the project where there are expected improvements. Two computer models were created, one for the 1235 Deer Springs Zone, and one for the 1608 and 1475 Zones combined. Each model will be further discussed in its respective section.

EXISTING 1608 ZONE PUMP STATION

EXISTING 1608 RESERVOIR

PROPOSED 1608 ZONE RESERVOIR

1608/1475 ZONE PR STATION

1608/1475 ZONE PR STATION

EXISTING 1028 ZONE RESERVOIRS

NORMALLY CLOSED 1475/1235 ZONE PR STATION

NORMALLY CLOSED ZONE VALVE

CONVERT EXISTING 1608 ZONE LINE TO 1475 ZONE

EXISTING 66" SDCWA CROSSOVER MAIN

PROPOSED 1235 ZONE RESERVOIR

EXISTING DEER SPRINGS PUMP STATION (1235 ZONE)

EXISTING 10" TO BE REPLACED

INTERSTATE 15

DEER SPRINGS ROAD

N

SCALE: 1"=1200'

0 1200 FEET

NOTE: ALL PROPOSED PIPES ARE RECOMMENDED AS 8-INCH UNLESS OTHERWISE NOTED

LEGEND

- PROJECT BOUNDARY
- EXISTING 1028 ZONE WATER LINE
- EXISTING 1235 ZONE WATER LINE
- PROPOSED 1235 ZONE WATER LINE
- PROPOSED 1475 ZONE WATER LINE
- EXISTING 1608 ZONE WATER LINE
- PROPOSED 1608 ZONE WATER LINE

FIGURE 5-1

RECOMMENDED WATER FACILITIES

NEWLAND SIERRA

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Twin Oaks 1028 Zone. The District has recently completed the construction of 33 million-gallon and 40 million gallon reservoirs in this zone. The VWD Number 10 turnout that supplies the Twin Oaks 1028 Zone has a capacity of 38.8 mgd. Improvements in this zone will not be required to be constructed by the Newland Sierra project, but the project will share in the cost of storage facilities through the payment of capacity fees.

North 1228 Zone. Approximately 349 acres within the Newland Sierra project are within the North 1228 Zone, but all of this property is proposed to be dedicated open space. Since Newland Sierra is not proposing any development in this zone, no improvements are proposed for this project. The water demands associated with the open space are included in the Coggan 1608 Zone water storage requirements.

Deer Springs 1235 Zone. The Vallecitos Water District Master Plan identifies capital improvement program projects to provide additional storage in the Deer Springs Zone and construction of a new transmission line between the Deer Springs Pump Station and the Reservoir. The Deer Springs Pump Station was upgraded to a capacity of 1,200 gpm by the District. Further evaluation will be required by the District to determine if the pump station will be adequate to accommodate ultimate development, including additional demands from the Newland Sierra project.

Construction of the other facilities will be required prior to or concurrent with the development of the Newland Sierra project, as described below.

The existing Deer Springs Reservoir has a capacity of 0.6 million gallons and has been determined by the District to be undersized to serve existing development in this zone. The District Master Plan identifies Deer Springs Reservoir No. 2 as a 1.0 million gallon reservoir (Capital Improvement Project R-4) to meet storage deficits in the 1235 and 1549 Zones and to allow the existing Deer Springs Reservoir to be abandoned. Table 3-3 identified the need for a 1.76 MG mg tank to serve the Newland Sierra project only. The final sizing of this reservoir will need to be determined by VWD based on master plan data and additional projected demands for Newland Sierra. For the purposes of this study, a 2.0 MG tank has been assumed. This reservoir is proposed to be located within the Newland Sierra project and shall have a low water line of 1,235 feet and a high water line of 1,267 feet to match the existing reservoir. Construction of this reservoir will need to be completed prior to occupancy of any development within this zone.

There is an existing 10-inch water line constructed in 1961 that conveys water from the Deer Springs Pump Station to the Deer Springs Reservoir. The District Master Plan has identified the need for a replacement 12-inch water line (Capital Improvement Project P-56). This pipeline project needs to be completed prior to or concurrent with development in this zone. As previously mentioned, the 1235 Zone was modeled as one zone. The model output is included as Appendix B, with a corresponding Exhibit A that provides the node and pipe diagram for the system model. To provide redundancy, we are recommending that the zone is supplied by both the proposed Deer Springs 1235 Zone Tank as well as a normally closed 1475/1235 Zone pressure reducing station. The hydraulic analysis assumes the 1235 Zone reservoir is half full with a hydraulic grade line of 1251 feet and the normally closed pressure reducing valve is set to open when the hydraulic grade line in the system drops below 1220 feet. The hydraulic model shows that 8-inch through 16-inch water lines can adequately supply the project during maximum day demand and peak hour demand scenarios from the reservoir only. In order to adequately supply the project during maximum day demand plus fire flow scenarios, the normally closed 1475/1235 Zone pressure reducing valve will need to open to allow the 1475 Zone to supplement supply to the 1235 Zone.

Coggan 1608/Proposed 1475 Zones. The Coggan Pump Station has a firm capacity of 4,000 gpm and is not anticipated to require upgrades to serve ultimate development. This will be confirmed by the District. Water from the pump station to the Coggan Tank is conveyed through 16-inch and 18-inch pipelines. These pipelines do not require upsizing to accommodate ultimate development, but portions may be re-aligned during construction of the Newland Sierra project. The existing Coggan Tank has a capacity of 1.3 million gallons, but the District Master Plan recommends replacement of this reservoir with a 6.0 MG Coggan No. 2 Tank. A future Coggan No. 3 Tank is also shown in the District Master Plan within the open space portion of the Newland Sierra property.

Based on the information contained in Table 3-3, the total capacity required for Newland Sierra is 5.43 MG. With the existing 1.3 MG tank, Newland Sierra would need to construct an additional 4.13 MG of storage to meet their project needs only. This reservoir will need to be oversized to meet District Master Plan requirements. The Coggan No. 2 Tank will be located at the same site as the existing reservoir and will have a low water line of 1608 feet and a high water line of 1648 feet. The VWD Master Plan identifies a 6.0 MG tank at this site that allows the existing reservoir to be abandoned and allows service to future development. This reservoir is identified as a District Capital Improvement project (Project R-5) and construction will be concurrent with development of the Newland Sierra project. It is not anticipated that the construction of the Future 6.1 MG Coggan No. 3 Tank (District CIP Project R-11) will be

required concurrent with development of Newland Sierra, but additional land may be needed from the project for this future site.

The 1475 Zone will be formed by pressure reducing off the 1608 Zone. Two pressure reducing stations are proposed to provide redundancy. Each pressure reducing station typically has one small (2-inch or 3-inch) and one larger (6-inch or 8-inch) pressure reducing valve to accommodate the full range of anticipated demands. The final determination of valve sizing and setpoints is generally made prior to initiation of final engineering for the project. The piping in the 1475 Zone is recommended to range from 8-inch to 12-inch.

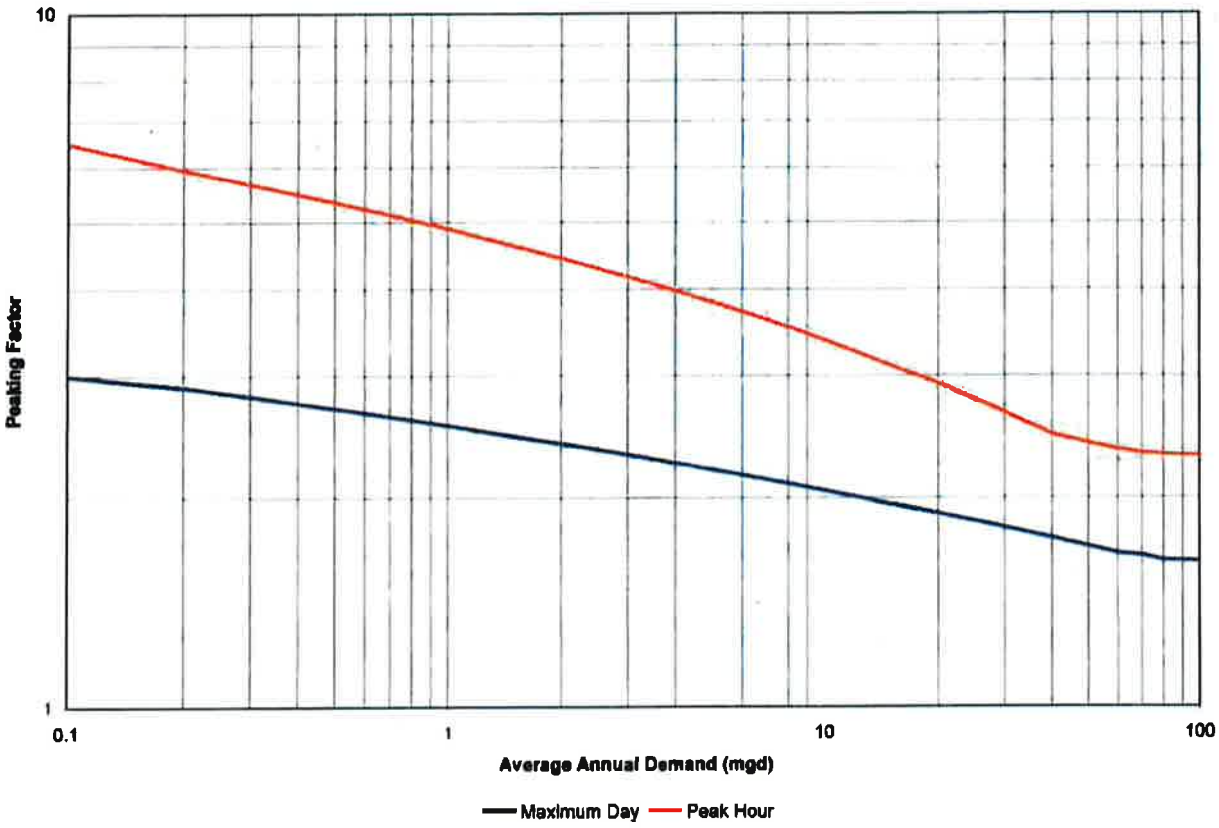
The 1608 and 1475 Zones are modeled as one system. The model output is included as Appendix C, with a corresponding Exhibit B to provide the node and pipe diagram for the system model. The model assumes the 1608 Zone reservoir is half full with a hydraulic grade line of 1628 feet. The 1475 Zone models both pressure reducing stations with an output hydraulic grade line of 1475 feet. The model demonstrates that the zones can be adequately supplied during maximum day demand plus fire flow conditions with 8-inch through 16-inch water lines. Average day demand and peak hour demand scenarios were also modeled.

APPENDIX A

VWD MASTER PLAN FIGURE 3-1

The peaking factors for maximum day and peak hour demands are based on the District's 2007 average demand of 18.3 MGD and are representative of District-wide demands. To size individual development infrastructure, the District will use Figure 3-1 to determine the appropriate peaking factors. Figure 3-1 displays peaking factor curves used in this Master Plan. The corresponding peaking factors obtained from these curves are multiplied by the average water demands to determine the peak flows for individual developments.

Figure 3-1 Water System Peaking Curves



Peaking Factors for Individual Projects/Developments

Peaking factors for new developments are determined based on the average daily demand of the new development multiplied by the appropriate peaking curve factor, as shown in Figure 3-1. Analysis of major infrastructure may use reduced peaking factors (at the District's discretion) based on the average flows of the tributary area served by the facility.

APPENDIX B

1235 ZONE COMPUTER MODELING OUTPUT

The following conditions were modeled:

1. Average day demand
2. Peak hour demand
3. Maximum day demand plus 3,500 gpm fire flow at node 8
4. Maximum day demand plus 1500 gpm fire flow at node 28
5. Maximum day demand plus 2500 gpm fire flow at node 44

FLOWRATE IS EXPRESSED IN GPM AND PRESSURE IN PSIG

A SUMMARY OF THE ORIGINAL DATA FOLLOWS

PIPE NO.	NODE NOS.		LENGTH (FEET)	DIAMETER (INCHES)	ROUGHNESS	MINOR LOSS K	FIXED GRADE
101	0	2	1850.0	16.0	130.0	.00	1251.00
105	2	4	600.0	12.0	130.0	.00	
109	2	8	1300.0	12.0	130.0	.00	
113	4	8	650.0	8.0	130.0	.00	
117	8	12	1050.0	12.0	130.0	.00	
121	4	12	600.0	12.0	130.0	.00	
125	12	16	11700.0	12.0	130.0	.00	
129	16	20	650.0	12.0	130.0	.00	
133	20	22	500.0	12.0	130.0	.00	
135	20	24	150.0	8.0	130.0	.00	
137	16	32	700.0	8.0	130.0	.00	
141	32	28	1800.0	8.0	130.0	.00	
143	32	24	150.0	8.0	130.0	.00	
145	24	28	1450.0	8.0	130.0	.00	
147	20	36	350.0	8.0	130.0	.00	
149	16	40	1200.0	8.0	130.0	.00	
153	40	44	300.0	8.0	130.0	.00	
157	44	48	600.0	8.0	130.0	.00	
161	36	40	650.0	8.0	130.0	.00	
165	36	44	750.0	8.0	130.0	.00	
169	22	48	1050.0	8.0	130.0	.00	
173	200	22	2200.0	12.0	130.0	.00	
177	0	200	10.0	12.0	130.0	.00	1220.00

THERE IS A CHECK VALVE IN LINE NUMBER177

JUNCTION NUMBER	DEMAND	ELEVATION	CONNECTING PIPES			
2	5.00	1080.00	101	105	109	
4	5.00	1055.00	105	113	121	
8	40.00	1080.00	109	113	117	
12	5.00	1060.00	117	121	125	
16	5.00	875.00	125	129	137	149
20	5.00	900.00	129	133	135	147
22	5.00	925.00	133	169	173	
24	5.00	900.00	135	143	145	
28	25.00	925.00	141	145		
32	25.00	900.00	137	141	143	
36	25.00	890.00	147	161	165	
40	25.00	900.00	149	153	161	
44	25.00	905.00	153	157	165	
48	25.00	915.00	157	169		
200	.00	1100.00	173	177		

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

THIS SYSTEM HAS 23 PIPES WITH 15 JUNCTIONS , 7 LOOPS AND 2 FGNS

THE RESULTS ARE OBTAINED AFTER 6 TRIALS WITH AN ACCURACY = .00295

AVERAGE DAY DEMAND

PIPE NO.	NODE NOS.		FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
101	0	2	225.00	.07	.00	.00	.36	.04
105	2	4	128.12	.03	.00	.00	.36	.06
109	2	8	91.88	.04	.00	.00	.26	.03
113	4	8	16.28	.01	.00	.00	.10	.01
117	8	12	68.16	.02	.00	.00	.19	.02
121	4	12	106.84	.02	.00	.00	.30	.04
125	12	16	170.00	1.11	.00	.00	.48	.10
129	16	20	97.38	.02	.00	.00	.28	.03
133	20	22	29.21	.00	.00	.00	.08	.00
135	20	24	21.08	.00	.00	.00	.13	.01
137	16	32	33.92	.02	.00	.00	.22	.03
141	32	28	11.75	.01	.00	.00	.07	.00
143	32	24	-2.83	.00	.00	.00	-.02	.00
145	24	28	13.25	.01	.00	.00	.08	.01
147	20	36	42.09	.02	.00	.00	.27	.05
149	16	40	33.70	.04	.00	.00	.22	.03
153	40	44	14.84	.00	.00	.00	.09	.01
157	44	48	.79	.00	.00	.00	.01	.00
161	36	40	6.14	.00	.00	.00	.04	.00
165	36	44	10.95	.00	.00	.00	.07	.00
169	22	48	24.21	.02	.00	.00	.15	.02
173	200	22	.00	.00	.00	.00	.00	.00

THE CHECK VALVE IN LINE NUMBER 177 IS CLOSED

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
2	5.00	1250.93	1080.00	74.07
4	5.00	1250.89	1055.00	84.89
8	40.00	1250.89	1080.00	74.05
12	5.00	1250.87	1060.00	82.71
16	5.00	1249.75	875.00	162.39
20	5.00	1249.73	900.00	151.55
22	5.00	1249.73	925.00	140.72
24	5.00	1249.73	900.00	151.55
28	25.00	1249.72	925.00	140.71
32	25.00	1249.73	900.00	151.55
36	25.00	1249.71	890.00	155.88
40	25.00	1249.71	900.00	151.54
44	25.00	1249.71	905.00	149.37
48	25.00	1249.71	915.00	145.04

200	.00	1249.73	1100.00	64.88

MAXIMUM PRESSURES

16	5.00	1249.75	875.00	162.39
36	25.00	1249.71	890.00	155.88
20	5.00	1249.73	900.00	151.55
24	5.00	1249.73	900.00	151.55
32	25.00	1249.73	900.00	151.55

MINIMUM PRESSURES

200	.00	1249.73	1100.00	64.88
8	40.00	1250.89	1080.00	74.05
2	5.00	1250.93	1080.00	74.07
12	5.00	1250.87	1060.00	82.71
4	5.00	1250.89	1055.00	84.89

THE NET SYSTEM DEMAND = 225.00

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

PIPE NUMBER	FLOWRATE
101	225.00

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 225.00
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = .00

A SUMMARY OF CONDITIONS SPECIFIED FOR THE NEXT SIMULATION FOLLOWS

THE DEMANDS ARE CHANGED FROM ORIGINAL VALUES BY A FACTOR = 5.70

THE RESULTS ARE OBTAINED AFTER 5 TRIALS WITH AN ACCURACY = .00006

PEAK HOUR DEMAND

PIPE NO.	NODE NOS.		FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
101	0	2	1267.86	1.79	.00	.00	2.02	.97
105	2	4	721.43	.83	.00	.00	2.05	1.39
109	2	8	517.94	.97	.00	.00	1.47	.75
113	4	8	92.22	.14	.00	.00	.59	.22
117	8	12	382.16	.45	.00	.00	1.08	.43
121	4	12	600.71	.59	.00	.00	1.70	.99
125	12	16	954.36	27.21	.00	.00	2.71	2.33
129	16	20	544.84	.54	.00	.00	1.55	.82
133	20	22	153.02	.04	.00	.00	.43	.08
135	20	24	122.93	.06	.00	.00	.78	.38
137	16	32	190.57	.59	.00	.00	1.22	.85
141	32	28	66.94	.22	.00	.00	.43	.12
143	32	24	-18.87	.00	.00	.00	-.12	-.01
145	24	28	75.56	.22	.00	.00	.48	.15
147	20	36	240.39	.46	.00	.00	1.53	1.30

149	16	40	190.45	1.02	.00	.00	1.22	.85
153	40	44	83.60	.06	.00	.00	.53	.18
157	44	48	3.34	.00	.00	.00	.02	.00
161	36	40	35.66	.02	.00	.00	.23	.04
165	36	44	62.23	.08	.00	.00	.40	.11
169	22	48	139.16	.50	.00	.00	.89	.47
173	200	22	14.64	.00	.00	.00	.04	.00
177	0	200	14.64	.00	.00	.00	.04	.00

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
2	28.50	1249.21	1080.00	73.32
4	28.50	1248.38	1055.00	83.80
8	228.00	1248.23	1080.00	72.90
12	28.50	1247.78	1060.00	81.37
16	28.50	1220.57	875.00	149.75
20	28.50	1220.04	900.00	138.68
22	28.50	1220.00	925.00	127.83
24	28.50	1219.98	900.00	138.66
28	142.50	1219.76	925.00	127.73
32	142.50	1219.98	900.00	138.66
36	142.50	1219.58	890.00	142.82
40	142.50	1219.56	900.00	138.47
44	142.50	1219.50	905.00	136.28
48	142.50	1219.50	915.00	131.95
200	.00	1220.00	1100.00	52.00
	MAXIMUM PRESSURES			
16	28.50	1220.57	875.00	149.75
36	142.50	1219.58	890.00	142.82
20	28.50	1220.04	900.00	138.68
24	28.50	1219.98	900.00	138.66
32	142.50	1219.98	900.00	138.66
	MINIMUM PRESSURES			
200	.00	1220.00	1100.00	52.00
8	228.00	1248.23	1080.00	72.90
2	28.50	1249.21	1080.00	73.32
12	28.50	1247.78	1060.00	81.37
4	28.50	1248.38	1055.00	83.80

THE NET SYSTEM DEMAND = 1282.50

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

PIPE NUMBER	FLOWRATE
101	1267.86
177	14.64

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 1282.50
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = .00

A SUMMARY OF CONDITIONS SPECIFIED FOR THE NEXT SIMULATION FOLLOWS

THE DEMANDS ARE CHANGED FROM ORIGINAL VALUES BY A FACTOR = 2.80

THE FOLLOWING SPECIFIC DEMAND CHANGES ARE MADE :

JUNCTION NUMBER	DEMAND
8	3610.00

THE RESULTS ARE OBTAINED AFTER 6 TRIALS WITH AN ACCURACY = .00049

MAXIMUM DAY DEMAND PLUS 3500 GPM FIRE FLOW AT NODE 8

PIPE NO.	NODE NOS.		FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
101	0	2	4084.10	15.65	.00	.00	6.52	8.46
105	2	4	2102.81	6.03	.00	.00	5.96	10.05
109	2	8	1967.29	11.54	.00	.00	5.58	8.88
113	4	8	660.99	5.52	.00	.00	4.22	8.49
117	8	12	-981.72	-2.57	.00	.00	-2.78	-2.45
121	4	12	1427.82	2.94	.00	.00	4.05	4.90
125	12	16	432.10	6.27	.00	.00	1.23	.54
129	16	20	241.64	.12	.00	.00	.69	.18
133	20	22	41.01	.00	.00	.00	.12	.01
135	20	24	67.15	.02	.00	.00	.43	.12
137	16	32	86.85	.14	.00	.00	.55	.20
141	32	28	32.76	.06	.00	.00	.21	.03
143	32	24	-15.91	.00	.00	.00	-.10	-.01
145	24	28	37.24	.06	.00	.00	.24	.04
147	20	36	119.48	.12	.00	.00	.76	.36
149	16	40	89.61	.25	.00	.00	.57	.21
153	40	44	38.76	.01	.00	.00	.25	.04
157	44	48	-.91	.00	.00	.00	-.01	.00
161	36	40	19.15	.01	.00	.00	.12	.01
165	36	44	30.33	.02	.00	.00	.19	.03
169	22	48	70.91	.14	.00	.00	.45	.14
173	200	22	43.90	.02	.00	.00	.12	.01
177	0	200	43.90	.00	.00	.00	.12	.01

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
2	14.00	1235.35	1080.00	67.32
4	14.00	1229.32	1055.00	75.54
8	3610.00	1223.80	1080.00	62.32
12	14.00	1226.38	1060.00	72.10
16	14.00	1220.10	875.00	149.55
20	14.00	1219.99	900.00	138.66
22	14.00	1219.98	925.00	127.83
24	14.00	1219.97	900.00	138.65
28	70.00	1219.91	925.00	127.79
32	70.00	1219.97	900.00	138.65
36	70.00	1219.86	890.00	142.94
40	70.00	1219.85	900.00	138.60
44	70.00	1219.84	905.00	136.43
48	70.00	1219.84	915.00	132.10
200	.00	1220.00	1100.00	52.00

MAXIMUM PRESSURES

16	14.00	1220.10	875.00	149.55
36	70.00	1219.86	890.00	142.94
20	14.00	1219.99	900.00	138.66
24	14.00	1219.97	900.00	138.65
32	70.00	1219.97	900.00	138.65

MINIMUM PRESSURES

200	.00	1220.00	1100.00	52.00
8	3610.00	1223.80	1080.00	62.32
2	14.00	1235.35	1080.00	67.32
12	14.00	1226.38	1060.00	72.10
4	14.00	1229.32	1055.00	75.54

THE NET SYSTEM DEMAND = 4128.00

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

PIPE NUMBER	FLOWRATE
101	4084.10
177	43.90

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 4128.00
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = .00

A SUMMARY OF CONDITIONS SPECIFIED FOR THE NEXT SIMULATION FOLLOWS

THE DEMANDS ARE CHANGED FROM ORIGINAL VALUES BY A FACTOR = 2.80

THE FOLLOWING SPECIFIC DEMAND CHANGES ARE MADE :

JUNCTION NUMBER	DEMAND
28	1555.00

THE RESULTS ARE OBTAINED AFTER 4 TRIALS WITH AN ACCURACY = .00100

MAXIMUM DAY DEMAND PLUS 1500 GPM FIRE FLOW AT NODE 28

PIPE NO.	NODE NOS.		FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
101	0	2	1211.87	1.65	.00	.00	1.93	.89
105	2	4	709.14	.81	.00	.00	2.01	1.34
109	2	8	488.74	.88	.00	.00	1.39	.67
113	4	8	62.74	.07	.00	.00	.40	.11
117	8	12	439.47	.58	.00	.00	1.25	.55
121	4	12	632.40	.65	.00	.00	1.79	1.09
125	12	16	1057.87	32.93	.00	.00	3.00	2.81
129	16	20	415.12	.32	.00	.00	1.18	.50
133	20	22	-735.06	-.72	.00	.00	-2.09	-1.43
135	20	24	1111.96	3.34	.00	.00	7.10	22.24
137	16	32	527.04	3.91	.00	.00	3.36	5.58
141	32	28	729.37	18.33	.00	.00	4.66	10.18
143	32	24	-272.33	-.25	.00	.00	-1.74	-1.64

145	24	28	825.63	18.58	.00	.00	5.27	12.81
147	20	36	24.21	.01	.00	.00	.15	.02
149	16	40	101.72	.32	.00	.00	.65	.27
153	40	44	7.63	.00	.00	.00	.05	.00
157	44	48	-84.07	-.11	.00	.00	-.54	-.19
161	36	40	-24.08	-.01	.00	.00	-.15	-.02
165	36	44	-21.70	-.01	.00	.00	-.14	-.02
169	22	48	154.07	.60	.00	.00	.98	.57
173	200	22	903.13	4.62	.00	.00	2.56	2.10
177	0	200	903.13	.02	.00	.00	2.56	2.10

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
2	14.00	1249.35	1080.00	73.39
4	14.00	1248.55	1055.00	83.87
8	112.00	1248.47	1080.00	73.01
12	14.00	1247.89	1060.00	81.42
16	14.00	1214.97	875.00	147.32
20	14.00	1214.64	900.00	136.35
22	14.00	1215.36	925.00	125.82
24	14.00	1211.31	900.00	134.90
28	1555.00	1192.73	925.00	116.02
32	70.00	1211.06	900.00	134.79
36	70.00	1214.64	890.00	140.68
40	70.00	1214.65	900.00	136.35
44	70.00	1214.65	905.00	134.18
48	70.00	1214.76	915.00	129.90
200	.00	1219.98	1100.00	51.99
	MAXIMUM PRESSURES			
16	14.00	1214.97	875.00	147.32
36	70.00	1214.64	890.00	140.68
40	70.00	1214.65	900.00	136.35
20	14.00	1214.64	900.00	136.35
24	14.00	1211.31	900.00	134.90
	MINIMUM PRESSURES			
200	.00	1219.98	1100.00	51.99
8	112.00	1248.47	1080.00	73.01
2	14.00	1249.35	1080.00	73.39
12	14.00	1247.89	1060.00	81.42
4	14.00	1248.55	1055.00	83.87

THE NET SYSTEM DEMAND = 2115.00

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

PIPE NUMBER	FLOWRATE
101	1211.87
177	903.13

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 2115.00
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = .00

A SUMMARY OF CONDITIONS SPECIFIED FOR THE NEXT SIMULATION FOLLOWS

THE DEMANDS ARE CHANGED FROM ORIGINAL VALUES BY A FACTOR = 2.80

THE FOLLOWING SPECIFIC DEMAND CHANGES ARE MADE :

JUNCTION NUMBER	DEMAND
44	2555.00

THE RESULTS ARE OBTAINED AFTER 4 TRIALS WITH AN ACCURACY = .00025

MAXIMUM DAY DEMAND PLUS 2500 GPM FIRE FLOW AT NODE 44

PIPE NO.	NODE NOS.		FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
101	0	2	1381.40	2.10	.00	.00	2.20	1.14
105	2	4	811.13	1.03	.00	.00	2.30	1.72
109	2	8	556.26	1.11	.00	.00	1.58	.86
113	4	8	67.22	.08	.00	.00	.43	.12
117	8	12	511.49	.77	.00	.00	1.45	.73
121	4	12	729.91	.85	.00	.00	2.07	1.42
125	12	16	1227.40	43.36	.00	.00	3.48	3.71
129	16	20	368.21	.26	.00	.00	1.04	.40
133	20	22	-917.06	-1.08	.00	.00	-2.60	-2.16
135	20	24	31.50	.00	.00	.00	.20	.03
137	16	32	122.50	.26	.00	.00	.78	.37
141	32	28	33.25	.06	.00	.00	.21	.03
143	32	24	19.25	.00	.00	.00	.12	.01
145	24	28	36.75	.06	.00	.00	.23	.04
147	20	36	1239.77	9.52	.00	.00	7.91	27.20
149	16	40	722.69	12.01	.00	.00	4.61	10.01
153	40	44	1058.44	6.09	.00	.00	6.76	20.29
157	44	48	-732.55	-6.16	.00	.00	-4.68	-10.27
161	36	40	405.76	2.23	.00	.00	2.59	3.44
165	36	44	764.01	8.32	.00	.00	4.88	11.10
169	22	48	802.55	12.76	.00	.00	5.12	12.16
173	200	22	1733.60	15.46	.00	.00	4.92	7.03
177	0	200	1733.60	.07	.00	.00	4.92	7.03

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
2	14.00	1248.90	1080.00	73.19
4	14.00	1247.86	1055.00	83.57
8	112.00	1247.79	1080.00	72.71
12	14.00	1247.02	1060.00	81.04
16	14.00	1203.65	875.00	142.42
20	14.00	1203.39	900.00	131.47
22	14.00	1204.47	925.00	121.11
24	14.00	1203.39	900.00	131.47
28	70.00	1203.33	925.00	120.61
32	70.00	1203.39	900.00	131.47
36	70.00	1193.87	890.00	131.68
40	70.00	1191.64	900.00	126.38
44	2555.00	1185.55	905.00	121.57
48	70.00	1191.71	915.00	119.91
200	.00	1219.93	1100.00	51.97

MAXIMUM PRESSURES

16	14.00	1203.65	875.00	142.42
36	70.00	1193.87	890.00	131.68
20	14.00	1203.39	900.00	131.47
32	70.00	1203.39	900.00	131.47
24	14.00	1203.39	900.00	131.47

MINIMUM PRESSURES

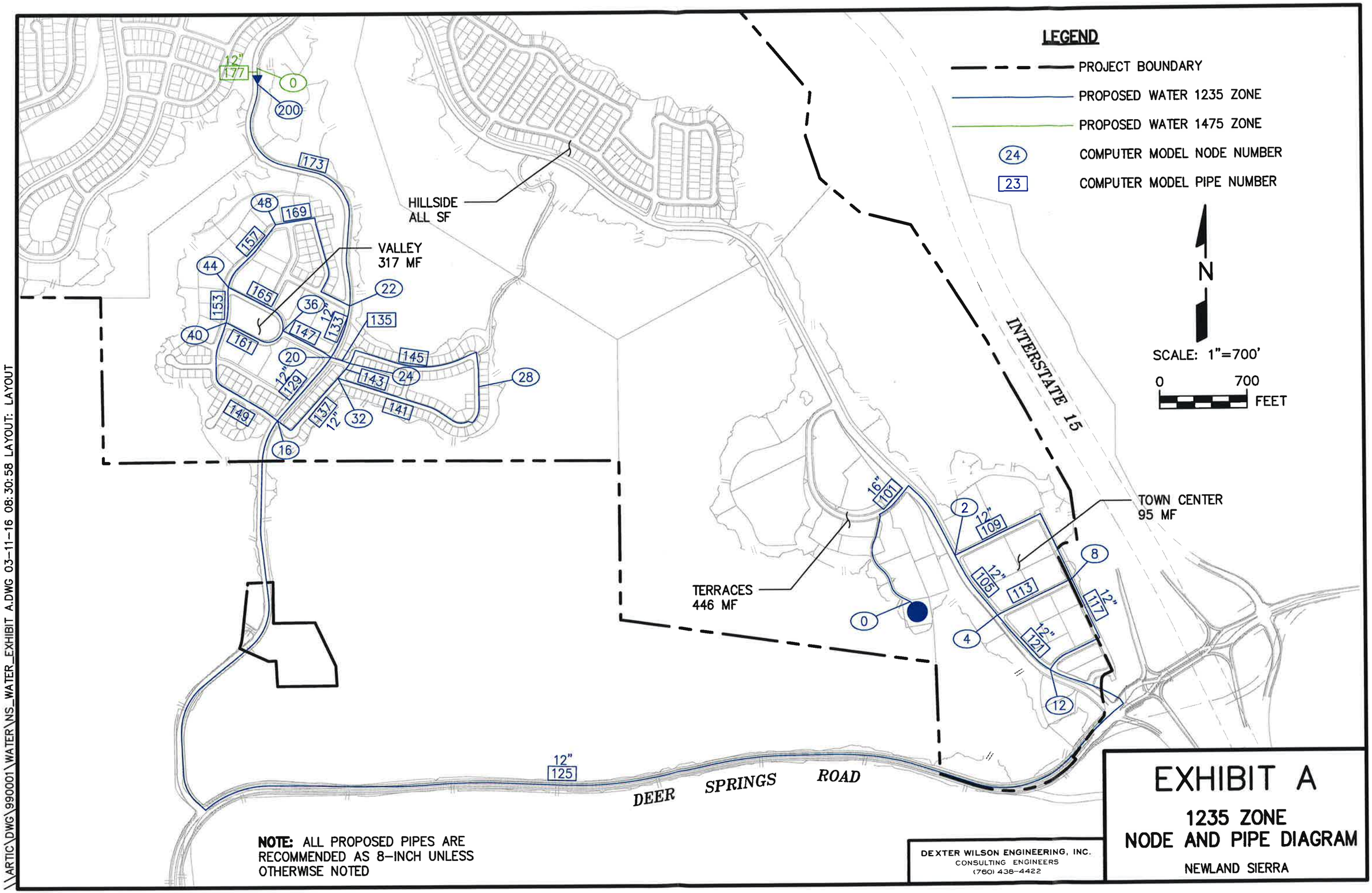
200	.00	1219.93	1100.00	51.97
8	112.00	1247.79	1080.00	72.71
2	14.00	1248.90	1080.00	73.19
12	14.00	1247.02	1060.00	81.04
4	14.00	1247.86	1055.00	83.57

THE NET SYSTEM DEMAND = 3115.00

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

PIPE NUMBER	FLOWRATE
101	1381.40
177	1733.60

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 3115.00
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = .00



NOTE: ALL PROPOSED PIPES ARE RECOMMENDED AS 8-INCH UNLESS OTHERWISE NOTED

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

EXHIBIT A

1235 ZONE NODE AND PIPE DIAGRAM

NEWLAND SIERRA

\\ARTIC\DWG\990001\WATER\NS_WATER_EXHIBIT A.DWG 03-11-16 08:30:58 LAYOUT: LAYOUT

APPENDIX C

1608/1475 ZONE COMPUTER MODELING OUTPUT

The following conditions were modeled:

1. Average day demand
2. Peak hour demand
3. Maximum day demand plus 1500 gpm fire flow at node 8
4. Maximum day demand plus 1500 gpm fire flow at node 24
5. Maximum day demand plus 2500 gpm fire flow at node 152
6. Maximum day demand plus 2500 gpm fire flow at node 128

FLOWRATE IS EXPRESSED IN GPM AND PRESSURE IN PSIG

A SUMMARY OF THE ORIGINAL DATA FOLLOWS

THERE IS A PRV AT JUNCTION 36 FOR LINE 501 SET AT A GRADE OF 1475.00
THERE IS A PRV AT JUNCTION 40 FOR LINE 527 SET AT A GRADE OF 1475.00

PIPE NO.	NODE NOS.		LENGTH (FEET)	DIAMETER (INCHES)	ROUGHNESS	MINOR LOSS K	FIXED GRADE
401	0	4	800.0	16.0	130.0	.00	1628.00
403	4	8	1550.0	8.0	130.0	.00	
405	8	12	2100.0	8.0	130.0	.00	
409	16	12	500.0	16.0	130.0	.00	
413	4	10	800.0	16.0	130.0	.00	
415	10	16	1000.0	16.0	130.0	.00	
417	16	20	500.0	8.0	130.0	.00	
421	20	24	1500.0	8.0	130.0	.00	
425	24	28	2100.0	8.0	130.0	.00	
429	20	24	1300.0	8.0	130.0	.00	
433	12	32	700.0	16.0	130.0	.00	
437	32	28	30.0	12.0	130.0	.00	
441	28	36	100.0	12.0	130.0	.00	
445	32	40	3400.0	16.0	130.0	.00	
501	36	100	200.0	12.0	130.0	.00	
503	100	104	400.0	12.0	130.0	.00	
505	104	108	900.0	12.0	130.0	.00	
509	108	112	1800.0	12.0	130.0	.00	
513	112	116	1450.0	12.0	130.0	.00	
517	116	120	2100.0	12.0	130.0	.00	
521	120	124	900.0	12.0	130.0	.00	
525	120	128	1100.0	12.0	130.0	.00	
527	40	112	20.0	16.0	130.0	.00	
529	124	128	900.0	12.0	130.0	.00	
533	100	132	1000.0	8.0	130.0	.00	
537	132	140	1700.0	8.0	130.0	.00	
541	136	140	2300.0	8.0	130.0	.00	
545	104	136	1050.0	8.0	130.0	.00	
549	108	136	1900.0	8.0	130.0	.00	
551	104	152	1500.0	8.0	130.0	.00	
553	108	144	200.0	12.0	130.0	.00	
555	152	156	800.0	8.0	130.0	.00	
557	144	152	1000.0	12.0	130.0	.00	
563	148	156	2800.0	8.0	130.0	.00	
567	148	156	800.0	8.0	130.0	.00	
571	112	160	200.0	8.0	130.0	.00	
573	116	168	200.0	8.0	130.0	.00	
575	160	164	650.0	8.0	130.0	.00	
579	160	164	1750.0	8.0	130.0	.00	
583	160	168	1400.0	8.0	130.0	.00	
587	164	172	1600.0	8.0	130.0	.00	

591	168	172	250.0	8.0	130.0	.00
595	172	176	800.0	8.0	130.0	.00
599	168	176	1500.0	8.0	130.0	.00

JUNCTION NUMBER	DEMAND	ELEVATION	CONNECTING PIPES			
4	16.00	1465.00	401	403	413	
8	35.00	1495.00	403	405		
10	14.00	1420.00	413	415		
12	35.00	1450.00	405	409	433	
16	35.00	1425.00	409	415	417	
20	36.00	1380.00	417	421	429	
24	36.00	1400.00	421	425	429	
28	13.00	1315.00	425	437	441	
32	.00	1315.00	433	437	445	
36	.00	1310.00	441	501		
40	.00	1275.00	445	527		
100	7.00	1285.00	501	503	533	
104	7.00	1270.00	503	505	545	551
108	7.00	1250.00	505	509	549	553
112	7.00	1265.00	509	513	527	571
116	7.00	1300.00	513	517	573	
120	7.00	1260.00	517	521	525	
124	47.00	1185.00	521	529		
128	47.00	1300.00	525	529		
132	38.00	1230.00	533	537		
136	38.00	1225.00	541	545	549	
140	38.00	1175.00	537	541		
144	34.00	1260.00	553	557		
148	34.00	1275.00	563	567		
152	34.00	1280.00	551	555	557	
156	34.00	1290.00	555	563	567	
160	20.00	1270.00	571	575	579	583
164	20.00	1275.00	575	579	587	
168	20.00	1300.00	573	583	591	599
172	20.00	1295.00	587	591	595	
176	20.00	1300.00	595	599		

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

THIS SYSTEM HAS MULTIPLE SUPPLY ZONES

ZONE NO. 1 IS SUPPLIED THROUGH THESE PIPES:
501
527

THIS SYSTEM HAS 44 PIPES WITH 31 JUNCTIONS , 12 LOOPS AND 3 FGNS

THE RESULTS ARE OBTAINED AFTER 6 TRIALS WITH AN ACCURACY = .00315

AVERAGE DAY DEMAND

PIPE NO.	NODE NOS.		FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
401	0	4	706.00	.26	.00	.00	1.13	.33
403	4	8	89.55	.32	.00	.00	.57	.21
405	8	12	54.55	.18	.00	.00	.35	.08
409	16	12	456.87	.07	.00	.00	.73	.15
413	4	10	600.45	.19	.00	.00	.96	.24
415	10	16	586.45	.23	.00	.00	.94	.23
417	16	20	94.58	.12	.00	.00	.60	.23
421	20	24	28.16	.04	.00	.00	.18	.02
425	24	28	22.58	.03	.00	.00	.14	.02
429	20	24	30.42	.04	.00	.00	.19	.03
433	12	32	476.42	.11	.00	.00	.76	.16
437	32	28	173.82	.00	.00	.00	.49	.10
441	28	36	183.40	.01	.00	.00	.52	.11
445	32	40	302.60	.23	.00	.00	.48	.07
501	0	100	183.40	.02	.00	.00	.52	.11
503	100	104	122.20	.02	.00	.00	.35	.05
505	104	108	50.29	.01	.00	.00	.14	.01
509	108	112	-87.60	-.05	.00	.00	-.25	-.03
513	112	116	120.16	.07	.00	.00	.34	.05
517	116	120	101.00	.08	.00	.00	.29	.04
521	120	124	49.49	.01	.00	.00	.14	.01
525	120	128	44.51	.01	.00	.00	.13	.01
527	0	112	302.60	.00	.00	.00	.48	.07
529	124	128	2.49	.00	.00	.00	.01	.00
533	100	132	54.20	.08	.00	.00	.35	.08
537	132	140	16.20	.02	.00	.00	.10	.01
541	136	140	21.80	.04	.00	.00	.14	.02
545	104	136	36.53	.04	.00	.00	.23	.04
549	108	136	23.27	.03	.00	.00	.15	.02
551	104	152	28.38	.04	.00	.00	.18	.02
553	108	144	107.62	.01	.00	.00	.31	.04
555	152	156	68.00	.10	.00	.00	.43	.13
557	144	152	73.62	.02	.00	.00	.21	.02
563	148	156	-11.53	-.01	.00	.00	-.07	.00
567	148	156	-22.47	-.01	.00	.00	-.14	-.02
571	112	160	87.84	.04	.00	.00	.56	.20
573	116	168	12.16	.00	.00	.00	.08	.01
575	160	164	25.33	.01	.00	.00	.16	.02
579	160	164	14.84	.01	.00	.00	.09	.01
583	160	168	27.66	.03	.00	.00	.18	.02
587	164	172	20.17	.02	.00	.00	.13	.01
591	168	172	10.80	.00	.00	.00	.07	.00
595	172	176	10.98	.00	.00	.00	.07	.00
599	168	176	9.02	.00	.00	.00	.06	.00

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
4	16.00	1627.74	1465.00	70.52
8	35.00	1627.41	1495.00	57.38
10	14.00	1627.54	1420.00	89.94
12	35.00	1627.24	1450.00	76.80
16	35.00	1627.31	1425.00	87.67
20	36.00	1627.19	1380.00	107.12

24	36.00	1627.16	1400.00	98.44
28	13.00	1627.12	1315.00	135.25
32	.00	1627.13	1315.00	135.26
36	.00	1627.11	1310.00	137.42
40	.00	1626.89	1275.00	152.49
100	7.00	1474.98	1285.00	82.32
104	7.00	1474.96	1270.00	88.81
108	7.00	1474.95	1250.00	97.48
112	7.00	1475.00	1265.00	91.00
116	7.00	1474.93	1300.00	75.80
120	7.00	1474.85	1260.00	93.10
124	47.00	1474.84	1185.00	125.60
128	47.00	1474.84	1300.00	75.76
132	38.00	1474.90	1230.00	106.12
136	38.00	1474.92	1225.00	108.30
140	38.00	1474.88	1175.00	129.95
144	34.00	1474.94	1260.00	93.14
148	34.00	1474.81	1275.00	86.58
152	34.00	1474.92	1280.00	84.47
156	34.00	1474.82	1290.00	80.09
160	20.00	1474.96	1270.00	88.82
164	20.00	1474.95	1275.00	86.64
168	20.00	1474.92	1300.00	75.80
172	20.00	1474.92	1295.00	77.97
176	20.00	1474.92	1300.00	75.80

MAXIMUM PRESSURES

40	.00	1626.89	1275.00	152.49
36	.00	1627.11	1310.00	137.42
32	.00	1627.13	1315.00	135.26
28	13.00	1627.12	1315.00	135.25
140	38.00	1474.88	1175.00	129.95

MINIMUM PRESSURES

8	35.00	1627.41	1495.00	57.38
4	16.00	1627.74	1465.00	70.52
128	47.00	1474.84	1300.00	75.76
176	20.00	1474.92	1300.00	75.80
168	20.00	1474.92	1300.00	75.80

THE NET SYSTEM DEMAND = 706.00

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

PIPE NUMBER	FLOWRATE
401	706.00

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 706.00
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = .00

A SUMMARY OF CONDITIONS SPECIFIED FOR THE NEXT SIMULATION FOLLOWS

THE DEMANDS ARE CHANGED FROM ORIGINAL VALUES BY A FACTOR = 4.90

THE RESULTS ARE OBTAINED AFTER 2 TRIALS WITH AN ACCURACY = .00002

PEAK HOUR DEMAND

PIPE NO.	NODE NOS.		FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
401	0	4	3459.40	4.98	.00	.00	5.52	6.22
403	4	8	438.77	6.16	.00	.00	2.80	3.97
405	8	12	267.27	3.33	.00	.00	1.71	1.59
409	16	12	2238.69	1.39	.00	.00	3.57	2.78
413	4	10	2942.23	3.69	.00	.00	4.69	4.61
415	10	16	2873.63	4.41	.00	.00	4.59	4.41
417	16	20	463.44	2.20	.00	.00	2.96	4.40
421	20	24	137.98	.70	.00	.00	.88	.47
425	24	28	110.64	.65	.00	.00	.71	.31
429	20	24	149.06	.70	.00	.00	.95	.54
433	12	32	2334.46	2.10	.00	.00	3.72	3.00
437	32	28	851.73	.06	.00	.00	2.42	1.88
441	28	36	898.67	.21	.00	.00	2.55	2.08
445	32	40	1482.73	4.41	.00	.00	2.37	1.30
501	0	100	898.67	.42	.00	.00	2.55	2.08
503	100	104	598.78	.39	.00	.00	1.70	.98
505	104	108	246.44	.17	.00	.00	.70	.19
509	108	112	-429.23	-.95	.00	.00	-1.22	-.53
513	112	116	588.80	1.38	.00	.00	1.67	.95
517	116	120	494.90	1.45	.00	.00	1.40	.69
521	120	124	242.52	.17	.00	.00	.69	.18
525	120	128	218.08	.17	.00	.00	.62	.15
527	0	112	1482.73	.03	.00	.00	2.37	1.30
529	124	128	12.22	.00	.00	.00	.03	.00
533	100	132	265.58	1.57	.00	.00	1.70	1.57
537	132	140	79.38	.28	.00	.00	.51	.17
541	136	140	106.82	.67	.00	.00	.68	.29
545	104	136	179.00	.79	.00	.00	1.14	.76
549	108	136	114.02	.62	.00	.00	.73	.33
551	104	152	139.04	.71	.00	.00	.89	.47
553	108	144	527.36	.16	.00	.00	1.50	.78
555	152	156	333.20	1.91	.00	.00	2.13	2.39
557	144	152	360.76	.38	.00	.00	1.02	.38
563	148	156	-56.15	-.25	.00	.00	-.36	-.09
567	148	156	-110.45	-.25	.00	.00	-.70	-.31
571	112	160	430.40	.77	.00	.00	2.75	3.83
573	116	168	59.60	.02	.00	.00	.38	.10
575	160	164	124.13	.25	.00	.00	.79	.38
579	160	164	72.72	.25	.00	.00	.46	.14
583	160	168	135.55	.63	.00	.00	.87	.45
587	164	172	98.85	.40	.00	.00	.63	.25
591	168	172	52.94	.02	.00	.00	.34	.08
595	172	176	53.79	.07	.00	.00	.34	.08
599	168	176	44.21	.08	.00	.00	.28	.06

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
4	78.40	1623.02	1465.00	68.48
8	171.50	1616.86	1495.00	52.81

10	68.60	1619.33	1420.00	86.38
12	171.50	1613.53	1450.00	70.86
16	171.50	1614.92	1425.00	82.30
20	176.40	1612.72	1380.00	100.85
24	176.40	1612.02	1400.00	91.88
28	63.70	1611.37	1315.00	128.43
32	.00	1611.43	1315.00	128.45
36	.00	1611.17	1310.00	130.51
40	.00	1607.03	1275.00	143.88
100	34.30	1474.58	1285.00	82.15
104	34.30	1474.19	1270.00	88.48
108	34.30	1474.02	1250.00	97.08
112	34.30	1474.97	1265.00	90.99
116	34.30	1473.60	1300.00	75.22
120	34.30	1472.15	1260.00	91.93
124	230.30	1471.98	1185.00	124.36
128	230.30	1471.98	1300.00	74.53
132	186.20	1473.02	1230.00	105.31
136	186.20	1473.40	1225.00	107.64
140	186.20	1472.73	1175.00	129.02
144	166.60	1473.87	1260.00	92.68
148	166.60	1471.33	1275.00	85.07
152	166.60	1473.48	1280.00	83.84
156	166.60	1471.57	1290.00	78.68
160	98.00	1474.21	1270.00	88.49
164	98.00	1473.96	1275.00	86.22
168	98.00	1473.58	1300.00	75.22
172	98.00	1473.56	1295.00	77.37
176	98.00	1473.49	1300.00	75.18

MAXIMUM PRESSURES

40	.00	1607.03	1275.00	143.88
36	.00	1611.17	1310.00	130.51
140	186.20	1472.73	1175.00	129.02
32	.00	1611.43	1315.00	128.45
28	63.70	1611.37	1315.00	128.43

MINIMUM PRESSURES

8	171.50	1616.86	1495.00	52.81
4	78.40	1623.02	1465.00	68.48
12	171.50	1613.53	1450.00	70.86
128	230.30	1471.98	1300.00	74.53
176	98.00	1473.49	1300.00	75.18

THE NET SYSTEM DEMAND = 3459.40

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

PIPE NUMBER	FLOWRATE
401	3459.40

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 3459.40
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 = 2.60

THE FOLLOWING SPECIFIC DEMAND CHANGES ARE MADE :

JUNCTION NUMBER	DEMAND
8	1590.00

THE RESULTS ARE OBTAINED AFTER 3 TRIALS WITH AN ACCURACY = .00032

MAXIMUM DAY DEMAND PLUS 1500 GPM FIRE FLOW AT NODE 8

PIPE NO.	NODE NOS.		FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
401	0	4	3334.60	4.65	.00	.00	5.32	5.81
403	4	8	925.56	24.54	.00	.00	5.91	15.83
405	8	12	-664.44	-17.99	.00	.00	-4.24	-8.57
409	16	12	1956.62	1.08	.00	.00	3.12	2.17
413	4	10	2367.44	2.47	.00	.00	3.78	3.08
415	10	16	2331.04	2.99	.00	.00	3.72	2.99
417	16	20	283.42	.88	.00	.00	1.81	1.77
421	20	24	91.25	.33	.00	.00	.58	.22
425	24	28	96.22	.50	.00	.00	.61	.24
429	20	24	98.58	.33	.00	.00	.63	.25
433	12	32	1201.18	.61	.00	.00	1.92	.88
437	32	28	414.42	.01	.00	.00	1.18	.50
441	28	36	476.84	.06	.00	.00	1.35	.64
445	32	40	786.76	1.36	.00	.00	1.26	.40
501	0	100	476.84	.13	.00	.00	1.35	.64
503	100	104	317.72	.12	.00	.00	.90	.30
505	104	108	130.77	.05	.00	.00	.37	.06
509	108	112	-227.76	-.29	.00	.00	-.65	-.16
513	112	116	312.42	.43	.00	.00	.89	.29
517	116	120	262.60	.45	.00	.00	.74	.21
521	120	124	128.68	.05	.00	.00	.37	.06
525	120	128	115.72	.05	.00	.00	.33	.05
527	0	112	786.76	.01	.00	.00	1.26	.40
529	124	128	6.48	.00	.00	.00	.02	.00
533	100	132	140.92	.48	.00	.00	.90	.48
537	132	140	42.12	.09	.00	.00	.27	.05
541	136	140	56.68	.21	.00	.00	.36	.09
545	104	136	94.98	.25	.00	.00	.61	.23
549	108	136	60.50	.19	.00	.00	.39	.10
551	104	152	73.78	.22	.00	.00	.47	.15
553	108	144	279.82	.05	.00	.00	.79	.24
555	152	156	176.80	.59	.00	.00	1.13	.74
557	144	152	191.42	.12	.00	.00	.54	.12
563	148	156	-29.80	-.08	.00	.00	-.19	-.03
567	148	156	-58.60	-.08	.00	.00	-.37	-.10
571	112	160	228.38	.24	.00	.00	1.46	1.19
573	116	168	31.62	.01	.00	.00	.20	.03
575	160	164	65.87	.08	.00	.00	.42	.12
579	160	164	38.58	.08	.00	.00	.25	.04
583	160	168	71.93	.20	.00	.00	.46	.14
587	164	172	52.45	.12	.00	.00	.33	.08

591	168	172	28.09	.01	.00	.00	.18	.02
595	172	176	28.54	.02	.00	.00	.18	.03
599	168	176	23.46	.03	.00	.00	.15	.02

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
4	41.60	1623.35	1465.00	68.62
8	1590.00	1598.81	1495.00	44.99
10	36.40	1620.88	1420.00	87.05
12	91.00	1616.81	1450.00	72.28
16	91.00	1617.89	1425.00	83.59
20	93.60	1617.01	1380.00	102.70
24	93.60	1616.68	1400.00	93.89
28	33.80	1616.18	1315.00	130.51
32	.00	1616.19	1315.00	130.52
36	.00	1616.11	1310.00	132.65
40	.00	1614.83	1275.00	147.26
100	18.20	1474.87	1285.00	82.28
104	18.20	1474.75	1270.00	88.72
108	18.20	1474.70	1250.00	97.37
112	18.20	1474.99	1265.00	91.00
116	18.20	1474.57	1300.00	75.65
120	18.20	1474.12	1260.00	92.78
124	122.20	1474.07	1185.00	125.26
128	122.20	1474.07	1300.00	75.43
132	98.80	1474.39	1230.00	105.90
136	98.80	1474.50	1225.00	108.12
140	98.80	1474.30	1175.00	129.70
144	88.40	1474.65	1260.00	93.01
148	88.40	1473.86	1275.00	86.17
152	88.40	1474.53	1280.00	84.30
156	88.40	1473.94	1290.00	79.71
160	52.00	1474.75	1270.00	88.73
164	52.00	1474.68	1275.00	86.53
168	52.00	1474.56	1300.00	75.64
172	52.00	1474.55	1295.00	77.81
176	52.00	1474.53	1300.00	75.63
	MAXIMUM PRESSURES			
40	.00	1614.83	1275.00	147.26
36	.00	1616.11	1310.00	132.65
32	.00	1616.19	1315.00	130.52
28	33.80	1616.18	1315.00	130.51
140	98.80	1474.30	1175.00	129.70
	MINIMUM PRESSURES			
8	1590.00	1598.81	1495.00	44.99
4	41.60	1623.35	1465.00	68.62
12	91.00	1616.81	1450.00	72.28
128	122.20	1474.07	1300.00	75.43
176	52.00	1474.53	1300.00	75.63

THE NET SYSTEM DEMAND = 3334.60

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

PIPE NUMBER	FLOWRATE
401	3334.60

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 3334.60
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 = 2.60

THE FOLLOWING SPECIFIC DEMAND CHANGES ARE MADE :

JUNCTION NUMBER	DEMAND
24	1593.00

THE RESULTS ARE OBTAINED AFTER 4 TRIALS WITH AN ACCURACY = .00119

MAXIMUM DAY DEMAND PLUS 1500 GPM FIRE FLOW AT NODE 24

PIPE NO.	NODE NOS.		FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
401	0	4	3335.00	4.65	.00	.00	5.32	5.81
403	4	8	385.82	4.85	.00	.00	2.46	3.13
405	8	12	294.82	4.00	.00	.00	1.88	1.90
409	16	12	1698.23	.83	.00	.00	2.71	1.67
413	4	10	2907.58	3.61	.00	.00	4.64	4.51
415	10	16	2871.18	4.41	.00	.00	4.58	4.41
417	16	20	1081.96	10.57	.00	.00	6.91	21.14
421	20	24	475.10	6.91	.00	.00	3.03	4.60
425	24	28	-604.64	-15.11	.00	.00	-3.86	-7.19
429	20	24	513.26	6.91	.00	.00	3.28	5.31
433	12	32	1902.04	1.44	.00	.00	3.03	2.05
437	32	28	1115.29	.09	.00	.00	3.16	3.10
441	28	36	476.84	.06	.00	.00	1.35	.64
445	32	40	786.76	1.36	.00	.00	1.26	.40
501	0	100	476.84	.13	.00	.00	1.35	.64
503	100	104	317.72	.12	.00	.00	.90	.30
505	104	108	130.77	.05	.00	.00	.37	.06
509	108	112	-227.76	-.29	.00	.00	-.65	-.16
513	112	116	312.42	.43	.00	.00	.89	.29
517	116	120	262.60	.45	.00	.00	.74	.21
521	120	124	128.68	.05	.00	.00	.37	.06
525	120	128	115.72	.05	.00	.00	.33	.05
527	0	112	786.76	.01	.00	.00	1.26	.40
529	124	128	6.48	.00	.00	.00	.02	.00
533	100	132	140.92	.48	.00	.00	.90	.48
537	132	140	42.12	.09	.00	.00	.27	.05
541	136	140	56.68	.21	.00	.00	.36	.09
545	104	136	94.98	.25	.00	.00	.61	.23
549	108	136	60.50	.19	.00	.00	.39	.10
551	104	152	73.78	.22	.00	.00	.47	.15
553	108	144	279.82	.05	.00	.00	.79	.24
555	152	156	176.80	.59	.00	.00	1.13	.74
557	144	152	191.42	.12	.00	.00	.54	.12

563	148	156	-29.80	-.08	.00	.00	-.19	-.03
567	148	156	-58.60	-.08	.00	.00	-.37	-.10
571	112	160	228.38	.24	.00	.00	1.46	1.19
573	116	168	31.62	.01	.00	.00	.20	.03
575	160	164	65.87	.08	.00	.00	.42	.12
579	160	164	38.58	.08	.00	.00	.25	.04
583	160	168	71.93	.20	.00	.00	.46	.14
587	164	172	52.45	.12	.00	.00	.33	.08
591	168	172	28.09	.01	.00	.00	.18	.02
595	172	176	28.54	.02	.00	.00	.18	.03
599	168	176	23.46	.03	.00	.00	.15	.02

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
4	41.60	1623.35	1465.00	68.62
8	91.00	1618.50	1495.00	53.52
10	36.40	1619.74	1420.00	86.55
12	91.00	1614.50	1450.00	71.28
16	91.00	1615.34	1425.00	82.48
20	93.60	1604.77	1380.00	97.40
24	1593.00	1597.86	1400.00	85.74
28	33.80	1612.97	1315.00	129.12
32	.00	1613.06	1315.00	129.16
36	.00	1612.91	1310.00	131.26
40	.00	1611.70	1275.00	145.90
100	18.20	1474.87	1285.00	82.28
104	18.20	1474.75	1270.00	88.72
108	18.20	1474.70	1250.00	97.37
112	18.20	1474.99	1265.00	91.00
116	18.20	1474.57	1300.00	75.65
120	18.20	1474.12	1260.00	92.78
124	122.20	1474.07	1185.00	125.26
128	122.20	1474.07	1300.00	75.43
132	98.80	1474.39	1230.00	105.90
136	98.80	1474.50	1225.00	108.12
140	98.80	1474.30	1175.00	129.70
144	88.40	1474.65	1260.00	93.01
148	88.40	1473.86	1275.00	86.17
152	88.40	1474.53	1280.00	84.30
156	88.40	1473.94	1290.00	79.71
160	52.00	1474.75	1270.00	88.73
164	52.00	1474.68	1275.00	86.53
168	52.00	1474.56	1300.00	75.64
172	52.00	1474.55	1295.00	77.81
176	52.00	1474.53	1300.00	75.63
	MAXIMUM PRESSURES			
40	.00	1611.70	1275.00	145.90
36	.00	1612.91	1310.00	131.26
140	98.80	1474.30	1175.00	129.70
32	.00	1613.06	1315.00	129.16
28	33.80	1612.97	1315.00	129.12
	MINIMUM PRESSURES			
8	91.00	1618.50	1495.00	53.52
4	41.60	1623.35	1465.00	68.62
12	91.00	1614.50	1450.00	71.28
128	122.20	1474.07	1300.00	75.43

176	52.00	1474.53	1300.00	75.63

THE NET SYSTEM DEMAND = 3335.00

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

PIPE NUMBER	FLOWRATE
401	3335.00

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 3335.00
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = .00

A SUMMARY OF CONDITIONS SPECIFIED FOR THE NEXT SIMULATION FOLLOWS

THE DEMANDS ARE CHANGED FROM ORIGINAL VALUES BY A FACTOR = 2.60

THE FOLLOWING SPECIFIC DEMAND CHANGES ARE MADE :

JUNCTION NUMBER	DEMAND
152	2590.00

THE RESULTS ARE OBTAINED AFTER 4 TRIALS WITH AN ACCURACY = .00468

MAXIMUM DAY DEMAND PLUS 2500 GPM FIRE FLOW AT NODE 152

PIPE NO.	NODE NOS.		FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
401	0	4	4337.20	7.57	.00	.00	6.92	9.46
403	4	8	509.56	8.12	.00	.00	3.25	5.24
405	8	12	418.56	7.65	.00	.00	2.67	3.64
409	16	12	3181.65	2.66	.00	.00	5.08	5.33
413	4	10	3786.04	5.88	.00	.00	6.04	7.35
415	10	16	3749.64	7.22	.00	.00	5.98	7.22
417	16	20	476.98	2.32	.00	.00	3.04	4.64
421	20	24	184.29	1.20	.00	.00	1.18	.80
425	24	28	289.78	3.87	.00	.00	1.85	1.84
429	20	24	199.09	1.20	.00	.00	1.27	.92
433	12	32	3509.22	4.47	.00	.00	5.60	6.39
437	32	28	1761.82	.22	.00	.00	5.00	7.24
441	28	36	2017.80	.93	.00	.00	5.72	9.31
445	32	40	1747.40	5.97	.00	.00	2.79	1.76
501	0	100	2017.80	1.86	.00	.00	5.72	9.31
503	100	104	1719.75	2.77	.00	.00	4.88	6.92
505	104	108	850.03	1.69	.00	.00	2.41	1.88
509	108	112	-1188.40	-6.28	.00	.00	-3.37	-3.49
513	112	116	312.42	.43	.00	.00	.89	.29
517	116	120	262.60	.45	.00	.00	.74	.21
521	120	124	128.68	.05	.00	.00	.37	.06
525	120	128	115.72	.05	.00	.00	.33	.05
527	0	112	1747.40	.04	.00	.00	2.79	1.76
529	124	128	6.48	.00	.00	.00	.02	.00
533	100	132	279.85	1.73	.00	.00	1.79	1.73

537	132	140	181.05	1.31	.00	.00	1.16	.77
541	136	140	-82.25	-.41	.00	.00	-.52	-.18
545	104	136	164.82	.68	.00	.00	1.05	.65
549	108	136	-148.27	-1.01	.00	.00	-.95	-.53
551	104	152	686.70	13.66	.00	.00	4.38	9.11
553	108	144	2168.50	2.13	.00	.00	6.15	10.63
555	152	156	176.80	.59	.00	.00	1.13	.74
557	144	152	2080.10	9.85	.00	.00	5.90	9.85
563	148	156	-29.80	-.08	.00	.00	-.19	-.03
567	148	156	-58.60	-.08	.00	.00	-.37	-.10
571	112	160	228.38	.24	.00	.00	1.46	1.19
573	116	168	31.62	.01	.00	.00	.20	.03
575	160	164	65.87	.08	.00	.00	.42	.12
579	160	164	38.58	.08	.00	.00	.25	.04
583	160	168	71.93	.20	.00	.00	.46	.14
587	164	172	52.45	.12	.00	.00	.33	.08
591	168	172	28.09	.01	.00	.00	.18	.02
595	172	176	28.54	.02	.00	.00	.18	.03
599	168	176	23.46	.03	.00	.00	.15	.02

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
4	41.60	1620.43	1465.00	67.35
8	91.00	1612.31	1495.00	50.83
10	36.40	1614.55	1420.00	84.31
12	91.00	1604.66	1450.00	67.02
16	91.00	1607.33	1425.00	79.01
20	93.60	1605.01	1380.00	97.50
24	93.60	1603.81	1400.00	88.32
28	33.80	1599.98	1315.00	123.49
32	.00	1600.19	1315.00	123.58
36	.00	1599.04	1310.00	125.25
40	.00	1594.22	1275.00	138.33
100	18.20	1473.14	1285.00	81.53
104	18.20	1470.37	1270.00	86.83
108	18.20	1468.68	1250.00	94.76
112	18.20	1474.96	1265.00	90.98
116	18.20	1474.54	1300.00	75.63
120	18.20	1474.09	1260.00	92.77
124	122.20	1474.04	1185.00	125.25
128	122.20	1474.04	1300.00	75.42
132	98.80	1471.41	1230.00	104.61
136	98.80	1469.69	1225.00	106.03
140	98.80	1470.10	1175.00	127.88
144	88.40	1466.55	1260.00	89.51
148	88.40	1456.04	1275.00	78.45
152	2590.00	1456.71	1280.00	76.57
156	88.40	1456.12	1290.00	71.98
160	52.00	1474.73	1270.00	88.72
164	52.00	1474.65	1275.00	86.52
168	52.00	1474.53	1300.00	75.63
172	52.00	1474.53	1295.00	77.79
176	52.00	1474.51	1300.00	75.62

MAXIMUM PRESSURES

40	.00	1594.22	1275.00	138.33
140	98.80	1470.10	1175.00	127.88
36	.00	1599.04	1310.00	125.25

124	122.20	1474.04	1185.00	125.25
32	.00	1600.19	1315.00	123.58

MINIMUM PRESSURES

8	91.00	1612.31	1495.00	50.83
12	91.00	1604.66	1450.00	67.02
4	41.60	1620.43	1465.00	67.35
156	88.40	1456.12	1290.00	71.98
128	122.20	1474.04	1300.00	75.42

THE NET SYSTEM DEMAND = 4337.20

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

PIPE NUMBER	FLOWRATE
401	4337.20

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 4337.20
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 = 2.60

THE FOLLOWING SPECIFIC DEMAND CHANGES ARE MADE :

JUNCTION NUMBER	DEMAND
128	2620.00

THE RESULTS ARE OBTAINED AFTER 3 TRIALS WITH AN ACCURACY = .00115

MAXIMUM DAY DEMAND PLUS 2500 GPM FIRE FLOW AT NODE 128

PIPE NO.	NODE NOS.		FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
401	0	4	4333.40	7.55	.00	.00	6.91	9.44
403	4	8	509.27	8.12	.00	.00	3.25	5.24
405	8	12	418.27	7.64	.00	.00	2.67	3.64
409	16	12	3184.09	2.67	.00	.00	5.08	5.34
413	4	10	3782.53	5.87	.00	.00	6.04	7.34
415	10	16	3746.13	7.21	.00	.00	5.98	7.21
417	16	20	471.05	2.27	.00	.00	3.01	4.53
421	20	24	181.44	1.16	.00	.00	1.16	.77
425	24	28	283.85	3.72	.00	.00	1.81	1.77
429	20	24	196.01	1.16	.00	.00	1.25	.89
433	12	32	3511.35	4.48	.00	.00	5.60	6.40
437	32	28	251.76	.01	.00	.00	.71	.20
441	28	36	501.81	.07	.00	.00	1.42	.71
445	32	40	3259.59	18.95	.00	.00	5.20	5.57
501	0	100	501.81	.14	.00	.00	1.42	.71
503	100	104	341.44	.14	.00	.00	.97	.35
505	104	108	151.32	.07	.00	.00	.43	.08

509	108	112	-202.79	-.24	.00	.00	-.58	-.13
513	112	116	2010.80	13.41	.00	.00	5.70	9.25
517	116	120	2760.40	34.92	.00	.00	7.83	16.63
521	120	124	1223.68	3.32	.00	.00	3.47	3.69
525	120	128	1518.52	6.05	.00	.00	4.31	5.50
527	0	112	3259.59	.11	.00	.00	5.20	5.57
529	124	128	1101.48	2.73	.00	.00	3.12	3.03
533	100	132	142.17	.49	.00	.00	.91	.49
537	132	140	43.37	.09	.00	.00	.28	.05
541	136	140	55.43	.20	.00	.00	.35	.09
545	104	136	95.82	.25	.00	.00	.61	.24
549	108	136	58.41	.18	.00	.00	.37	.09
551	104	152	76.10	.23	.00	.00	.49	.15
553	108	144	277.50	.05	.00	.00	.79	.24
555	152	156	176.80	.59	.00	.00	1.13	.74
557	144	152	189.10	.12	.00	.00	.54	.12
563	148	156	-29.80	-.08	.00	.00	-.19	-.03
567	148	156	-58.60	-.08	.00	.00	-.37	-.10
571	112	160	1027.80	3.84	.00	.00	6.56	19.22
573	116	168	-767.80	-2.24	.00	.00	-4.90	-11.20
575	160	164	294.34	1.23	.00	.00	1.88	1.90
579	160	164	172.42	1.23	.00	.00	1.10	.70
583	160	168	509.04	7.32	.00	.00	3.25	5.23
587	164	172	414.76	5.73	.00	.00	2.65	3.58
591	168	172	-254.93	-.36	.00	.00	-1.63	-1.45
595	172	176	107.83	.24	.00	.00	.69	.30
599	168	176	-55.83	-.13	.00	.00	-.36	-.09

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
4	41.60	1620.45	1465.00	67.36
8	91.00	1612.33	1495.00	50.84
10	36.40	1614.57	1420.00	84.32
12	91.00	1604.70	1450.00	67.03
16	91.00	1607.36	1425.00	79.02
20	93.60	1605.10	1380.00	97.54
24	93.60	1603.94	1400.00	88.37
28	33.80	1600.21	1315.00	123.59
32	.00	1600.22	1315.00	123.59
36	.00	1600.14	1310.00	125.73
40	.00	1581.27	1275.00	132.72
100	18.20	1474.86	1285.00	82.27
104	18.20	1474.72	1270.00	88.71
108	18.20	1474.65	1250.00	97.35
112	18.20	1474.89	1265.00	90.95
116	18.20	1461.48	1300.00	69.98
120	18.20	1426.57	1260.00	72.18
124	122.20	1423.25	1185.00	103.24
128	2620.00	1420.52	1300.00	52.22
132	98.80	1474.37	1230.00	105.89
136	98.80	1474.47	1225.00	108.10
140	98.80	1474.27	1175.00	129.68
144	88.40	1474.60	1260.00	92.99
148	88.40	1473.82	1275.00	86.16
152	88.40	1474.49	1280.00	84.28
156	88.40	1473.90	1290.00	79.69
160	52.00	1471.04	1270.00	87.12
164	52.00	1469.81	1275.00	84.42

168	52.00	1463.72	1300.00	70.95
172	52.00	1464.08	1295.00	73.27
176	52.00	1463.85	1300.00	71.00

MAXIMUM PRESSURES

40	.00	1581.27	1275.00	132.72
140	98.80	1474.27	1175.00	129.68
36	.00	1600.14	1310.00	125.73
32	.00	1600.22	1315.00	123.59
28	33.80	1600.21	1315.00	123.59

MINIMUM PRESSURES

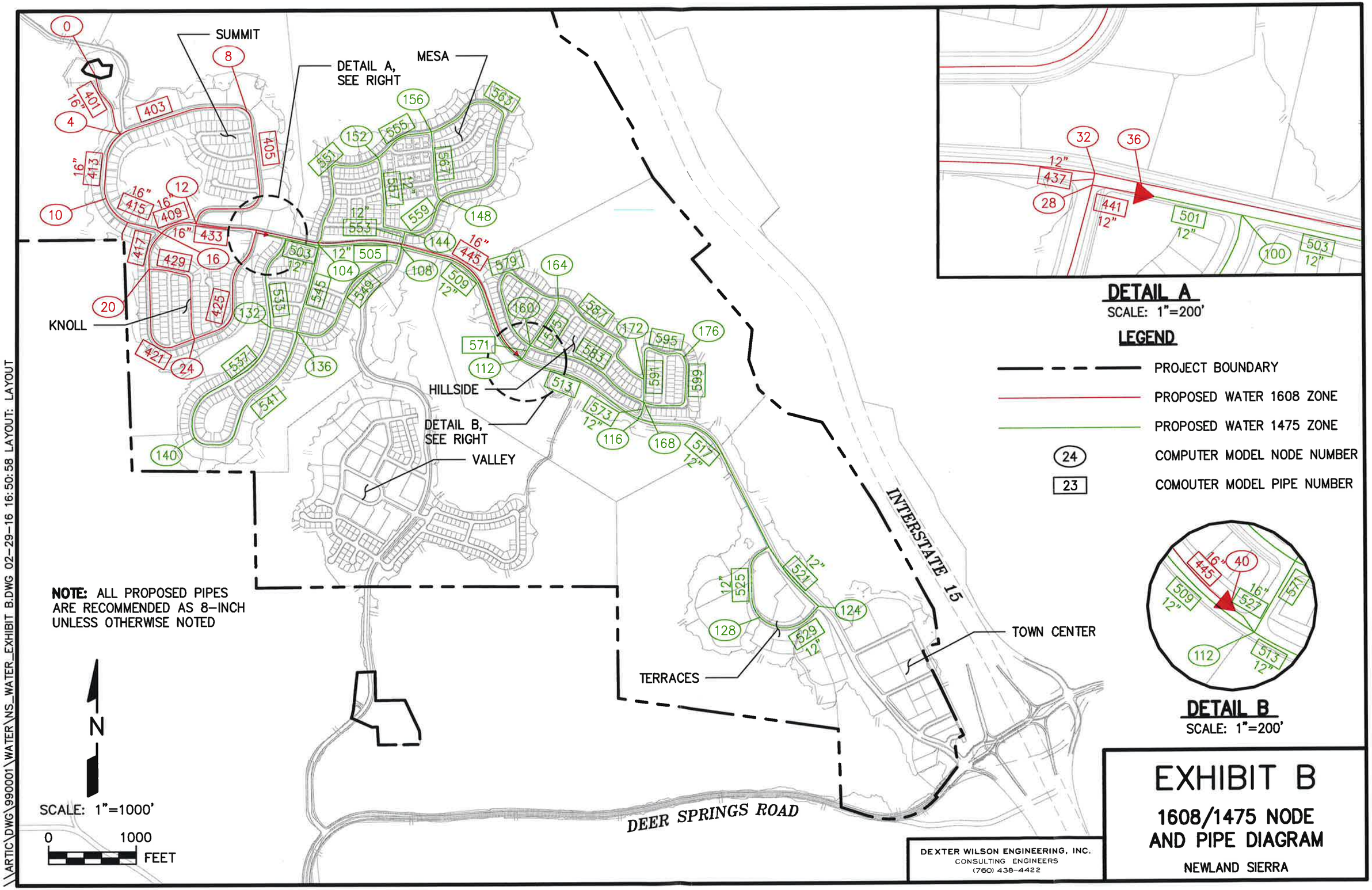
8	91.00	1612.33	1495.00	50.84
128	2620.00	1420.52	1300.00	52.22
12	91.00	1604.70	1450.00	67.03
4	41.60	1620.45	1465.00	67.36
116	18.20	1461.48	1300.00	69.98

THE NET SYSTEM DEMAND = 4333.40

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

PIPE NUMBER	FLOWRATE
401	4333.40

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 4333.40
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = .00



LEGEND

- PROJECT BOUNDARY
- PROPOSED WATER 1608 ZONE
- PROPOSED WATER 1475 ZONE
- (24) COMPUTER MODEL NODE NUMBER
- [23] COMOUTER MODEL PIPE NUMBER

EXHIBIT B

1608/1475 NODE AND PIPE DIAGRAM

NEWLAND SIERRA

DEXTER WILSON ENGINEERING, INC.
CONSULTING ENGINEERS
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