APPENDIX R

Water Study

DEXTER WILSON ENGINEERING, INC.

WATER • WASTEWATER • RECYCLED WATER

CONSULTING ENGINEERS

WATER STUDY
FOR THE
PALOMAR HEIGHTS PROJECT IN THE
CITY OF ESCONDIDO

May 21, 2020

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

WATER STUDY
FOR THE
PALOMAR HEIGHTS PROJECT IN THE
CITY OF ESCONDIDO

May 21, 2020

5-21-2020

Prepared by:
Dexter Wilson Engineering, Inc.
2234 Faraday Avenue
Carlsbad, CA 92008
760-438-4422

Job No. 930-012

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DEXTER WILSON ENGINEERING, INC.

DEXTER S. WILSON, P.E.
ANDREW M. OVEN, P.E.
STEPHEN M. NIELSEN, P.E.
NATALIE J. FRASCHETTI, P.E.
STEVEN J. HENDERSON, P.E.

May 21, 2020

930-012

Integral Communities
2235 Encinitas Blvd., Suite 216
Encinitas, CA 92024

Attention: Ninia Hammond, Project Manager

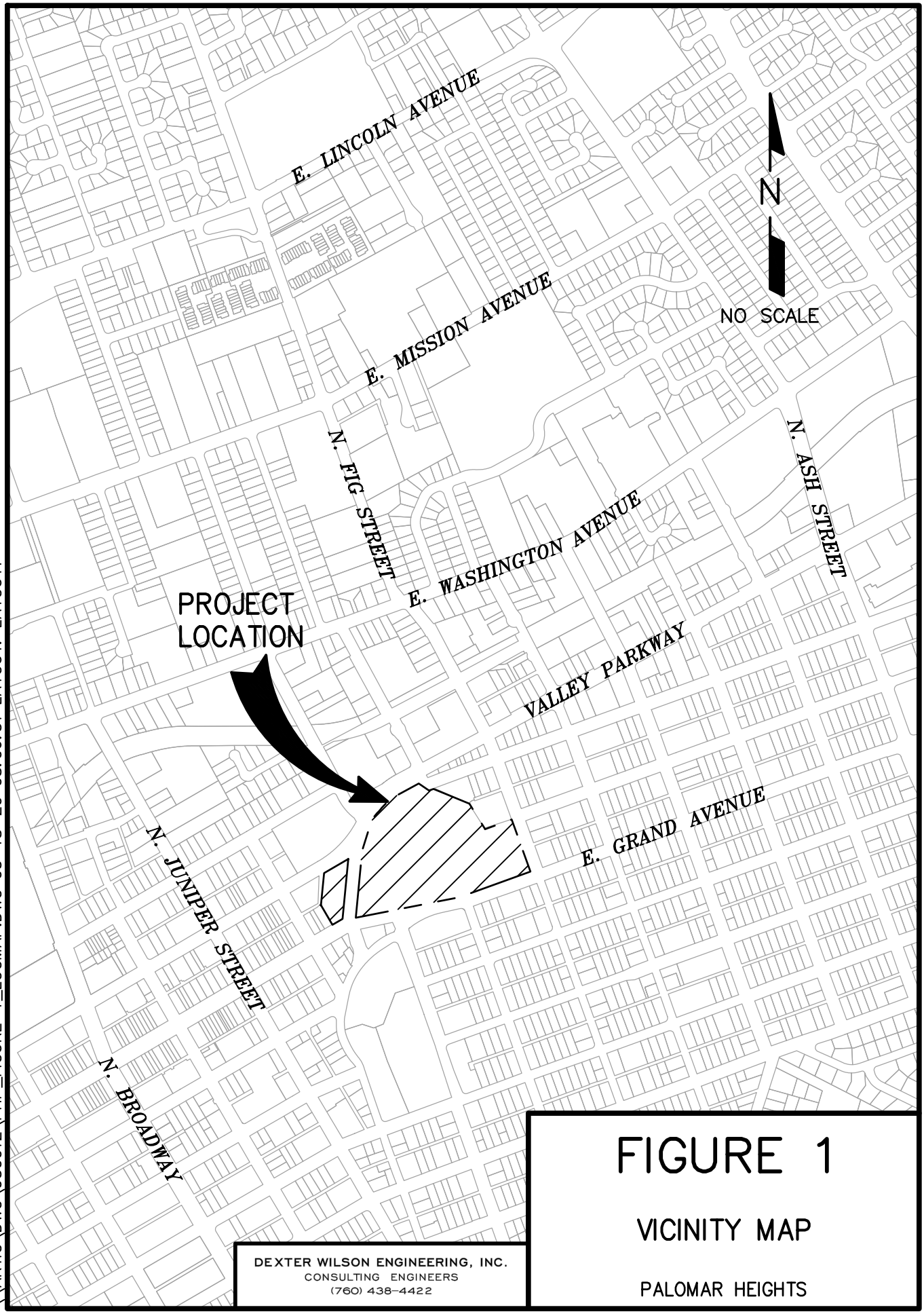
Subject: Water Study for the Palomar Heights Project in the City of Escondido

Introduction

The Palomar Heights project is located in the City of Escondido, south of Valley Parkway, north of East Grand Avenue, and west of Fig Street. Valley Boulevard traverses the project dividing the project into two separate areas. The western side, called the Senior Housing Building, currently encompasses office buildings and a parking lot. The eastern side, identified as the Main Residential Area, was formerly the location of the Palomar Health Downtown Campus. Access to the project will be from Valley Boulevard, Valley Parkway, and Grand Avenue. Figure 1 provides a vicinity map for the project.

The project encompasses approximately 13.8 acres and proposes to redevelop the sites with a total of 510 multi-family residential dwelling units including 90 senior apartments, 258 apartment units, 162 townhomes, 12,000 square feet of commercial space, and 4.71 acres of landscaped area.

The Senior Housing Building will include 90 senior homes and a 2,000 square feet cafe. The remaining development will be located in the Main Residential Area; the commercial components will be work space (3,000 SF), retail (2,000 SF), residents-only gym (2,000 SF), and a bar/restaurant (3,000 SF). Elevations on the project range from approximately 660 feet to 695 feet.



\\ARTIC\DWG\930012\PHP_FIGURE-1_LOCMAP.DWG 03-18-20 08:06:31 LAYOUT: LAYOUT1

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CONSULTING ENGINEERS
(760) 438-4422

FIGURE 1

VICINITY MAP

PALOMAR HEIGHTS

Historical Water Demands

The site for the Palomar Heights project was formerly the Palomar Medical Center and therefore the site has a historical water demand. The Palomar Medical Center was served by 4 water meters including two 2" by 6" compound meters, a 2" meter, and a 2" irrigation meter. The Palomar Heights project also includes the property at 624 E. Grand Avenue which was not a part of the hospital site and was served by a separate 3/4-inch meter.

The City of Escondido analyzed the historical usage of the existing Palomar Medical Center meters and equated the previous demand of the hospital to 348.54 multi-family dwelling units. With the addition of the property at 624 E. Grand, the total historical demand of the site equates to 349.03 multi- family dwelling units. At 300 gpd/DU for multi-family units the average daily demand of the site was 104,708 gpd or 72.71 gpm. Appendix A presents the background information from the City of Escondido supporting these values.

Proposed Water Demands

Water demands were developed in accordance with the City of Escondido Design Standards. Multi-family residential water demand is estimated based on a unit water demand of 300 gpd/DU. The commercial area water demand is estimated using a unit water demand of 2,300 gpd/acre-day. The landscaped area water demand is estimated using a unit water demand of 3,000 gal/acre-day. Table 1 presents the projected average potable water demand for the Palomar Heights project. Figure 2 presents the project's proposed layout.

TABLE 1
PALOMAR HEIGHTS PROJECT
AVERAGE POTABLE WATER DEMAND

Development Type	Net Area, ac	Dwelling Units	Water Demand	Average Water Demand, gpd
Multi-family Residential	5.3	510	300 gpd/EDU	153,000
Landscaped Area	4.71	-	3,000 gpd/acre	14,130
Commercial	0.28	-	2,300 gpd/acre	644
Private Drive and Parking	3.5	-	-	-
TOTAL	**13.8**	**510**	-	**167,774 (117 gpm)**

PALOMAR HEIGHTS

COLORED SITE PLAN EXHIBIT

ESCONDIDO
City of Choice

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

FIGURE 2

SITE LAND USE PLAN

PALOMAR HEIGHTS

From the City of Escondido Design Standards, the maximum day demand to average annual demand ratio is 1.8, resulting in an estimated maximum day demand of 301,993 gpd (210 gpm). The peak hour demand to maximum day demand ratio from the City of Escondido Design Standards is 2.7, resulting in an estimated peak hour demand of 815,382 gpd (566 gpm).

City of Escondido Design Criteria

The City of Escondido Design Standards were used to analyze the water system. A summary of the design criteria is presented as Table 2.

TABLE 2
CITY OF ESCONDIDO
WATER SYSTEM DESIGN CRITERIA

Criteria	Design Requirement
Maximum Desirable Static Pressure	110 psi
Minimum Pressure – Peak Hour	40 psi
Minimum Pressure – Max Day plus Fire	20 psi
Maximum Pipeline Head Loss per 1,000 feet	10 feet
Maximum Pipeline Velocity	10 fps

Fire Flow Requirements

The City of Escondido Design Standards were used for the fire flow analysis of the water system for the Palomar Heights project. The fire flow used for both multi-family residential areas and commercial areas is 2,500 gpm. This fire flow must be confirmed with the City of Escondido Fire Department during the review and approval of building plans for the Palomar Heights project.

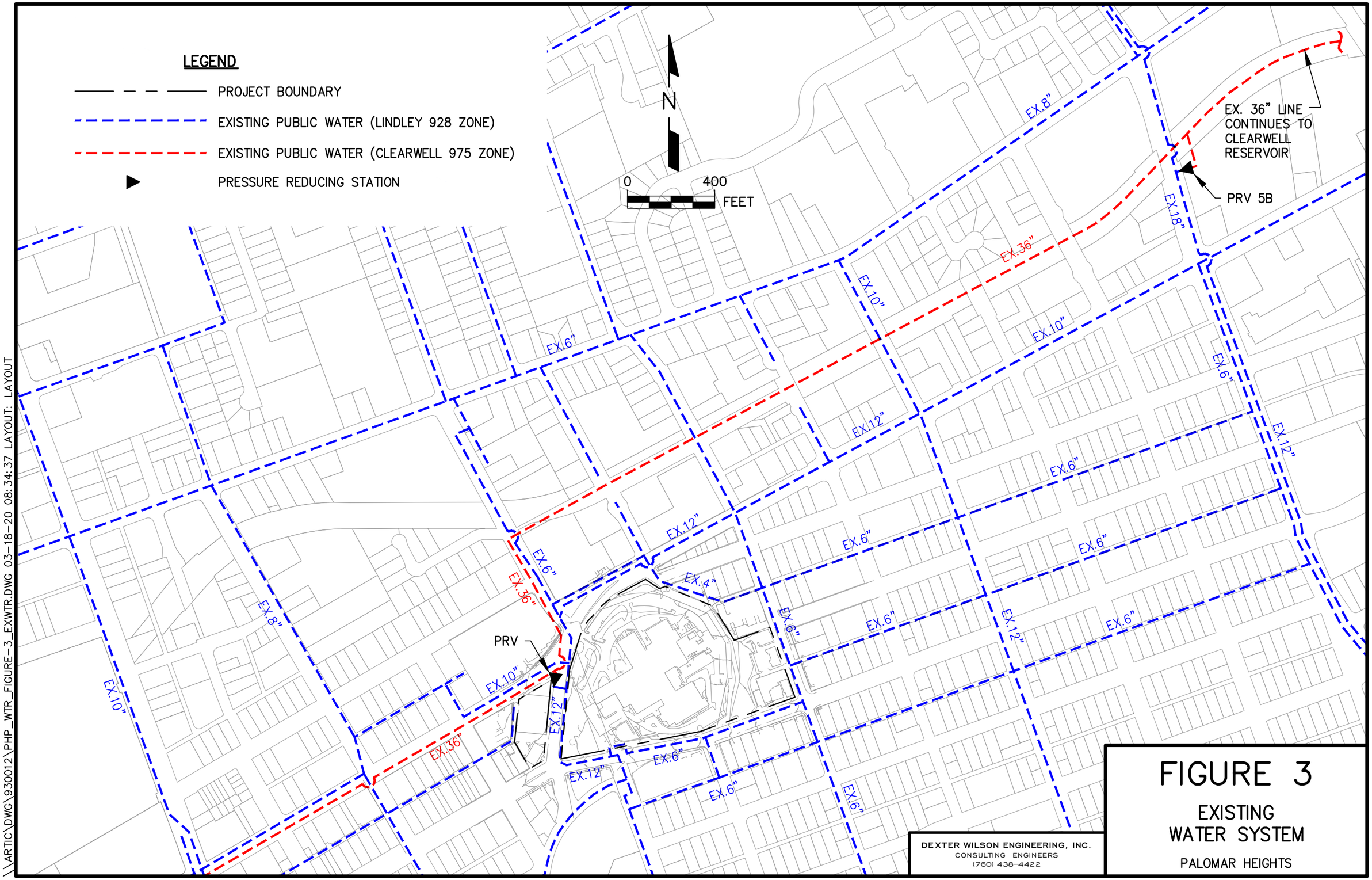
Existing Water System

The Palomar Heights project is within the City of Escondido's Lindley/A-11 Zone. Specifically, the project is within the Lindley Zone, but the Lindley and A-11 Zones are intertied and therefore combined in the City's 2012 Water Master Plan. The hydraulic grade of the Lindley Zone is 928 feet and the A-11 Zone is 930 feet. The Lindley Zone is mainly supplied by the Lindley Reservoir located off of Hubbard Avenue approximately 2 miles northwest of the project. The Lindley Reservoir has storage capacity of 2 MG and is supplied by the Clearwell Zone (HGL of 975) through Pressure Regulating Station 2 nearby the reservoir.

Backup supply for the portion of the Lindley Zone which the project is located in is supplied by Pressure Regulating Station 5B along the Clearwell Zone Channel Line. The Clearwell Zone Channel Line has a total of eight pressure reducing stations that provide primary and backup supply to the Lindley/A-11 Zone. Pressure Regulating Station 5B is located along North Ash Street, just south of the Escondido Creek approximately 1-mile northeast of the Palomar Heights project. The downstream pressure is typically set at 100 psi and the elevation of the station is approximately 672 feet, resulting in a hydraulic grade of 902 feet. Figure 3 shows the existing water facilities in the vicinity of the Palomar Heights project.

Proposed Water System

The proposed water system will consist of 12-inch public pipelines through the project. The project will also need to replace approximately 900 feet of 6-inch piping with 12-inch piping in Grand Avenue on the south side of the project. The proposed 12-inch water line improvement extends from the existing 12-inch water main in Grand Avenue at the intersection with South Hickory Street east to the intersection of Grand Avenue and Fig Street. There are two proposed connections to the existing City of Escondido public system, one to the 12-inch pipeline in Valley Parkway and another to the upsized 12-inch line in Grand Avenue. Figure 4 presents the proposed water system configuration and pipe sizes.



\\ARTIC\DWG\930012\PHP_WTR_FIGURE-3_EXWTR.DWG 03-18-20 08:34:37 LAYOUT: LAYOUT

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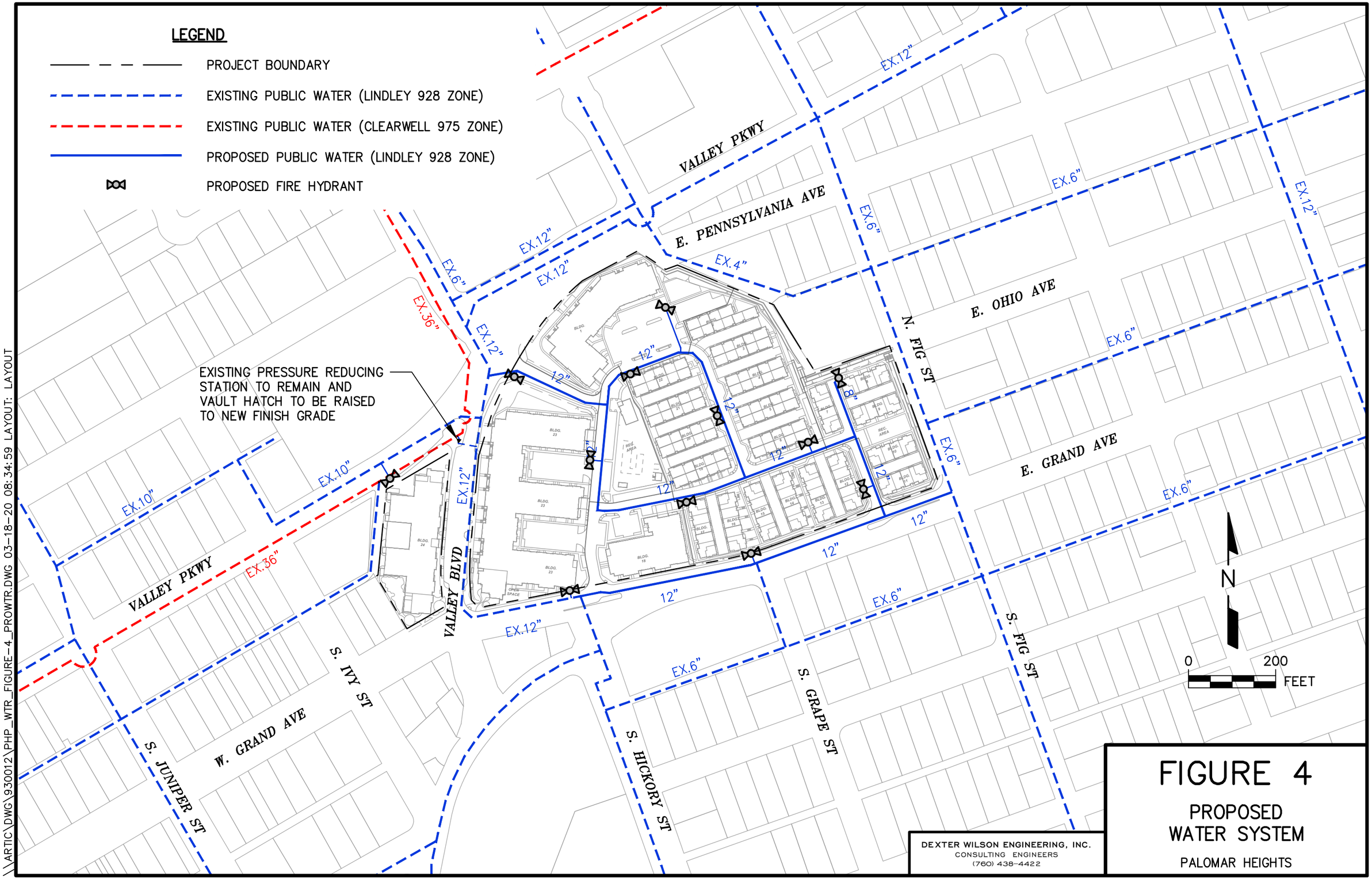
CONSULTING ENGINEERS
(760) 438-4422

FIGURE 3

EXISTING WATER SYSTEM

PALOMAR HEIGHTS



\\ARTIC\DWG\930012\PHP_WTR_FIGURE-4_PROWTR.DWG 03-18-20 08:34:59 LAYOUT: LAYOUT

FIGURE 4

PROPOSED WATER SYSTEM

PALOMAR HEIGHTS

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(760) 438-4422

Water System Analysis and Results

In order to analyze the proposed water system a hydraulic model of the system was created using KYPIPE computer software program developed by the University of Kentucky. The computer software was used to determine residual pressure throughout the water system and also uses the Hazen-Williams equation for determining head loss on pipes. Pipe lengths throughout the entire project were increased by 10% to simulate minor losses through pipe fittings. Exhibit A presents the Node and Pipe Diagram for the proposed water system. The exhibit's corresponding computer model results are presented in Appendix C.

As previously mentioned, the Palomar Heights project is located within the Lindley Zone which has a hydraulic grade line of 928 feet and is made up of an extensive grid pattern with considerable looping of mostly smaller diameter pipelines. The larger pipelines in North Ash Street and North Broadway between the Lindley Reservoir and the project were added to the model and it was assumed that the project will be served off these lines and the connection to Pressure Reducing Station 5B. The City of Escondido operations team verified that Pressure Reducing Station 5B is set at 100 psi. According to the 2012 Water Master Plan the total average day demand of the Lindley Zone is 5,927 gpm. This demand was distributed throughout the model to simulate the existing condition. The model was then verified against fire hydrant flow tests performed in 2016 and 2012 which reports are provided in Appendix B

The water system was sized based on flow, velocity, and pressure requirements for the proposed project. The 2,500 gpm fire flow requirement was modeled at a single hydrant within the Palomar Heights project. This fire flow was modeled with both of the project's connections open and with the northwestern connection to Valley Parkway closed. Under the second fire flow scenario all flow had to be supplied through the Grand Avenue connection.

Without upsizing the 6-inch piping in Grand Avenue during the second fire flow analysis with the Valley Parkway connection closed, the velocities within the vicinity of the project exceeded the maximum pipe velocity of 10 feet per second reaching as high as 17.6 feet per second. If the Palomar Heights project extends the 12-inch piping already in Grand Avenue to the project's southern connection these velocities decrease to within the allowed range and the water system has the added benefit of completing the 12-inch loop around Valley Parkway and Grand Avenue and through the project.

After the piping in Grand Avenue is upsized and with all of the pipes open, the fire flow requirement of 2,500 gpm is being met with a minimum residual pressure of 42 psi and a maximum velocity of 8.1 feet per second within the vicinity of the project. With the Valley Parkway connection closed, the fire flow requirement of 2,500 gpm is being met with a minimum residual pressure 40 psi and a maximum velocity of 9.3 feet per second within the vicinity of the project. Under each of these scenarios the fire flow requirement is being met with more than 20 psi of residual pressure and less than 10 feet per second pipe velocity.

Proposed Domestic Water Metering

The backbone water line through the Palomar Heights project will be part of the public water system. Connected to the public water line will be domestic meters serving the buildings. The location of the proposed domestic water meters is as depicted in Figure 5. The meters were sized based on the proposed layouts of each residence type or commercial use and an estimated water fixture unit count based on the 2016 California Plumbing Code.

The buildings were grouped based on the most efficient piping layout and meter use. The estimated number of fixture units for each meter was converted to demand based on Chart A 103.1 from the 2016 California Plumbing Code. The meters were sized based on this demand and the capacity standards set by AWWA C700 and C702. The project will be served by a total of 12 meters varying in size from 1-inch to 4-inch.

\\ARTIC\DWG\930012\PHP_WTR_FIGURE-5_PROWTRMETER.DWG 03-18-20 08:35:26 LAYOUT: LAYOUT

LEGEND

- PROJECT BOUNDARY
- EXISTING PUBLIC WATER (LINDLEY 928 ZONE)
- EXISTING PUBLIC WATER (CLEARWELL 975 ZONE)
- PROPOSED PUBLIC WATER (LINDLEY 928 ZONE)
- M — PROPOSED WATER METER
- PROPOSED FIRE HYDRANT

N

EXISTING PRESSURE REDUCING STATION TO REMAIN AND VAULT HATCH TO BE RAISED TO NEW FINISH GRADE

0 100 FEET

E. PENNSYLVANIA AVE

N. FIG ST

VALLEY PKWY

VALLEY BLVD

EX.12" EX.12" EX.4" EX.6" EX.12" EX.36" EX.10" EX.36" EX.12" EX.12" EX.6"

12" 12" 12" 12" 12" 12" 12" 12" 12" 12" 12" 12" 12"

1.5" 3" 1" 3" 3" 3" 1.5" 2" 2" 3" 4" 3" 2"

BLDG. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24

REC. AREA

OPEN SPACE

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

FIGURE 5

PROPOSED WATER METER LAYOUT

PALOMAR HEIGHTS

Conclusions and Recommendations

1. The Palomar Heights project will be served by the City of Escondido public water system.

2. The onsite public water system for the Palomar Heights project will connect in two locations. One connection will be made to the existing 12-inch in Valley Parkway and the other will be made to a new 12-inch water main in Grand Avenue.

3. To meet water system design criteria, the existing 6-inch water line in Grand Avenue must be replaced with a 12-inch water main from the South Hickory Street intersection east to the intersection of Grand Avenue and Fig Street.

4. The proposed water system layout and sizing of the Palomar Heights project as well as the proposed improvements in Grand Avenue are shown in Figure 4 of this report.

5. The proposed meter layout and sizing for the project is shown in Figure 5 of this report. The project will be served by a total of 12 domestic water meters varying in size from 1-inch to 4-inches.

6. This report presents the sizing and a general schematic layout of the proposed domestic water system. The design engineer for these systems should incorporate valves, fittings, and appurtenances as needed for proper installation and long-term operation of the water system in accordance with the design standards of the City of Escondido.

Thank you for the opportunity to assist you with the 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.

Andrew Oven, P.E.

AO:KH:ps

APPENDIX A

HISTORICAL WATER USE
FOR THE PALOMAR HOSPITAL SITE

Andrew Oven

From: Philip Tunnell <ptunnell@escondido.org>
Sent: Tuesday, April 17, 2018 4:55 PM
To: 'Ninia Hammond'
Cc: Andrew Oven; Stephanie U. Roman; Angela Morrow; LaVona D. Koretke
Subject: RE: Palomar Health

Hi Ninia,

I got the data for the meters serving the site and the results of the analysis are as follows:

Sewer:

- (using 200 gpd/EDU) Equivalent EDUs = 454.33

Water:

- (using 800 gpd/EDU ~ single family > 7,000 SF) Equivalent EDUs = 130.70
- (using 500 gpd/EDU ~ single family < 7,000 SF) Equivalent EDUs = 209.12
- (using 300 gpd/EDU ~ multi family) Equivalent EDUs = 348.54

Thank you,

Philip Tunnell, P.E.
Engineer II
Utilities
City of Escondido
(760) 839-6290 x.7040
ptunnell@escondido.org

From: Ninia Hammond [mailto:nhammond@integralcommunities.com]
Sent: Tuesday, April 17, 2018 1:09 PM
To: Philip Tunnell <ptunnell@escondido.org>
Cc: andrew@dwilsoneng.com; Stephanie U. Roman <sroman@escondido.org>; Angela Morrow <amorrow@escondido.org>; LaVona D. Koretke <lkoretke@escondido.org>
Subject: RE: Palomar Health

Hi Phillip,

I'm just checking in. We are rapidly approaching the end of our DD period and I would like this info to review with Dexter Wilson.

Thanks!

Ninia Hammond

(760) 944-7511 xt 105 office
(760) 814-7246 cell
2235 Encinitas Blvd., Suite 216
Encinitas, CA 92024

INTEGRAL
Communities
A DIVERSIFIED REAL ESTATE COMPANY

From: Philip Tunnell [mailto:ptunnell@escondido.org]
Sent: Monday, April 9, 2018 12:05 PM
To: Ninia Hammond <nhammond@integralcommunities.com>
Cc: andrew@dwilsoneng.com; Stephanie U. Roman <sroman@escondido.org>; Angela Morrow <amorrow@escondido.org>; LaVona D. Koretke <lkoretke@escondido.org>
Subject: RE: Palomar Health

Hi Ninia,

I just sent a follow up email to our Utility Billing department (I believe someone was out of the office and just got back), to get the historical data for the meter I don't have yet. Hopefully I'll get the data and assimilate it with the other numbers I already have soon.

Thank you,

Philip Tunnell, P.E.
Engineer II
Utilities
City of Escondido
(760) 839-6290 x.7040
ptunnell@escondido.org

From: Ninia Hammond [mailto:nhammond@integralcommunities.com]
Sent: Friday, April 6, 2018 12:57 PM
To: Philip Tunnell <ptunnell@escondido.org>
Cc: andrew@dwilsoneng.com; Stephanie U. Roman <sroman@escondido.org>; Angela Morrow <amorrow@escondido.org>; LaVona D. Koretke <lkoretke@escondido.org>
Subject: RE: Palomar Health

Hi Phillip,

Any update on the EDU conversion of the existing meters?

Thank you!

From: Philip Tunnell [mailto:ptunnell@escondido.org]
Sent: Monday, March 12, 2018 3:00 PM
To: Ninia Hammond <nhammond@integralcommunities.com>
Cc: andrew@dwilsoneng.com; Stephanie U. Roman <sroman@escondido.org>; Angela Morrow <amorrow@escondido.org>; LaVona D. Koretke <lkoretke@escondido.org>
Subject: RE: Palomar Health

Hi Ninia,

It was a pleasure meeting you and your team as well, to discuss the project last week. On the water side, there are two separate components that your question touches on. The first is assembling a baseline / EDU equivalent from the existing meters serving the main site to establish a basis for credits relating to the needs of your proposed development, which I am working on. I had assembled this credit basis for the meters I knew of, but it looks like there may be another meter or two that serve the main site that I am going to pull historical usage for, and incorporate into that overall credit basis. In regards to this credit number (for both water and sewer), I am currently only looking at the historical usage by the meters serving the main "teardrop" site, and am not currently analyzing any of the additional lots on the east or west sides of the site that may be acquired. These would be analyzed separately if they are added to the project.

The other issue you mentioned that is very important to your project is (estimated) required fireflow. This is determined by the Fire Department, and I've copied LaVona Koretke who (along with our fire Marshal Al Dobynes who you met at the meeting) will be making that determination. This is based on a number of aspects of your project design (# of stories, construction type, sprinklering, etc.), and Fire can fill you in on those particulars. Until you have a solid idea of your design parameters, the best they can probably give you is a worst case fireflow, which might be significantly higher than your true final result. This fireflow requirement will dictate if any existing mains need to be upsized to provide that, etc. Also, the required fire hydrant locations on site will factor into the water system design (possibly looping a main through the site from Grand to Valley). Let me know if I can answer any more questions while I work on the credit basis, and LaVona can more directly answer fireflow questions.

Thank you,

Philip Tunnell, P.E.
Engineer II
Utilities
City of Escondido
(760) 839-6290 x.7040
ptunnell@escondido.org

From: Ninia Hammond [mailto:nhammond@integralcommunities.com]
Sent: Monday, March 12, 2018 2:16 PM
To: Philip Tunnell <ptunnell@escondido.org>
Cc: andrew@dwilsoneng.com
Subject: Palomar Health

Good Afternoon Phillip,

Thank you for your time last week, it was a pleasure to meet you.

We are working with Andrew Oven of Dexter Wilson to review and provide due diligence on the water and sewer services for Palomar Health. When we met, you discussed converting the existing system capacity into an EDU equivalent. Is that something you will be able to do relatively quickly? We are anxious to understand the system flows, especially fire.

Please let us know if there is any information we can provide to you.

Thank you

Ninia Hammond
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(760) 814-7246 cell
2235 Encinitas Blvd., Suite 216
Encinitas, CA 92024

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Communities
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Andrew Oven

From: Laurie Gordon <lgordon@escondido.org>
Sent: Friday, August 23, 2019 1:34 PM
To: Ninia Hammond; LaVona D. Koretke
Cc: Andrew Oven
Subject: RE: [EXT] RE: Palomar Health
Attachments: Palomar Hospital Meter Readings.xlsx

Good afternoon Ninia,

I apologize for the delay. Attached please find the information you requested.

Regards,

Laurie Gordon
Engineer I
Utilities | Construction and Engineering
Direct: 760-839-6290 ext. 7040
www.escondido.org

From: Ninia Hammond <nhammond@integralcommunities.com>
Sent: Saturday, August 17, 2019 7:00 AM
To: Laurie Gordon <lgordon@escondido.org>; LaVona D. Koretke <lkoretke@escondido.org>
Cc: Andrew Oven <Andrew@dwilsoneng.com>
Subject: RE: [EXT] RE: Palomar Health

Good Morning,

I wondered if you were able to track down any additional information? Should we schedule a meeting for next week to discuss?

Thank you,
Ninia Hammond

From: Ninia Hammond
Sent: Monday, August 5, 2019 1:11 PM
To: 'Laurie Gordon' <lgordon@escondido.org>; LaVona D. Koretke <lkoretke@escondido.org>
Cc: Andrew Oven <Andrew@dwilsoneng.com>
Subject: RE: [EXT] RE: Palomar Health

Hi Laurie,

We are working on the redevelopment of the former Palomar Health hospital site downtown campus. We are preparing an EIR and a WSA as part of our technical studies. If you scroll down you will see that in April 2018 Phillip provided current usage data for the hospital site. We are trying to get backup information for that data to use in the Water Supply Assessment.

Ninia Hammond
(760) 944-7511 xt 105 office
(760) 814-7246 cell
2235 Encinitas Blvd., Suite 216
Encinitas, CA 92024

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Communities
A DIVERSIFIED REAL ESTATE COMPANY

From: Laurie Gordon [mailto:lgordon@escondido.org]
Sent: Monday, August 5, 2019 12:43 PM
To: Ninia Hammond <nhammond@integralcommunities.com>; LaVona D. Koretke <lkoretke@escondido.org>
Cc: Andrew Oven <Andrew@dwilsoneng.com>
Subject: RE: [EXT] RE: Palomar Health

Hi Ninia,

Philip no longer works for the City of Escondido. Can you give me more information as to what you are looking for?

Regards,

Laurie Gordon
Engineer I
Utilities | Construction and Engineering
Direct: 760-839-6290 ext. 7040
www.escondido.org

From: Adam Finestone <afinestone@escondido.org>
Sent: Friday, August 2, 2019 2:54 PM
To: Ninia Hammond <nhammond@integralcommunities.com>; LaVona D. Koretke <lkoretke@escondido.org>; Laurie

Gordon <lgordon@escondido.org>
Cc: Andrew Oven <Andrew@dwilsoneng.com>
Subject: RE: [EXT] RE: Palomar Health

Laurie, see below. With Stephanie being out, you may want to discuss with Angie or Chris.

Thanks,

Adam Finestone, AICP
Principal Planner
City of Escondido

From: Ninia Hammond <nhammond@integralcommunities.com>
Sent: Friday, August 2, 2019 2:48 PM
To: ptunnell@escondido.org; LaVona D. Koretke <lkoretke@escondido.org>
Cc: Andrew Oven <Andrew@dwilsoneng.com>; Adam Finestone <afinestone@escondido.org>
Subject: [EXT] RE: Palomar Health

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender email address AND know the content is safe.

Good Afternoon,

Can you please confirm receipt of this email?

From: Ninia Hammond
Sent: Friday, July 26, 2019 1:49 PM
To: ptunnell@escondido.org; 'lkoretke@escondido.org' <lkoretke@escondido.org>
Cc: 'Andrew Oven' <Andrew@dwilsoneng.com>
Subject: FW: Palomar Health

Good Afternoon Phillip,

I hope this finds you well! As part of our EIR, Dexter Wilson will be working on a Water Supply Assessment (WSA).

It would be helpful to have back up data for the conclusions below to use in the WSA. Can you provide any more information?

Thank you!

Ninia Hammond
(760) 944-7511 xt 105 office
(760) 814-7246 cell
2235 Encinitas Blvd., Suite 216
Encinitas, CA 92024

INTEGRAL
Communities
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Sent: Tuesday, April 17, 2018 4:55 PM
To: Ninia Hammond <nhammond@integralcommunities.com>
Cc: andrew@dwilsoneng.com; Stephanie U. Roman <sroman@escondido.org>; Angela Morrow <amorrow@escondido.org>; LaVona D. Koretke <lkoretke@escondido.org>
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Philip Tunnell, P.E.
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Utilities
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ptunnell@escondido.org

From: Ninia Hammond [mailto:nhammond@integralcommunities.com]
Sent: Tuesday, April 17, 2018 1:09 PM
To: Philip Tunnell <ptunnell@escondido.org>
Cc: andrew@dwilsoneng.com; Stephanie U. Roman <sroman@escondido.org>; Angela Morrow <amorrow@escondido.org>; LaVona D. Koretke <lkoretke@escondido.org>
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INTEGRAL
Communities
A DIVERSIFIED REAL ESTATE COMPANY

From: Philip Tunnell [mailto:ptunnell@escondido.org]
Sent: Monday, April 9, 2018 12:05 PM
To: Ninia Hammond <nhammond@integralcommunities.com>
Cc: andrew@dwilsoneng.com; Stephanie U. Roman <sroman@escondido.org>; Angela Morrow <amorrow@escondido.org>; LaVona D. Koretke <lkoretke@escondido.org>
Subject: RE: Palomar Health

Hi Ninia,

I just sent a follow up email to our Utility Billing department (I believe someone was out of the office and just got back), to get the historical data for the meter I don't have yet. Hopefully I'll get the data and assimilate it with the other numbers I already have soon.

Thank you,

Philip Tunnell, P.E.
Engineer II
Utilities
City of Escondido
(760) 839-6290 x.7040
ptunnell@escondido.org

From: Ninia Hammond [mailto:nhammond@integralcommunities.com]
Sent: Friday, April 6, 2018 12:57 PM
To: Philip Tunnell <ptunnell@escondido.org>
Cc: andrew@dwilsoneng.com; Stephanie U. Roman <sroman@escondido.org>; Angela Morrow <amorrow@escondido.org>; LaVona D. Koretke <lkoretke@escondido.org>
Subject: RE: Palomar Health

Hi Phillip,

Any update on the EDU conversion of the existing meters?

Thank you!

From: Philip Tunnell [mailto:ptunnell@escondido.org]
Sent: Monday, March 12, 2018 3:00 PM
To: Ninia Hammond <nhammond@integralcommunities.com>
Cc: andrew@dwilsoneng.com; Stephanie U. Roman <sroman@escondido.org>; Angela Morrow <amorrow@escondido.org>; LaVona D. Koretke <lkoretke@escondido.org>
Subject: RE: Palomar Health

Hi Ninia,

It was a pleasure meeting you and your team as well, to discuss the project last week. On the water side, there are two separate components that your question touches on. The first is assembling a baseline / EDU equivalent from the existing meters serving the main site to establish a basis for credits relating to the needs of your proposed development, which I am working on. I had assembled this credit basis for the meters I knew of, but it looks like there may be another meter or two that serve the main site that I am going to pull historical usage for, and incorporate into that overall credit basis. In regards to this credit number (for both water and sewer), I am currently only looking at the historical usage by the meters serving the main "teardrop" site, and am not currently analyzing any of the additional lots on the east or west sides of the site that may be acquired. These would be analyzed separately if they are added to the project.

The other issue you mentioned that is very important to your project is (estimated) required fireflow. This is determined by the Fire Department, and I've copied LaVona Koretke who (along with our fire Marshal Al Dobynes who you met at the meeting) will be making that determination. This is based on a number of aspects of your project design (# of stories, construction type, sprinklering, etc.), and Fire can fill you in on those particulars. Until you have a solid idea of your design parameters, the best they can probably give you is a worst case fireflow, which might be significantly higher than your true final result. This fireflow requirement will dictate if any existing mains need to be upsized to provide that, etc. Also, the required fire hydrant locations on site will factor into the water system design (possibly looping a main through the site from Grand to Valley). Let me know if I can answer any more questions while I work on the credit basis, and LaVona can more directly answer fireflow questions.

Thank you,

Philip Tunnell, P.E.
Engineer II
Utilities
City of Escondido
(760) 839-6290 x.7040
ptunnell@escondido.org

From: Ninia Hammond [mailto:nhammond@integralcommunities.com]
Sent: Monday, March 12, 2018 2:16 PM
To: Philip Tunnell <ptunnell@escondido.org>
Cc: andrew@dwilsoneng.com
Subject: Palomar Health

Good Afternoon Phillip,

Thank you for your time last week, it was a pleasure to meet you.

We are working with Andrew Oven of Dexter Wilson to review and provide due diligence on the water and sewer services for Palomar Health. When we met, you discussed converting the existing system capacity into an EDU equivalent. Is that something you will be able to do relatively quickly? We are anxious to understand the system flows, especially fire.

Please let us know if there is any information we can provide to you.

Thank you

Ninia Hammond
(760) 944-7511 xt 105 office
(760) 814-7246 cell
2235 Encinitas Blvd., Suite 216
Encinitas, CA 92024

INTEGRAL
Communities
A DIVERSIFIED REAL ESTATE COMPANY

Water Use Summary - Old Palomar Hospital Site		
Location	**Meter Number**	**Average Flow for Meter, gpd**
Hospital Site	Sum Overall Average Meter #1452468	42,927.21 gpd
	Sum Overall Average Meter #1447352	52,671.42 gpd
	Sum Overall Average Meter #30759344	50.76 gpd
	Sum Overall Average Irrigation Meter #32994158	8,913.04 gpd
	Hospital Site Subtotal	**104,562.43 gpd**
624 E. Grand Ave.	Sum Overall Average Meter #8912978530	145.81 gpd
TOTAL		**104,708.24 gpd**
Water EDUs (using 800 gpd/EDU ~ single family > 7,000 sf)		130.89 EDUs
Water EDUs (using 500 gpd/EDU ~ single family < 7,000 sf)		209.42 EDUs
Water EDUs (using 300 gpd/EDU ~ multi family)		349.03 EDUs

Palomar Hospital Meter Readings

High Flow (6") Meter #1452468

Read Date	Avg. Gal. / Day (for Month)	Year	Avg. Gal. / Day (for Year)
12/14/2011	29,658.53	2011	33,483.53
11/3/2011	31,642.85		
10/6/2011	32,875.00		
9/12/2011	31,925.00		
8/3/2011	32,413.79		
7/5/2011	29,037.03		
6/8/2011	34,750.00		
5/11/2011	36,857.14		
4/13/2011	36,571.42		
3/16/2011	36,852.94		
2/10/2011	36,942.85		
1/6/2011	32,275.86		
12/8/2010	34,030.30	2010	38,634.93
11/5/2010	35,806.45		
10/5/2010	35,942.85		
8/31/2010	45,473.68		
8/12/2010	47,241.37		
7/14/2010	46,823.52		
6/10/2010	42,428.57		
5/13/2010	38,857.14		
4/15/2010	37,260.86		
3/23/2010	32,925.92		
2/24/2010	32,931.03		
1/26/2010	33,897.43		
12/18/2009	31,655.17	2009	33,948.55
11/19/2009	33,416.66		
10/26/2009	32,387.09		
9/25/2009	36,064.51		
8/25/2009	36,000.00		
7/20/2009	43,500.00		
6/30/2009	25,545.45		
6/19/2009	35,794.87		
5/11/2009	36,323.52		
4/7/2009	33,090.90		
3/5/2009	32,600.00		
2/3/2009	34,230.76		
1/8/2009	30,722.22		
12/3/2008	35,785.71		
11/5/2008	39,954.54		
10/14/2008	43,071.42		

9/16/2008	43,781.25	2008	38,996.66
8/15/2008	47,548.38		
7/15/2008	46,310.34		
6/16/2008	39,555.55		
5/20/2008	39,035.71		
4/22/2008	36,121.21		
3/20/2008	34,947.36		
2/11/2008	31,848.48		
1/9/2008	30,000.00		
12/31/2007	30,035.71	2007	34,266.40
12/3/2007	33,870.96		
11/2/2007	34,347.82		
10/10/2007	35,533.33		
9/10/2007	39,484.84		
8/8/2007	34,333.33		
7/9/2007	36,500.00		
6/13/2007	38,588.23		
5/10/2007	35,344.82		
4/11/2007	33,678.57		
3/14/2007	32,965.51		
2/13/2007	31,151.51		
1/11/2007	29,628.57		
12/7/2006	36,291.66	2006	35,555.88
11/13/2006	37,322.58		
10/13/2006	38,586.20		
9/14/2006	39,291.66		
8/21/2006	40,142.85		
7/17/2006	38,218.75		
6/15/2006	34,347.82		
5/23/2006	30,902.43		
4/12/2006	28,666.66		
3/16/2006	31,566.66		
2/14/2006	36,000.00		
1/17/2006	35,333.33		
12/15/2005	35,388.88	2005	38,952.60
11/9/2005	37,222.22		
10/13/2005	37,304.34		
9/20/2005	41,555.55		
8/15/2005	43,838.70		
7/15/2005	39,200.00		
6/30/2005	39,111.11		
6/21/2005	38,000.00		

Overall Average	**36,262.65**

Palomar Hospital Meter Readings

Low Flow (2") Meter #1452468

Read Date	Avg. Gal. / Day (for Month)	Year	Avg. Gal. / Day (for Year)
12/14/011	4,829.26	2011	8,252.87
11/3/2011	8,714.28		
10/6/2011	10,958.33		
9/12/2011	14,075.00		
8/3/2011	13,827.58		
7/5/2011	10,777.77		
6/8/2011	8,642.85		
5/11/2011	6,214.28		
4/13/2011	7,000.00		
3/16/2011	5,382.35		
2/10/2011	5,371.42		
1/6/2011	3,241.37		
12/8/2010	5,727.27	2010	7,391.37
11/5/2010	8,935.48		
10/5/2010	12,542.85		
8/31/2010	15,052.63		
8/12/2010	12,517.24		
7/14/2010	7,500.00		
6/10/2010	7,285.71		
5/13/2010	5,178.57		
4/15/2010	4,173.91		
3/23/2010	3,555.55		
2/24/2010	3,586.20		
1/26/2010	2,641.02		
12/18/2009	2,413.79	2009	7,825.74
11/19/2009	7,250.00		
10/26/2009	9,064.51		
9/25/2009	14,354.83		
8/25/2009	12,583.33		
7/20/2009	12,550.00		
6/30/2009	7,272.72		
6/19/2009	7,256.41		
5/11/2009	8,411.76		
4/7/2009	5,727.27		
3/5/2009	3,766.66		
2/3/2009	7,000.00		
1/8/2009	4,083.33		
12/3/2008	7,714.28		
11/5/2008	10,545.45		
10/14/2008	12,000.00		

9/16/2008	12,625.00	2008	6,914.20
8/15/2008	12,387.09		
7/15/2008	9,931.03		
6/16/2008	4,333.33		
5/20/2008	4,571.42		
4/22/2008	2,818.18		
3/20/2008	2,105.26		
2/11/2008	2,272.72		
1/9/2008	1,666.66		
12/31/2007	1,714.28	2007	3,764.58
12/3/2007	2,032.25		
11/2/2007	2,565.21		
10/10/2007	3,300.00		
9/10/2007	8,848.48		
8/8/2007	5,800.00		
7/9/2007	6,269.23		
6/13/2007	4,500.00		
5/10/2007	4,620.68		
4/11/2007	2,785.71		
3/14/2007	2,448.27		
2/13/2007	1,969.69		
1/11/2007	2,085.71		
12/7/2006	3,166.66	2006	5,328.58
11/13/2006	4,258.06		
10/13/2006	4,413.79		
9/14/2006	9,250.00		
8/21/2006	11,457.14		
7/17/2006	12,625.00		
6/15/2006	5,130.43		
5/23/2006	4,390.24		
4/12/2006	1,592.59		
3/16/2006	1,666.66		
2/14/2006	2,750.00		
1/17/2006	3,242.42		
12/15/2005	4,805.55	2005	7,174.54
11/9/2005	5,888.88		
10/13/2005	8,565.21		
9/20/2005	8,444.44		
8/15/2005	10,322.58		
7/15/2005	7,066.66		
6/30/2005	7,000.00		
6/21/2005	5,303.03		

Overall Average	**6,664.56**	
Sum Overall Average Meter #1452468	**42,927.21**	**gpd**

Palomar Hospital Meter Readings

High Flow (6") Meter #1447352

Read Date	kgals/mo.	Avg. Gal. / Day (for Month)	Year	Avg. Gal. / Day (for Year)
12/14/2011	1816	44,292.68	2011	44,614.02
11/3/2011	1305	46,607.14		
10/6/2011	1122	46,750.00		
9/12/2011	1876	46,900.00		
8/3/2011	1467	50,586.21		
7/5/2011	1376	50,962.96		
6/8/2011	1078	38,500.00		
5/11/2011	1192	42,571.43		
4/13/2011	1164	43,111.11		
3/17/2011	1513	43,228.57		
2/10/2011	1529	43,685.71		
1/6/2011	1107	38,172.41		
12/8/2010	1325	40,151.52	2010	48,090.55
11/5/2010	1303	42,032.26		
10/5/2010	1517	43,342.86		
8/31/2010	1030	54,210.53		
8/12/2010	1560	55,714.29		
7/15/2010	1859	53,114.29		
6/10/2010	1244	51,833.33		
5/17/2010	1555	48,593.75		
4/15/2010	1154	50,173.91		
3/23/2010	1238	45,851.85		
2/24/2010	1333	45,965.52		
1/26/2010	1798	46,102.56		
12/18/2009	1312	45,241.38	2009	47,460.90
11/19/2009	1134	47,250.00		
10/26/2009	1399	45,129.03		
9/25/2009	1493	48,161.29		
8/25/2009	1731	48,083.33		
7/20/2009	1166	58,300.00		
6/30/2009	387	35,181.82		
6/19/2009	1919	49,205.13		
5/11/2009	1764	51,882.35		
4/7/2009	1604	48,606.06		
3/5/2009	1407	46,900.00		
2/3/2009	1245	47,884.62		
1/8/2009	1626	45,166.67		

12/3/2008	1419	50,678.57	2008	46,877.44
11/5/2008	1201	54,590.91		
10/14/2008	330	55,000.00		
10/8/2008	63	5,250.00		
9/26/2008	1214	121,400.00		
9/16/2008	1610	50,312.50		
8/15/2008	1514	48,838.71		
7/15/2008	1407	48,517.24		
6/16/2008	1187	43,962.96		
5/20/2008	1215	43,392.86		
4/22/2008	4220	40,576.92		
1/9/2008	340	8.62		

Overall Average	**46,760.73**

Palomar Hospital Meter Readings

Low Flow (2") Meter #1447352

Read Date	Avg. Gal. / Day (for Month)	Year	Avg. Gal. / Day (for Year)
12/14/011	1,219.51	2011	2,419.45
11/3/2011	2,035.71		
10/6/2011	2,541.66		
9/12/2011	3,425.00		
8/3/2011	3,413.79		
7/5/2011	2,444.44		
6/8/2011	642.85		
5/11/2011	3,142.85		
4/13/2011	3,444.44		
3/17/2011	2,571.42		
2/10/2011	2,600.00		
1/6/2011	1,551.72		
12/8/2010	2,787.87	2010	4,379.57
11/5/2010	4,483.87		
10/5/2010	6,600.00		
8/31/2010	8,947.36		
8/12/2010	7,178.57		
7/15/2010	4,371.42		
6/10/2010	4,541.66		
5/17/2010	3,437.50		
4/15/2010	3,043.47		
3/23/2010	2,518.51		
2/24/2010	2,413.79		
1/26/2010	2,230.76		
12/18/2009	2,241.37	2009	5,416.62
11/19/2009	5,791.66		
10/26/2009	5,645.16		
9/25/2009	9,709.67		
8/25/2009	8,555.55		
7/20/2009	8,450.00		
6/30/2009	5,000.00		
6/19/2009	4,974.35		
5/11/2009	6,205.88		
4/7/2009	4,272.72		
3/5/2009	2,700.00		
2/3/2009	4,230.76		
1/8/2009	2,638.88		

12/3/2008	5,285.71	2008	7,913.62	
11/5/2008	7,500.00			
10/14/2008	6,666.66			
10/8/2008	10,250.00			
9/16/2008	13,741.93			
8/16/2016	1,000.00			
8/15/2008	15,225.80			
7/15/2008	14,793.10			
6/16/2008	8,185.18			
5/20/2008	9,142.85			
4/22/2008	6,303.03			
3/20/2008	4,736.84			
2/11/2008	4,181.81			
1/9/2008	3,777.77			
12/31/2007	3,777.77	2007	6,984.03	
12/4/2007	5,437.50			
11/2/2007	7,045.45			
10/11/2007	8,612.90			
9/10/2007	16,121.21			
8/8/2007	13,400.00			
7/9/2007	12,000.00			
6/13/2007	6,470.58			
5/10/2007	4,862.06			
4/11/2007	4,000.00			
3/15/2007	3,666.66			
2/13/2007	2,969.69			
1/11/2007	2,428.57			
12/7/2006	3,875.00	2006	8,350.87	
11/13/2006	4,774.19			
10/13/2006	5,551.72			
9/14/2006	10,375.00			
8/21/2006	13,571.42			
7/17/2006	14,000.00			
6/15/2006	9,000.00			
5/23/2006	7,000.00			
4/12/2006	7,010.48			
		Overall Average	**5,910.69**	**gpd**

Sum Overall Average Meter #1447352	**52,671.42**

Irrigation (2") Meter #30759344

Read Date	Avg. Gal. / Day (for Month)	Year	Avg. Gal. / Day (for Year)
7/27/2011	0.00	2011	0.00
7/5/2011	0.00		
6/8/2011	0.00		
5/11/2011	0.00		
4/13/2011	0.00		
3/17/2011	0.00		
2/10/2011	0.00		
1/6/2011	0.00		
12/8/2010	0.00	2010	2.78
11/5/2010	0.00		
10/5/2010	0.00		
8/31/2010	0.00		
8/12/2010	0.00		
7/15/2010	0.00		
6/10/2010	33.33		
5/17/2010	0.00		
4/15/2010	0.00		
3/23/2010	0.00		
2/24/2010	0.00		
1/26/2010	0.00		
12/18/2009	0.00	2009	5.56
11/19/2009	0.00		
10/26/2009	0.00		
9/25/2009	0.00		
8/25/2009	0.00		
7/20/2009	0.00		
6/19/2009	0.00		
5/11/2009	33.33		
4/7/2009	0.00		
3/5/2009	0.00		
2/3/2009	33.33		
1/8/2009	0.00		
12/3/2008	0.00	2008	63.92
11/5/2008	0.00		
10/14/2008	0.00		
9/16/2008	0.00		
8/15/2008	0.00		
7/15/2008	103.45		
6/16/2008	185.19		
5/20/2008	321.43		
4/22/2008	29.13		
1/9/2008	0.00		
		7/6/00 - 12/31/07	73.18

Totals from 6/21/05 to 7/27/07
113000 Tot. gal.
2226 Tot. days
50.76 Avg. gal/day

Irrigation (2") Meter #32994158

read Date	Avg. Gal. / Day (for Month)	Year	Avg. Gal. / Day (for Year)
5/8/2014	10,096.77	2014	9,353.01
4/7/2014	7,607.14		
3/10/2014	8,290.32		
2/7/2014	9,708.33		
1/14/2014	11,062.50		
12/13/2013	8,354.83	2013	10,174.98
11/12/2013	11,242.42		
10/10/2013	14,103.44		
9/11/2013	13,428.57		
8/7/2013	14,857.14		
7/10/2013	14,029.41		
6/6/2013	11,966.66		
5/7/2013	9,896.55		
4/8/2013	8,807.69		
3/13/2013	6,034.48		
2/12/2013	5,321.42		
1/15/2013	4,057.14		
12/11/2012	6,321.42	2012	8,222.86
11/13/2012	10,034.48		
10/15/2012	10,968.75		
9/13/2012	12,638.88		
8/8/2012	12,035.71		
7/11/2012	12,500.00		
6/11/2012	10,969.69		
5/9/2012	4,142.85		
4/11/2012	3,885.71		
3/7/2012	4,535.71		
2/8/2012	5,296.29		
1/12/2012	5,344.82		
12/14/2011	5,268.29	2011	7,732.28
11/3/2011	8,785.71		
10/6/2011	8,916.66		
9/12/2011	11,075.00		
8/3/2011	10,896.55		
7/5/2011	11,074.07		
6/8/2011	12,107.14		
5/11/2011	6,285.71		
4/13/2011	4,185.18		
3/17/2011	4,428.57		
2/10/2011	4,971.42		
1/6/2011	4,793.10		

12/8/2010	10,969.69	2010	9,233.51
11/5/2010	11,354.83		
10/5/2010	14,600.00		
8/31/2010	12,736.84		
8/12/2010	11,142.85		
7/15/2010	11,285.71		
6/10/2010	10,958.33		
5/17/2010	7,968.75		
4/15/2010	5,391.30		
3/23/2010	5,185.18		
2/24/2010	4,413.79		
1/26/2010	4,794.87		
12/18/2009	5,482.75	2009	7,064.24
11/19/2009	7,416.66		
10/26/2009	7,548.38		
9/25/2009	8,548.38		
8/25/2009	9,083.33		
7/20/2009	8,096.77		
6/19/2009	7,615.38		
5/11/2009	8,617.64		
4/7/2009	4,484.84		
3/5/2009	5,833.33		
2/3/2009	6,000.00		
1/31/2009	6,043.47		
12/3/2008	5,071.42	2008	8,447.45
11/5/2008	9,318.18		
10/14/2008	10,142.85		
9/16/2008	9,468.75		
8/15/2008	9,903.22		
7/15/2008	10,413.79		
6/16/2008	9,333.33		
5/20/2008	10,678.57		
4/22/2008	10,090.90		
3/20/2008	5,973.68		
2/11/2008	5,030.30		
1/9/2008	5,944.44		
12/4/2007	9,781.25	2007	11,076.01
11/2/2007	12,363.63		
10/11/2007	13,100.00		
9/11/2007	13,735.29		
8/8/2007	13,400.00		
7/9/2007	14,538.46		
6/13/2007	14,529.41		
5/10/2007	7,862.06		
4/11/2007	6,250.00		
3/14/2007	5,200.00		
		Overall Average Meter #32994158	**8,913.04**

gpd

624 E Grand (3/4") Meter #8912978530

Read Date	units/month	gal/month	gal/day
8/10/2015	3	2244	77.38
9/8/2015	10	7480	249.33
10/8/2015	13	9724	303.88
11/9/2015	7	5236	187.00
12/7/2015	4	2992	96.52
1/7/2016	4	2992	106.86
2/4/2016	2	1496	51.59
3/4/2016	2	1496	45.33
4/6/2016	1	748	25.79
5/5/2016	2	1496	46.75
6/6/2016	2	1496	48.26
7/7/2016	4	2992	106.86
8/4/2016	3	2244	68.00
9/6/2016	6	4488	149.60
10/6/2016	4	2992	93.50
11/7/2016	9	6732	224.40
12/7/2016	13	9724	286.00
1/10/2017	15	11220	415.56
2/6/2017	13	9724	335.31
3/7/2017	2	1496	49.87
4/6/2017	6	4488	140.25
5/8/2017	4	2992	99.73

Overall Average Meter #8912978530 145.81 gpd

Andrew Oven

From: Laurie Gordon <lgordon@escondido.org>
Sent: Tuesday, September 10, 2019 1:29 PM
To: Ninia Hammond
Cc: LaVona D. Koretke; Andrew Oven
Subject: RE: [EXT] RE: Palomar Health
Attachments: MeterReadHistory 624 East Grand.docx

Hello Ninia,
Attached is the meter history for 624 E. Grand from May 2016 to May 2017.

Regards,

Laurie Gordon
Engineer I
Utilities | Construction and Engineering
Direct: 760-839-6290 ext. 7040
www.escondido.org

From: Ninia Hammond <nhammond@integralcommunities.com>
Sent: Friday, September 6, 2019 11:53 AM
To: Laurie Gordon <lgordon@escondido.org>
Cc: LaVona D. Koretke <lkoretke@escondido.org>; Andrew Oven <Andrew@dwilsoneng.com>
Subject: Re: [EXT] RE: Palomar Health

Thank you. Can you do the 1 year period from May 2016-May 2017?

On Sep 6, 2019, at 11:41 AM, Laurie Gordon <lgordon@escondido.org> wrote:

> Hi Ninia,
>
> The meter number is 9712515. It is a ¾" meter and has had no usage since May of 2017.
>
> Regards,
>
> <image001.jpg> Laurie Gordon

Engineer I
Utilities | Construction and Engineering
Direct: 760-839-6290 ext. 7040
www.escondido.org

From: Ninia Hammond <nhammond@integralcommunities.com>
Sent: Friday, September 6, 2019 10:43 AM
To: Laurie Gordon <lgordon@escondido.org>; LaVona D. Koretke <lkoretke@escondido.org>
Cc: Andrew Oven <Andrew@dwilsoneng.com>
Subject: RE: [EXT] RE: Palomar Health

Can you go back to January of 2018?

From: Laurie Gordon [mailto:lgordon@escondido.org]
Sent: Friday, September 6, 2019 10:38 AM
To: Ninia Hammond <nhammond@integralcommunities.com>; LaVona D. Koretke <lkoretke@escondido.org>
Cc: Andrew Oven <Andrew@dwilsoneng.com>
Subject: RE: [EXT] RE: Palomar Health

Hi Ninia,

Can you tell me how far back or what years of data you would like?

Regards,

<image001.jpg>

Laurie Gordon
Engineer I
Utilities | Construction and Engineering
Direct: 760-839-6290 ext. 7040
www.escondido.org

From: Ninia Hammond <nhammond@integralcommunities.com>
Sent: Friday, September 6, 2019 9:59 AM
To: Laurie Gordon <lgordon@escondido.org>; LaVona D. Koretke <lkoretke@escondido.org>
Cc: Andrew Oven <Andrew@dwilsoneng.com>
Subject: RE: [EXT] RE: Palomar Health

Hi Laurie,

We have purchased an additional parcel, APN 230-163-04-00 at 624 East Grand

Can you pull the historical water meter data for this site as well?

Thank you,

Ninia Hammond
(760) 944-7511 xt 105 office
(760) 814-7246 cell
2235 Encinitas Blvd., Suite 216
Encinitas, CA 92024
<image002.jpg>

From: Laurie Gordon [mailto:lgordon@escondido.org]
Sent: Friday, August 23, 2019 1:34 PM
To: Ninia Hammond <nhammond@integralcommunities.com>; LaVona D. Koretke <lkoretke@escondido.org>
Cc: Andrew Oven <Andrew@dwilsoneng.com>
Subject: RE: [EXT] RE: Palomar Health

Good afternoon Ninia,

I apologize for the delay. Attached please find the information you requested.

Regards,

<image001.jpg> Laurie Gordon
Engineer I
Utilities | Construction and Engineering
Direct: 760-839-6290 ext. 7040
www.escondido.org

From: Ninia Hammond <nhammond@integralcommunities.com>
Sent: Saturday, August 17, 2019 7:00 AM
To: Laurie Gordon <lgordon@escondido.org>; LaVona D. Koretke <lkoretke@escondido.org>
Cc: Andrew Oven <Andrew@dwilsoneng.com>
Subject: RE: [EXT] RE: Palomar Health

Good Morning,

I wondered if you were able to track down any additional information? Should we schedule a meeting for next week to discuss?

Thank you,
Ninia Hammond

From: Ninia Hammond
Sent: Monday, August 5, 2019 1:11 PM
To: 'Laurie Gordon' <lgordon@escondido.org>; LaVona D. Koretke <lkoretke@escondido.org>
Cc: Andrew Oven <Andrew@dwilsoneng.com>
Subject: RE: [EXT] RE: Palomar Health

Hi Laurie,

We are working on the redevelopment of the former Palomar Health hospital site downtown campus. We are preparing an EIR and a WSA as part of our technical studies. If you scroll down you will see that in April 2018 Phillip provided current usage data for the hospital site. We are trying to get backup information for that data to use in the Water Supply Assessment.

Ninia Hammond
(760) 944-7511 xt 105 office
(760) 814-7246 cell
2235 Encinitas Blvd., Suite 216
Encinitas, CA 92024
<image002.jpg>

From: Laurie Gordon [mailto:lgordon@escondido.org]
Sent: Monday, August 5, 2019 12:43 PM
To: Ninia Hammond <nhammond@integralcommunities.com>; LaVona D. Koretke <lkoretke@escondido.org>
Cc: Andrew Oven <Andrew@dwilsoneng.com>
Subject: RE: [EXT] RE: Palomar Health

Hi Ninia,

Philip no longer works for the City of Escondido. Can you give me more information as to what you are looking for?

Regards,

<image001.jpg>

Laurie Gordon
Engineer I
Utilities | Construction and Engineering
Direct: 760-839-6290 ext. 7040
www.escondido.org

From: Adam Finestone <afinestone@escondido.org>
Sent: Friday, August 2, 2019 2:54 PM
To: Ninia Hammond <nhammond@integralcommunities.com>; LaVona D. Koretke <lkoretke@escondido.org>; Laurie Gordon <lgordon@escondido.org>
Cc: Andrew Oven <Andrew@dwilsoneng.com>
Subject: RE: [EXT] RE: Palomar Health

Laurie, see below. With Stephanie being out, you may want to discuss with Angie or Chris.

Thanks,

Adam Finestone, AICP
Principal Planner
City of Escondido

From: Ninia Hammond <nhammond@integralcommunities.com>
Sent: Friday, August 2, 2019 2:48 PM
To: ptunnell@escondido.org; LaVona D. Koretke <lkoretke@escondido.org>
Cc: Andrew Oven <Andrew@dwilsoneng.com>; Adam Finestone <afinestone@escondido.org>
Subject: [EXT] RE: Palomar Health

Good Afternoon,

Can you please confirm receipt of this email?

From: Ninia Hammond
Sent: Friday, July 26, 2019 1:49 PM
To: ptunnell@escondido.org; 'lkoretke@escondido.org' <lkoretke@escondido.org>
Cc: 'Andrew Oven' <Andrew@dwilsoneng.com>
Subject: FW: Palomar Health

Good Afternoon Phillip,

I hope this finds you well! As part of our EIR, Dexter Wilson will be working on a Water Supply Assessment (WSA).

It would be helpful to have back up data for the conclusions below to use in the WSA. Can you provide any more information?

Thank you!

Ninia Hammond
(760) 944-7511 xt 105 office

(760) 814-7246 cell
2235 Encinitas Blvd., Suite 216
Encinitas, CA 92024
<image003.jpg>

From: Philip Tunnell [mailto:ptunnell@escondido.org]
Sent: Tuesday, April 17, 2018 4:55 PM
To: Ninia Hammond <nhammond@integralcommunities.com>
Cc: andrew@dwilsoneng.com; Stephanie U. Roman <sroman@escondido.org>; Angela Morrow <amorrow@escondido.org>; LaVona D. Koretke <lkoretke@escondido.org>
Subject: RE: Palomar Health

Hi Ninia,

I got the data for the meters serving the site and the results of the analysis are as follows:

Sewer:

- (using 200 gpd/EDU) Equivalent EDUs = 454.33

Water:

- (using 800 gpd/EDU ~ single family > 7,000 SF) Equivalent EDUs = 130.70
- (using 500 gpd/EDU ~ single family < 7,000 SF) Equivalent EDUs = 209.12
- (using 300 gpd/EDU ~ multi family) Equivalent EDUs = 348.54

Thank you,

Philip Tunnell, P.E.
Engineer II
Utilities
City of Escondido
(760) 839-6290 x.7040
ptunnell@escondido.org

<image004.png>

From: Ninia Hammond [mailto:nhammond@integralcommunities.com]
Sent: Tuesday, April 17, 2018 1:09 PM
To: Philip Tunnell <ptunnell@escondido.org>
Cc: andrew@dwilsoneng.com; Stephanie U. Roman <sroman@escondido.org>; Angela Morrow <amorrow@escondido.org>; LaVona D. Koretke <lkoretke@escondido.org>
Subject: RE: Palomar Health

Hi Phillip,

I'm just checking in. We are rapidly approaching the end of our DD period and I would like this info to review with Dexter Wilson.

Thanks!

Ninia Hammond
(760) 944-7511 xt 105 office
(760) 814-7246 cell
2235 Encinitas Blvd., Suite 216
Encinitas, CA 92024
<image005.jpg>

From: Philip Tunnell [mailto:ptunnell@escondido.org]
Sent: Monday, April 9, 2018 12:05 PM
To: Ninia Hammond <nhammond@integralcommunities.com>
Cc: andrew@dwilsoneng.com; Stephanie U. Roman <sroman@escondido.org>; Angela Morrow <amorrow@escondido.org>; LaVona D. Koretke <lkoretke@escondido.org>
Subject: RE: Palomar Health

Hi Ninia,

I just sent a follow up email to our Utility Billing department (I believe someone was out of the office and just got back), to get the historical data for the meter I don't have yet. Hopefully I'll get the data and assimilate it with the other numbers I already have soon.

Thank you,

Philip Tunnell, P.E.
Engineer II
Utilities
City of Escondido
(760) 839-6290 x.7040
ptunnell@escondido.org

<image004.png>

From: Ninia Hammond [mailto:nhammond@integralcommunities.com]
Sent: Friday, April 6, 2018 12:57 PM
To: Philip Tunnell <ptunnell@escondido.org>
Cc: andrew@dwilsoneng.com; Stephanie U. Roman <sroman@escondido.org>; Angela Morrow <amorrow@escondido.org>; LaVona D. Koretke <lkoretke@escondido.org>
Subject: RE: Palomar Health

Hi Phillip,

Any update on the EDU conversion of the existing meters?

Thank you!

From: Philip Tunnell [mailto:ptunnell@escondido.org]
Sent: Monday, March 12, 2018 3:00 PM
To: Ninia Hammond <nhammond@integralcommunities.com>
Cc: andrew@dwilsoneng.com; Stephanie U. Roman <sroman@escondido.org>; Angela Morrow

<amorrow@escondido.org>; LaVona D. Koretke <lkoretke@escondido.org>
Subject: RE: Palomar Health

Hi Ninia,

It was a pleasure meeting you and your team as well, to discuss the project last week. On the water side, there are two separate components that your question touches on. The first is assembling a baseline / EDU equivalent from the existing meters serving the main site to establish a basis for credits relating to the needs of your proposed development, which I am working on. I had assembled this credit basis for the meters I knew of, but it looks like there may be another meter or two that serve the main site that I am going to pull historical usage for, and incorporate into that overall credit basis. In regards to this credit number (for both water and sewer), I am currently only looking at the historical usage by the meters serving the main "teardrop" site, and am not currently analyzing any of the additional lots on the east or west sides of the site that may be acquired. These would be analyzed separately if they are added to the project.

The other issue you mentioned that is very important to your project is (estimated) required fireflow. This is determined by the Fire Department, and I've copied LaVona Koretke who (along with our fire Marshal Al Dobynes who you met at the meeting) will be making that determination. This is based on a number of aspects of your project design (# of stories, construction type, sprinklering, etc.), and Fire can fill you in on those particulars. Until you have a solid idea of your design parameters, the best they can probably give you is a worst case fireflow, which might be significantly higher than your true final result. This fireflow requirement will dictate if any existing mains need to be upsized to provide that, etc. Also, the required fire hydrant locations on site will factor into the water system design (possibly looping a main through the site from Grand to Valley). Let me know if I can answer any more questions while I work on the credit basis, and LaVona can more directly answer fireflow questions.

Thank you,

Philip Tunnell, P.E.
Engineer II
Utilities
City of Escondido
(760) 839-6290 x.7040
ptunnell@escondido.org

<image006.png>

From: Ninia Hammond [mailto:nhammond@integralcommunities.com]
Sent: Monday, March 12, 2018 2:16 PM
To: Philip Tunnell <ptunnell@escondido.org>
Cc: andrew@dwilsoneng.com
Subject: Palomar Health

Good Afternoon Phillip,

Thank you for your time last week, it was a pleasure to meet you.

We are working with Andrew Oven of Dexter Wilson to review and provide due diligence on the water and sewer services for Palomar Health. When we met, you discussed converting the existing system capacity into an EDU equivalent. Is that something you will be able to do relatively quickly? We are anxious to understand the system flows, especially fire.

Please let us know if there is any information we can provide to you.

Thank you

Ninia Hammond
(760) 944-7511 xt 105 office
(760) 814-7246 cell
2235 Encinitas Blvd., Suite 216
Encinitas, CA 92024
<image007.jpg>

Read History

Main

Meter ID 8912978530 3/4" Multijet / 9712515 /Active

Register Information KGAL,LOW, format 4.0, 1.000000, Additive

Register ID 8912913970

Filter by All

Read Date/Time	Read Difference	Message	Register Reading	Read Type	Use On Bill	High/Low Failed
09-05-2019 11:05AM	0.000000	Usage: 0, Valid Usage: 0 - 0, Valid Readings: 172 - 172	172.000000	60 - Regular	☑	☐
08-07-2019 08:47AM	0.000000	Usage: 0, Valid Usage: 0 - 0, Valid Readings: 172 - 172	172.000000	60 - Regular	☑	☐
07-03-2019 02:27PM	0.000000	Usage: 0, Valid Usage: 0 - 0, Valid Readings: 172 - 172	172.000000	60 - Regular	☑	☐
06-05-2019 12:59PM	0.000000	Usage: 0, Valid Usage: 0 - 0, Valid Readings: 172 - 172	172.000000	60 - Regular	☑	☐
05-06-2019 10:50AM	0.000000	Usage: 0, Valid Usage: 0 - 0, Valid Readings: 172 - 172	172.000000	60 - Regular	☑	☐
04-04-2019 10:16AM	0.000000	Usage: 0, Valid Usage: 0 - 0, Valid Readings: 172 - 172	172.000000	60 - Regular	☑	☐
03-06-2019 10:51AM	0.000000	Usage: 0, Valid Usage: 0 - 0, Valid Readings: 172 - 172	172.000000	60 - Regular	☑	☐
02-06-2019 10:52AM	0.000000	Usage: 0, Valid Usage: 0 - 0, Valid Readings: 172 - 172	172.000000	60 - Regular	☑	☐
01-07-2019 11:36AM	0.000000	Usage: 0, Valid Usage: 0 - 0, Valid Readings: 172 - 172	172.000000	60 - Regular	☑	☐
12-20-2018 12:00AM	0.000000	Usage: 0, Valid Usage: 0 - 0, Valid Readings: 172 - 172	172.000000	60 - Regular	☑	☐
12-05-2018 10:38AM	0.000000	Usage: 0, Valid Usage: 0 - 0, Valid Readings: 172 - 172	172.000000	60 - Regular	☑	☐
11-07-2018 01:05PM	0.000000	Usage: 0, Valid Usage: 0 - 0, Valid Readings: 172 - 172	172.000000	60 - Regular	☑	☐
10-04-2018 10:37AM	0.000000	Usage: 0, Valid Usage: 0 - 0, Valid Readings: 172 - 172	172.000000	60 - Regular	☑	☐
09-07-2018 10:57AM	0.000000	Usage: 0, Valid Usage: 0 - 0, Valid Readings: 172 - 172	172.000000	60 - Regular	☑	☐
08-07-2018 10:40AM	0.000000	Usage: 0, Valid Usage: 0 - 0, Valid Readings: 172 - 172	172.000000	60 - Regular	☑	☐
07-06-2018 11:35AM	0.000000	Usage: 0, Valid Usage: 0 - 0, Valid Readings: 172 - 172	172.000000	60 - Regular	☑	☐
06-07-2018 11:12AM	0.000000	Usage: 0, Valid Usage: 0 - 0, Valid Readings: 172 - 172	172.000000	60 - Regular	☑	☐
05-07-2018 10:29AM	0.000000	Usage: 0, Valid Usage: 0 - 12, Valid Readings: 172 - 184	172.000000	60 - Regular	☑	☐
04-05-2018 12:53PM	0.000000	Usage: 0, Valid Usage: 0 - 18, Valid Readings: 172 - 190	172.000000	60 - Regular	☑	☐
03-06-2018 12:51PM	0.000000	Usage: 0, Valid Usage: 0 - 6, Valid Readings: 172 - 178	172.000000	60 - Regular	☑	☐
02-06-2018 11:21AM	1.000000	Usage: 1, Valid Usage: 0 - 48, Valid Readings: 171 - 219	172.000000	60 - Regular	☑	☐
01-04-2018 02:44PM	0.000000	Usage: 0, Valid Usage: 0 - 38, Valid Readings: 171 - 209	171.000000	60 - Regular	☑	☐
12-06-2017 12:33PM	0.000000	Usage: 0, Valid Usage: 0 - 39, Valid Readings: 171 - 210	171.000000	60 - Regular	☑	☐
11-06-2017 01:21PM	0.000000	Usage: 0, Valid Usage: 0 - 27, Valid Readings: 171 - 198	171.000000	60 - Regular	☑	☐
10-05-2017 12:45PM	0.000000	Usage: 0, Valid Usage: 0 - 11, Valid Readings: 171 - 182	171.000000	60 - Regular	☑	☐
09-07-2017 11:15AM	0.000000	Usage: 0, Valid Usage: 0 - 19, Valid Readings: 171 - 190	171.000000	60 - Regular	☑	☐
08-04-2017 11:22AM	0.000000	Usage: 0, Valid Usage: 0 - 9, Valid Readings: 171 - 180	171.000000	60 - Regular	☑	☐

07-07-2017 10:52AM	0.000000	Usage: 0, Valid Usage: 0 - 12, Valid Readings: 171 - 183	171.000000	60 - Regular	☑	☐
06-07-2017 10:49AM	0.000000	Usage: 0, Valid Usage: 0 - 6, Valid Readings: 171 - 177	171.000000	60 - Regular	☑	☐
05-08-2017 01:18PM	4.000000	Usage: 4, Valid Usage: 0 - 7, Valid Readings: 167 - 174	171.000000	60 - Regular	☑	☐
04-06-2017 01:12PM	6.000000	Usage: 6, Valid Usage: 0 - 3, Valid Readings: 161 - 164	167.000000	60 - Regular	☑	☑
03-07-2017 10:52AM	2.000000	Usage: 2, Valid Usage: 0 - 6, Valid Readings: 159 - 165	161.000000	60 - Regular	☑	☐
02-06-2017 01:40PM	13.000000	Usage: 13, Valid Usage: 0 - 6, Valid Readings: 146 - 152	159.000000	60 - Regular	☑	☑
01-10-2017 09:43AM	15.000000	Usage: 15, Valid Usage: 0 - 13, Valid Readings: 131 - 144	146.000000	60 - Regular	☑	☑
12-07-2016 01:14PM	13.000000	Usage: 13, Valid Usage: 0 - 13, Valid Readings: 118 - 131	131.000000	60 - Regular	☑	☐
11-07-2016 01:31PM	9.000000	Usage: 9, Valid Usage: 0 - 21, Valid Readings: 109 - 130	118.000000	60 - Regular	☑	☐
10-06-2016 01:43PM	4.000000	Usage: 4, Valid Usage: 0 - 39, Valid Readings: 105 - 144	109.000000	60 - Regular	☑	☐
09-06-2016 01:05PM	6.000000	Usage: 6, Valid Usage: 0 - 34, Valid Readings: 99 - 133	105.000000	60 - Regular	☑	☐
08-04-2016 09:08AM	3.000000	Usage: 3, Valid Usage: 0 - 12, Valid Readings: 96 - 108	99.000000	60 - Regular	☑	☐
07-07-2016 02:37PM	4.000000	Usage: 4, Valid Usage: 0 - 7, Valid Readings: 92 - 99	96.000000	60 - Regular	☑	☐
06-06-2016 01:02PM	2.000000	Usage: 2, Valid Usage: 0 - 7, Valid Readings: 90 - 97	92.000000	60 - Regular	☑	☐
05-05-2016 09:54AM	2.000000	Usage: 2, Valid Usage: 0 - 3, Valid Readings: 88 - 91	90.000000	60 - Regular	☑	☐
04-06-2016 01:24PM	1.000000	Usage: 1, Valid Usage: 0 - 6, Valid Readings: 87 - 93	88.000000	60 - Regular	☑	☐
03-04-2016 01:19PM	2.000000	Usage: 2, Valid Usage: 0 - 7, Valid Readings: 85 - 92	87.000000	60 - Regular	☑	☐
02-04-2016 10:56AM	2.000000	Usage: 2, Valid Usage: 0 - 10, Valid Readings: 83 - 93	85.000000	60 - Regular	☑	☐
01-07-2016 12:01PM	4.000000	Usage: 4, Valid Usage: 0 - 11, Valid Readings: 79 - 90	83.000000	60 - Regular	☑	☐
12-07-2015 08:05AM	4.000000	Usage: 4, Valid Usage: 0 - 17, Valid Readings: 75 - 92	79.000000	60 - Regular	☑	☐
11-09-2015 10:54AM	7.000000	Usage: 7, Valid Usage: 0 - 37, Valid Readings: 68 - 105	75.000000	60 - Regular	☑	☐
10-08-2015 02:32PM	13.000000	Usage: 13, Valid Usage: 0 - 31, Valid Readings: 55 - 86	68.000000	60 - Regular	☑	☐
09-08-2015 02:05PM	10.000000	Usage: 10, Valid Usage: 0 - 10, Valid Readings: 45 - 55	55.000000	60 - Regular	☑	☐
08-10-2015 01:32PM	3.000000	Usage: 3, Valid Usage: 0 - 58, Valid Readings: 42 - 100	45.000000	60 - Regular	☑	☐

APPENDIX B

HYDRANT FLOW TEST REPORTS

Hydrant Flow Test Report

Test Date 1/14/2016 **Test Time**

Location

North Inland Crises Center
606 E. Valley Parkway
Escondido, ca.

Tested by

INDUSTRIAL FIRE SPRINKLER
KEITH MITCHEL/JAKE SANDAGE
WITNESSED BY
ESCONDIDO FIRE & WATER DEPT.

Notes

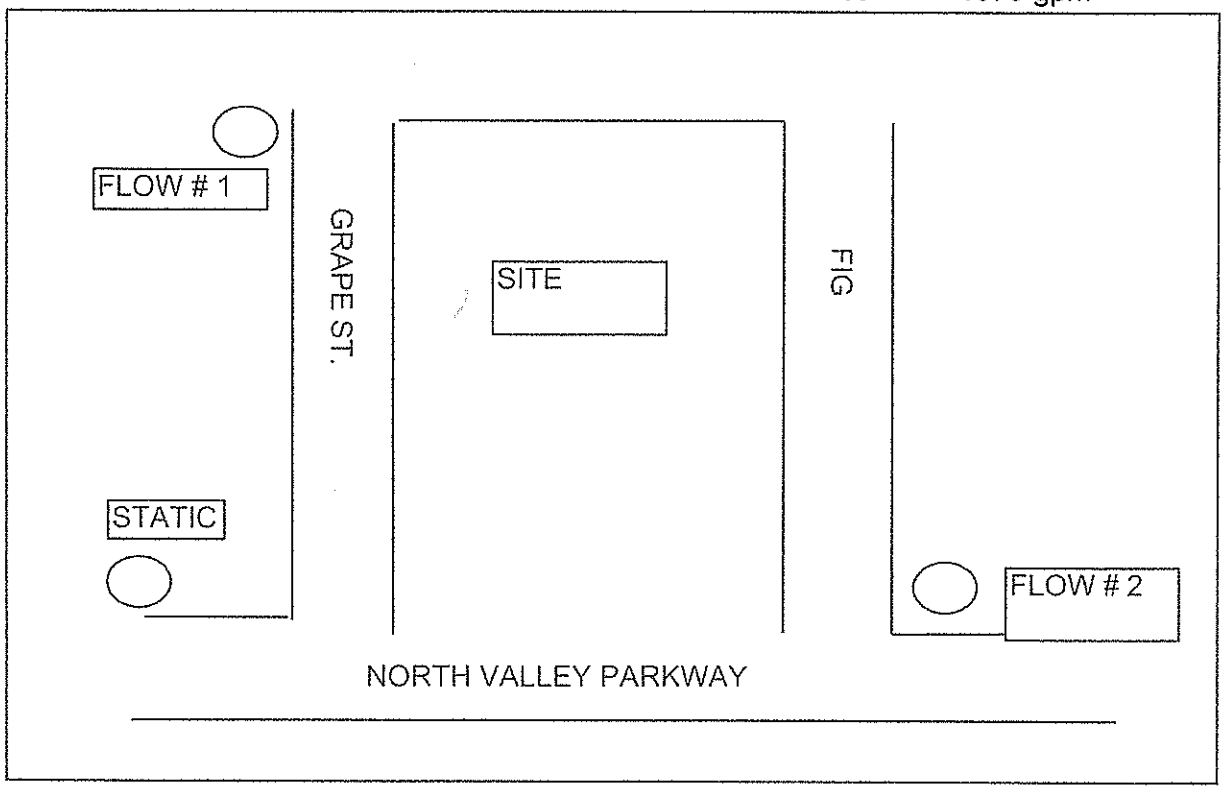
1ST. OUTLET STATIC N. VALLEY PARKWAY AND N. GRAPE ST.
FLOW HYDRANT N. VALLEY PARKWAY AND FIG
2ND FLOW GRAPE ST.

Read Hydrant

110 psi **static pressure**
106 psi **residual pressure**
658.3 ft **hydrant elevation**

Flow Hydrant(s)

Outlet	Elev	Size	C	Pitot Pressure	Flow
#1	658.3	2.5		65	1225 gpm
#2	658.3	2.5		55	1075 gpm



Millennium Fire Protection Corp.

Date of Test: 7/17/2012 Time of Test: 9:30 AM Elevation: 664

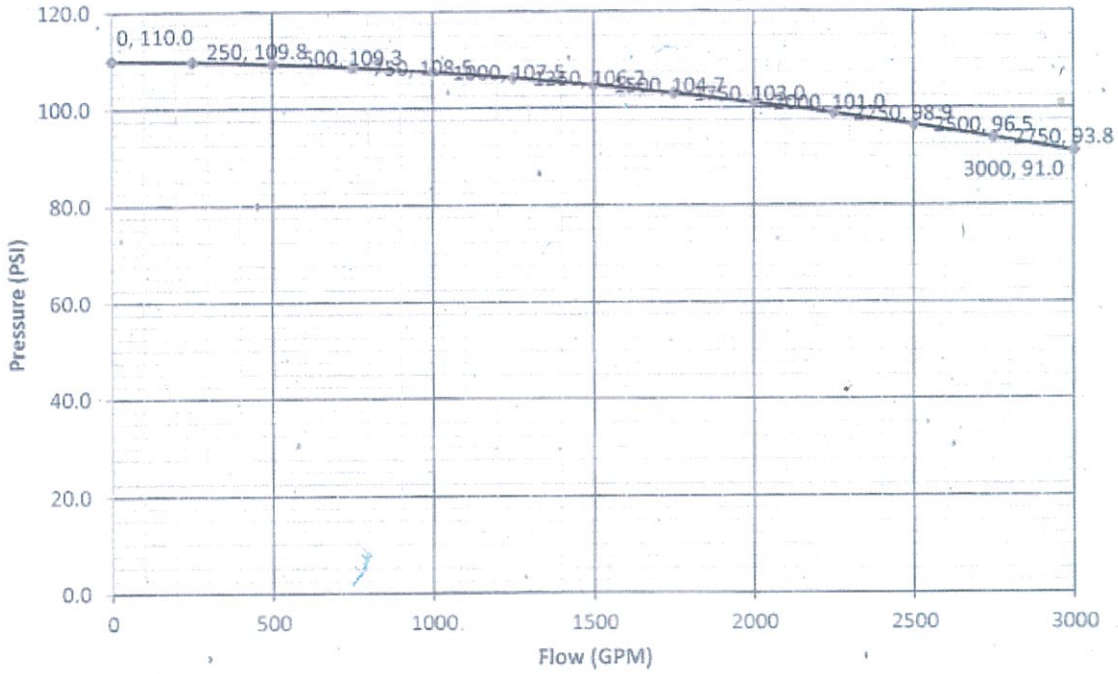
Project:
Neighborhood Healthcare

Preformed by:
Brian Richardson

Test Address:
728 East Valley Pkwy
Escondido, CA

Witness by:
Jeff Seifert
Escondido Public Works Dept.

Static	110 PSI		
Residual	106 PSI	Flow at Residual	1294.1 GPM
Pitot	72.5 PSI	Flow at 20 PSI	6952.4 GPM
Outlet Dia.	2.5 IN	Flow at 0 PSI	7748.1 GPM
Outlet Coff.	0.816		



Used for Residual Flow
$Q=29.8 \times c \times d^2 \times \sqrt{Pv}$

Used for Pressure at specific Flow
$Qf=QF \times (hr^{0.54} / hf^{0.54})$ $hr=((Qf \times hf^{0.54})/QF)^{1.85}$

Q= Flow
c= Outlet Coff.
d= Outlet Dia.
Pv= Pitot

Qf= Flow (at desired pressure)
QF= Flow Observed (Flow @ Residual)
hr= Desired Δ Pressure (Static - Desired Pressure i.e 20 psi, 0 psi)
hf= Observed Δ Pressure (Static - Residual)

101 Copperwood Way, Ste H • Oceanside, CA 92058 • Phone (760) 722-2722 • Fax (760) 722-2730 • License# C16-869040

APPENDIX C

COMPUTER MODELING OUTPUT
PALOMAR HEIGHTS
WATER SYSTEM

NODE AND PIPE DIAGRAM REFERENCE:

Exhibit A in the back of the report.

CONDITIONS MODELED:

1. Existing Demands to Match Hydrant Flow Test Results
2. Existing Average Day Demands
3. Proposed Average Day Demands
4. Proposed Maximum Day Demands
5. Proposed Peak Hour Demands
6. Proposed Maximum Day Demands plus 2,500 gpm Fire Flow at Node 218
7. Proposed Maximum Day Demands plus 2,500 gpm Fire Flow at Node 218, Pipe 227 Closed

```
* * * * * * * * * * * *  K Y P I P E  * * * * * * * * * * * *
*                                                             *
*  Pipe Network Modeling Software                             *
*                                                             *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)                 *
*  Version: 9.023  06/04/2018                                 *
*  Company:  Dexter        Serial #:  592169                  *
*  Interface:  Classic                                        *
*  Licensed for Pipe2018                                      *
*                                                             *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
```

Date & Time: Wed Sep 11 11:51:47 2019

Master File : \\artic\eng\930012\water\ky pipe - 9-2019\930012.KYP\930012.P2K

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

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

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

R E G U L A T I N G V A L V E D A T A

VALVE LABEL	VALVE TYPE	VALVE SETTING (ft or gpm)
PRV-5B	PRV-1	925.85

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.
101	Lindley	102	2710.00	8.00	125.0000	0.35
103	102	104	2010.00	8.00	125.0000	0.35
105	102	104	2010.00	8.00	125.0000	0.35
107	104	106	1480.00	16.00	100.0000	0.35
109	106	108	2930.00	12.00	125.0000	0.35
111	108	110	1030.00	12.00	125.0000	0.35
113	110	112	1450.00	12.00	125.0000	0.35
115	112	148	2090.00	10.00	125.0000	0.35
117	Lindley	114	1040.00	18.00	100.0000	0.35
119	114	116	610.00	26.00	100.0000	0.35

121	116	118	350.00	8.00	125.0000	0.35
123	118	120	1700.00	8.00	125.0000	0.35
125	120	124	1240.00	8.00	125.0000	0.35
127	124	104	1540.00	12.00	140.0000	0.35
129	120	122	340.00	8.00	125.0000	0.35
131	122	126	1530.00	8.00	125.0000	0.35
133	126	128	3250.00	12.00	125.0000	0.35
135	128	106	1320.00	16.00	125.0000	0.35
137	126	130	2560.00	18.00	100.0000	0.35
139	130	108	5180.00	8.00	125.0000	0.35
141	130	132	1430.00	18.00	100.0000	0.35
143	132	110	5530.00	8.00	125.0000	0.35
145	132	134	1450.00	18.00	100.0000	0.35
147	138	134	210.00	18.00	100.0000	0.35
149	134	136	1820.00	8.00	124.0000	0.35
151	136	142	900.00	10.00	124.0000	0.35
153	138	140	900.00	18.00	100.0000	0.35
155	140	142	1610.00	10.00	124.0000	0.35
157	142	146	1060.00	12.00	139.0000	0.35
159	148	150	230.00	16.00	124.0000	0.35
161	150	152	450.00	10.00	124.0000	0.35
163	152	154	420.00	10.00	124.0000	0.35
165	148	156	1000.00	10.00	139.0000	0.35
167	150	158	1030.00	10.00	124.0000	0.35
169	154	160	1060.00	10.00	124.0000	0.35
171	156	162	210.00	8.00	124.0000	0.35
173	162	168	540.00	10.00	124.0000	0.35
175	168	170	810.00	10.00	139.0000	0.35
177	156	158	230.00	8.00	124.0000	0.35
179	158	160	870.00	8.00	124.0000	0.35
181	160	172	620.00	8.00	124.0000	0.35
183	172	176	320.00	8.00	124.0000	0.35
185	176	178	990.00	8.00	124.0000	0.35
187	178	180	590.00	6.00	125.0000	0.35
189	176	182	580.00	8.00	124.0000	0.35
191	184	182	1050.00	8.00	124.0000	0.35
193	180	184	140.00	8.00	124.0000	0.35
195	180	186	150.00	12.00	124.0000	0.35
197	184	188	480.00	6.00	125.0000	0.35
199	190	188	220.00	6.00	125.0000	0.35
201	188	192	530.00	6.00	125.0000	0.35
203	192	196	200.00	6.00	125.0000	0.35
205	198	196	630.00	6.00	125.0000	0.35
207	146	198	400.00	6.00	125.0000	0.35
209	146	200	540.00	12.00	139.0000	0.35
211	200	198	700.00	4.00	125.0000	0.35
213	200	202	510.00	12.00	124.0000	0.35
215	202	204	190.00	12.00	139.0000	0.35
217	204	170	150.00	12.00	139.0000	0.35
219	170	186	830.00	12.00	124.0000	0.35
221	190	186	490.00	6.00	125.0000	0.35
223	194	190	340.00	6.00	125.0000	0.35
225	196	194	190.00	6.00	125.0000	0.35
227	204	214	260.00	12.00	139.0000	0.35
229	194	224	230.00	12.00	139.0000	0.35
231	O-PRV-5B	138	10.00	36.00	124.0000	0.00
233	Clearwell	I-PRV-5B	16000.00	36.00	124.0000	0.00
235	140	206	780.00	12.00	100.0000	0.00
237	206	208	850.00	12.00	100.0000	0.00
239	206	210	1600.00	6.00	125.0000	0.00

241	208	212	1590.00	6.00	125.0000	0.00
243	142	210	540.00	12.00	139.0000	0.00
245	210	212	840.00	12.00	139.0000	0.00
247	210	198	1050.00	6.00	125.0000	0.00
249	212	192	1070.00	6.00	125.0000	0.00
251	214	216	280.00	12.00	139.0000	0.00
253-XX	216	220	350.00	12.00	139.0000	0.00
255-XX	214	218	270.00	12.00	139.0000	0.00
257	218	220	390.00	12.00	139.0000	0.00
259	224	220	280.00	12.00	139.0000	0.00

N O D E D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
102		131.71	712.00	
104		131.71	708.00	
106		296.35	682.00	
108		296.35	663.00	
110		296.35	657.00	
112		296.35	659.00	
114		131.71	835.00	
116		131.71	819.00	
118		131.71	815.00	
120		131.71	735.00	
122		131.71	736.00	
124		131.71	795.00	
126		395.13	695.00	
128		131.71	695.00	
130		395.13	676.00	
132		395.13	673.00	
134		34.78	671.00	
136		34.78	665.00	
138		0.00	672.00	
140		395.13	673.00	
142		34.78	667.00	
146		1109.78	358.30	
148		34.78	653.00	
150		34.78	655.00	
152		34.78	654.00	
154		34.78	655.00	
156		34.78	656.00	
158		34.78	657.00	
160		34.78	663.00	
162		34.78	656.00	
168		34.78	658.00	
170		34.78	666.00	
172		34.78	671.00	
176		34.78	683.00	
178		34.78	684.00	
180		34.78	693.00	
182		34.78	748.00	
184		34.78	705.00	
186		34.78	689.00	
188		34.78	709.00	

190	34.78	702.00	
192	34.78	674.00	
194	34.78	677.00	
196	34.78	672.00	
198	34.78	665.00	
200	34.78	658.30	
202	34.78	660.00	
204	34.78	664.00	
206	395.13	692.00	
208	395.13	687.00	
210	34.78	667.00	
212	34.78	680.00	
214	36.31	676.00	
216	0.00	680.00	
218	0.00	686.00	
220	0.00	687.00	
224	36.31	680.00	
Clearwell	----	953.00	975.00
Lindley	----	905.00	928.00
O-PRV-5B	----	672.00	925.85
I-PRV-5B	0.00	672.00	

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
MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

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

NUMBER OF PIPES .....(P) = 80
NUMBER OF END NODES .....(J) = 58
NUMBER OF PRIMARY LOOPS .....(L) = 21
NUMBER OF SUPPLY NODES .....(F) = 2
NUMBER OF SUPPLY ZONES .....(Z) = 1

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Case: 1 – Existing Demands to Match Hydrant Flow Test Results

RESULTS OBTAINED AFTER 14 TRIALS: ACCURACY = 0.18532E-04

S I M U L A T I O N D E S C R I P T I O N (L A B E L)

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
101	Lindley	102	479.44	13.64	0.05	3.06	5.05	5.03
103	102	104	173.87	1.55	0.01	1.11	0.77	0.77
105	102	104	173.87	1.55	0.01	1.11	0.77	0.77
107	104	106	403.01	0.28	0.00	0.64	0.19	0.19
109	106	108	584.55	2.96	0.01	1.66	1.01	1.01
111	108	110	550.14	0.93	0.01	1.56	0.91	0.90
113	110	112	555.50	1.33	0.01	1.58	0.93	0.92
115	112	148	259.15	1.14	0.01	1.06	0.55	0.54
117	Lindley	114	878.76	0.47	0.01	1.11	0.46	0.45
119	114	116	747.05	0.03	0.00	0.45	0.06	0.06
121	116	118	615.34	2.80	0.08	3.93	8.23	7.99
123	118	120	483.63	8.70	0.05	3.09	5.15	5.12
125	120	124	318.70	2.93	0.02	2.03	2.38	2.36
127	124	104	186.99	0.15	0.00	0.53	0.10	0.10
129	120	122	33.22	0.01	0.00	0.21	0.04	0.04
131	122	126	-98.49	0.41	0.00	0.63	0.27	0.27
133	126	128	609.60	3.54	0.02	1.73	1.10	1.09
135	128	106	477.89	0.23	0.00	0.76	0.17	0.17
137	126	130	-1103.22	1.76	0.01	1.39	0.69	0.69
139	130	108	261.93	8.51	0.02	1.67	1.65	1.64
141	130	132	-1760.28	2.33	0.03	2.22	1.65	1.63
143	132	110	301.72	11.81	0.02	1.93	2.14	2.14
145	132	134	-2457.13	4.39	0.05	3.10	3.06	3.02
147	138	134	3035.01	0.94	0.08	3.83	4.85	4.47
149	134	136	543.10	11.72	0.07	3.47	6.47	6.44
151	136	142	508.32	1.73	0.02	2.08	1.95	1.92
153	138	140	2608.94	3.04	0.06	3.29	3.45	3.38
155	140	142	1026.00	11.36	0.10	4.19	7.11	7.05
157	142	146	1417.98	4.53	0.09	4.02	4.36	4.28
159	148	150	179.85	0.01	0.00	0.29	0.03	0.03
161	150	152	101.94	0.04	0.00	0.42	0.10	0.10
163	152	154	67.16	0.02	0.00	0.27	0.05	0.05
165	148	156	44.52	0.02	0.00	0.18	0.02	0.02
167	150	158	43.13	0.02	0.00	0.18	0.02	0.02
169	154	160	32.38	0.01	0.00	0.13	0.01	0.01
171	156	162	-27.00	0.01	0.00	0.17	0.03	0.02
173	162	168	-61.78	0.02	0.00	0.25	0.04	0.04
175	168	170	-96.56	0.06	0.00	0.39	0.07	0.07
177	156	158	36.75	0.01	0.00	0.23	0.05	0.04
179	158	160	45.10	0.06	0.00	0.29	0.06	0.06
181	160	172	42.70	0.04	0.00	0.27	0.06	0.06
183	172	176	7.92	0.00	0.00	0.05	0.00	0.00
185	176	178	-5.36	0.00	0.00	0.03	0.00	0.00

187	178	180	-40.14	0.12	0.00	0.46	0.21	0.21
189	176	182	-21.51	0.01	0.00	0.14	0.02	0.02
191	184	182	56.29	0.10	0.00	0.36	0.10	0.10
193	180	184	52.59	0.01	0.00	0.34	0.09	0.09
195	180	186	-127.50	0.01	0.00	0.36	0.07	0.06
197	184	188	-38.48	0.09	0.00	0.44	0.19	0.19
199	190	188	-19.17	0.01	0.00	0.22	0.05	0.05
201	188	192	-92.43	0.51	0.01	1.05	0.98	0.97
203	192	196	79.33	0.15	0.00	0.90	0.75	0.73
205	198	196	71.84	0.38	0.00	0.82	0.61	0.61
207	146	198	-71.00	0.24	0.00	0.81	0.60	0.59
209	146	200	379.21	0.20	0.01	1.08	0.38	0.37
211	200	198	-25.38	0.45	0.00	0.65	0.64	0.64
213	200	202	369.81	0.22	0.01	1.05	0.45	0.44
215	202	204	335.03	0.06	0.00	0.95	0.32	0.30
217	204	170	263.94	0.03	0.00	0.75	0.21	0.19
219	170	186	132.60	0.05	0.00	0.38	0.07	0.07
221	190	186	29.69	0.06	0.00	0.34	0.12	0.12
223	194	190	45.30	0.09	0.00	0.51	0.26	0.26
225	196	194	116.39	0.28	0.01	1.32	1.53	1.49
227	204	214	36.31	0.00	0.00	0.10	0.01	0.00
229	194	224	36.31	0.00	0.00	0.10	0.01	0.00
231	O-PRV-5B	138	5643.94	0.00	0.00	1.78	0.32	0.32
233	Clearwell	I-PRV-5B	5643.94	5.18	0.00	1.78	0.32	0.32
235	140	206	1187.80	4.42	0.00	3.37	5.67	5.67
237	206	208	583.45	1.29	0.00	1.66	1.52	1.52
239	206	210	209.23	7.04	0.00	2.37	4.40	4.40
241	208	212	188.32	5.76	0.00	2.14	3.62	3.62
243	142	210	81.56	0.01	0.00	0.23	0.02	0.02
245	210	212	53.00	0.01	0.00	0.15	0.01	0.01
247	210	198	203.00	4.37	0.00	2.30	4.16	4.16
249	212	192	206.54	4.60	0.00	2.34	4.30	4.30
251	214	216	0.00	0.00	0.00	0.00	0.00	0.00
253-XX	216	220						
255-XX	214	218						
257	218	220	0.00	0.00	0.00	0.00	0.00	0.00
259	224	220	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
102		131.71	914.31	712.00	202.31	87.67
104		131.71	912.75	708.00	204.75	88.73
106		296.35	912.47	682.00	230.47	99.87
108		296.35	909.50	663.00	246.50	106.82
110		296.35	908.56	657.00	251.56	109.01
112		296.35	907.21	659.00	248.21	107.56
114		131.71	927.52	835.00	92.52	40.09
116		131.71	927.49	819.00	108.49	47.01
118		131.71	924.61	815.00	109.61	47.50
120		131.71	915.86	735.00	180.86	78.37
122		131.71	915.85	736.00	179.85	77.93
124		131.71	912.91	795.00	117.91	51.09
126		395.13	916.26	695.00	221.26	95.88
128		131.71	912.70	695.00	217.70	94.34
130		395.13	918.03	676.00	242.03	104.88
132		395.13	920.39	673.00	247.39	107.20

134	34.78	924.82	671.00	253.82	109.99
136	34.78	913.04	665.00	248.04	107.49
138	0.00	925.84	672.00	253.84	110.00
140	395.13	922.74	673.00	249.74	108.22
142	34.78	911.29	667.00	244.29	105.86
146	1109.78	906.67	358.30	548.37	237.63
148	34.78	906.07	653.00	253.07	109.66
150	34.78	906.06	655.00	251.06	108.79
152	34.78	906.02	654.00	252.02	109.21
154	34.78	906.00	655.00	251.00	108.77
156	34.78	906.05	656.00	250.05	108.36
158	34.78	906.04	657.00	249.04	107.92
160	34.78	905.99	663.00	242.99	105.29
162	34.78	906.06	656.00	250.06	108.36
168	34.78	906.08	658.00	248.08	107.50
170	34.78	906.14	666.00	240.14	104.06
172	34.78	905.95	671.00	234.95	101.81
176	34.78	905.95	683.00	222.95	96.61
178	34.78	905.95	684.00	221.95	96.18
180	34.78	906.07	693.00	213.07	92.33
182	34.78	905.96	748.00	157.96	68.45
184	34.78	906.06	705.00	201.06	87.13
186	34.78	906.08	689.00	217.08	94.07
188	34.78	906.15	709.00	197.15	85.43
190	34.78	906.14	702.00	204.14	88.46
192	34.78	906.67	674.00	232.67	100.83
194	34.78	906.23	677.00	229.23	99.33
196	34.78	906.52	672.00	234.52	101.63
198	34.78	906.91	665.00	241.91	104.83
200	34.78	906.46	658.30	248.16	107.54
202	34.78	906.23	660.00	246.23	106.70
204	34.78	906.17	664.00	242.17	104.94
206	395.13	918.32	692.00	226.32	98.07
208	395.13	917.03	687.00	230.03	99.68
210	34.78	911.28	667.00	244.28	105.85
212	34.78	911.27	680.00	231.27	100.22
214	36.31	906.17	676.00	230.17	99.74
216	0.00	906.17	680.00	226.17	98.01
218	0.00	906.23	686.00	220.23	95.43
220	0.00	906.23	687.00	219.23	95.00
224	36.31	906.23	680.00	226.23	98.03
Clearwell	----	975.00	953.00	22.00	9.53
Lindley	----	928.00	905.00	23.00	9.97
O-PRV-5B	----	925.85	672.00	253.85	110.00
I-PRV-5B	0.00	969.82	672.00	297.82	129.05

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
146	237.63	Clearwell	9.53
I-PRV-5B	129.05	Lindley	9.97
O-PRV-5B	110.00	114	40.09
138	110.00	116	47.01
134	109.99	118	47.50

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
155	4.19	185	0.03
157	4.02	183	0.05
121	3.93	227	0.10
147	3.83	229	0.10
149	3.47	169	0.13

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
121	8.23	185	0.00
155	7.11	183	0.00
149	6.47	227	0.01
235	5.67	229	0.01
123	5.15	245	0.01

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
121	7.99	185	0.00
155	7.05	183	0.00
149	6.44	227	0.00
235	5.67	229	0.00
123	5.12	245	0.01

R E G U L A T I N G V A L V E R E P O R T

VALVE LABEL	VALVE TYPE	VALVE SETTING psi or gpm	VALVE STATUS	UPSTREAM PRESSURE psi	DOWNSTREAM PRESSURE psi	THROUGH FLOW gpm
PRV-5B	PRV-1	110.00	ACTIVATED	129.05	110.00	5643.94

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
Clearwell	5643.94	
Lindley	1358.20	

NET SYSTEM INFLOW = 7002.15
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 7002.14

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Case: 2 – Existing Average Day Demands

C H A N G E S F O R N E X T S I M U L A T I O N (Change Number = 1)

JUNCTION DEMANDS CHANGED - PLEASE SEE RESULTS TABL

RESULTS OBTAINED AFTER 9 TRIALS: ACCURACY = 0.87736E-04

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
101	Lindley	102	429.75	11.14	0.04	2.74	4.13	4.11
103	102	104	149.02	1.16	0.00	0.95	0.58	0.58
105	102	104	149.02	1.16	0.00	0.95	0.58	0.58
107	104	106	296.13	0.16	0.00	0.47	0.11	0.11
109	106	108	366.65	1.25	0.01	1.04	0.43	0.43
111	108	110	272.24	0.25	0.00	0.77	0.25	0.25
113	110	112	210.96	0.22	0.00	0.60	0.15	0.15
115	112	148	-85.39	0.15	0.00	0.35	0.07	0.07
117	Lindley	114	832.72	0.42	0.01	1.05	0.41	0.41
119	114	116	701.01	0.03	0.00	0.42	0.05	0.05
121	116	118	569.30	2.42	0.07	3.63	7.13	6.92
123	118	120	437.59	7.23	0.04	2.79	4.28	4.25
125	120	124	261.51	2.03	0.02	1.67	1.65	1.64
127	124	104	129.80	0.08	0.00	0.37	0.05	0.05
129	120	122	44.38	0.02	0.00	0.28	0.06	0.06
131	122	126	-87.33	0.33	0.00	0.56	0.22	0.21
133	126	128	498.58	2.44	0.01	1.41	0.75	0.75
135	128	106	366.87	0.14	0.00	0.59	0.11	0.10
137	126	130	-981.04	1.41	0.01	1.24	0.56	0.55
139	130	108	201.94	5.26	0.01	1.29	1.02	1.02
141	130	132	-1578.12	1.90	0.02	1.99	1.35	1.33
143	132	110	235.07	7.44	0.01	1.50	1.35	1.34
145	132	134	-2208.32	3.60	0.04	2.78	2.51	2.48
147	138	134	2610.25	0.71	0.06	3.29	3.66	3.38
149	134	136	367.16	5.67	0.03	2.34	3.13	3.12
151	136	142	332.38	0.79	0.01	1.36	0.89	0.87
153	138	140	2056.74	1.96	0.04	2.59	2.22	2.18
155	140	142	675.33	5.23	0.04	2.76	3.28	3.25
157	142	146	811.55	1.61	0.03	2.30	1.55	1.52
159	148	150	-9.01	0.00	0.00	0.01	0.00	0.00
161	150	152	13.84	0.00	0.00	0.06	0.00	0.00
163	152	154	-20.94	0.00	0.00	0.09	0.01	0.01
165	148	156	-111.16	0.09	0.00	0.45	0.09	0.09
167	150	158	-57.63	0.04	0.00	0.24	0.03	0.03
169	154	160	-55.72	0.03	0.00	0.23	0.03	0.03
171	156	162	-239.39	0.30	0.01	1.53	1.47	1.41
173	162	168	-274.17	0.33	0.01	1.12	0.62	0.61
175	168	170	-308.95	0.50	0.01	1.26	0.63	0.62
177	156	158	93.45	0.06	0.00	0.60	0.26	0.25
179	158	160	1.04	0.00	0.00	0.01	0.00	0.00
181	160	172	-89.46	0.14	0.00	0.57	0.23	0.23
183	172	176	-124.24	0.13	0.00	0.79	0.43	0.42
185	176	178	-60.48	0.11	0.00	0.39	0.11	0.11

187	178	180	-95.26	0.60	0.01	1.08	1.04	1.02
189	176	182	-98.53	0.16	0.00	0.63	0.28	0.27
191	184	182	133.31	0.50	0.00	0.85	0.48	0.48
193	180	184	116.98	0.05	0.00	0.75	0.40	0.37
195	180	186	-247.02	0.03	0.00	0.70	0.23	0.21
197	184	188	-51.12	0.16	0.00	0.58	0.33	0.32
199	190	188	-7.58	0.00	0.00	0.09	0.01	0.01
201	188	192	-93.48	0.52	0.01	1.06	1.00	0.99
203	192	196	33.51	0.03	0.00	0.38	0.15	0.15
205	198	196	131.13	1.17	0.01	1.49	1.87	1.85
207	146	198	65.41	0.20	0.00	0.74	0.52	0.51
209	146	200	709.04	0.64	0.02	2.01	1.23	1.19
211	200	198	-25.57	0.45	0.00	0.65	0.65	0.65
213	200	202	699.83	0.73	0.02	1.99	1.47	1.43
215	202	204	665.05	0.20	0.02	1.89	1.15	1.05
217	204	170	593.96	0.13	0.02	1.68	0.96	0.85
219	170	186	250.22	0.18	0.00	0.71	0.22	0.21
221	190	186	31.58	0.06	0.00	0.36	0.13	0.13
223	194	190	58.77	0.14	0.00	0.67	0.43	0.42
225	196	194	129.86	0.35	0.01	1.47	1.88	1.82
227	204	214	36.31	0.00	0.00	0.10	0.01	0.00
229	194	224	36.31	0.00	0.00	0.10	0.01	0.00
231	O-PRV-5B	138	4666.99	0.00	0.00	1.47	0.23	0.23
233	Clearwell	I-PRV-5B	4666.99	3.65	0.00	1.47	0.23	0.23
235	140	206	986.27	3.13	0.00	2.80	4.02	4.02
237	206	208	479.98	0.90	0.00	1.36	1.06	1.06
239	206	210	111.17	2.18	0.00	1.26	1.36	1.36
241	208	212	84.85	1.32	0.00	0.96	0.83	0.83
243	142	210	161.38	0.04	0.00	0.46	0.08	0.08
245	210	212	111.70	0.03	0.00	0.32	0.04	0.04
247	210	198	126.06	1.81	0.00	1.43	1.72	1.72
249	212	192	161.77	2.92	0.00	1.84	2.73	2.73
251	214	216	0.00	0.00	0.00	0.00	0.00	0.00
253-XX	216	220						
255-XX	214	218						
257	218	220	0.00	0.00	0.00	0.00	0.00	0.00
259	224	220	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
102		131.71	916.82	712.00	204.82	88.75
104		131.71	915.65	708.00	207.65	89.98
106		296.35	915.49	682.00	233.49	101.18
108		296.35	914.24	663.00	251.24	108.87
110		296.35	913.98	657.00	256.98	111.36
112		296.35	913.76	659.00	254.76	110.40
114		131.71	927.57	835.00	92.57	40.11
116		131.71	927.54	819.00	108.54	47.03
118		131.71	925.04	815.00	110.04	47.69
120		131.71	917.78	735.00	182.78	79.20
122		131.71	917.75	736.00	181.75	78.76
124		131.71	915.73	795.00	120.73	52.32
126		395.13	918.08	695.00	223.08	96.67
128		131.71	915.63	695.00	220.63	95.61
130		395.13	919.51	676.00	243.51	105.52

132	395.13	921.43	673.00	248.43	107.65
134	34.78	925.07	671.00	254.07	110.10
136	34.78	919.37	665.00	254.37	110.23
138	0.00	925.84	672.00	253.84	110.00
140	395.13	923.85	673.00	250.85	108.70
142	34.78	918.57	667.00	251.57	109.02
146	37.09(0.03)	916.93	358.30	558.63	242.07
148	34.78	913.91	653.00	260.91	113.06
150	34.78	913.91	655.00	258.91	112.19
152	34.78	913.91	654.00	259.91	112.63
154	34.78	913.91	655.00	258.91	112.19
156	34.78	914.00	656.00	258.00	111.80
158	34.78	913.94	657.00	256.94	111.34
160	34.78	913.94	663.00	250.94	108.74
162	34.78	914.31	656.00	258.31	111.93
168	34.78	914.65	658.00	256.65	111.21
170	34.78	915.16	666.00	249.16	107.97
172	34.78	914.09	671.00	243.09	105.34
176	34.78	914.22	683.00	231.22	100.20
178	34.78	914.33	684.00	230.33	99.81
180	34.78	914.94	693.00	221.94	96.18
182	34.78	914.38	748.00	166.38	72.10
184	34.78	914.89	705.00	209.89	90.95
186	34.78	914.98	689.00	225.98	97.92
188	34.78	915.05	709.00	206.05	89.29
190	34.78	915.04	702.00	213.04	92.32
192	34.78	915.58	674.00	241.58	104.68
194	34.78	915.19	677.00	238.19	103.21
196	34.78	915.55	672.00	243.55	105.54
198	34.78	916.72	665.00	251.72	109.08
200	34.78	916.27	658.30	257.97	111.79
202	34.78	915.52	660.00	255.52	110.73
204	34.78	915.30	664.00	251.30	108.90
206	395.13	920.72	692.00	228.72	99.11
208	395.13	919.82	687.00	232.82	100.89
210	34.78	918.53	667.00	251.53	109.00
212	34.78	918.50	680.00	238.50	103.35
214	36.31	915.30	676.00	239.30	103.70
216	0.00	915.30	680.00	235.30	101.96
218	0.00	915.19	686.00	229.19	99.31
220	0.00	915.19	687.00	228.19	98.88
224	36.31	915.19	680.00	235.19	101.91
Clearwell	----	975.00	953.00	22.00	9.53
Lindley	----	928.00	905.00	23.00	9.97
O-PRV-5B	----	925.85	672.00	253.85	110.00
I-PRV-5B	0.00	971.35	672.00	299.35	129.72

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
146	242.07	Clearwell	9.53
I-PRV-5B	129.72	Lindley	9.97
148	113.06	114	40.11
152	112.63	116	47.03
154	112.19	118	47.69

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
121	3.63	179	0.01
147	3.29	159	0.01
235	2.80	161	0.06
123	2.79	163	0.09
145	2.78	199	0.09

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
121	7.13	179	0.00
123	4.28	159	0.00
101	4.13	161	0.00
235	4.02	227	0.01
147	3.66	229	0.01

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
121	6.92	179	0.00
123	4.25	159	0.00
101	4.11	161	0.00
235	4.02	227	0.00
147	3.38	229	0.00

R E G U L A T I N G V A L V E R E P O R T

VALVE LABEL	VALVE TYPE	VALVE SETTING psi or gpm	VALVE STATUS	UPSTREAM PRESSURE psi	DOWNSTREAM PRESSURE psi	THROUGH FLOW gpm
PRV-5B	PRV-1	110.00	ACTIVATED	129.72	110.00	4666.99

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
Clearwell	4666.99	
Lindley	1262.47	

NET SYSTEM INFLOW = 5929.46
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 5929.45

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Case: 3 – Proposed Average Day Demands

C H A N G E S F O R N E X T S I M U L A T I O N (Change Number = 2)

JUNCTION DEMANDS CHANGED - PLEASE SEE RESULTS TABLE

Pipe 221 has a new DIAMETER of..... 12.000
Pipe 223 has a new DIAMETER of..... 12.000
Pipe 253 is OPENED
Pipe 255 is OPENED

RESULTS OBTAINED AFTER 9 TRIALS: ACCURACY = 0.97442E-04

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
101	Lindley	102	431.84	11.24	0.04	2.76	4.16	4.15
103	102	104	150.06	1.18	0.00	0.96	0.59	0.59
105	102	104	150.06	1.18	0.00	0.96	0.59	0.59
107	104	106	300.66	0.16	0.00	0.48	0.11	0.11
109	106	108	375.94	1.31	0.01	1.07	0.45	0.45
111	108	110	284.02	0.27	0.00	0.81	0.27	0.27
113	110	112	225.43	0.25	0.00	0.64	0.17	0.17
115	112	148	-70.92	0.10	0.00	0.29	0.05	0.05
117	Lindley	114	834.66	0.43	0.01	1.05	0.42	0.41
119	114	116	702.95	0.03	0.00	0.42	0.05	0.05
121	116	118	571.24	2.44	0.07	3.65	7.17	6.96
123	118	120	439.53	7.29	0.04	2.81	4.31	4.29
125	120	124	263.95	2.07	0.02	1.68	1.68	1.67
127	124	104	132.24	0.08	0.00	0.38	0.05	0.05
129	120	122	43.87	0.02	0.00	0.28	0.06	0.06
131	122	126	-87.84	0.33	0.00	0.56	0.22	0.22
133	126	128	503.34	2.49	0.01	1.43	0.77	0.76
135	128	106	371.63	0.14	0.00	0.59	0.11	0.11
137	126	130	-986.32	1.43	0.01	1.24	0.56	0.56
139	130	108	204.43	5.38	0.01	1.30	1.04	1.04
141	130	132	-1585.87	1.92	0.02	2.00	1.36	1.34
143	132	110	237.76	7.60	0.01	1.52	1.38	1.37
145	132	134	-2218.77	3.63	0.04	2.80	2.53	2.50
147	138	134	2627.66	0.72	0.06	3.31	3.71	3.42
149	134	136	374.12	5.87	0.03	2.39	3.24	3.23
151	136	142	339.34	0.82	0.01	1.39	0.92	0.91
153	138	140	2079.18	2.00	0.04	2.62	2.26	2.22
155	140	142	689.17	5.43	0.04	2.82	3.40	3.38
157	142	146	835.09	1.70	0.03	2.37	1.63	1.60
159	148	150	-2.29	0.00	0.00	0.00	0.00	0.00
161	150	152	16.66	0.00	0.00	0.07	0.00	0.00
163	152	154	-18.12	0.00	0.00	0.07	0.00	0.00
165	148	156	-103.41	0.08	0.00	0.42	0.08	0.08
167	150	158	-53.73	0.03	0.00	0.22	0.03	0.03

169	154	160	-52.90	0.03	0.00	0.22	0.03	0.03
171	156	162	-225.02	0.26	0.01	1.44	1.31	1.26
173	162	168	-259.80	0.30	0.01	1.06	0.57	0.55
175	168	170	-294.58	0.46	0.01	1.20	0.58	0.57
177	156	158	86.83	0.05	0.00	0.55	0.22	0.22
179	158	160	-1.68	0.00	0.00	0.01	0.00	0.00
181	160	172	-89.36	0.14	0.00	0.57	0.23	0.23
183	172	176	-124.14	0.13	0.00	0.79	0.43	0.42
185	176	178	-60.52	0.11	0.00	0.39	0.11	0.11
187	178	180	-95.30	0.61	0.01	1.08	1.04	1.03
189	176	182	-98.40	0.16	0.00	0.63	0.28	0.27
191	184	182	133.18	0.50	0.00	0.85	0.48	0.48
193	180	184	119.21	0.05	0.00	0.76	0.41	0.39
195	180	186	-249.29	0.03	0.00	0.71	0.23	0.21
197	184	188	-48.75	0.14	0.00	0.55	0.30	0.30
199	190	188	-6.22	0.00	0.00	0.07	0.01	0.01
201	188	192	-89.75	0.49	0.01	1.02	0.93	0.92
203	192	196	39.91	0.04	0.00	0.45	0.21	0.20
205	198	196	132.02	1.18	0.01	1.50	1.89	1.88
207	146	198	64.54	0.20	0.00	0.73	0.51	0.50
209	146	200	733.47	0.68	0.02	2.08	1.31	1.26
211	200	198	-26.99	0.50	0.00	0.69	0.72	0.71
213	200	202	725.68	0.78	0.02	2.06	1.57	1.53
215	202	204	690.90	0.21	0.02	1.96	1.24	1.13
217	204	170	470.71	0.08	0.01	1.34	0.62	0.55
219	170	186	141.35	0.06	0.00	0.40	0.07	0.07
221	190	186	142.72	0.04	0.01	0.40	0.10	0.07
223	194	190	171.28	0.04	0.02	0.49	0.16	0.10
225	196	194	137.15	0.38	0.01	1.56	2.08	2.01
227	204	214	185.41	0.03	0.00	0.53	0.10	0.10
229	194	224	-68.91	0.00	0.00	0.20	0.02	0.02
231	O-PRV-5B	138	4706.84	0.00	0.00	1.48	0.23	0.23
233	Clearwell	I-PRV-5B	4706.84	3.70	0.00	1.48	0.23	0.23
235	140	206	994.88	3.19	0.00	2.82	4.08	4.08
237	206	208	484.52	0.92	0.00	1.37	1.08	1.08
239	206	210	115.23	2.33	0.00	1.31	1.46	1.46
241	208	212	89.39	1.45	0.00	1.01	0.91	0.91
243	142	210	158.64	0.04	0.00	0.45	0.07	0.07
245	210	212	109.83	0.03	0.00	0.31	0.04	0.04
247	210	198	129.25	1.89	0.00	1.47	1.80	1.80
249	212	192	164.44	3.01	0.00	1.87	2.82	2.82
251	214	216	81.50	0.01	0.00	0.23	0.02	0.02
253	216	220	58.20	0.00	0.00	0.17	0.01	0.01
255	214	218	80.61	0.01	0.00	0.23	0.02	0.02
257	218	220	57.31	0.00	0.00	0.16	0.01	0.01
259	224	220	-92.21	0.01	0.00	0.26	0.03	0.03

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
102		131.71	916.72	712.00	204.72	88.71
104		131.71	915.53	708.00	207.53	89.93
106		296.35	915.37	682.00	233.37	101.13
108		296.35	914.06	663.00	251.06	108.79
110		296.35	913.78	657.00	256.78	111.27

112	296.35	913.53	659.00	254.53	110.30
114	131.71	927.57	835.00	92.57	40.11
116	131.71	927.54	819.00	108.54	47.03
118	131.71	925.03	815.00	110.03	47.68
120	131.71	917.70	735.00	182.70	79.17
122	131.71	917.68	736.00	181.68	78.73
124	131.71	915.62	795.00	120.62	52.27
126	395.13	918.01	695.00	223.01	96.64
128	131.71	915.52	695.00	220.52	95.56
130	395.13	919.45	676.00	243.45	105.49
132	395.13	921.39	673.00	248.39	107.64
134	34.78	925.07	671.00	254.07	110.09
136	34.78	919.16	665.00	254.16	110.14
138	0.00	925.84	672.00	253.84	110.00
140	395.13	923.81	673.00	250.81	108.68
142	34.78	918.33	667.00	251.33	108.91
146	37.09(0.03)	916.60	358.30	558.30	241.93
148	34.78	913.63	653.00	260.63	112.94
150	34.78	913.63	655.00	258.63	112.07
152	34.78	913.63	654.00	259.63	112.51
154	34.78	913.63	655.00	258.63	112.07
156	34.78	913.72	656.00	257.72	111.68
158	34.78	913.67	657.00	256.67	111.22
160	34.78	913.67	663.00	250.67	108.62
162	34.78	913.99	656.00	257.99	111.80
168	34.78	914.30	658.00	256.30	111.06
170	34.78	914.76	666.00	248.76	107.80
172	34.78	913.81	671.00	242.81	105.22
176	34.78	913.95	683.00	230.95	100.08
178	34.78	914.06	684.00	230.06	99.69
180	34.78	914.67	693.00	221.67	96.06
182	34.78	914.11	748.00	166.11	71.98
184	34.78	914.61	705.00	209.61	90.83
186	34.78	914.70	689.00	225.70	97.80
188	34.78	914.75	709.00	205.75	89.16
190	34.78	914.75	702.00	212.75	92.19
192	34.78	915.25	674.00	241.25	104.54
194	34.78	914.81	677.00	237.81	103.05
196	34.78	915.20	672.00	243.20	105.39
198	34.78	916.40	665.00	251.40	108.94
200	34.78	915.89	658.30	257.59	111.62
202	34.78	915.09	660.00	255.09	110.54
204	34.78	914.86	664.00	250.86	108.70
206	395.13	920.62	692.00	228.62	99.07
208	395.13	919.71	687.00	232.71	100.84
210	34.78	918.29	667.00	251.29	108.89
212	34.78	918.26	680.00	238.26	103.25
214	23.30(0.64)	914.83	676.00	238.83	103.49
216	23.30	914.82	680.00	234.82	101.76
218	23.30	914.82	686.00	228.82	99.16
220	23.30	914.82	687.00	227.82	98.72
224	23.30(0.64)	914.81	680.00	234.81	101.75
Clearwell	----	975.00	953.00	22.00	9.53
Lindley	----	928.00	905.00	23.00	9.97
O-PRV-5B	----	925.85	672.00	253.85	110.00
I-PRV-5B	0.00	971.30	672.00	299.30	129.70

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
146	241.93	Clearwell	9.53
I-PRV-5B	129.70	Lindley	9.97
148	112.94	114	40.11
152	112.51	116	47.03
154	112.07	118	47.68

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
121	3.65	159	0.00
147	3.31	179	0.01
235	2.82	161	0.07
155	2.82	199	0.07
123	2.81	163	0.07

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
121	7.17	159	0.00
123	4.31	179	0.00
101	4.16	161	0.00
235	4.08	163	0.00
147	3.71	199	0.01

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
121	6.96	159	0.00
123	4.29	179	0.00
101	4.15	161	0.00
235	4.08	163	0.00
147	3.42	199	0.01

R E G U L A T I N G V A L V E R E P O R T

VALVE LABEL	VALVE TYPE	VALVE SETTING psi or gpm	VALVE STATUS	UPSTREAM PRESSURE psi	DOWNSTREAM PRESSURE psi	THROUGH FLOW gpm
PRV-5B	PRV-1	110.00	ACTIVATED	129.70	110.00	4706.84

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
Clearwell	4706.84	
Lindley	1266.50	

NET SYSTEM INFLOW = 5973.34
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 5973.33

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Case: 4 – Proposed Maximum Day Demands

C H A N G E S F O R N E X T S I M U L A T I O N (Change Number = 3)

JUNCTION DEMANDS CHANGED - PLEASE SEE RESULTS TABLE

Pipe 221 has a new DIAMETER of..... 12.000
Pipe 223 has a new DIAMETER of..... 12.000

RESULTS OBTAINED AFTER 11 TRIALS: ACCURACY = 0.44954E-06

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
101	Lindley	102	743.34	30.74	0.12	4.74	11.39	11.34
103	102	104	253.13	3.10	0.01	1.62	1.55	1.54
105	102	104	253.13	3.10	0.01	1.62	1.55	1.54
107	104	106	499.83	0.42	0.00	0.80	0.28	0.28
109	106	108	651.43	3.61	0.02	1.85	1.24	1.23
111	108	110	489.01	0.75	0.01	1.39	0.74	0.72
113	110	112	387.64	0.68	0.01	1.10	0.48	0.47
115	112	148	-145.79	0.39	0.00	0.60	0.19	0.19
117	Lindley	114	1457.64	1.20	0.02	1.84	1.17	1.15
119	114	116	1220.56	0.08	0.00	0.74	0.14	0.14
121	116	118	983.48	6.67	0.21	6.28	19.66	19.05
123	118	120	746.40	19.43	0.12	4.76	11.50	11.43
125	120	124	467.72	5.96	0.05	2.99	4.85	4.81
127	124	104	230.65	0.23	0.00	0.65	0.15	0.15
129	120	122	41.60	0.02	0.00	0.27	0.06	0.05
131	122	126	-195.48	1.46	0.01	1.25	0.96	0.96
133	126	128	922.11	7.63	0.04	2.62	2.36	2.35
135	128	106	685.03	0.44	0.01	1.09	0.34	0.33
137	126	130	-1828.82	4.48	0.03	2.31	1.76	1.75
139	130	108	371.01	16.22	0.03	2.37	3.14	3.13
141	130	132	-2911.07	5.92	0.07	3.67	4.19	4.14
143	132	110	432.06	22.96	0.04	2.76	4.16	4.15
145	132	134	-4054.36	11.09	0.14	5.11	7.74	7.65
147	138	134	4793.86	2.19	0.20	6.04	11.37	10.43
149	134	136	676.90	17.62	0.10	4.32	9.73	9.68
151	136	142	614.30	2.46	0.03	2.51	2.77	2.73
153	138	140	3757.17	5.98	0.12	4.74	6.78	6.64
155	140	142	1249.36	16.35	0.14	5.10	10.25	10.16
157	142	146	1516.10	5.13	0.10	4.30	4.94	4.84
159	148	150	-15.02	0.00	0.00	0.02	0.00	0.00
161	150	152	25.13	0.00	0.00	0.10	0.01	0.01
163	152	154	-37.47	0.01	0.00	0.15	0.02	0.02
165	148	156	-193.37	0.26	0.00	0.79	0.26	0.26
167	150	158	-102.76	0.10	0.00	0.42	0.10	0.10
169	154	160	-100.07	0.10	0.00	0.41	0.10	0.09
171	156	162	-415.91	0.82	0.04	2.65	4.11	3.93

173	162	168	-478.51	0.93	0.02	1.95	1.76	1.72
175	168	170	-541.12	1.41	0.03	2.21	1.78	1.75
177	156	158	159.93	0.15	0.01	1.02	0.69	0.67
179	158	160	-5.43	0.00	0.00	0.03	0.00	0.00
181	160	172	-168.10	0.45	0.01	1.07	0.74	0.73
183	172	176	-230.71	0.42	0.01	1.47	1.36	1.32
185	176	178	-111.92	0.34	0.00	0.71	0.35	0.35
187	178	180	-174.53	1.86	0.02	1.98	3.18	3.14
189	176	182	-181.39	0.49	0.01	1.16	0.86	0.84
191	184	182	243.99	1.54	0.01	1.56	1.48	1.46
193	180	184	217.18	0.17	0.01	1.39	1.25	1.18
195	180	186	-454.31	0.10	0.01	1.29	0.70	0.64
197	184	188	-89.42	0.44	0.01	1.01	0.92	0.91
199	190	188	-11.86	0.00	0.00	0.13	0.02	0.02
201	188	192	-163.88	1.48	0.02	1.86	2.83	2.80
203	192	196	72.49	0.12	0.00	0.82	0.64	0.62
205	198	196	240.07	3.58	0.04	2.72	5.74	5.68
207	146	198	116.97	0.60	0.01	1.33	1.52	1.50
209	146	200	1332.37	2.06	0.08	3.78	3.96	3.81
211	200	198	-49.17	1.52	0.01	1.26	2.18	2.17
213	200	202	1318.93	2.36	0.08	3.74	4.77	4.62
215	202	204	1256.33	0.65	0.07	3.56	3.78	3.42
217	204	170	860.79	0.25	0.03	2.44	1.91	1.70
219	170	186	257.07	0.19	0.00	0.73	0.23	0.22
221	190	186	259.85	0.11	0.05	0.74	0.32	0.22
223	194	190	310.59	0.11	0.07	0.88	0.51	0.31
225	196	194	249.96	1.16	0.04	2.84	6.35	6.12
227	204	214	332.93	0.08	0.00	0.94	0.31	0.29
229	194	224	-123.23	0.01	0.00	0.35	0.05	0.05
231	O-PRV-5B	138	8551.03	0.01	0.00	2.70	0.70	0.70
233	Clearwell	I-PRV-5B	8551.03	11.19	0.00	2.70	0.70	0.70
235	140	206	1796.57	9.52	0.00	5.10	12.20	12.20
237	206	208	875.19	2.74	0.00	2.48	3.22	3.22
239	206	210	210.15	7.10	0.00	2.38	4.44	4.44
241	208	212	163.95	4.45	0.00	1.86	2.80	2.80
243	142	210	284.96	0.12	0.00	0.81	0.22	0.22
245	210	212	197.63	0.09	0.00	0.56	0.11	0.11
247	210	198	234.87	5.72	0.00	2.66	5.45	5.45
249	212	192	298.98	9.12	0.00	3.39	8.52	8.52
251	214	216	146.30	0.02	0.00	0.42	0.06	0.06
253	216	220	104.36	0.01	0.00	0.30	0.03	0.03
255	214	218	144.69	0.02	0.00	0.41	0.06	0.06
257	218	220	102.75	0.01	0.00	0.29	0.03	0.03
259	224	220	-165.17	0.02	0.00	0.47	0.08	0.08

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
102		237.08(1.80)	897.14	712.00	185.14	80.23
104		237.08(1.80)	894.03	708.00	186.03	80.61
106		533.43(1.80)	893.61	682.00	211.61	91.70
108		533.43(1.80)	889.98	663.00	226.98	98.36
110		533.43(1.80)	889.22	657.00	232.22	100.63
112		533.43(1.80)	888.53	659.00	229.53	99.46
114		237.08(1.80)	926.79	835.00	91.79	39.77

116	237.08(1.80)	926.70	819.00	107.70	46.67
118	237.08(1.80)	919.82	815.00	104.82	45.42
120	237.08(1.80)	900.27	735.00	165.27	71.62
122	237.08(1.80)	900.25	736.00	164.25	71.17
124	237.08(1.80)	894.25	795.00	99.25	43.01
126	711.23(1.80)	901.72	695.00	206.72	89.58
128	237.08(1.80)	894.05	695.00	199.05	86.26
130	711.23(1.80)	906.23	676.00	230.23	99.77
132	711.23(1.80)	912.22	673.00	239.22	103.66
134	62.60(1.80)	923.45	671.00	252.45	109.40
136	62.60(1.80)	905.73	665.00	240.73	104.32
138	0.00	925.84	672.00	253.84	110.00
140	711.23(1.80)	919.74	673.00	246.74	106.92
142	62.60(1.80)	903.24	667.00	236.24	102.37
146	66.76(0.06)	898.01	358.30	539.71	233.87
148	62.60(1.80)	888.92	653.00	235.92	102.23
150	62.60(1.80)	888.92	655.00	233.92	101.37
152	62.60(1.80)	888.92	654.00	234.92	101.80
154	62.60(1.80)	888.93	655.00	233.93	101.37
156	62.60(1.80)	889.19	656.00	233.19	101.05
158	62.60(1.80)	889.03	657.00	232.03	100.54
160	62.60(1.80)	889.03	663.00	226.03	97.95
162	62.60(1.80)	890.05	656.00	234.05	101.42
168	62.60(1.80)	891.00	658.00	233.00	100.97
170	62.60(1.80)	892.44	666.00	226.44	98.12
172	62.60(1.80)	889.49	671.00	218.49	94.68
176	62.60(1.80)	889.92	683.00	206.92	89.67
178	62.60(1.80)	890.27	684.00	206.27	89.38
180	62.60(1.80)	892.14	693.00	199.14	86.30
182	62.60(1.80)	890.42	748.00	142.42	61.71
184	62.60(1.80)	891.97	705.00	186.97	81.02
186	62.60(1.80)	892.25	689.00	203.25	88.07
188	62.60(1.80)	892.41	709.00	183.41	79.48
190	62.60(1.80)	892.41	702.00	190.41	82.51
192	62.60(1.80)	893.91	674.00	219.91	95.30
194	62.60(1.80)	892.58	677.00	215.58	93.42
196	62.60(1.80)	893.79	672.00	221.79	96.11
198	62.60(1.80)	897.40	665.00	232.40	100.71
200	62.60(1.80)	895.88	658.30	237.58	102.95
202	62.60(1.80)	893.44	660.00	233.44	101.16
204	62.60(1.80)	892.72	664.00	228.72	99.11
206	711.23(1.80)	910.22	692.00	218.22	94.56
208	711.23(1.80)	907.49	687.00	220.49	95.54
210	62.60(1.80)	903.13	667.00	236.13	102.32
212	62.60(1.80)	903.03	680.00	223.03	96.65
214	41.94(1.16)	892.64	676.00	216.64	93.88
216	41.94	892.63	680.00	212.63	92.14
218	41.94	892.63	686.00	206.63	89.54
220	41.94	892.61	687.00	205.61	89.10
224	41.94(1.16)	892.59	680.00	212.59	92.12
Clearwell	----	975.00	953.00	22.00	9.53
Lindley	----	928.00	905.00	23.00	9.97
O-PRV-5B	----	925.85	672.00	253.85	110.00
I-PRV-5B	0.00	963.81	672.00	291.81	126.45

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
146	233.87	Clearwell	9.53
I-PRV-5B	126.45	Lindley	9.97
O-PRV-5B	110.00	114	39.77
138	110.00	124	43.01
134	109.40	118	45.42

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
121	6.28	159	0.02
147	6.04	179	0.03
145	5.11	161	0.10
155	5.10	199	0.13
235	5.10	163	0.15

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
121	19.66	159	0.00
235	12.20	179	0.00
123	11.50	161	0.01
101	11.39	163	0.02
147	11.37	199	0.02

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
121	19.05	159	0.00
235	12.20	179	0.00
123	11.43	161	0.01
101	11.34	163	0.02
147	10.43	199	0.02

R E G U L A T I N G V A L V E R E P O R T

VALVE LABEL	VALVE TYPE	VALVE SETTING psi or gpm	VALVE STATUS	UPSTREAM PRESSURE psi	DOWNSTREAM PRESSURE psi	THROUGH FLOW gpm
PRV-5B	PRV-1	110.00	ACTIVATED	126.45	110.00	8551.03

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
Clearwell	8551.03	
Lindley	2200.98	

NET SYSTEM INFLOW = 10752.01
NET SYSTEM OUTFLOW =   0.00
NET SYSTEM DEMAND = 10752.01

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Case: 5 – Proposed Peak Hour Demands

C H A N G E S F O R N E X T S I M U L A T I O N (Change Number = 4)

JUNCTION DEMANDS CHANGED - PLEASE SEE RESULTS TABLE

Pipe 221 has a new DIAMETER of..... 12.000
Pipe 223 has a new DIAMETER of..... 12.000

RESULTS OBTAINED AFTER 9 TRIALS: ACCURACY = 0.20742E-05

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
101	Lindley	102	1113.05	64.92	0.27	7.10	24.06	23.95
103	102	104	378.72	6.54	0.03	2.42	3.27	3.25
105	102	104	378.72	6.54	0.03	2.42	3.27	3.25
107	104	106	757.80	0.90	0.01	1.21	0.61	0.61
109	106	108	1016.95	8.24	0.05	2.88	2.83	2.81
111	108	110	787.74	1.81	0.03	2.23	1.78	1.75
113	110	112	651.68	1.79	0.02	1.85	1.25	1.23
115	112	148	-148.47	0.40	0.00	0.61	0.19	0.19
117	Lindley	114	2179.21	2.52	0.04	2.75	2.46	2.42
119	114	116	1823.59	0.18	0.01	1.10	0.30	0.29
121	116	118	1467.98	14.00	0.48	9.37	41.36	39.99
123	118	120	1112.36	40.68	0.27	7.10	24.09	23.93
125	120	124	711.61	12.97	0.11	4.54	10.55	10.46
127	124	104	355.99	0.50	0.01	1.01	0.33	0.33
129	120	122	45.14	0.02	0.00	0.29	0.06	0.06
131	122	126	-310.48	3.44	0.02	1.98	2.27	2.25
133	126	128	1414.91	16.85	0.09	4.01	5.21	5.19
135	128	106	1059.30	0.99	0.02	1.69	0.76	0.75
137	126	130	-2792.25	9.81	0.07	3.52	3.86	3.83
139	130	108	570.93	36.04	0.07	3.64	6.97	6.96
141	130	132	-4430.03	12.88	0.17	5.59	9.13	9.01
143	132	110	664.08	50.90	0.10	4.24	9.22	9.20
145	132	134	-6160.96	24.06	0.33	7.77	16.82	16.60
147	138	134	7297.68	4.77	0.46	9.20	24.90	22.71
149	134	136	1042.81	39.22	0.24	6.66	21.68	21.55
151	136	142	948.91	5.49	0.08	3.88	6.19	6.10
153	138	140	5726.67	13.05	0.28	7.22	14.81	14.50
155	140	142	1930.02	36.60	0.34	7.88	22.94	22.73
157	142	146	2354.95	11.60	0.24	6.68	11.17	10.94
159	148	150	20.02	0.00	0.00	0.03	0.00	0.00
161	150	152	56.22	0.01	0.00	0.23	0.03	0.03
163	152	154	-37.68	0.01	0.00	0.15	0.02	0.02
165	148	156	-262.40	0.46	0.01	1.07	0.46	0.46
167	150	158	-130.10	0.16	0.00	0.53	0.16	0.15
169	154	160	-131.59	0.17	0.00	0.54	0.16	0.16
171	156	162	-582.27	1.54	0.08	3.72	7.68	7.32

173	162	168	-676.18	1.76	0.04	2.76	3.34	3.26
175	168	170	-770.09	2.72	0.05	3.15	3.42	3.36
177	156	158	225.97	0.29	0.01	1.44	1.32	1.27
179	158	160	1.96	0.00	0.00	0.01	0.00	0.00
181	160	172	-223.54	0.77	0.01	1.43	1.26	1.24
183	172	176	-317.44	0.76	0.02	2.03	2.45	2.38
185	176	178	-156.11	0.63	0.01	1.00	0.65	0.64
187	178	180	-250.02	3.61	0.04	2.84	6.19	6.12
189	176	182	-255.24	0.92	0.01	1.63	1.61	1.59
191	184	182	349.14	2.98	0.03	2.23	2.87	2.84
193	180	184	313.41	0.33	0.02	2.00	2.48	2.33
195	180	186	-657.34	0.19	0.02	1.86	1.40	1.27
197	184	188	-129.63	0.87	0.01	1.47	1.84	1.81
199	190	188	-37.05	0.04	0.00	0.42	0.18	0.18
201	188	192	-260.59	3.50	0.05	2.96	6.70	6.61
203	192	196	116.95	0.30	0.01	1.33	1.55	1.50
205	198	196	383.89	8.53	0.10	4.36	13.70	13.54
207	146	198	189.16	1.46	0.03	2.15	3.71	3.65
209	146	200	2128.70	4.90	0.20	6.04	9.44	9.08
211	200	198	-78.28	3.59	0.02	2.00	5.16	5.13
213	200	202	2113.07	5.64	0.20	5.99	11.45	11.06
215	202	204	2019.17	1.56	0.18	5.73	9.17	8.23
217	204	170	1259.99	0.52	0.07	3.57	3.90	3.44
219	170	186	395.99	0.41	0.01	1.12	0.51	0.50
221	190	186	355.25	0.20	0.09	1.01	0.58	0.40
223	194	190	412.11	0.18	0.12	1.17	0.88	0.53
225	196	194	406.94	2.87	0.12	4.62	15.69	15.08
227	204	214	665.28	0.27	0.02	1.89	1.13	1.05
229	194	224	-99.08	0.01	0.00	0.28	0.03	0.03
231	O-PRV-5B	138	13024.35	0.02	0.00	4.10	1.52	1.52
233	Clearwell	I-PRV-5B	13024.35	24.39	0.00	4.10	1.52	1.52
235	140	206	2729.80	20.65	0.00	7.74	26.48	26.48
237	206	208	1331.18	5.95	0.00	3.78	7.00	7.00
239	206	210	331.77	16.54	0.00	3.76	10.33	10.33
241	208	212	264.33	10.79	0.00	3.00	6.78	6.78
243	142	210	430.07	0.25	0.00	1.22	0.47	0.47
245	210	212	301.02	0.20	0.00	0.85	0.24	0.24
247	210	198	366.92	13.08	0.00	4.16	12.45	12.45
249	212	192	471.44	21.20	0.00	5.35	19.81	19.81
251	214	216	276.75	0.06	0.00	0.79	0.21	0.21
253	216	220	163.51	0.03	0.00	0.46	0.08	0.08
255	214	218	275.28	0.06	0.00	0.78	0.21	0.21
257	218	220	162.04	0.03	0.00	0.46	0.08	0.08
259	224	220	-212.32	0.04	0.00	0.60	0.13	0.13

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
102		355.62(2.70)	862.81	712.00	150.81	65.35
104		355.62(2.70)	856.24	708.00	148.24	64.24
106		800.15(2.70)	855.33	682.00	173.33	75.11
108		800.15(2.70)	847.04	663.00	184.04	79.75
110		800.15(2.70)	845.21	657.00	188.21	81.56
112		800.15(2.70)	843.40	659.00	184.40	79.91
114		355.62(2.70)	925.44	835.00	90.44	39.19

116	355.62(2.70)	925.26	819.00	106.26	46.04
118	355.62(2.70)	910.78	815.00	95.78	41.51
120	355.62(2.70)	869.83	735.00	134.83	58.43
122	355.62(2.70)	869.81	736.00	133.81	57.98
124	355.62(2.70)	856.75	795.00	61.75	26.76
126	1066.85(2.70)	873.28	695.00	178.28	77.25
128	355.62(2.70)	856.33	695.00	161.33	69.91
130	1066.85(2.70)	883.16	676.00	207.16	89.77
132	1066.85(2.70)	896.21	673.00	223.21	96.72
134	93.91(2.70)	920.60	671.00	249.60	108.16
136	93.91(2.70)	881.14	665.00	216.14	93.66
138	0.00	925.83	672.00	253.83	109.99
140	1066.85(2.70)	912.50	673.00	239.50	103.78
142	93.91(2.70)	875.57	667.00	208.57	90.38
146	37.09(0.03)	863.72	358.30	505.42	219.02
148	93.91(2.70)	843.81	653.00	190.81	82.68
150	93.91(2.70)	843.81	655.00	188.81	81.82
152	93.91(2.70)	843.80	654.00	189.80	82.24
154	93.91(2.70)	843.80	655.00	188.80	81.81
156	93.91(2.70)	844.27	656.00	188.27	81.59
158	93.91(2.70)	843.97	657.00	186.97	81.02
160	93.91(2.70)	843.97	663.00	180.97	78.42
162	93.91(2.70)	845.89	656.00	189.89	82.28
168	93.91(2.70)	847.69	658.00	189.69	82.20
170	93.91(2.70)	850.46	666.00	184.46	79.93
172	93.91(2.70)	844.75	671.00	173.75	75.29
176	93.91(2.70)	845.54	683.00	162.54	70.43
178	93.91(2.70)	846.18	684.00	162.18	70.28
180	93.91(2.70)	849.83	693.00	156.83	67.96
182	93.91(2.70)	846.47	748.00	98.47	42.67
184	93.91(2.70)	849.48	705.00	144.48	62.61
186	93.91(2.70)	850.04	689.00	161.04	69.78
188	93.91(2.70)	850.36	709.00	141.36	61.26
190	93.91(2.70)	850.32	702.00	148.32	64.27
192	93.91(2.70)	853.91	674.00	179.91	77.96
194	93.91(2.70)	850.62	677.00	173.62	75.24
196	93.91(2.70)	853.61	672.00	181.61	78.70
198	93.91(2.70)	862.24	665.00	197.24	85.47
200	93.91(2.70)	858.62	658.30	200.32	86.81
202	93.91(2.70)	852.79	660.00	192.79	83.54
204	93.91(2.70)	851.05	664.00	187.05	81.05
206	1066.85(2.70)	891.85	692.00	199.85	86.60
208	1066.85(2.70)	885.90	687.00	198.90	86.19
210	93.91(2.70)	875.31	667.00	208.31	90.27
212	93.91(2.70)	875.11	680.00	195.11	84.55
214	113.24(3.12)	850.75	676.00	174.75	75.73
216	113.24	850.69	680.00	170.69	73.97
218	113.24	850.70	686.00	164.70	71.37
220	113.24	850.67	687.00	163.67	70.92
224	113.24(3.12)	850.63	680.00	170.63	73.94
Clearwell	----	975.00	953.00	22.00	9.53
Lindley	----	928.00	905.00	23.00	9.97
O-PRV-5B	----	925.85	672.00	253.85	110.00
I-PRV-5B	0.00	950.61	672.00	278.61	120.73

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
146	219.02	Clearwell	9.53
I-PRV-5B	120.73	Lindley	9.97
O-PRV-5B	110.00	124	26.76
138	109.99	114	39.19
134	108.16	118	41.51

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
121	9.37	179	0.01
147	9.20	159	0.03
155	7.88	163	0.15
145	7.77	161	0.23
235	7.74	229	0.28

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
121	41.36	179	0.00
235	26.48	159	0.00
147	24.90	163	0.02
123	24.09	229	0.03
101	24.06	161	0.03

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
121	39.99	179	0.00
235	26.48	159	0.00
101	23.95	163	0.02
123	23.93	229	0.03
155	22.73	161	0.03

R E G U L A T I N G V A L V E R E P O R T

VALVE LABEL	VALVE TYPE	VALVE SETTING psi or gpm	VALVE STATUS	UPSTREAM PRESSURE psi	DOWNSTREAM PRESSURE psi	THROUGH FLOW gpm
PRV-5B	PRV-1	110.00	ACTIVATED	120.73	110.00	13024.35

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
Clearwell	13024.35	
Lindley	3292.26	

NET SYSTEM INFLOW = 16316.61
NET SYSTEM OUTFLOW =   0.00
NET SYSTEM DEMAND = 16316.62

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Case: 5 – Proposed Maximum Day Demands plus 2,500 gpm Fire Flow at Node 218

C H A N G E S F O R N E X T S I M U L A T I O N (Change Number = 5)

JUNCTION DEMANDS CHANGED - PLEASE SEE RESULTS TABLE

Pipe 221 has a new DIAMETER of..... 12.000
Pipe 223 has a new DIAMETER of..... 12.000

RESULTS OBTAINED AFTER 8 TRIALS: ACCURACY = 0.42554E-04

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
101	Lindley	102	884.94	42.45	0.17	5.65	15.73	15.66
103	102	104	323.93	4.90	0.02	2.07	2.45	2.44
105	102	104	323.93	4.90	0.02	2.07	2.45	2.44
107	104	106	800.36	1.00	0.01	1.28	0.68	0.67
109	106	108	1253.38	12.14	0.07	3.56	4.17	4.14
111	108	110	1256.24	4.29	0.07	3.56	4.23	4.16
113	110	112	1339.99	6.80	0.08	3.80	4.74	4.69
115	112	148	806.56	9.30	0.06	3.29	4.48	4.45
117	Lindley	114	1588.83	1.40	0.02	2.00	1.37	1.35
119	114	116	1351.75	0.10	0.00	0.82	0.17	0.17
121	116	118	1114.68	8.41	0.28	7.11	24.81	24.02
123	118	120	877.60	26.22	0.17	5.60	15.53	15.42
125	120	124	626.66	10.25	0.09	4.00	8.34	8.27
127	124	104	389.58	0.59	0.01	1.11	0.39	0.39
129	120	122	13.86	0.00	0.00	0.09	0.01	0.01
131	122	126	-223.22	1.87	0.01	1.42	1.23	1.22
133	126	128	1223.53	12.88	0.07	3.47	3.98	3.96
135	128	106	986.45	0.86	0.01	1.57	0.67	0.66
137	126	130	-2157.98	6.09	0.04	2.72	2.39	2.38
139	130	108	536.29	32.09	0.06	3.42	6.21	6.20
141	130	132	-3405.50	7.92	0.10	4.29	5.61	5.54
143	132	110	617.18	44.44	0.08	3.94	8.05	8.04
145	132	134	-4733.92	14.77	0.19	5.97	10.32	10.19
147	138	134	5839.61	3.16	0.29	7.36	16.43	15.03
149	134	136	1043.09	39.24	0.24	6.66	21.69	21.56
151	136	142	980.49	5.84	0.09	4.01	6.58	6.48
153	138	140	4908.96	9.81	0.21	6.19	11.13	10.90
155	140	142	1983.08	38.48	0.36	8.10	24.12	23.90
157	142	146	2628.15	14.22	0.30	7.46	13.70	13.41
159	148	150	515.54	0.05	0.00	0.82	0.22	0.20
161	150	152	267.84	0.26	0.01	1.09	0.60	0.59
163	152	154	205.24	0.15	0.00	0.84	0.37	0.36
165	148	156	228.42	0.35	0.00	0.93	0.36	0.35
167	150	158	185.09	0.30	0.00	0.76	0.30	0.30
169	154	160	142.63	0.19	0.00	0.58	0.18	0.18
171	156	162	174.61	0.17	0.01	1.11	0.82	0.79

173	162	168	112.01	0.06	0.00	0.46	0.12	0.12
175	168	170	49.40	0.02	0.00	0.20	0.02	0.02
177	156	158	-8.80	0.00	0.00	0.06	0.00	0.00
179	158	160	113.69	0.31	0.00	0.73	0.36	0.36
181	160	172	193.72	0.59	0.01	1.24	0.97	0.95
183	172	176	131.12	0.15	0.00	0.84	0.47	0.46
185	176	178	36.23	0.04	0.00	0.23	0.04	0.04
187	178	180	-26.38	0.06	0.00	0.30	0.10	0.10
189	176	182	32.28	0.02	0.00	0.21	0.03	0.03
191	184	182	30.32	0.03	0.00	0.19	0.03	0.03
193	180	184	17.87	0.00	0.00	0.11	0.01	0.01
195	180	186	-106.85	0.01	0.00	0.30	0.05	0.04
197	184	188	-75.06	0.32	0.00	0.85	0.67	0.66
199	190	188	-165.52	0.63	0.02	1.88	2.94	2.85
201	188	192	-303.18	4.64	0.06	3.44	8.87	8.75
203	192	196	166.05	0.57	0.02	1.88	2.96	2.87
205	198	196	443.67	11.15	0.14	5.03	17.92	17.70
207	146	198	190.32	1.48	0.03	2.16	3.76	3.69
209	146	200	2400.73	6.12	0.25	6.81	11.81	11.34
211	200	198	-91.99	4.84	0.03	2.35	6.96	6.92
213	200	202	2430.12	7.31	0.26	6.89	14.84	14.33
215	202	204	2367.52	2.10	0.25	6.72	12.34	11.05
217	204	170	569.53	0.12	0.01	1.62	0.88	0.79
219	170	186	556.33	0.78	0.01	1.58	0.95	0.93
221	190	186	-386.88	0.23	0.10	1.10	0.68	0.47
223	194	190	-489.79	0.25	0.17	1.39	1.22	0.73
225	196	194	547.12	4.96	0.21	6.21	27.20	26.10
227	204	214	1735.39	1.62	0.13	4.92	6.72	6.22
229	194	224	974.31	0.49	0.04	2.76	2.32	2.13
231	O-PRV-5B	138	10748.57	0.01	0.00	3.39	1.07	1.07
233	Clearwell	I-PRV-5B	10748.57	17.09	0.00	3.39	1.07	1.07
235	140	206	2214.65	14.02	0.00	6.28	17.97	17.97
237	206	208	1089.33	4.11	0.00	3.09	4.83	4.83
239	206	210	414.09	24.93	0.00	4.70	15.58	15.58
241	208	212	378.09	20.93	0.00	4.29	13.16	13.16
243	142	210	272.81	0.11	0.00	0.77	0.20	0.20
245	210	212	216.35	0.11	0.00	0.61	0.13	0.13
247	210	198	407.94	15.91	0.00	4.63	15.15	15.15
249	212	192	531.84	26.50	0.00	6.03	24.77	24.77
251	214	216	856.32	0.47	0.00	2.43	1.68	1.68
253	216	220	814.38	0.54	0.00	2.31	1.53	1.53
255	214	218	837.13	0.44	0.00	2.37	1.61	1.61
257	218	220	795.19	0.57	0.00	2.26	1.47	1.47
259	224	220	932.37	0.55	0.00	2.64	1.97	1.97

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
102		237.08(1.80)	885.38	712.00	173.38	75.13
104		237.08(1.80)	880.46	708.00	172.46	74.73
106		533.43(1.80)	879.45	682.00	197.45	85.56
108		533.43(1.80)	867.24	663.00	204.24	88.51
110		533.43(1.80)	862.89	657.00	205.89	89.22
112		533.43(1.80)	856.01	659.00	197.01	85.37
114		237.08(1.80)	926.58	835.00	91.58	39.68

116	237.08(1.80)	926.47	819.00	107.47	46.57
118	237.08(1.80)	917.79	815.00	102.79	44.54
120	237.08(1.80)	891.40	735.00	156.40	67.77
122	237.08(1.80)	891.39	736.00	155.39	67.34
124	237.08(1.80)	881.06	795.00	86.06	37.29
126	711.23(1.80)	893.27	695.00	198.27	85.92
128	237.08(1.80)	880.33	695.00	185.33	80.31
130	711.23(1.80)	899.40	676.00	223.40	96.81
132	711.23(1.80)	907.42	673.00	234.42	101.58
134	62.60(1.80)	922.38	671.00	251.38	108.93
136	62.60(1.80)	882.91	665.00	217.91	94.43
138	0.00	925.84	672.00	253.84	110.00
140	711.23(1.80)	915.82	673.00	242.82	105.22
142	62.60(1.80)	876.98	667.00	209.98	90.99
146	37.09(0.03)	862.46	358.30	504.16	218.47
148	62.60(1.80)	846.65	653.00	193.65	83.92
150	62.60(1.80)	846.60	655.00	191.60	83.03
152	62.60(1.80)	846.33	654.00	192.33	83.34
154	62.60(1.80)	846.18	655.00	191.18	82.84
156	62.60(1.80)	846.30	656.00	190.30	82.46
158	62.60(1.80)	846.30	657.00	189.30	82.03
160	62.60(1.80)	845.98	663.00	182.98	79.29
162	62.60(1.80)	846.12	656.00	190.12	82.39
168	62.60(1.80)	846.06	658.00	188.06	81.49
170	62.60(1.80)	846.04	666.00	180.04	78.02
172	62.60(1.80)	845.38	671.00	174.38	75.57
176	62.60(1.80)	845.23	683.00	162.23	70.30
178	62.60(1.80)	845.19	684.00	161.19	69.85
180	62.60(1.80)	845.25	693.00	152.25	65.97
182	62.60(1.80)	845.21	748.00	97.21	42.13
184	62.60(1.80)	845.24	705.00	140.24	60.77
186	62.60(1.80)	845.25	689.00	156.25	67.71
188	62.60(1.80)	845.56	709.00	136.56	59.18
190	62.60(1.80)	844.92	702.00	142.92	61.93
192	62.60(1.80)	850.26	674.00	176.26	76.38
194	62.60(1.80)	844.50	677.00	167.50	72.58
196	62.60(1.80)	849.67	672.00	177.67	76.99
198	62.60(1.80)	860.96	665.00	195.96	84.92
200	62.60(1.80)	856.09	658.30	197.79	85.71
202	62.60(1.80)	848.52	660.00	188.52	81.69
204	62.60(1.80)	846.17	664.00	182.17	78.94
206	711.23(1.80)	901.80	692.00	209.80	90.91
208	711.23(1.80)	897.69	687.00	210.69	91.30
210	62.60(1.80)	876.87	667.00	209.87	90.95
212	62.60(1.80)	876.76	680.00	196.76	85.26
214	41.94(1.16)	844.43	676.00	168.43	72.98
216	41.94	843.96	680.00	163.96	71.05
218	41.94	843.99	686.00	157.99	68.46
220	2541.94	843.42	687.00	156.42	67.78
224	41.94(1.16)	843.97	680.00	163.97	71.05
Clearwell	----	975.00	953.00	22.00	9.53
Lindley	----	928.00	905.00	23.00	9.97
O-PRV-5B	----	925.85	672.00	253.85	110.00
I-PRV-5B	0.00	957.91	672.00	285.91	123.89

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
146	218.47	Clearwell	9.53
I-PRV-5B	123.89	Lindley	9.97
O-PRV-5B	110.00	124	37.29
138	110.00	114	39.68
134	108.93	182	42.13

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
155	8.10	177	0.06
157	7.46	129	0.09
147	7.36	193	0.11
121	7.11	191	0.19
213	6.89	175	0.20

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
225	27.20	177	0.00
121	24.81	129	0.01
249	24.77	193	0.01
155	24.12	175	0.02
149	21.69	191	0.03

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
225	26.10	177	0.00
249	24.77	129	0.01
121	24.02	193	0.01
155	23.90	175	0.02
149	21.56	191	0.03

R E G U L A T I N G V A L V E R E P O R T

VALVE LABEL	VALVE TYPE	VALVE SETTING psi or gpm	VALVE STATUS	UPSTREAM PRESSURE psi	DOWNSTREAM PRESSURE psi	THROUGH FLOW gpm
PRV-5B	PRV-1	110.00	ACTIVATED	123.89	110.00	10748.57

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
Clearwell	10748.57	
Lindley	2473.77	

NET SYSTEM INFLOW = 13222.34
NET SYSTEM OUTFLOW =   0.00
NET SYSTEM DEMAND = 13222.34

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Case: 6 - Proposed Maximum Day Demands plus 2,500 gpm Fire Flow at Node 218, Pipe 227 Closed

C H A N G E S F O R N E X T S I M U L A T I O N (Change Number = 6)

JUNCTION DEMANDS CHANGED - PLEASE SEE RESULTS TABLE

Pipe 221 has a new DIAMETER of..... 12.000
Pipe 223 has a new DIAMETER of..... 12.000
Pipe 227 is CLOSED

RESULTS OBTAINED AFTER 8 TRIALS: ACCURACY = 0.25863E-04

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
101	Lindley	102	883.31	42.31	0.17	5.64	15.68	15.61
103	102	104	323.12	4.87	0.02	2.06	2.44	2.42
105	102	104	323.12	4.87	0.02	2.06	2.44	2.42
107	104	106	796.90	0.99	0.01	1.27	0.67	0.67
109	106	108	1246.38	12.01	0.07	3.54	4.12	4.10
111	108	110	1247.24	4.23	0.07	3.54	4.17	4.11
113	110	112	1328.70	6.69	0.08	3.77	4.67	4.62
115	112	148	795.27	9.06	0.06	3.25	4.36	4.34
117	Lindley	114	1587.36	1.40	0.02	2.00	1.37	1.35
119	114	116	1350.28	0.10	0.00	0.82	0.17	0.17
121	116	118	1113.20	8.39	0.27	7.10	24.74	23.96
123	118	120	876.12	26.14	0.17	5.59	15.48	15.38
125	120	124	624.82	10.20	0.09	3.99	8.29	8.22
127	124	104	387.74	0.59	0.01	1.10	0.39	0.38
129	120	122	14.22	0.00	0.00	0.09	0.01	0.01
131	122	126	-222.85	1.86	0.01	1.42	1.23	1.22
133	126	128	1219.99	12.81	0.07	3.46	3.96	3.94
135	128	106	982.91	0.86	0.01	1.57	0.66	0.65
137	126	130	-2154.08	6.07	0.04	2.72	2.39	2.37
139	130	108	534.29	31.87	0.06	3.41	6.17	6.15
141	130	132	-3399.60	7.89	0.10	4.29	5.59	5.52
143	132	110	614.89	44.14	0.08	3.92	8.00	7.98
145	132	134	-4725.73	14.73	0.19	5.96	10.29	10.16
147	138	134	5833.95	3.15	0.29	7.35	16.40	15.00
149	134	136	1045.62	39.41	0.24	6.67	21.79	21.66
151	136	142	983.02	5.86	0.09	4.02	6.61	6.52
153	138	140	4917.72	9.84	0.21	6.20	11.16	10.93
155	140	142	1987.65	38.65	0.36	8.12	24.23	24.00
157	142	146	2548.34	13.43	0.28	7.23	12.93	12.67
159	148	150	607.45	0.06	0.01	0.97	0.29	0.27
161	150	152	393.49	0.54	0.01	1.61	1.23	1.20
163	152	154	330.89	0.36	0.01	1.35	0.89	0.87
165	148	156	125.22	0.12	0.00	0.51	0.12	0.12
167	150	158	151.36	0.21	0.00	0.62	0.21	0.20

169	154	160	268.28	0.62	0.01	1.10	0.59	0.59
171	156	162	-98.57	0.06	0.00	0.63	0.28	0.27
173	162	168	-161.18	0.12	0.00	0.66	0.23	0.23
175	168	170	-223.78	0.28	0.00	0.91	0.35	0.34
177	156	158	161.19	0.16	0.01	1.03	0.70	0.68
179	158	160	249.94	1.33	0.01	1.60	1.55	1.53
181	160	172	455.62	2.88	0.05	2.91	4.72	4.65
183	172	176	393.02	1.13	0.03	2.51	3.64	3.54
185	176	178	140.20	0.52	0.00	0.89	0.53	0.52
187	178	180	77.60	0.41	0.00	0.88	0.71	0.70
189	176	182	190.21	0.53	0.01	1.21	0.94	0.92
191	184	182	-127.60	0.46	0.00	0.81	0.44	0.44
193	180	184	130.17	0.06	0.00	0.83	0.48	0.46
195	180	186	-115.17	0.01	0.00	0.33	0.05	0.05
197	184	188	195.17	1.86	0.03	2.21	3.92	3.87
199	190	188	-390.68	3.08	0.11	4.43	14.47	13.99
201	188	192	-258.12	3.44	0.05	2.93	6.58	6.49
203	192	196	289.39	1.60	0.06	3.28	8.32	8.02
205	198	196	590.40	18.93	0.24	6.70	30.44	30.05
207	146	198	291.95	3.26	0.06	3.31	8.30	8.16
209	146	200	2219.30	5.30	0.22	6.30	10.20	9.81
211	200	198	-59.72	2.18	0.01	1.52	3.13	3.11
213	200	202	2216.41	6.16	0.21	6.29	12.51	12.09
215	202	204	2153.81	1.76	0.20	6.11	10.34	9.28
217	204	170	2091.20	1.32	0.19	5.93	10.06	8.78
219	170	186	1804.81	6.86	0.14	5.12	8.43	8.26
221	190	186	-1627.04	3.29	1.85	4.62	10.50	6.72
223	194	190	-1955.12	3.21	2.67	5.55	17.30	9.44
225	196	194	817.18	10.42	0.47	9.27	57.33	54.87
227-XX	204	214						
229	194	224	2709.70	3.26	0.32	7.69	15.59	14.19
231	O-PRV-5B	138	10751.67	0.01	0.00	3.39	1.07	1.07
233	Clearwell	I-PRV-5B	10751.67	17.10	0.00	3.39	1.07	1.07
235	140	206	2218.83	14.07	0.00	6.29	18.04	18.04
237	206	208	1091.81	4.12	0.00	3.10	4.85	4.85
239	206	210	415.79	25.12	0.00	4.72	15.70	15.70
241	208	212	380.57	21.19	0.00	4.32	13.32	13.32
243	142	210	359.73	0.18	0.00	1.02	0.34	0.34
245	210	212	292.14	0.19	0.00	0.83	0.23	0.23
247	210	198	420.77	16.85	0.00	4.77	16.05	16.05
249	212	192	610.11	34.17	0.00	6.92	31.94	31.94
251	214	216	-22.35	0.00	0.00	0.06	0.00	0.00
253	216	220	-64.29	0.00	0.00	0.18	0.01	0.01
255	214	218	-19.59	0.00	0.00	0.06	0.00	0.00
257	218	220	-61.53	0.00	0.00	0.17	0.01	0.01
259	224	220	2667.76	3.86	0.00	7.57	13.79	13.79

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
102		237.08(1.80)	885.52	712.00	173.52	75.19
104		237.08(1.80)	880.62	708.00	172.62	74.80
106		533.43(1.80)	879.63	682.00	197.63	85.64
108		533.43(1.80)	867.55	663.00	204.55	88.64
110		533.43(1.80)	863.25	657.00	206.25	89.37

112	533.43(1.80)	856.48	659.00	197.48	85.57
114	237.08(1.80)	926.58	835.00	91.58	39.68
116	237.08(1.80)	926.47	819.00	107.47	46.57
118	237.08(1.80)	917.81	815.00	102.81	44.55
120	237.08(1.80)	891.50	735.00	156.50	67.82
122	237.08(1.80)	891.50	736.00	155.50	67.38
124	237.08(1.80)	881.22	795.00	86.22	37.36
126	711.23(1.80)	893.37	695.00	198.37	85.96
128	237.08(1.80)	880.50	695.00	185.50	80.38
130	711.23(1.80)	899.48	676.00	223.48	96.84
132	711.23(1.80)	907.47	673.00	234.47	101.60
134	62.60(1.80)	922.39	671.00	251.39	108.94
136	62.60(1.80)	882.74	665.00	217.74	94.35
138	0.00	925.84	672.00	253.84	110.00
140	711.23(1.80)	915.79	673.00	242.79	105.21
142	62.60(1.80)	876.78	667.00	209.78	90.91
146	37.09(0.03)	863.07	358.30	504.77	218.73
148	62.60(1.80)	847.36	653.00	194.36	84.22
150	62.60(1.80)	847.29	655.00	192.29	83.33
152	62.60(1.80)	846.74	654.00	192.74	83.52
154	62.60(1.80)	846.37	655.00	191.37	82.93
156	62.60(1.80)	847.24	656.00	191.24	82.87
158	62.60(1.80)	847.08	657.00	190.08	82.37
160	62.60(1.80)	845.74	663.00	182.74	79.19
162	62.60(1.80)	847.30	656.00	191.30	82.90
168	62.60(1.80)	847.43	658.00	189.43	82.09
170	62.60(1.80)	847.71	666.00	181.71	78.74
172	62.60(1.80)	842.81	671.00	171.81	74.45
176	62.60(1.80)	841.64	683.00	158.64	68.75
178	62.60(1.80)	841.12	684.00	157.12	68.09
180	62.60(1.80)	840.70	693.00	147.70	64.00
182	62.60(1.80)	841.10	748.00	93.10	40.34
184	62.60(1.80)	840.63	705.00	135.63	58.77
186	62.60(1.80)	840.71	689.00	151.71	65.74
188	62.60(1.80)	838.75	709.00	129.75	56.23
190	62.60(1.80)	835.57	702.00	133.57	57.88
192	62.60(1.80)	842.24	674.00	168.24	72.90
194	62.60(1.80)	829.68	677.00	152.68	66.16
196	62.60(1.80)	840.57	672.00	168.57	73.05
198	62.60(1.80)	859.75	665.00	194.75	84.39
200	62.60(1.80)	857.56	658.30	199.26	86.35
202	62.60(1.80)	851.18	660.00	191.18	82.85
204	62.60(1.80)	849.22	664.00	185.22	80.26
206	711.23(1.80)	901.72	692.00	209.72	90.88
208	711.23(1.80)	897.59	687.00	210.59	91.26
210	62.60(1.80)	876.60	667.00	209.60	90.83
212	62.60(1.80)	876.41	680.00	196.41	85.11
214	41.94(1.16)	822.23	676.00	146.23	63.37
216	41.94	822.23	680.00	142.23	61.63
218	41.94	822.23	686.00	136.23	59.03
220	2541.94	822.24	687.00	135.24	58.60
224	41.94(1.16)	826.10	680.00	146.10	63.31
Clearwell	----	975.00	953.00	22.00	9.53
Lindley	----	928.00	905.00	23.00	9.97
O-PRV-5B	----	925.85	672.00	253.85	110.00
I-PRV-5B	0.00	957.90	672.00	285.90	123.89

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
146	218.73	Clearwell	9.53
I-PRV-5B	123.89	Lindley	9.97
O-PRV-5B	110.00	124	37.36
138	110.00	114	39.68
134	108.94	182	40.34

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
225	9.27	255	0.06
155	8.12	251	0.06
229	7.69	129	0.09
259	7.57	257	0.17
147	7.35	253	0.18

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
225	57.33	255	0.00
249	31.94	251	0.00
205	30.44	129	0.01
121	24.74	257	0.01
155	24.23	253	0.01

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
225	54.87	255	0.00
249	31.94	251	0.00
205	30.05	129	0.01
155	24.00	257	0.01
121	23.96	253	0.01

R E G U L A T I N G V A L V E R E P O R T

VALVE LABEL	VALVE TYPE	VALVE SETTING psi or gpm	VALVE STATUS	UPSTREAM PRESSURE psi	DOWNSTREAM PRESSURE psi	THROUGH FLOW gpm
PRV-5B	PRV-1	110.00	ACTIVATED	123.89	110.00	10751.67

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
Clearwell	10751.67	
Lindley	2470.67	

NET SYSTEM INFLOW = 13222.34
NET SYSTEM OUTFLOW =   0.00
NET SYSTEM DEMAND = 13222.34

***** HYDRAULIC ANALYSIS COMPLETED *****

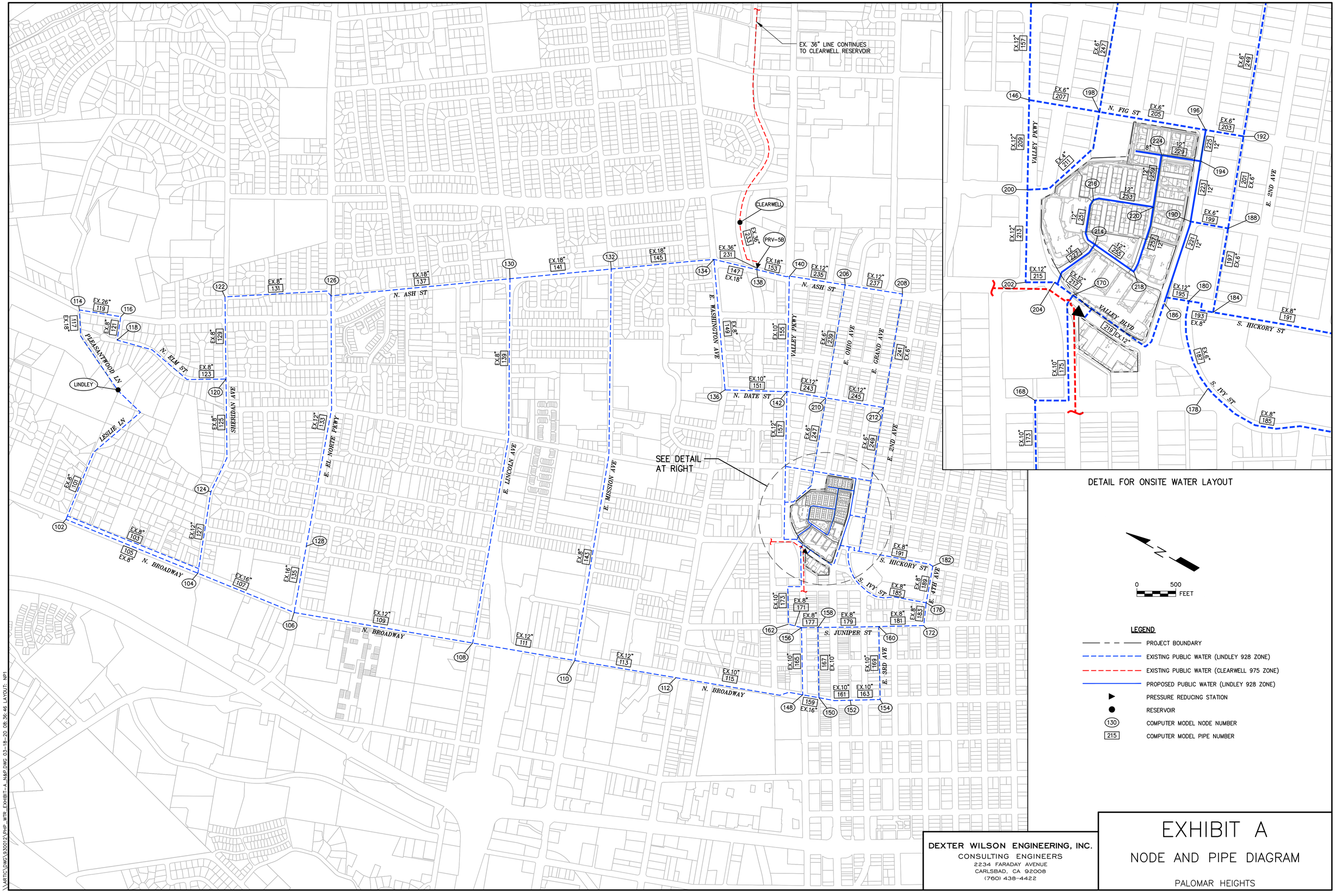

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EXHIBIT A

NODE AND PIPE DIAGRAM

PALOMAR HEIGHTS