

## Appendices

### Appendix P      Master Plan of Water

## Appendices

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# MASTER PLAN OF WATER

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## *RANCHO SAN GORGONIO SPECIFIC PLAN*

CITY OF BANNING

COUNTY OF RIVERSIDE

STATE OF CALIFORNIA

PREPARED BY:



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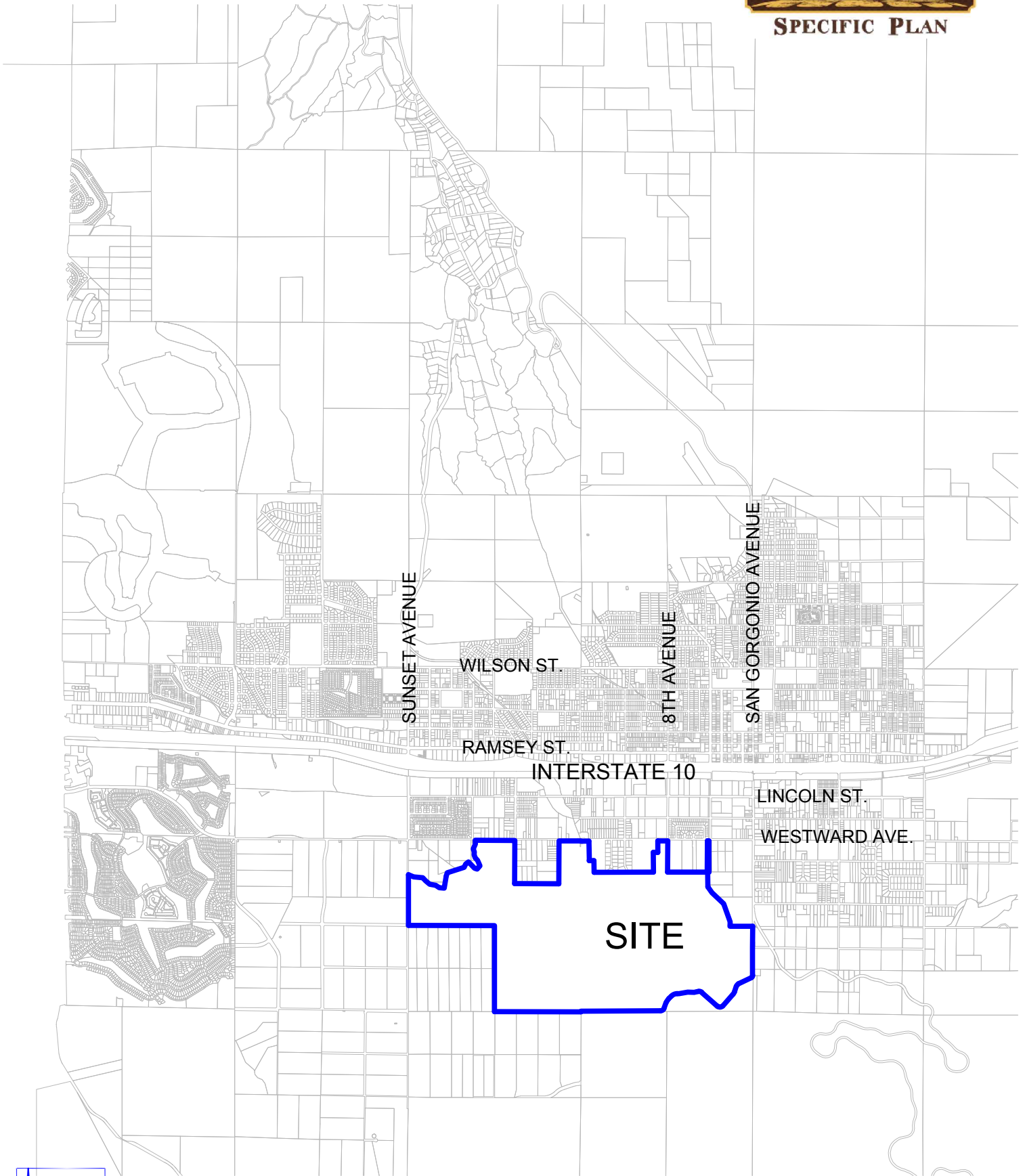
**Rancho San Gorgonio, LLC**

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September 17, 2015

## Contents

|                                                                 |    |
|-----------------------------------------------------------------|----|
| 1. Executive Summary .....                                      | 3  |
| 2. Master Plan of Water .....                                   | 4  |
| 2.1. Introduction.....                                          | 4  |
| 2.2. Existing City of Banning Water Master Plan .....           | 4  |
| 2.3. Existing City of Banning Water System Hydraulic Model..... | 4  |
| 2.4. Proposed Project Demands.....                              | 5  |
| 2.5. Project Water Supply Assessment .....                      | 5  |
| 2.6. Proposed Source of New Supply .....                        | 6  |
| 2.7. Analysis of Existing City Water System .....               | 6  |
| 2.8. Storage Requirements.....                                  | 7  |
| 2.9. Existing City Pressure Zones .....                         | 7  |
| 3. Proposed Water System .....                                  | 8  |
| 3.1. Preliminary Hydraulic Model .....                          | 8  |
| 3.2. System Storage Requirements .....                          | 12 |
| 3.3. Analysis of Pressure Zones.....                            | 12 |
| 3.4. Summary of Proposed Water System .....                     | 14 |
| 4. Proposed Recycled Water System .....                         | 15 |
| Appendix A. Peak Hour Hydraulic Calculations.....               | 20 |
| Appendix B. Peak Day with Fire Hydraulic Calculations .....     | 21 |
| Appendix C. Recycled Water System Hydraulics .....              | 22 |



**Vicinity Map**

# 1. Executive Summary

Rancho San Gorgonio is a master planned community proposed in the City of Banning, Riverside County, California. The proposed site is located on approximately 831 acres on the south side of the city, including approximately 160 acres to be annexed from the county, with up to 3385 residences anticipated, among other uses and amenities.

The purpose of this Master Plan of Water (MPW) is to estimate the size and configuration of the potable water improvements needed to serve the proposed community. Peak water demands are calculated for each planning area based on standards established by the city. Irrigation of private residential properties will be provided by the potable water system. Common area landscaping will be irrigated by utilizing a proposed wastewater treatment package plant which will become part of the city's future recycled water system.

The irrigation system can be served by a network of 8-inch pipelines. The point of connection to the city system is approximately 1350 feet north of the project. The potable water system will be comprised of mostly 8-inch pipelines, however some areas in lower pressure conditions will require 12-inch pipelines.

The city has an existing network of potable water pipelines in the vicinity of the project, and therefore no major off-site waterline improvements are necessary. The existing potable water storage capacity within the city is insufficient, and therefore the project will need to construct, or contribute to the construction, of approximately 2.59 MG of storage capacity. A suitable site does not exist on-site, and therefore a reservoir will need to be built off-site elsewhere in the city.

## **2. Master Plan of Water**

### **2.1. Introduction**

This Master Plan of Water is prepared to determine the water system requirements for the Rancho San Gorgonio Specific Plan master planned community. The project is located south of Interstate 10 in the City of Banning, County of Riverside, State of California. The property lies generally south of Westward Avenue, east of Sunset Avenue, west of San Gorgonio Avenue, with Smith Creek comprising a portion of the southerly boundary.

### **2.2. Existing City of Banning Water Master Plan**

The City of Banning's 1994 Water Master Plan (WMP) was utilized as the basis of preparing this MPW. Per the WMP, the system shall be designed to provide peak hour demands with a minimum residual pressure of 40 psi, plus peak day demands including fire flows with a residual pressure of 20 psi or more.

The WMP estimates peak demand as two times average demand, for both daily and peak hour.

Fire flow for residential shall be a minimum of 1500 gpm for 2 hours, and for commercial uses, 2500 gpm for 3 hours. Note that the WMP has a residential fire requirement of 1250 gpm, which has since been increased by the city.

Storage considerations shall be 25% of the Maximum Day Demand (MDD) plus 100% of the Average Day Demand (ADD) plus fire flow, as listed above, amounting to 0.45 MG for commercial uses.

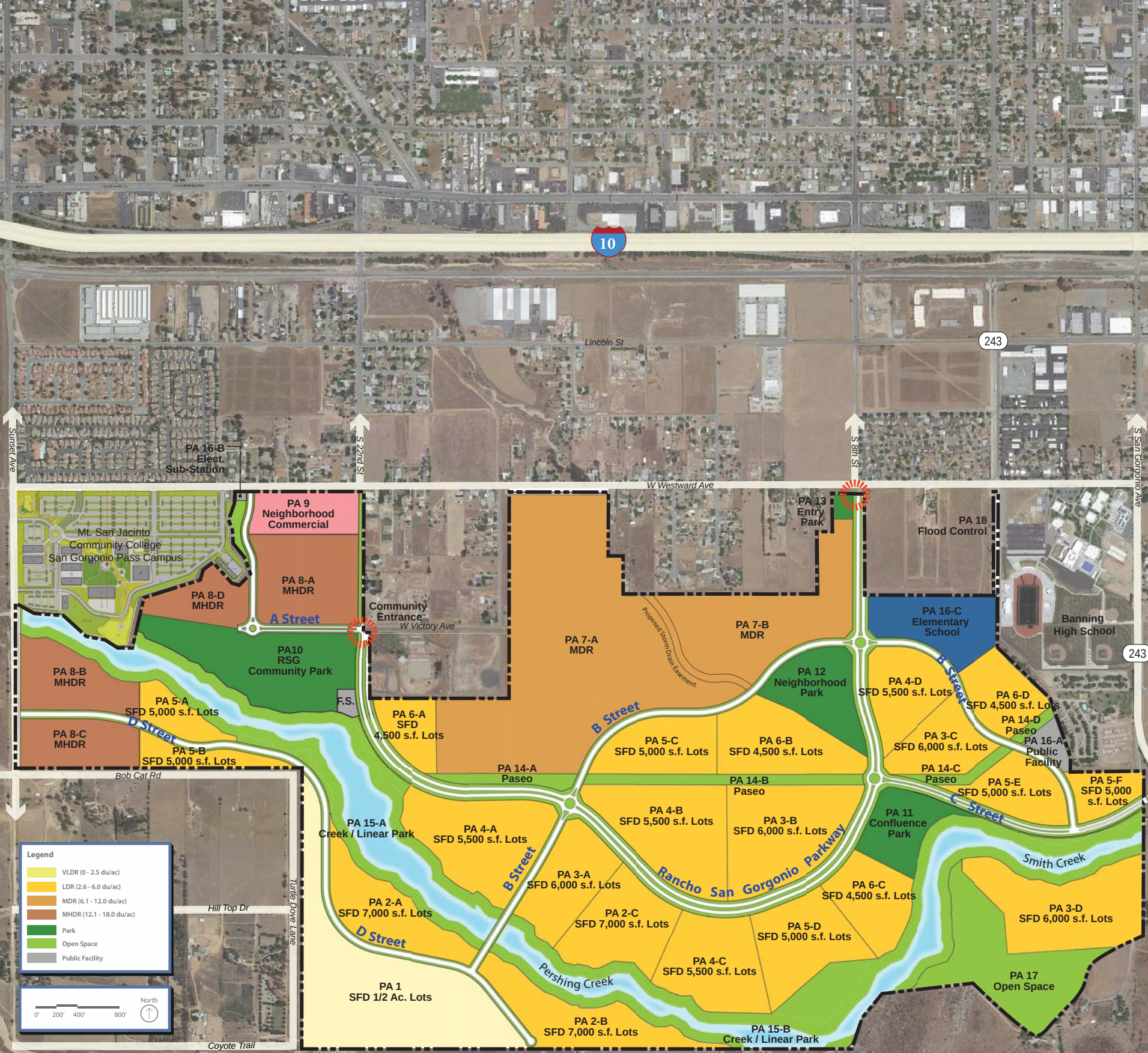
Refer to Section 3.2 for the project storage requirement calculations.

### **2.3. Existing City of Banning Water System Hydraulic Model**

In addition to the WMP, the city's 2002 Water System Hydraulic Modeling Report (WSHM) was also followed in the assessment of the project water system requirements. The WSHM concluded that there is insufficient pumping capacity and storage capacity to meet certain critical conditions, such as a fire occurring during the peak summer demand.

To address these deficiencies, the WSHM puts forth various recommendations, such as improving existing groundwater wells which have not yet been equipped to pump water, the







| Planning Area | Land Use                                              | Density Range | Target Density | Acreage | DU    |
|---------------|-------------------------------------------------------|---------------|----------------|---------|-------|
| PA 1          | VLDR - Single Family Detached 1/2 Acre Lots           | 0-2.5         | 2.0            | 47.05   | 94    |
| PA 2-A        | LDR - Single Family Detached 7000 Lots                | 2.6-6.0       | 3.4            | 15.51   | 53    |
| PA 2-B        | LDR - Single Family Detached 7000 Lots                | 2.6-6.0       | 3.4            | 17.57   | 60    |
| PA 2-C        | LDR - Single Family Detached 7000 Lots                | 2.6-6.0       | 3.4            | 16.33   | 56    |
| PA 3-A        | LDR - Single Family Detached 6000 Lots                | 2.6-6.0       | 3.8            | 13.96   | 53    |
| PA 3-B        | LDR - Single Family Detached 6000 Lots                | 2.6-6.0       | 3.8            | 23.81   | 90    |
| PA 3-C        | LDR- Single Family Detached 6000 Lots                 | 2.6-6.0       | 3.8            | 10.63   | 40    |
| PA 3-D        | LDR - Single Family Detached 6000 Lots                | 2.6-6.0       | 3.8            | 24.00   | 91    |
| PA 4-A        | LDR - Single Family Detached 5500 Lots                | 2.6-6.0       | 4.4            | 23.19   | 102   |
| PA 4-B        | LDR - Single Family Detached 5500 Lots                | 2.6-6.0       | 4.4            | 23.11   | 102   |
| PA 4-C        | LDR - Single Family Detached 5500 Lots                | 2.6-6.0       | 4.4            | 17.73   | 78    |
| PA 4-D        | LDR - Single Family Detached 5500 Lots                | 2.6-6.0       | 4.4            | 12.34   | 54    |
| PA 5-A        | LDR - Single Family Detached 5000 Lots                | 2.6-6.0       | 5.2            | 5.90    | 31    |
| PA 5-B        | LDR - Single Family Detached 5000 Lots                | 2.6-6.0       | 5.2            | 6.50    | 34    |
| PA 5-C        | LDR - Single Family Detached 5000 Lots                | 2.6-6.0       | 5.2            | 12.60   | 66    |
| PA 5-D        | LDR - Single Family Detached 5000 Lots                | 2.6-6.0       | 5.2            | 16.43   | 85    |
| PA 5-E        | LDR - Single Family Detached 5000 Lots                | 2.6-6.0       | 5.2            | 10.41   | 54    |
| PA 5-F        | LDR - Single Family Detached 5000 Lots                | 2.6-6.0       | 5.2            | 5.87    | 31    |
| PA 6-A        | LDR - Single Family Detached 4500 Lots                | 2.6-6.0       | 6.0            | 7.26    | 44    |
| PA 6-B        | LDR - Single Family Detached 4500 Lots                | 2.6-6.0       | 6.0            | 16.83   | 101   |
| PA 6-C        | LDR - Single Family Detached 4500 Lots                | 2.6-6.0       | 6.0            | 11.72   | 70    |
| PA 6-D        | LDR - Single Family Detached 4500 Lots                | 2.6-6.0       | 6.0            | 10.05   | 60    |
| PA 7-A        | MDR - 6.5                                             | 6.1-12.0      | 6.5            | 85.36   | 555   |
| PA 7-B        | MDR - 6.5                                             | 6.1-12.0      | 6.5            | 30.58   | 199   |
| PA 8-A        | MHDR - 18                                             | 12.1-18.0     | 18.0           | 18.50   | 333   |
| PA 8-B        | MHDR - 18                                             | 12.1-18.0     | 18.0           | 12.90   | 232   |
| PA 8-C        | MHDR - 18                                             | 12.1-18.0     | 18.0           | 11.70   | 211   |
| PA 8-D        | MHDR - 18                                             | 12.1-18.1     | 18.0           | 8.60    | 154   |
| PA 9          | Neighborhood Commercial (MHDR-18 Residential Overlay) | 12.1-18.0     | 18.0           | 9.33    | 168   |
| PA 9          | Neighborhood Commercial (0.25 FAR)                    |               |                |         |       |
| PA 10         | RSG Community Park                                    |               |                | 25.00   |       |
| PA 11         | Confluence Park                                       |               |                | 10.15   |       |
| PA 12         | Neighborhood Park                                     |               |                | 12.70   |       |
| PA 13         | Entry Park                                            |               |                | 1.08    |       |
| PA 14-A       | Village Paseo                                         |               |                | 3.25    |       |
| PA 14-B       | Village Paseo                                         |               |                | 6.01    |       |
| PA 14-C       | Village Paseo                                         |               |                | 2.26    |       |
| PA 14-D       | Village Paseo                                         |               |                | 1.03    |       |
| PA 15-A       | Creeks / Creek Edge Linear Parks (100' Width)         |               |                | 54.83   |       |
| PA 15-B       | Creeks / Creek Edge Linear Parks (100' Width)         |               |                | 67.17   |       |
| PA 16-A       | Public Facility                                       |               |                | 2.42    |       |
| PA 16-B       | Electrical Sub-station                                |               |                | 0.20    |       |
| PA 16-C       | Elementary School<br>LDR SFD 4,500SF Overlay          |               | 6.0            | 14.00   | 84    |
| PA 17         | Open Space                                            |               |                | 25.70   |       |
| PA 18         | Flood Control                                         |               |                | 1.10    |       |
|               | Fire Station                                          |               |                | 1.00    |       |
|               | Right-of-Way (Include Landscape Corridor)             |               |                | 77.17   |       |
|               | TOTAL                                                 |               |                | 830.84  | 3,385 |

| Land Use                                          | Acreage | DU    | % of Total Ac. |
|---------------------------------------------------|---------|-------|----------------|
| VLDR                                              | 47.05   | 94    | 6%             |
| LDR                                               | 301.75  | 1355  | 36%            |
| MDR                                               | 115.94  | 754   | 14%            |
| MHDR                                              | 51.70   | 930   | 6%             |
| Neighborhood Commercial with Residential overlay* | 9.33    | 168   | 1%             |
| Elementary School with Residential Overlay**      | 14.00   | 84    | 2%             |
| Parks & Open Space                                | 209.18  |       | 25%            |
| Right-of-way                                      | 77.17   |       | 9%             |
| Public Facility                                   | 2.62    |       | 0%             |
| Flood Control                                     | 1.10    |       | 0%             |
| Fire Station                                      | 1.00    |       | 0%             |
| TOTAL                                             | 830.84  | 3,385 | 100%           |

| Distribution of Product Type         | Density Range | Target Density | Acreage | DU    | % of Total DU |
|--------------------------------------|---------------|----------------|---------|-------|---------------|
| Single Family Detached 1/2 Acre Lots | 0 - 2.5       | 2.0            | 47.05   | 94    | 3%            |
| Single Family Detached 7000 Lots     | 2.6 - 6.0     | 3.4            | 49.41   | 169   | 5%            |
| Single Family Detached 6000 Lots     | 2.6 - 6.0     | 3.8            | 72.40   | 274   | 8%            |
| Single Family Detached 5500 Lots     | 2.6 - 6.0     | 4.4            | 76.37   | 336   | 10%           |
| Single Family Detached 5000 Lots     | 2.6 - 6.0     | 5.2            | 57.71   | 301   | 9%            |
| Single Family Detached 4500 Lots     | 2.6 - 6.0     | 6.0            | 45.86   | 359   | 11%           |
| Age Qualified                        | 6.1 - 12.0    | 6.5            | 115.94  | 754   | 22%           |
| Multi-Family Attached-18 *           | 12.1 - 18.0   | 18.0           | 61.03   | 1098  | 32%           |
| TOTAL                                |               |                | 525.77  | 3,385 | 100%          |

\* 168 dwelling units (9.33 ac.) are dedicated to the residential overlay within PA 9.

\* \* 84 dwelling units (14 ac.) are dedicated to the residential overlay within PA 16-C.

utilization of reclaimed water for landscape irrigation, and the installation of additional storage capacity.

## 2.4. Proposed Project Demands

The project water demand is established based on the unit water demand from the UWMP, 0.52 acre-feet per year per dwelling unit, decreased to reflect the required 20% reduction by 2020 (371 gallons per dwelling unit per day). The reduction is included in the demand calculations not only because it is a requirement of state law, but because the city has been proactive in requiring that new development incorporate water-saving features, not limited to water-efficient plumbing fixtures and appliances, drought-tolerant landscaping, and the use of reclaimed water for common area irrigation. And as outlined in the Specific Plan, this project is going to incorporate Building Green philosophies, seen now and in the future as a beneficial marketing strategy.

Projected water demand from the proposed public facilities is included in Appendix A, and is based on estimated fixture units.

Common area landscape irrigation is not included in the potable water calculations, as those areas will be served by the Recycled Water System.

Table 2.4-1 below shows the calculation for the project.

| <b>Table 2.4-1: Project Average Day Water Demand</b> |        |                          |          |      |           |       |
|------------------------------------------------------|--------|--------------------------|----------|------|-----------|-------|
| Land Use                                             | FACTOR |                          | QUANTITY | UNIT | TOTAL     |       |
|                                                      |        |                          |          |      | GPD       | MGD   |
| Residential                                          | 371    | gal/DU/day               | 3385     | DU   | 1,255,835 | 1.256 |
| Commercial                                           | 0.6    | gal/min per Fixture Unit | 198      | FX   | 171,072   | 0.171 |
| Total                                                |        |                          |          |      | 1,426,907 | 1.427 |

## 2.5. Project Water Supply Assessment

The project WSA (by Madole & Associates, Inc. and Encompass Associates, Inc.) concluded that there will be adequate supply currently available to the city to meet the project demands through buildout. The WSA actually uses a higher per capita demand factor than

that utilized in this master plan, as defined in the 2010 UWMP (Table 3-8). The factors utilized in the WSA are for long term water supply planning purposes, and simply assess the actual water usage divided by the population, with projections, resulting in an assessment of city-wide water usage, not applicable to the calculation for demand for new housing. Instead, the objective of the MPW is to size the facilities for this project, where peak demand from this project is the variable of concern, not the impact the added population will have on city-wide supply.

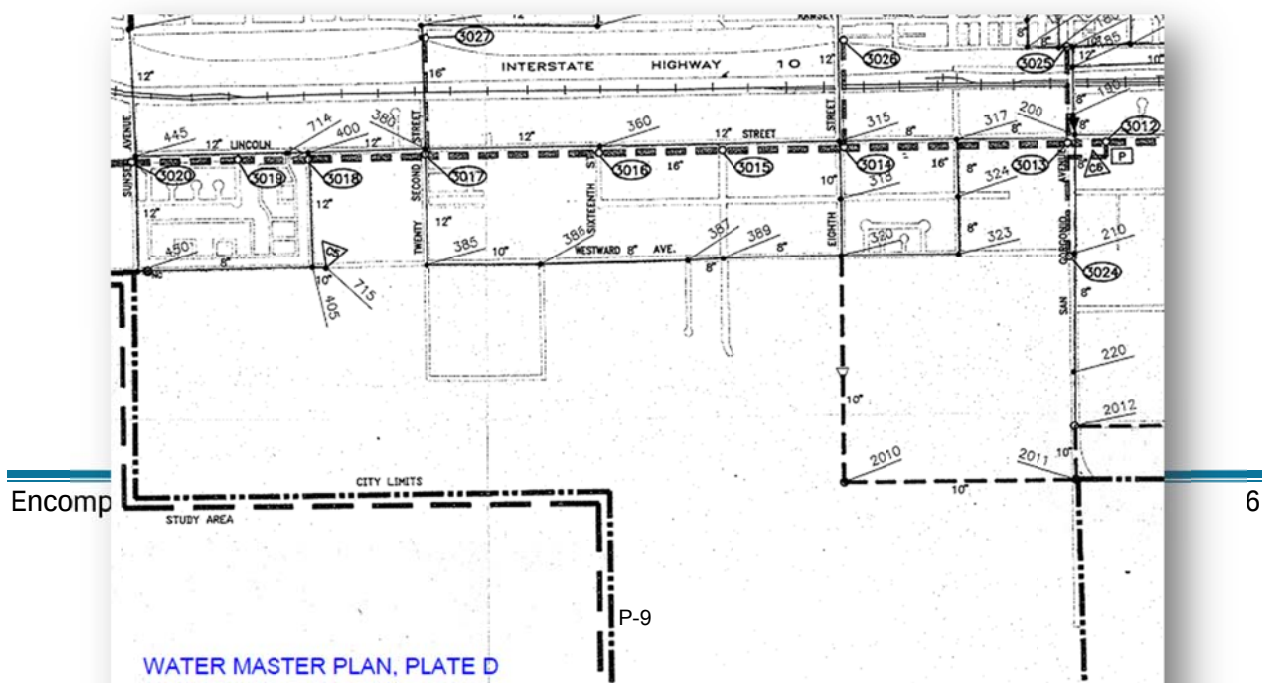
## 2.6. Proposed Source of New Supply

Per the project WSA, the city has sufficient rights to water such that new sources of water supply are not required for this project. As discussed in the WSHM, at certain critical peak demand conditions, there may be a deficiency in immediately available water, such that additional pumping and or storage capacity is required. Additional capacity may be necessary, different that additional supply.

## 2.7. Analysis of Existing City Water System

The city has an extensive existing water system, including pipelines, wells, pumps, pressure reducing valves and storage reservoirs. The city system is currently split into 5 different pressure zones, which will be discussed further below.

As demonstrated in the WSA, the city currently has the capacity and water available to serve the project, from an annual average perspective. This report will determine if the current system can deliver the peak hour and fire flow necessary to accommodate the project, and if not, what changes are required, either with respect to current system operations, or new system improvements. Storage capacity is discussed in Section 2.8.





## 2.8. Storage Requirements

Water storage is necessary for the successful operation of a water system for a number of reasons. The various pressure zones are established based primarily on the average elevations in the connected reservoirs. The water storage also provides a buffer between the average water demand and the peak demand, as well as a reserve supply for emergencies, for example when a source of water is temporarily damaged or cut-off. And the reservoirs provide additional water for firefighting efforts.

The WSHM identifies an existing system storage capacity of 10.4 MG, but a calculated minimum requirement of 26.4 MG, resulting in a current shortfall of 16.0 MG. Therefore, the project will be required to provide additional storage capacity (see Section 3.2 for the project storage requirements).

## 2.9. Existing City Pressure Zones

The WSHM lists the existing pressure zones and ranges in Table 4-2. This table is included below. See Exhibit 2.9 for the existing pressure zones.

| Pressure Zone  | Nominal Hydraulic Grade (feet) | Low Elevation (feet) | High Elevation (feet) |
|----------------|--------------------------------|----------------------|-----------------------|
| Foothill West  | 2,822                          | 2,500                | 2,650                 |
| Foothill East  | 2,800                          | 2,580                | 2,680                 |
| Main           | 2,720                          | 2,250                | 2,620                 |
| Lower          | 2,450                          | 2,100                | 2,310                 |
| Mountain North | 2,900                          | 2,670                | 2,760                 |
| Mountain South | 2,570                          | 2,330                | 2,450                 |

### 3. Proposed Water System

A system of water main pipelines are proposed to be installed throughout the project, with a transmission system proposed in the major streets, which in turn will serve local waterlines distributed throughout the various planning areas.

Three points of connection to the existing city water system are proposed. It is anticipated that the project will connect to the city's "Lower Main" pressure zone along Westward Avenue, 22<sup>nd</sup> Street, and 8<sup>th</sup> Street, and to the "Main" zone off of Sunset Avenue. Phasing of the project may necessitate additional intermediate connections, which will be determined later as needed. A pressure reducing valve will be needed for the connection to Sunset Avenue.

An independent recycled water system is a proposed alternative to traditional irrigation from potable water sources for this master planned community. The modeling in this report assumes common area landscaping will be irrigated with the recycled water system.

#### 3.1. Preliminary Hydraulic Model

The proposed water system is modeled in the hydraulic calculations provided in the appendices. At each of the proposed points of connection, existing data is utilized to simulate the hydraulic conditions at that location. A hypothetical reservoir is established at those locations, with the hydraulic grade line established from the pipeline elevation plus the pressure at that point.

For the connections at Sunset Avenue, 22<sup>nd</sup> and 8<sup>th</sup> Streets, the hydraulic grade line elevations are taken from the current city water system model, as provided by Carollo Engineers, Inc. (via email dated 4/21/14 from Ms. Inge Wiersema, P.E.) and as tabulated below. A pressure reducing valve will be needed for the connection at Sunset Avenue to maintain a maximum HGL of 2,540 feet.

| Location                      | Elevation (ft) | Existing MDD  |           | Future MDD*          |           |
|-------------------------------|----------------|---------------|-----------|----------------------|-----------|
|                               |                | HGL (ft)      | Psi Range | HGL (ft)             | Psi Range |
| Sunset and Westward           | 2,432          | 2,709 - 2,718 | 120 - 124 | <u>2,702</u> - 2,712 | 117 - 121 |
| 22 <sup>nd</sup> and Westward | 2,380          | 2,696 - 2,713 | 137 - 144 | <u>2,514</u> - 2,530 | 58 - 65   |
| 8 <sup>th</sup> and Westward  | 2,306          | 2,696 - 2,715 | 169 - 177 | <u>2,516</u> - 2,539 | 91 - 101  |

\*Note that the Future System has different pressure zones

Primarily, eight-inch diameter cement-lined steel pipe is modeled for the backbone water improvements in the calculations in this study. Each planning area is modeled as a dedicated node connected at one location to the backbone line. While this does not model the variability in elevation within each planning area, nor the additional friction losses incurred via planning area piping systems, the ultimate condition will typically include at least two points of connection to the backbone system, creating a more hydraulically efficient looped system.

A final model will need to be calculated to validate the pipe sizes during the preparation of construction documents for the mainline infrastructure, once refined planning area layouts are available, however the analyses included herein provide a large buffer that should allow for additional system losses.

The calculations in Appendix A are for the peak hour demand condition. As defined in the WMP, the peak hour is determined by multiplying the peak day demand by 2.0. The peak day demand is determined by multiplying the average day demand by 2.0, as shown in Table 3.1-1 below. The base demands shown in the peak day column are input into the hydraulic model. The additional 2.0 peaking factor is then applied uniformly within the demand pattern in the model.

The calculations in Appendix B are for the peak day demand with fire condition. The peak day demand is determined by multiplying the average day demand by 2.0. Then, the required fire demand is added at the nodes with the lowest pressure from the peak hour condition. Three conditions were checked: PA 9 is a potential commercial planning area, and the community building facilities in PA 10 are categorized as commercial, both with a fire flow requirement of 2500 gpm, and PA 8-A was assessed with a residential fire flow requirement of 1500 gpm.

The worst case was a fire at PA 10, and the pipe reaches between PA 10 and Westward Avenue, including on-site across the park (PA 10), would require 12-inch water lines to convey the required fire flow and maintain 20 psi, however the remaining planning areas could be served by 8-inch systems. The calculations included herein are for the fire condition at PA 10.

A diurnal demand pattern is not utilized in these calculations, as the existing system is modeled statically with the worst-case pressure condition at each point of connection. The calculations herein provide an instantaneous peak flow condition.

EPANet 2.0, by the U.S. EPA, was utilized to model the water system in this study.

Table 3.1-2 shows a summary of the two hydraulic models. As can be drawn from the table, a minimum of 40 psi is maintained for the peak hour demand model, and a minimum of 20 psi is maintained for the peak day fire model. And in neither model does the pressure exceed 140 psi. Therefore, the existing city system is adequate to provide water to the project.



| Table 3.1-1: Water Demand by Planning Area |      |      |     |      |                    |             |          |
|--------------------------------------------|------|------|-----|------|--------------------|-------------|----------|
| Planning Area                              | AC   | DU   | FX  | UNIT | AVERAGE GPM FACTOR | AVERAGE GPM | PEAK GPM |
| PA 1                                       | 47.1 | 94   |     | DU   | 0.2576             | 24.22       | 48.44    |
| PA 2-A                                     | 15.5 | 53   |     | DU   | 0.2576             | 13.65       | 27.31    |
| PA 2-B                                     | 17.6 | 60   |     | DU   | 0.2576             | 15.46       | 30.92    |
| PA 2-C                                     | 16.3 | 56   |     | DU   | 0.2576             | 14.43       | 28.86    |
| PA 3-A                                     | 14   | 53   |     | DU   | 0.2576             | 13.65       | 27.31    |
| PA 3-B                                     | 23.8 | 90   |     | DU   | 0.2576             | 23.19       | 46.38    |
| PA 3-C                                     | 10.6 | 40   |     | DU   | 0.2576             | 10.31       | 20.61    |
| PA 3-D                                     | 24   | 91   |     | DU   | 0.2576             | 23.45       | 46.89    |
| PA 4-A                                     | 23.2 | 102  |     | DU   | 0.2576             | 26.28       | 52.56    |
| PA 4-B                                     | 23.1 | 102  |     | DU   | 0.2576             | 26.28       | 52.56    |
| PA 4-C                                     | 17.7 | 78   |     | DU   | 0.2576             | 20.10       | 40.19    |
| PA 4-D                                     | 12.3 | 54   |     | DU   | 0.2576             | 13.91       | 27.83    |
| PA 5-A                                     | 5.9  | 31   |     | DU   | 0.2576             | 7.99        | 15.97    |
| PA 5-B                                     | 6.5  | 34   |     | DU   | 0.2576             | 8.76        | 17.52    |
| PA 5-C                                     | 12.6 | 66   |     | DU   | 0.2576             | 17.00       | 34.01    |
| PA 5-D                                     | 16.4 | 85   |     | DU   | 0.2576             | 21.90       | 43.80    |
| PA 5-E                                     | 10.4 | 54   |     | DU   | 0.2576             | 13.91       | 27.83    |
| PA 5-F                                     | 5.87 | 31   |     | DU   | 0.2576             | 7.99        | 15.97    |
| PA 6-A                                     | 7.3  | 95   |     | DU   | 0.2576             | 24.48       | 48.95    |
| PA 6-B                                     | 16.8 | 101  |     | DU   | 0.2576             | 26.02       | 52.04    |
| PA 6-C                                     | 11.7 | 70   |     | DU   | 0.2576             | 18.03       | 36.07    |
| PA 6-D                                     | 24.1 | 144  |     | DU   | 0.2576             | 37.10       | 74.20    |
| PA 7-A                                     | 85.4 | 604  |     | DU   | 0.2576             | 155.61      | 311.23   |
| PA 7-B                                     | 30.6 | 199  |     | DU   | 0.2576             | 51.27       | 102.54   |
| PA 8-A                                     | 18.5 | 414  |     | DU   | 0.2576             | 106.66      | 213.33   |
| PA 8-B                                     | 12.9 | 232  |     | DU   | 0.2576             | 59.77       | 119.54   |
| PA 8-C                                     | 11.7 | 211  |     | DU   | 0.2576             | 54.36       | 108.72   |
| PA 8-D                                     | 8.6  | 154  |     | DU   | 0.2576             | 39.68       | 79.35    |
| PA 9                                       | 9.33 | 168  |     | DU   | 0.2576             | 43.28       | 86.57    |
| PA 10                                      |      |      | 160 | FX   | 0.6000             | 96.00       | 192.00   |
| PA 11                                      |      |      | 14  | FX   | 0.6000             | 8.40        | 16.80    |
| PA 12                                      |      |      | 28  | FX   | 0.6000             | 16.80       | 33.60    |
| PA 16-A                                    |      |      | 14  | FX   | 0.6000             | 8.40        | 16.80    |
| Totals                                     | 540  | 3385 |     |      | 10.472             | 990.9       | 1981.8   |

GPM = GPD / 24 hr/day / 60 min / hr

| <b>Table 3.1-2: Hydraulic Model Results</b> |           |               |                    |               |
|---------------------------------------------|-----------|---------------|--------------------|---------------|
|                                             | Peak Hour |               | Peak Day with Fire |               |
|                                             | Demand    | Pressure      | Demand             | Pressure      |
|                                             | GPM       | psi           | GPM                | psi           |
| PA 1                                        | 96.88     | 78.95         | 48.44              | 77.39         |
| PA 2-A                                      | 54.62     | 81.33         | 27.31              | 80.12         |
| PA 2-B                                      | 61.84     | 98.31         | 30.92              | 96.75         |
| PA 2-C                                      | 57.72     | 89.81         | 28.86              | 87.46         |
| PA 3-A                                      | 54.62     | 84.21         | 27.31              | 81.01         |
| PA 3-B                                      | 92.76     | 95            | 46.38              | 93.75         |
| PA 3-C                                      | 41.22     | 102.43        | 20.61              | 102.56        |
| PA 3-D                                      | 93.78     | 108.79        | 46.89              | 108.84        |
| PA 4-A                                      | 105.12    | 79.32         | 52.56              | 73.38         |
| PA 4-B                                      | 105.12    | 88.81         | 52.56              | 87.07         |
| PA 4-C                                      | 80.38     | 98.39         | 40.19              | 96.65         |
| PA 4-D                                      | 55.66     | 96.69         | 27.83              | 96.55         |
| PA 5-A                                      | 31.94     | 68.03         | 15.97              | 67.97         |
| PA 5-B                                      | 35.04     | 64.96         | 17.52              | 64.86         |
| PA 5-C                                      | 68.02     | 81.71         | 34.01              | 80.56         |
| PA 5-D                                      | 87.6      | 105.5         | 43.8               | 104.11        |
| PA 5-E                                      | 55.66     | 113.81        | 27.83              | 113.81        |
| PA 5-F                                      | 31.94     | <b>119.29</b> | 15.97              | <b>119.33</b> |
| PA 6-A                                      | 45.34     | 68.09         | 22.67              | 54.72         |
| PA 6-B                                      | 104.08    | 87.4          | 52.04              | 86.54         |
| PA 6-C                                      | 72.14     | 108.72        | 36.07              | 107.74        |
| PA 6-D                                      | 148.4     | 100.87        | 74.2               | 101.06        |
| PA 7-A                                      | 571.96    | 69.25         | 285.98             | 68.15         |
| PA 7-B                                      | 205.08    | 77.22         | 102.54             | 76.65         |
| PA 8-A                                      | 343.18    | 55.49         | 171.59             | 40.65         |
| PA 8-B                                      | 239.08    | 59.41         | 119.54             | 59.54         |
| PA 8-C                                      | 217.44    | 60.32         | 108.72             | 60.41         |
| PA 8-D                                      | 158.7     | 55.48         | 79.35              | 40.34         |
| PA 9                                        | 173.14    | <b>54.46</b>  | 86.57              | 40.53         |
| PA 10                                       | 340.8     | 58.58         | 2670.4             | <b>30.8</b>   |
| PA 11                                       | 33.6      | 103.76        | 16.8               | 103.27        |
| PA 12                                       | 67.2      | 90.4          | 33.6               | 90.29         |
| PA 16-A                                     | 33.6      | 106.95        | 16.8               | 107.08        |
|                                             | 3963.7    |               | 4481.8             |               |

### **3.2. System Storage Requirements**

As stated above and determined in the WSHM, the city is currently deficient with respect to water storage, therefore the project will need to contribute to the increase in system storage capacity.

The storage capacity requirement is determined using methodology provided by Carollo Engineers as used in the 2015 Storage and Pressure Zone Analysis Study. Storage is needed for operational needs, emergency shortage avoidance, and fire protection.

- Operational Storage is 25% of maximum day demand (MDD).
- Emergency Storage is 100% of average day demand (ADD).
- Fire Protection Storage is 2,500 gpm for 3 hours (due to commercial-type uses).

Therefore the total storage requirement for the project is 2.59 MG [25% x 2x1.427 (MDD) + 1.427 MG (ADD) + 2500 gpm x 60 min/hr x 3 hr].

### **3.3. Analysis of Pressure Zones**

The hydraulic analyses contained in this study indicate that the project can connect to the existing “Main” pressure zone and adequately serve all planning areas. A pressure reducing valve will be needed for the Sunset Avenue connection to ensure pressures are not too high. An analysis then needs to be made to determine a location for the required additional storage capacity.

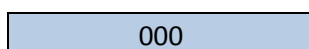
The highest elevation on the property is 2404 feet, in PA 8-C, adjacent to Sunset Avenue. Possibly deceptively, the hill overlooking the property in the southeastern area, PA 17, has a maximum elevation of about 2344 feet.

However, as shown below in Table 3.3-1, a new reservoir in either of these two locations is not sufficient to serve the property. The shaded values reflect acceptable pressure conditions, as defined in the WMP as being between 40 and 140 psi. A new reservoir at a surface elevation of approximately 2510 feet is required to serve the project. As the new reservoir site will serve the city system, not just this project, the city will lead the analyses to determine the optimum location, and Rancho San Gorgonio will contribute a fair share of associated costs.

| <b>Table 3.3-1: Analysis of Pressure Zone Alternatives</b> |              |               |            |
|------------------------------------------------------------|--------------|---------------|------------|
|                                                            | RSG (new)    |               |            |
|                                                            | Offsite      | On-site       | On-site    |
|                                                            | <u>Above</u> | <u>Sunset</u> | <u>SEC</u> |
| Surface Grade                                              | 2510         | 2404          | 2344       |
| Min. Depth                                                 | 10           | 10            | 10         |
| Nominal HGL*                                               | 2496         | 2390          | 2330       |
| Prop Pad EL                                                | RSG PSI      | RSG PSI       | RSG PSI    |
| 2206                                                       | 126          | 80            | 54         |
| 2210                                                       | 124          | 78            | 52         |
| 2220                                                       | 120          | 74            | 48         |
| 2230                                                       | 115          | 69            | 43         |
| 2240                                                       | 111          | 65            | 39         |
| 2250                                                       | 107          | 61            | 35         |
| 2260                                                       | 102          | 56            | 30         |
| 2270                                                       | 98           | 52            | 26         |
| 2280                                                       | 94           | 48            | 22         |
| 2290                                                       | 89           | 43            | 17         |
| 2300                                                       | 85           | 39            | 13         |
| 2310                                                       | 81           | 35            | 9          |
| 2320                                                       | 76           | 30            | 4          |
| 2330                                                       | 72           | 26            | 0          |
| 2340                                                       | 68           | 22            | -4         |
| 2350                                                       | 63           | 17            | -9         |
| 2360                                                       | 59           | 13            | -13        |
| 2370                                                       | 55           | 9             | -17        |
| 2380                                                       | 50           | 4             | -22        |
| 2390                                                       | 46           | 0             | -26        |
| 2400                                                       | 42           | -4            | -30        |
| 2404                                                       | 40           | -6            | -32        |

\* 24 feet of head is subtracted to account for transmission system losses

Legend:



Shaded numbers indicate an acceptable pressure for a given pressure zone and pad elevation

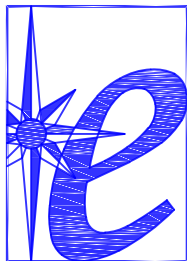
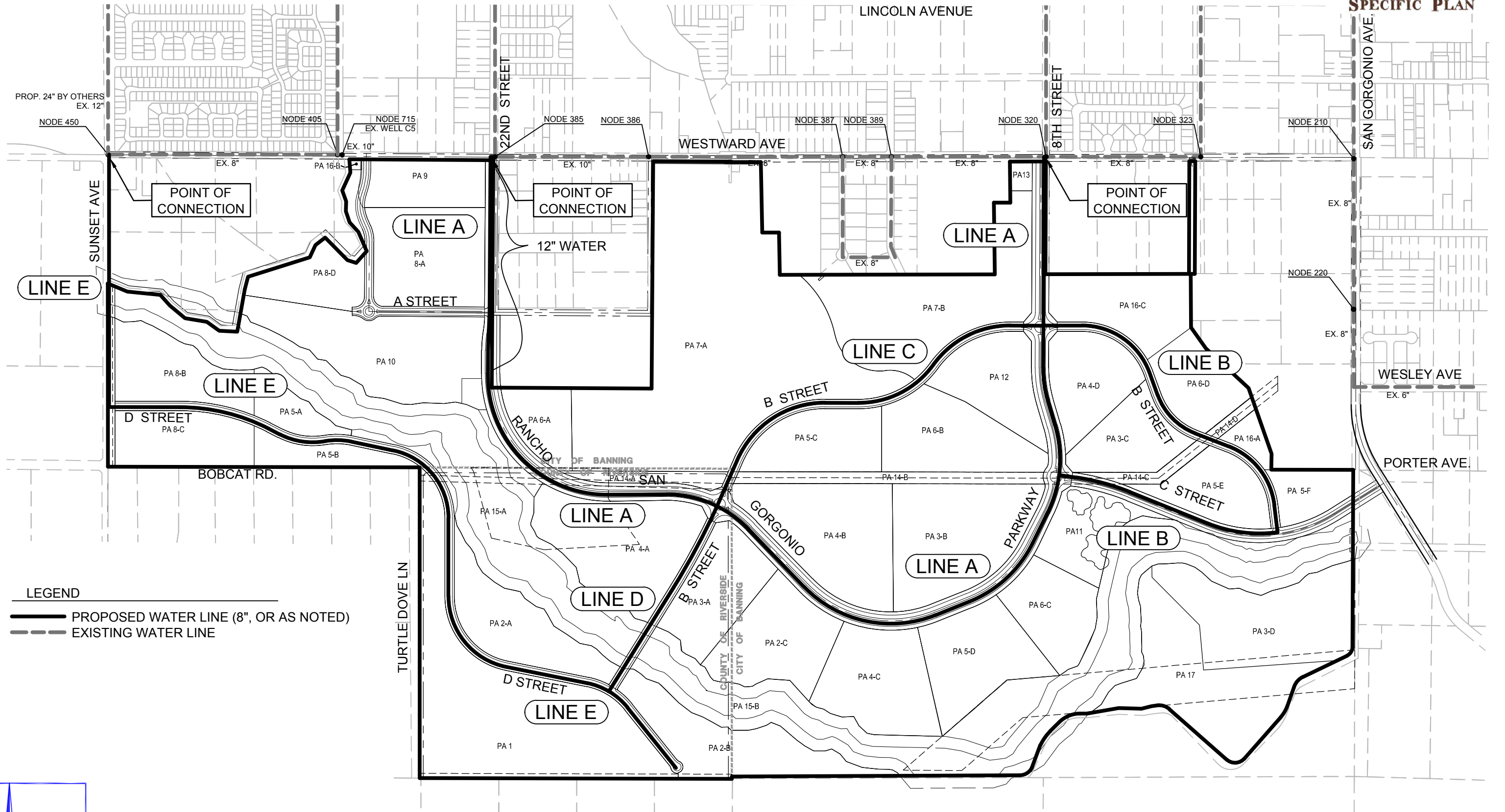


### **3.4. Summary of Proposed Water System**

Based on the preliminary hydraulic analysis, an 8-inch backbone infrastructure system should be adequate in most reaches, with some 12-inch segments needed to accommodate fire flows in the lowest pressure areas. The WSHM does not indicate any system deficiencies in the area of the project, therefore no off-site pipeline improvements are anticipated, other than the required storage capacity discussed above. The city will coordinate the siting and design of the additional storage and accompanying transmission pipelines, with this project contributing a fair share of the cost.

When construction documents are prepared for the infrastructure, detailed planning area street alignments and conceptual grading will allow for a more precise system model, at which point pressure conditions can be further refined. With more precise modeling and with current (at that time) existing water system hydraulic data at the points of connection, the water system could benefit from upsizing of some of the backbone mainlines. Further refinement is not viable, nor beneficial, at this preliminary stage.

As discussed above, the project will need to contribute to the expansion of storage capacity, in the amount of 2.59 MG. And as indicated above, an acceptable on-site location for such a reservoir does not exist. It is anticipated that the city will determine acceptable locations based upon a pending update to the city water master plan.



## 4. Proposed Recycled Water System

The recycled water system is discussed in detail in the project WSA and Master Plan of Sewer. This section is a summary of the preliminary calculations for the recycled water system.

Recycled water will be used for irrigation of common areas landscaping only. Residential (lot) irrigation will be provided per the domestic water system. The following table provides a summary of the various landscape areas, categorized by irrigation water demand. Irrigated area for each planning area was estimated from the conceptual landscape plan, with information provided by Architerra Design Group. See Exhibit 4-1 for locations of the various planning areas and the type of landscaping planned, with respect to irrigation demand rates.

It is assumed that irrigation for a given planning area will occur evenly throughout an eight-hour period. Per the City of Banning's Recycled Water Master Plan (Carollo Engineers, 2006), the peaking factor to be applied to the average daily demand (ADD) is 2.82 for the Maximum Day Demand (MDD).

| Table 4-1: IRRIGATION WATER NEEDS ASSESSMENT<br>Provided by Architerra Design Group |       |               |    |            |           |                |                  |                   |            |
|-------------------------------------------------------------------------------------|-------|---------------|----|------------|-----------|----------------|------------------|-------------------|------------|
| HYDROZONE                                                                           | ACRES | SF            | ET | MAWA       | MAWA(CCF) | ETWU<br>gal/yr | ETWU<br>(CCF)/yr | GPD               | GPM (8-hr) |
| PA10: SPORTS PARK                                                                   |       |               |    |            |           |                |                  | 58494             | 121.86     |
| HIGH                                                                                | 11.25 | 490050        | 55 | 11697494   | 15638     | 18938799       | 25319            | 51887             | 108.10     |
| LOW                                                                                 | 4.6   | 200376        | 55 | 4782975    | 6394      | 2411584        | 3224             | 6607              | 13.76      |
| PA11: CONFLUENCE PARK                                                               |       |               |    |            |           |                |                  | 13100             | 27.29      |
| HIGH                                                                                | 0.88  | 38332.8       | 55 | 915004     | 1223      | 1481435        | 1981             | 4059              | 8.46       |
| MOD                                                                                 | 0.55  | 23958         | 55 | 571877     | 765       | 510605         | 683              | 1399              | 2.91       |
| LOW                                                                                 | 2.11  | 91911.6       | 55 | 2193930    | 2933      | 1106183        | 1479             | 3031              | 6.31       |
| WETLAND                                                                             | 1.7   | 74052         | 55 | 1767621    | 2363      | 1683449        | 2251             | 4612              | 9.61       |
| PA12: NEIGHBORHOOD PARK                                                             |       |               |    |            |           |                |                  | 32702             | 68.13      |
| HIGH                                                                                | 6.17  | 268765.2      | 55 | 6415425    | 8577      | 10386879       | 13886            | 28457             | 59.29      |
| LOW                                                                                 | 2.87  | 125017.2      | 55 | 2984161    | 3990      | 1504619        | 2012             | 4122              | 8.59       |
| SLA                                                                                 | 0.03  | 1306.8        | 55 | 44562      | 60        | 44562          | 60               | 122               | 0.25       |
| PA13 & Small open space outside of 100' setback @ creeks: MISC. LINEAR PARKS:       |       |               |    |            |           |                |                  |                   |            |
| MOD                                                                                 | 5.07  | 220849.2      | 55 | 5271670    | 7048      | 5020638        | 6712             | 13755             | 28.66      |
| PA15A & B: SMITH & PERSHING CREEK OS                                                |       |               |    |            |           |                |                  |                   |            |
| LOW                                                                                 | 15.2  | 662112        | 55 | 15804613   | 21129     | 7968713        | 10653            | 21832             | 45.48      |
| PA14A,B,C,D: UTILITY CORRIDORS                                                      |       |               |    |            |           |                |                  |                   |            |
| LOW                                                                                 | 2.65  | 115434        | 55 | 2755410    | 3684      | 1389282        | 1857             | 3806              | 7.93       |
| : EXTERIOR STREETSCAPE                                                              |       |               |    |            |           |                |                  |                   |            |
| LOW/MOD                                                                             | 2.55  | 111078        | 55 | 2651432    | 3545      | 1893880        | 2532             | 5189              | 10.81      |
| : INTERIOR STREETSCAPE                                                              |       |               |    |            |           |                |                  |                   |            |
| LOW/MOD                                                                             | 22.35 | 973566        | 55 | 23239020   | 31068     | 16599300       | 22192            | 45478             | 94.74      |
|                                                                                     |       | YEARLY TOTALS |    | 81,095,195 | 108,416   | 70,939,928     | 94,839           | 194,356           | 404.91     |
| 77.98 ac                                                                            |       |               |    |            |           |                |                  | 218 ac-ft/year    |            |
|                                                                                     |       |               |    |            |           |                |                  | 2492 gal/day/acre |            |

-Assumes irrigation spread out over an 8-hour period

-MAWA = Maximum Applied Water Allowance (gal per year) = Area (SF) x ET x 0.7 (1.0 for sports) x 0.62

-ETWU = Estimated Total Water Use (gallons per year) = ET x 0.62 x Area (SF) x PF / IE  
(PF = Plant Factor, IE = Irrigation Efficiency)

-CCF = 100 cubic feet (748 gallons, 1 "unit" of water)

-Peaking Factor of 2.82 is applied in hydraulic modeling software (not included above)

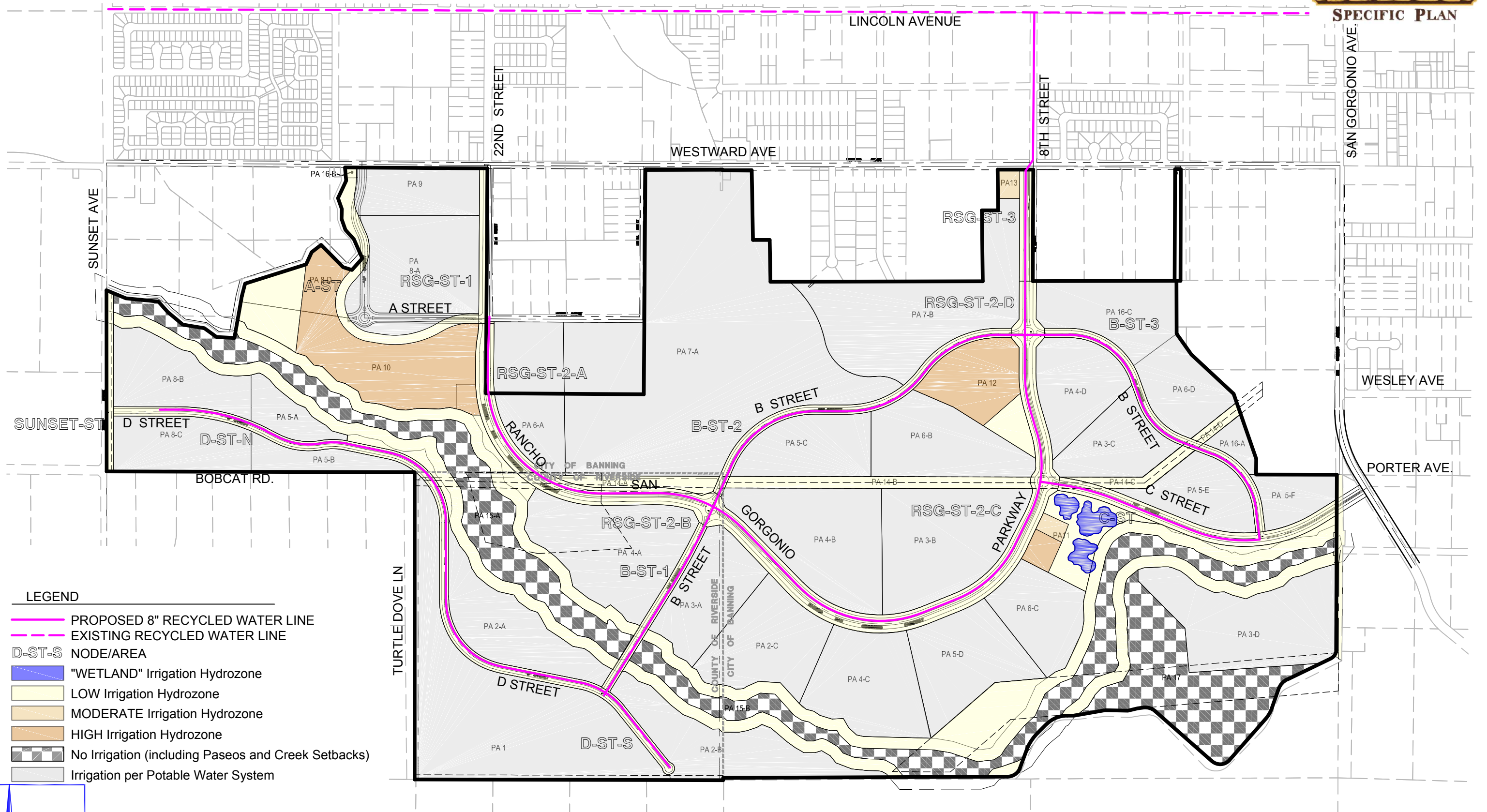


| <b>Table 4-1: IRRIGATION WATER NEEDS ASSESSMENT, Continued</b> |        |                                          |        |
|----------------------------------------------------------------|--------|------------------------------------------|--------|
| <b><u>Plant Factors (PF)</u></b>                               |        | <b><u>Irrigation Efficiency (IE)</u></b> |        |
| High water use plants                                          | - .85  | Turf Rotors                              | - .75  |
| Moderate water use plants                                      | - .50  | Rotating Nozzles                         | - .80  |
| Low water use plants                                           | - .30  | Point to Point/Drip                      | - .85  |
| Wetland plants                                                 | - .50  | SLA (Special Landscape Use)              | - 1.00 |
| SLA (Special Landscape Use)                                    | - 1.00 |                                          |        |

A hydraulic model was then run given these demands. For the purpose of this calculation, it is assumed that the future city recycled water system will have hydraulic characteristics similar to the “Main” (domestic) pressure zone serving the area. The point of connection is anticipated to be at Lincoln Avenue and 8<sup>th</sup> Street. Therefore, about 1350 feet of off-site recycled water mainline will need to be constructed to serve the project.

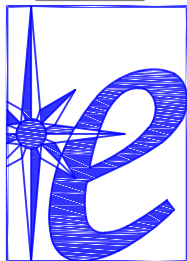
The results of the hydraulic model are included in Appendix C, with a summary provided in the table below. An 8-inch system will be adequate to provide irrigation water at a range of 60 to 200 psi.

| <b>Table 4-2: Recycled Water System Pressure</b> |            |          |
|--------------------------------------------------|------------|----------|
| Junction                                         | AREA       | Pressure |
| Node ID                                          |            | psi      |
| 71                                               | 10         | 85.13    |
| 87                                               | 12         | 133.51   |
| 2                                                | 13         | 124.23   |
| 21                                               | 11         | 152.23   |
| 63                                               | D-ST-N     | 79.64    |
| 50                                               | D-ST-S     | 114.6    |
| 64                                               | SUNSET-ST  | 74.44    |
| 45                                               | B-ST-1     | 120.52   |
| 20                                               | RSG-ST-1   | 89.64    |
| 19                                               | RSG-ST-2-A | 93.73    |
| 14                                               | RSG-ST-2-B | 119.71   |
| 7                                                | RSG-ST-2-C | 145.8    |
| 4                                                | RSG-ST-2-D | 134.78   |
| 67                                               | RSG-ST-3   | 125.57   |
| 47                                               | A-ST       | 83.13    |
| 40                                               | B-ST-2     | 120.39   |
| 22                                               | B-ST-3     | 132.39   |
| 35                                               | C-ST       | 151.43   |
|                                                  |            |          |



**LEGEND**

- PROPOSED 8" RECYCLED WATER LINE
- EXISTING RECYCLED WATER LINE
- D-ST-S** NODE/AREA
- "WETLAND" Irrigation Hydrozone
- LOW Irrigation Hydrozone
- MODERATE Irrigation Hydrozone
- HIGH Irrigation Hydrozone
- No Irrigation (including Paseos and Creek Setbacks)
- Irrigation per Potable Water System



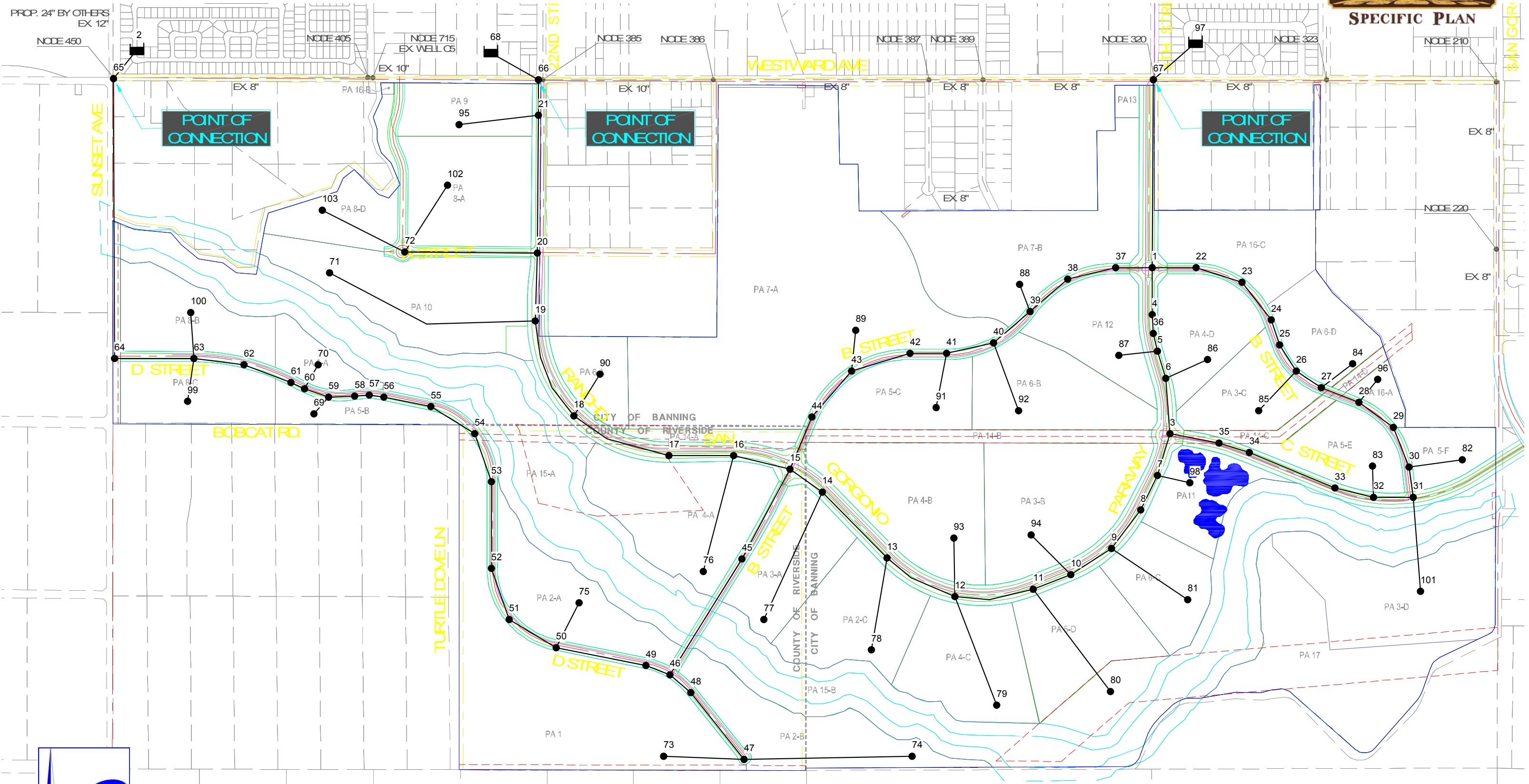
0' 800' 1600'

A project-specific package “satellite” wastewater treatment plant is a potential source for recycled water, and could be located in various places on-site, possibly in PA 16-A. The package plant would be sized to accommodate the project, and would be designed such that it could be expanded in phases consistent with project build-out. The package plant would be operated and maintained by the city. The package plant would produce recycled water for use in common area irrigation throughout the project, and possibly elsewhere in the city. The plant is discussed further in the project MPS.

A preferred alternative for recycled water would be via the city’s planned recycled water system. The city is constructing a this system, which is planned to originate at the existing wastewater treatment plant. For this alternative, the project would contribute to the cost of the improvements needed at the WWTP in order to supply recycled water.

The storage requirement for the project recycled water system is the demand as quantified in Table 4.1, 218 ac-ft/year, or 0.194 MGD, and with the 2.82 peaking factor applied, 0.548 MG. The location of this facility will be determined by the city in order to optimize the city recycled water system.

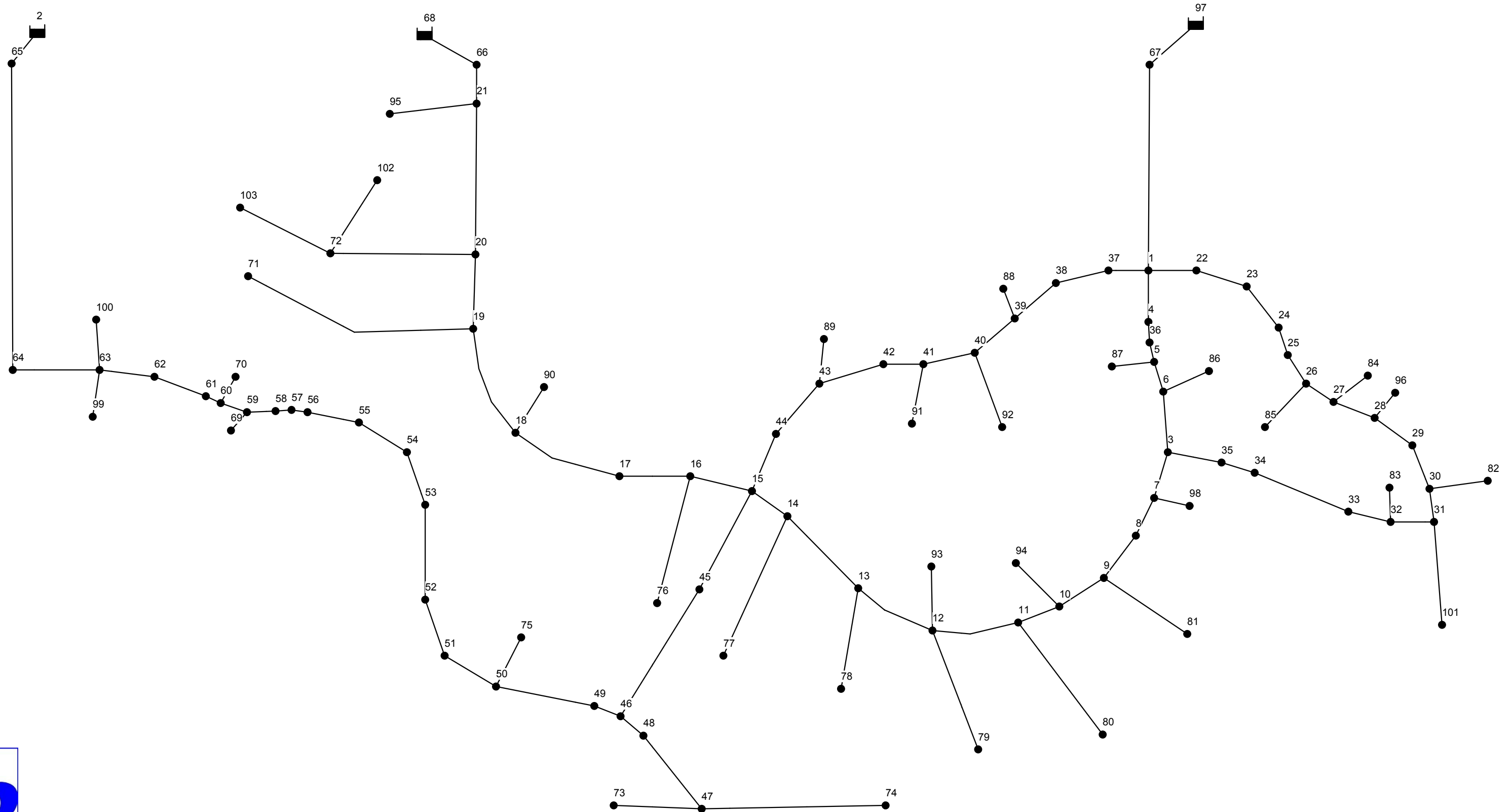
## **Appendix A. Peak Hour Hydraulic Calculations**



**Potable Water System Hydraulic Model – Junction ID's**

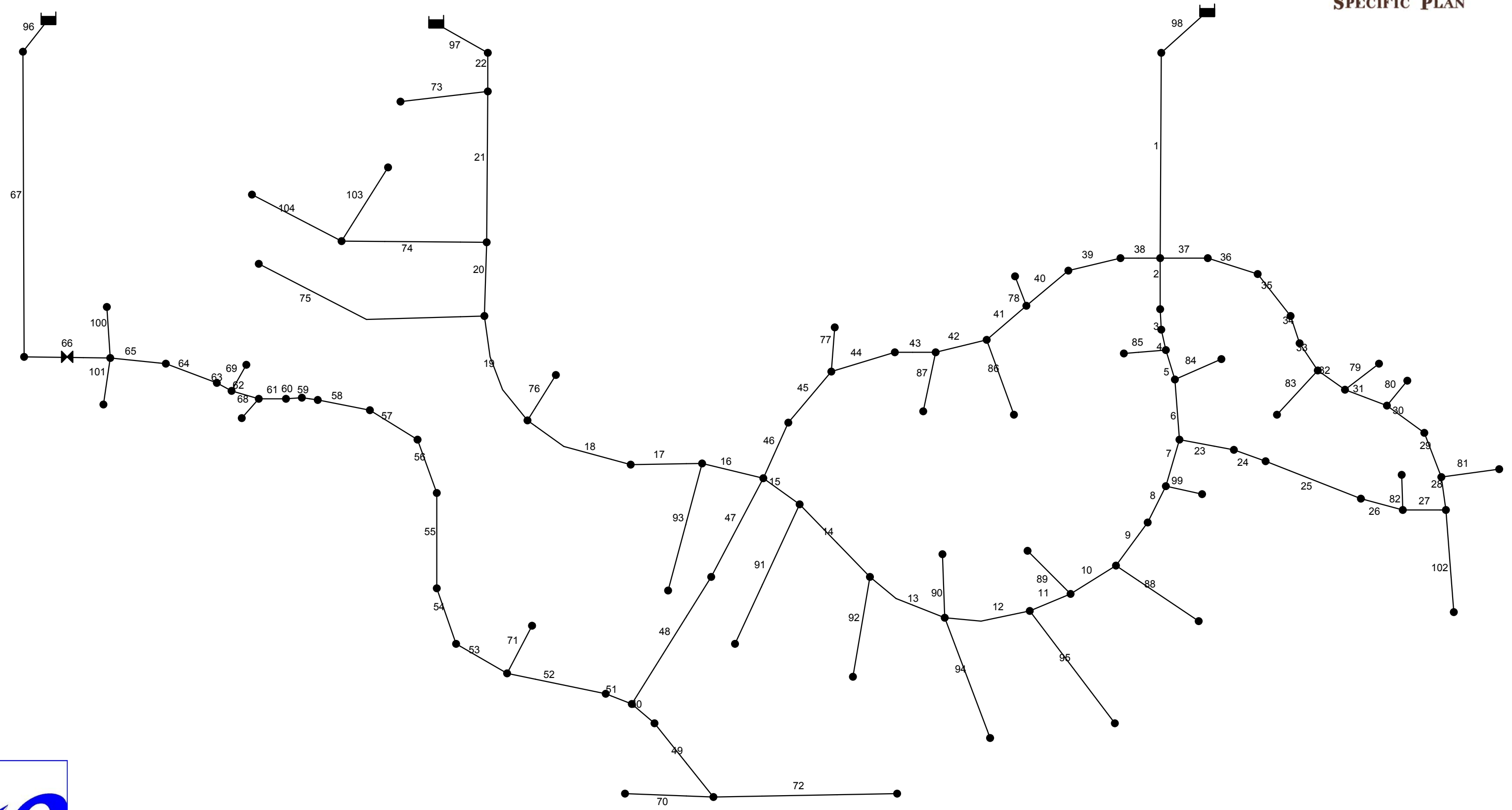


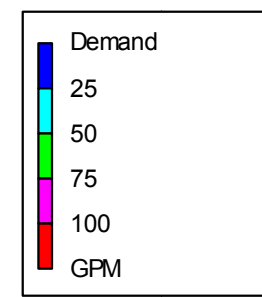
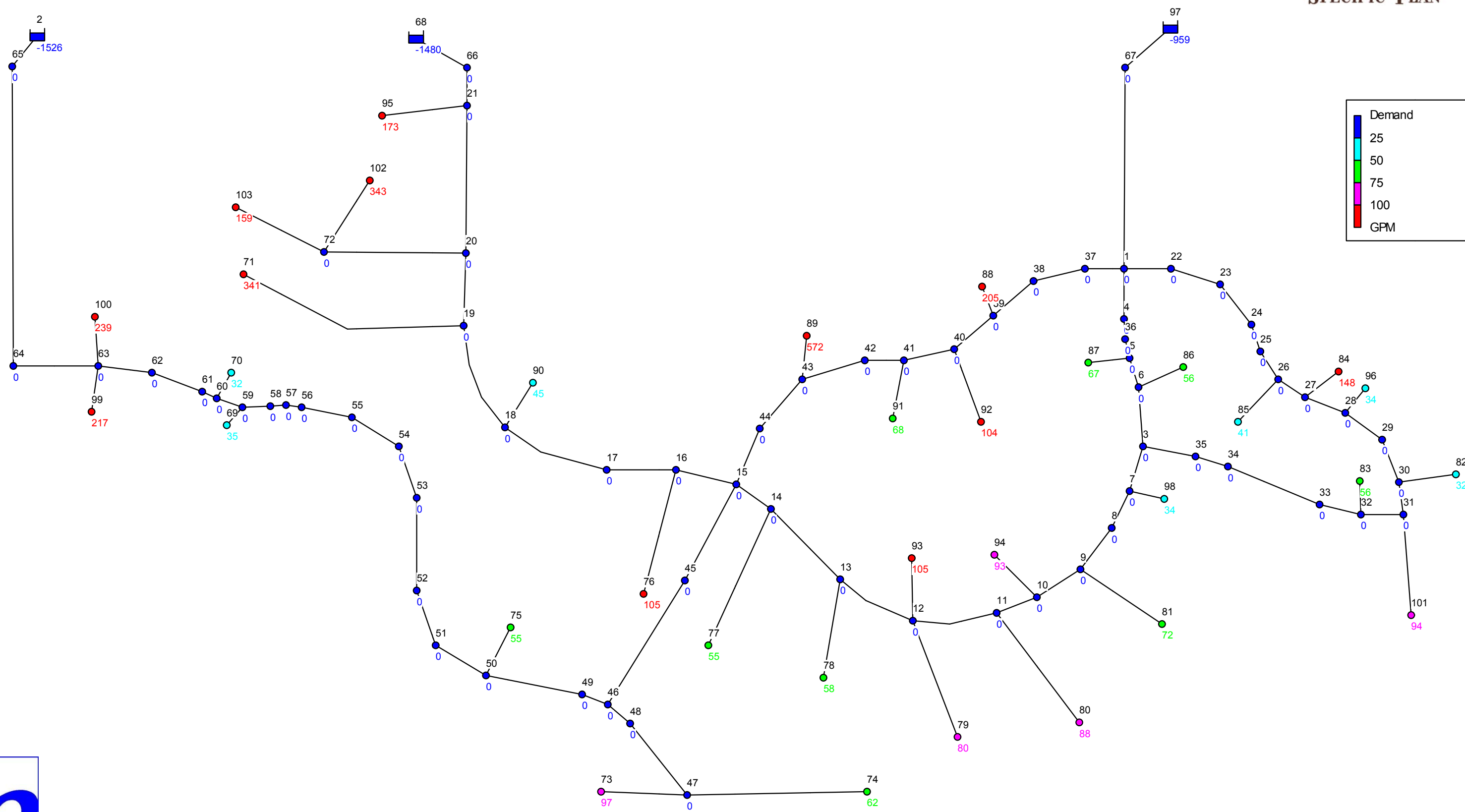




**Potable Water System Hydraulic Model – Junction ID's**







**Potable Water System Hydraulic Model – Junction ID's with Demands**

Page 1

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*****
*                               E P A N E T                               *
*                               Hydraulic and Water Quality                 *
*                               Analysis for Pipe Networks                   *
*                               Version 2.0                                 *
*****

```

Input File: RSG-Banning-Prelim.net

RSG BANNING PRELIMINARY

Peak Hour Flow

Peak flow pattern to Peak Day

(Pattern Factor = 2.0)

City Water Master Plan:

Avg Daily Flow x 2 = Peak Day Flow

Peak Day Flow x 2 = Peak Hour Flow

Link - Node Table:

| Link<br>ID | Start<br>Node | End<br>Node | Length<br>ft | Diameter<br>in |
|------------|---------------|-------------|--------------|----------------|
| 1          | 67            | 1           | 1436.83      | 8              |
| 2          | 1             | 4           | 360.65       | 8              |
| 3          | 4             | 36          | 142.21       | 8              |
| 4          | 36            | 5           | 142.21       | 8              |
| 5          | 5             | 6           | 217.32       | 8              |
| 6          | 6             | 3           | 424.02       | 8              |
| 7          | 3             | 7           | 336.05       | 8              |
| 8          | 7             | 8           | 287.29       | 8              |
| 9          | 8             | 9           | 372.97       | 8              |
| 10         | 9             | 10          | 372.97       | 8              |
| 11         | 10            | 11          | 310.32       | 8              |
| 12         | 11            | 12          | 604.70       | 8              |
| 13         | 12            | 13          | 604.05       | 8              |
| 14         | 13            | 14          | 705.11       | 8              |
| 15         | 14            | 15          | 309.12       | 8              |
| 16         | 15            | 16          | 441.70       | 8              |
| 17         | 16            | 17          | 499.17       | 8              |
| 18         | 17            | 18          | 797.44       | 8              |
| 19         | 18            | 19          | 804.31       | 8              |
| 20         | 19            | 20          | 522.15       | 12             |
| 21         | 20            | 21          | 1054.65      | 12             |
| 22         | 21            | 66          | 269.33       | 12             |
| 23         | 3             | 35          | 383.20       | 8              |
| 24         | 35            | 34          | 238.81       | 8              |
| 25         | 34            | 33          | 711.80       | 8              |
| 26         | 33            | 32          | 302.66       | 8              |
| 27         | 32            | 31          | 302.66       | 8              |
| 28         | 31            | 30          | 234.72       | 8              |
| 29         | 30            | 29          | 326.37       | 8              |
| 30         | 29            | 28          | 326.37       | 8              |
| 31         | 28            | 27          | 310.25       | 8              |

Page 2

RSG BANNING PRELIMINARY

Link - Node Table: (continued)

| Link ID | Start Node | End Node | Length ft | Diameter in |
|---------|------------|----------|-----------|-------------|
| 32      | 27         | 26       | 231.89    | 8           |
| 33      | 26         | 25       | 231.89    | 8           |
| 34      | 25         | 24       | 201.41    | 8           |
| 35      | 24         | 23       | 368.64    | 8           |
| 36      | 23         | 22       | 368.64    | 8           |
| 37      | 22         | 1        | 329.18    | 8           |
| 38      | 1          | 37       | 280.13    | 8           |
| 39      | 37         | 38       | 378.92    | 8           |
| 40      | 38         | 39       | 378.92    | 8           |
| 41      | 39         | 40       | 368.43    | 8           |
| 42      | 40         | 41       | 368.43    | 8           |
| 43      | 41         | 42       | 283.02    | 8           |
| 44      | 42         | 43       | 465.41    | 8           |
| 45      | 43         | 44       | 465.41    | 8           |
| 46      | 44         | 15       | 428.67    | 8           |
| 47      | 15         | 45       | 781.04    | 8           |
| 48      | 45         | 46       | 1044.65   | 8           |
| 49      | 47         | 48       | 657.72    | 8           |
| 50      | 48         | 46       | 209.70    | 8           |
| 51      | 46         | 49       | 197.41    | 8           |
| 52      | 49         | 50       | 703.70    | 8           |
| 53      | 50         | 51       | 411.70    | 8           |
| 54      | 51         | 52       | 411.70    | 8           |
| 55      | 52         | 53       | 666.35    | 8           |
| 56      | 53         | 54       | 393.50    | 8           |
| 57      | 54         | 55       | 393.50    | 8           |
| 58      | 55         | 56       | 367.25    | 8           |
| 59      | 56         | 57       | 111.52    | 8           |
| 60      | 57         | 58       | 111.52    | 8           |
| 61      | 58         | 59       | 197.30    | 8           |
| 62      | 59         | 60       | 197.30    | 8           |
| 63      | 60         | 61       | 110.35    | 8           |
| 64      | 61         | 62       | 387.63    | 8           |
| 65      | 62         | 63       | 387.63    | 8           |
| 67      | 64         | 65       | 2136.54   | 8           |
| 68      | 69         | 59       | 175.79    | 8           |
| 69      | 70         | 60       | 211.69    | 8           |
| 70      | 73         | 47       | 619.91    | 8           |
| 71      | 75         | 50       | 379.71    | 8           |
| 72      | 74         | 47       | 1282.85   | 8           |
| 73      | 95         | 21       | 612.95    | 10          |
| 74      | 72         | 20       | 1017.37   | 8           |
| 75      | 71         | 19       | 1672.72   | 12          |
| 76      | 90         | 18       | 375.80    | 8           |
| 77      | 89         | 43       | 309.78    | 8           |
| 78      | 88         | 39       | 224.06    | 8           |
| 79      | 84         | 27       | 299.12    | 8           |



Page 3

RSG BANNING PRELIMINARY

Link - Node Table: (continued)

| Link ID | Start Node | End Node | Length ft | Diameter in |
|---------|------------|----------|-----------|-------------|
| 80      | 96         | 28       | 225.44    | 8           |
| 81      | 82         | 30       | 409.01    | 8           |
| 82      | 83         | 32       | 242.34    | 8           |
| 83      | 85         | 26       | 416.61    | 8           |
| 84      | 86         | 6        | 353.47    | 8           |
| 85      | 87         | 5        | 294.98    | 8           |
| 86      | 92         | 40       | 555.07    | 8           |
| 87      | 91         | 41       | 420.32    | 8           |
| 88      | 81         | 9        | 698.38    | 8           |
| 89      | 94         | 10       | 429.85    | 8           |
| 90      | 93         | 12       | 446.47    | 8           |
| 91      | 77         | 14       | 1076.61   | 8           |
| 92      | 78         | 13       | 710.10    | 8           |
| 93      | 76         | 16       | 915.90    | 8           |
| 94      | 79         | 12       | 893.68    | 8           |
| 95      | 80         | 11       | 982.16    | 8           |
| 96      | 2          | 65       | 277.36    | 8           |
| 97      | 68         | 66       | 100       | 8           |
| 98      | 67         | 97       | 423.97    | 8           |
| 99      | 98         | 7        | 150       | 8           |
| 100     | 63         | 100      | 350.58    | 8           |
| 101     | 63         | 99       | 331.50    | 8           |
| 102     | 31         | 101      | 719.33    | 8           |
| 103     | 72         | 102      | 610.65    | 8           |
| 104     | 72         | 103      | 702.83    | 8           |
| 66      | 64         | 63       | #N/A      | 8 Valve     |

Node Results:

| Node ID | Demand GPM | Head ft | Pressure psi | Quality |
|---------|------------|---------|--------------|---------|
| 1       | 0.00       | 2482.24 | 86.79        | 0.00    |
| 3       | 0.00       | 2479.63 | 99.92        | 0.00    |
| 4       | 0.00       | 2481.30 | 91.66        | 0.00    |
| 5       | 0.00       | 2480.56 | 98.52        | 0.00    |
| 6       | 0.00       | 2480.16 | 97.85        | 0.00    |
| 7       | 0.00       | 2479.47 | 102.53       | 0.00    |
| 8       | 0.00       | 2479.39 | 104.28       | 0.00    |
| 9       | 0.00       | 2479.28 | 103.57       | 0.00    |
| 10      | 0.00       | 2479.26 | 99.72        | 0.00    |
| 11      | 0.00       | 2479.28 | 96.45        | 0.00    |
| 12      | 0.00       | 2479.53 | 90.35        | 0.00    |
| 13      | 0.00       | 2480.71 | 84.99        | 0.00    |
| 14      | 0.00       | 2482.59 | 78.98        | 0.00    |
| 15      | 0.00       | 2483.65 | 76.44        | 0.00    |
| 16      | 0.00       | 2485.92 | 73.14        | 0.00    |

Page 4

RSG BANNING PRELIMINARY

Node Results: (continued)

| Node<br>ID | Demand<br>GPM | Head<br>ft | Pressure<br>psi | Quality |
|------------|---------------|------------|-----------------|---------|
| 17         | 0.00          | 2489.49    | 69.87           | 0.00    |
| 18         | 0.00          | 2495.19    | 66.79           | 0.00    |
| 19         | 0.00          | 2501.70    | 65.05           | 0.00    |
| 20         | 0.00          | 2502.93    | 61.50           | 0.00    |
| 21         | 0.00          | 2508.09    | 56.07           | 0.00    |
| 22         | 0.00          | 2481.68    | 89.12           | 0.00    |
| 23         | 0.00          | 2481.05    | 93.48           | 0.00    |
| 24         | 0.00          | 2480.43    | 96.72           | 0.00    |
| 25         | 0.00          | 2480.08    | 98.32           | 0.00    |
| 26         | 0.00          | 2479.69    | 100.40          | 0.00    |
| 27         | 0.00          | 2479.39    | 101.02          | 0.00    |
| 28         | 0.00          | 2479.31    | 105.94          | 0.00    |
| 29         | 0.00          | 2479.26    | 112.37          | 0.00    |
| 30         | 0.00          | 2479.22    | 116.34          | 0.00    |
| 31         | 0.00          | 2479.21    | 117.50          | 0.00    |
| 32         | 0.00          | 2479.23    | 115.60          | 0.00    |
| 33         | 0.00          | 2479.30    | 114.94          | 0.00    |
| 34         | 0.00          | 2479.48    | 112.22          | 0.00    |
| 35         | 0.00          | 2479.53    | 107.92          | 0.00    |
| 36         | 0.00          | 2480.93    | 95.10           | 0.00    |
| 37         | 0.00          | 2481.44    | 83.80           | 0.00    |
| 38         | 0.00          | 2480.35    | 82.19           | 0.00    |
| 39         | 0.00          | 2479.26    | 79.26           | 0.00    |
| 40         | 0.00          | 2478.98    | 76.87           | 0.00    |
| 41         | 0.00          | 2478.92    | 75.39           | 0.00    |
| 42         | 0.00          | 2478.91    | 74.28           | 0.00    |
| 43         | 0.00          | 2478.91    | 72.45           | 0.00    |
| 44         | 0.00          | 2481.38    | 73.34           | 0.00    |
| 45         | 0.00          | 2486.41    | 81.55           | 0.00    |
| 46         | 0.00          | 2490.11    | 82.47           | 0.00    |
| 47         | 0.00          | 2489.65    | 87.49           | 0.00    |
| 48         | 0.00          | 2490.00    | 83.78           | 0.00    |
| 49         | 0.00          | 2491.34    | 82.91           | 0.00    |
| 50         | 0.00          | 2495.73    | 79.68           | 0.00    |
| 51         | 0.00          | 2498.74    | 79.04           | 0.00    |
| 52         | 0.00          | 2501.76    | 79.47           | 0.00    |
| 53         | 0.00          | 2506.64    | 77.27           | 0.00    |
| 54         | 0.00          | 2509.52    | 75.12           | 0.00    |
| 55         | 0.00          | 2512.40    | 73.18           | 0.00    |
| 56         | 0.00          | 2515.09    | 72.10           | 0.00    |
| 57         | 0.00          | 2515.90    | 71.63           | 0.00    |
| 58         | 0.00          | 2516.72    | 71.14           | 0.00    |
| 59         | 0.00          | 2518.16    | 68.99           | 0.00    |
| 60         | 0.00          | 2519.75    | 69.22           | 0.00    |
| 61         | 0.00          | 2520.72    | 63.85           | 0.00    |
| 62         | 0.00          | 2524.12    | 57.69           | 0.00    |
| 63         | 0.00          | 2527.51    | 58.50           | 0.00    |

Page 5

RSG BANNING PRELIMINARY

Node Results: (continued)

| Node ID | Demand GPM | Head ft | Pressure psi | Quality        |
|---------|------------|---------|--------------|----------------|
| 64      | 0.00       | 2649.71 | 106.25       | 0.00           |
| 65      | 0.00       | 2695.99 | 115.66       | 0.00           |
| 66      | 0.00       | 2509.70 | 54.91        | 0.00           |
| 67      | 0.00       | 2508.31 | 87.26        | 0.00           |
| 69      | 35.04      | 2518.16 | 64.96        | 0.00           |
| 70      | 31.94      | 2519.75 | 68.03        | 0.00           |
| 71      | 340.80     | 2501.20 | 58.58        | 0.00           |
| 72      | 0.00       | 2498.41 | 59.54        | 0.00           |
| 73      | 96.88      | 2489.52 | 78.95        | 0.00           |
| 74      | 61.84      | 2489.54 | 98.31        | 0.00           |
| 75      | 54.62      | 2495.70 | 81.33        | 0.00           |
| 76      | 105.12     | 2485.70 | 79.32        | 0.00           |
| 77      | 54.62      | 2482.51 | 84.21        | 0.00           |
| 78      | 57.72      | 2480.66 | 89.81        | 0.00           |
| 79      | 80.38      | 2479.39 | 98.39        | 0.00           |
| 80      | 87.60      | 2479.11 | 105.50       | 0.00           |
| 81      | 72.14      | 2479.20 | 108.72       | 0.00           |
| 82      | 31.94      | 2479.21 | 119.29       | 0.00           |
| 83      | 55.66      | 2479.21 | 113.81       | 0.00           |
| 84      | 148.40     | 2479.25 | 100.87       | 0.00           |
| 85      | 41.22      | 2479.67 | 102.43       | 0.00           |
| 86      | 55.66      | 2480.14 | 96.69        | 0.00           |
| 87      | 67.20      | 2480.53 | 90.40        | 0.00           |
| 88      | 205.08     | 2479.07 | 77.22        | 0.00           |
| 89      | 571.96     | 2477.16 | 69.25        | 0.00           |
| 90      | 45.34      | 2495.17 | 68.09        | 0.00           |
| 91      | 68.02      | 2478.87 | 81.71        | 0.00           |
| 92      | 104.08     | 2478.85 | 87.40        | 0.00           |
| 93      | 105.12     | 2479.42 | 88.81        | 0.00           |
| 94      | 92.76      | 2479.18 | 95.00        | 0.00           |
| 95      | 173.14     | 2507.96 | 54.46        | 0.00           |
| 96      | 33.60      | 2479.30 | 106.95       | 0.00           |
| 98      | 33.60      | 2479.47 | 103.76       | 0.00           |
| 99      | 217.44     | 2527.20 | 60.32        | 0.00           |
| 100     | 239.08     | 2527.12 | 59.41        | 0.00           |
| 101     | 93.78      | 2479.06 | 108.79       | 0.00           |
| 102     | 343.18     | 2497.07 | 55.49        | 0.00           |
| 103     | 158.70     | 2498.04 | 55.48        | 0.00           |
| 2       | -1180.87   | 2702.00 | 0.00         | 0.00 Reservoir |
| 68      | -1709.89   | 2514.00 | 0.00         | 0.00 Reservoir |
| 97      | -1072.93   | 2516.00 | 0.00         | 0.00 Reservoir |

Page 6

RSG BANNING PRELIMINARY

Link Results:

| Link ID | Flow GPM | Velocity fps | Unit Headloss ft/Kft | Status |
|---------|----------|--------------|----------------------|--------|
| 1       | 1072.93  | 6.85         | 18.14                | Open   |
| 2       | 376.85   | 2.41         | 2.61                 | Open   |
| 3       | 376.85   | 2.41         | 2.61                 | Open   |
| 4       | 376.85   | 2.41         | 2.61                 | Open   |
| 5       | 309.65   | 1.98         | 1.82                 | Open   |
| 6       | 253.99   | 1.62         | 1.26                 | Open   |
| 7       | 148.53   | 0.95         | 0.47                 | Open   |
| 8       | 114.93   | 0.73         | 0.29                 | Open   |
| 9       | 114.93   | 0.73         | 0.29                 | Open   |
| 10      | 42.79    | 0.27         | 0.05                 | Open   |
| 11      | -49.97   | 0.32         | 0.06                 | Open   |
| 12      | -137.57  | 0.88         | 0.40                 | Open   |
| 13      | -323.07  | 2.06         | 1.96                 | Open   |
| 14      | -380.79  | 2.43         | 2.66                 | Open   |
| 15      | -435.41  | 2.78         | 3.41                 | Open   |
| 16      | -543.61  | 3.47         | 5.15                 | Open   |
| 17      | -648.73  | 4.14         | 7.14                 | Open   |
| 18      | -648.73  | 4.14         | 7.14                 | Open   |
| 19      | -694.07  | 4.43         | 8.10                 | Open   |
| 20      | -1034.87 | 2.94         | 2.35                 | Open   |
| 21      | -1536.75 | 4.36         | 4.90                 | Open   |
| 22      | -1709.89 | 4.85         | 5.97                 | Open   |
| 23      | 105.46   | 0.67         | 0.25                 | Open   |
| 24      | 105.46   | 0.67         | 0.25                 | Open   |
| 25      | 105.46   | 0.67         | 0.25                 | Open   |
| 26      | 105.46   | 0.67         | 0.25                 | Open   |
| 27      | 49.80    | 0.32         | 0.06                 | Open   |
| 28      | -43.98   | 0.28         | 0.05                 | Open   |
| 29      | -75.92   | 0.48         | 0.13                 | Open   |
| 30      | -75.92   | 0.48         | 0.13                 | Open   |
| 31      | -109.52  | 0.70         | 0.27                 | Open   |
| 32      | -257.92  | 1.65         | 1.29                 | Open   |
| 33      | -299.14  | 1.91         | 1.70                 | Open   |
| 34      | -299.14  | 1.91         | 1.70                 | Open   |
| 35      | -299.14  | 1.91         | 1.70                 | Open   |
| 36      | -299.14  | 1.91         | 1.70                 | Open   |
| 37      | -299.14  | 1.91         | 1.70                 | Open   |
| 38      | 396.95   | 2.53         | 2.88                 | Open   |
| 39      | 396.95   | 2.53         | 2.88                 | Open   |
| 40      | 396.95   | 2.53         | 2.88                 | Open   |
| 41      | 191.87   | 1.22         | 0.75                 | Open   |
| 42      | 87.79    | 0.56         | 0.18                 | Open   |
| 43      | 19.77    | 0.13         | 0.01                 | Open   |
| 44      | 19.77    | 0.13         | 0.01                 | Open   |
| 45      | -552.19  | 3.52         | 5.30                 | Open   |
| 46      | -552.19  | 3.52         | 5.30                 | Open   |
| 47      | -444.00  | 2.83         | 3.54                 | Open   |

Page 7

RSG BANNING PRELIMINARY

Link Results: (continued)

| Link ID | Flow GPM | Velocity fps | Unit Headloss ft/Kft | Status |
|---------|----------|--------------|----------------------|--------|
| 48      | -444.00  | 2.83         | 3.54                 | Open   |
| 49      | -158.72  | 1.01         | 0.53                 | Open   |
| 50      | -158.72  | 1.01         | 0.53                 | Open   |
| 51      | -602.72  | 3.85         | 6.23                 | Open   |
| 52      | -602.72  | 3.85         | 6.23                 | Open   |
| 53      | -657.34  | 4.20         | 7.32                 | Open   |
| 54      | -657.34  | 4.20         | 7.32                 | Open   |
| 55      | -657.34  | 4.20         | 7.32                 | Open   |
| 56      | -657.34  | 4.20         | 7.32                 | Open   |
| 57      | -657.34  | 4.20         | 7.32                 | Open   |
| 58      | -657.34  | 4.20         | 7.32                 | Open   |
| 59      | -657.34  | 4.20         | 7.32                 | Open   |
| 60      | -657.34  | 4.20         | 7.32                 | Open   |
| 61      | -657.34  | 4.20         | 7.32                 | Open   |
| 62      | -692.38  | 4.42         | 8.06                 | Open   |
| 63      | -724.32  | 4.62         | 8.76                 | Open   |
| 64      | -724.32  | 4.62         | 8.76                 | Open   |
| 65      | -724.32  | 4.62         | 8.76                 | Open   |
| 67      | -1180.87 | 7.54         | 21.66                | Open   |
| 68      | -35.04   | 0.22         | 0.03                 | Open   |
| 69      | -31.94   | 0.20         | 0.03                 | Open   |
| 70      | -96.88   | 0.62         | 0.21                 | Open   |
| 71      | -54.62   | 0.35         | 0.07                 | Open   |
| 72      | -61.84   | 0.39         | 0.09                 | Open   |
| 73      | -173.14  | 0.71         | 0.21                 | Open   |
| 74      | -501.88  | 3.20         | 4.44                 | Open   |
| 75      | -340.80  | 0.97         | 0.30                 | Open   |
| 76      | -45.34   | 0.29         | 0.05                 | Open   |
| 77      | -571.96  | 3.65         | 5.66                 | Open   |
| 78      | -205.08  | 1.31         | 0.85                 | Open   |
| 79      | -148.40  | 0.95         | 0.47                 | Open   |
| 80      | -33.60   | 0.21         | 0.03                 | Open   |
| 81      | -31.94   | 0.20         | 0.03                 | Open   |
| 82      | -55.66   | 0.36         | 0.08                 | Open   |
| 83      | -41.22   | 0.26         | 0.04                 | Open   |
| 84      | -55.66   | 0.36         | 0.08                 | Open   |
| 85      | -67.20   | 0.43         | 0.11                 | Open   |
| 86      | -104.08  | 0.66         | 0.24                 | Open   |
| 87      | -68.02   | 0.43         | 0.11                 | Open   |
| 88      | -72.14   | 0.46         | 0.12                 | Open   |
| 89      | -92.76   | 0.59         | 0.19                 | Open   |
| 90      | -105.12  | 0.67         | 0.25                 | Open   |
| 91      | -54.62   | 0.35         | 0.07                 | Open   |
| 92      | -57.72   | 0.37         | 0.08                 | Open   |
| 93      | -105.12  | 0.67         | 0.25                 | Open   |
| 94      | -80.38   | 0.51         | 0.15                 | Open   |
| 95      | -87.60   | 0.56         | 0.18                 | Open   |

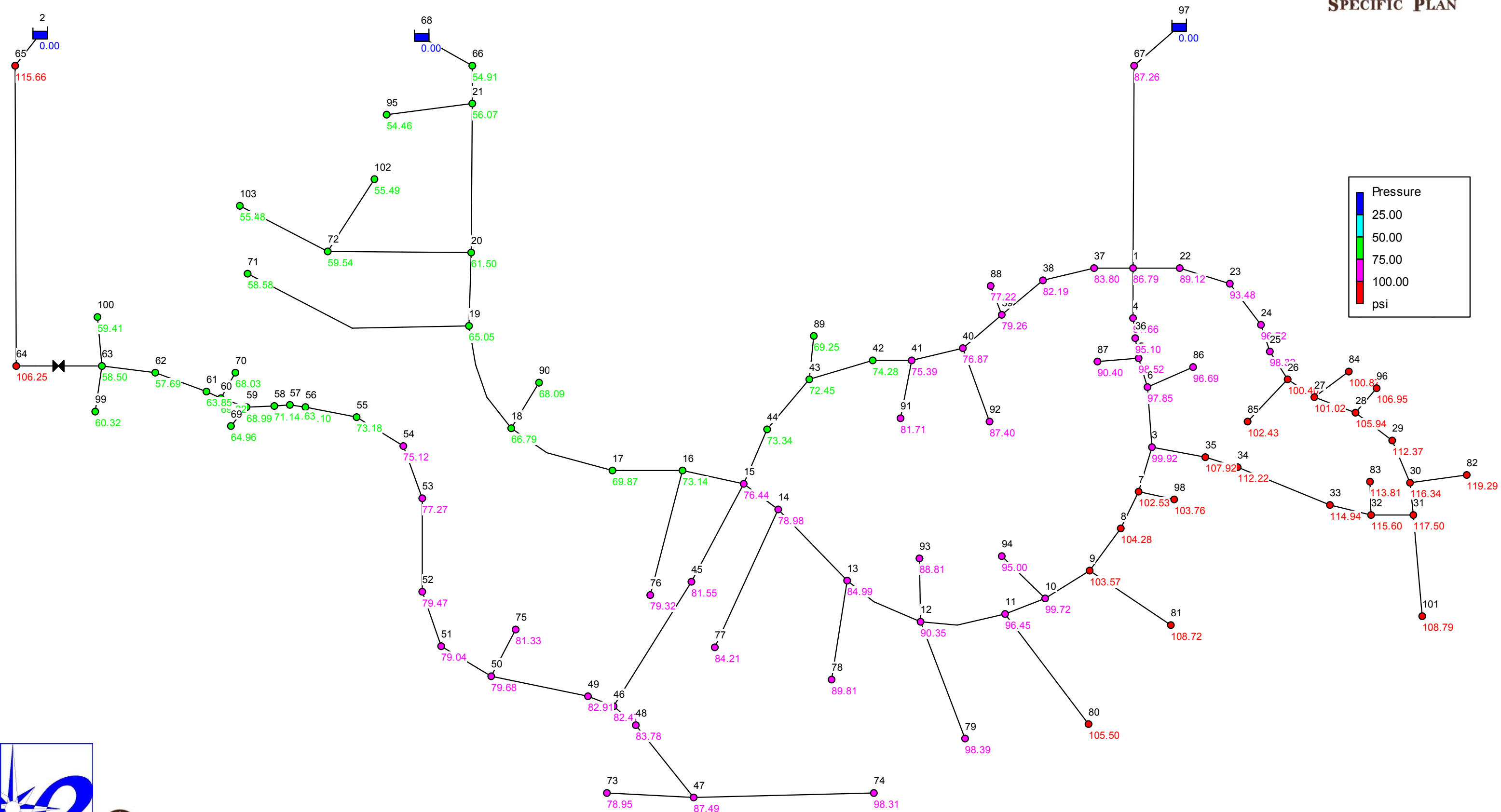


Page 8

RSG BANNING PRELIMINARY

Link Results: (continued)

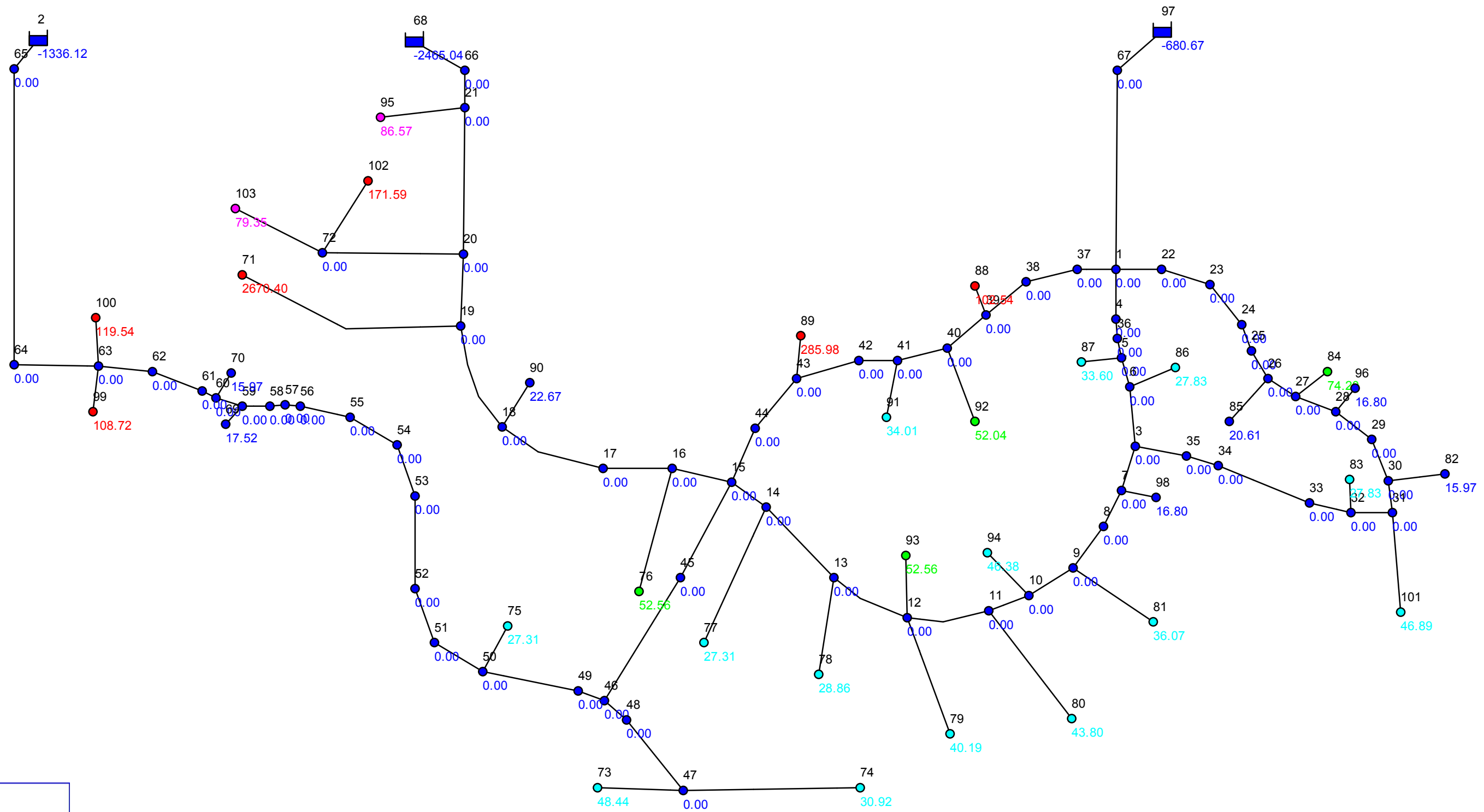
| Link<br>ID | Flow<br>GPM | Velocity<br>fps | Unit Headloss<br>ft/Kft | Status       |
|------------|-------------|-----------------|-------------------------|--------------|
| 96         | 1180.87     | 7.54            | 21.66                   | Open         |
| 97         | 1709.89     | 10.91           | 43.00                   | Open         |
| 98         | -1072.93    | 6.85            | 18.14                   | Open         |
| 99         | -33.60      | 0.21            | 0.03                    | Open         |
| 100        | 239.08      | 1.53            | 1.12                    | Open         |
| 101        | 217.44      | 1.39            | 0.94                    | Open         |
| 102        | 93.78       | 0.60            | 0.20                    | Open         |
| 103        | 343.18      | 2.19            | 2.20                    | Open         |
| 104        | 158.70      | 1.01            | 0.53                    | Open         |
| 66         | 1180.87     | 7.54            | 122.19                  | Active Valve |



**Encompass Associates, Inc.**

### Potable Water System Hydraulic Model – Junction ID's with Pressure

## **Appendix B. Peak Day with Fire Hydraulic Calculations**



Page 1 4/2/2015 10:15:35 AM

```
*****
*                               E P A N E T                               *
*                               Hydraulic and Water Quality                 *
*                               Analysis for Pipe Networks                   *
*                               Version 2.0                                 *
*****
```

Input File: RSG-Banning-Prelim-Fire-PA10.net

RSG BANNING PRELIMINARY-WITH FIRE

Peak Day Flow with Fire

Peak flow pattern to Peak Day

(Pattern Factor = 1.0)

City Water Master Plan:

Avg Daily Flow x 2 = Peak Day Flow

Link - Node Table:

| Link<br>ID | Start<br>Node | End<br>Node | Length<br>ft | Diameter<br>in |
|------------|---------------|-------------|--------------|----------------|
| 1          | 67            | 1           | 1436.82      | 8              |
| 2          | 1             | 4           | 360.65       | 8              |
| 3          | 4             | 36          | 142.21       | 8              |
| 4          | 36            | 5           | 142.21       | 8              |
| 5          | 5             | 6           | 217.32       | 8              |
| 6          | 6             | 3           | 424.02       | 8              |
| 7          | 3             | 7           | 336.05       | 8              |
| 8          | 7             | 8           | 287.29       | 8              |
| 9          | 8             | 9           | 372.97       | 8              |
| 10         | 9             | 10          | 372.97       | 8              |
| 11         | 10            | 11          | 310.32       | 8              |
| 12         | 11            | 12          | 604.70       | 8              |
| 13         | 12            | 13          | 604.05       | 8              |
| 14         | 13            | 14          | 705.11       | 8              |
| 15         | 14            | 15          | 309.12       | 8              |
| 16         | 15            | 16          | 441.70       | 8              |
| 17         | 16            | 17          | 499.17       | 8              |
| 18         | 17            | 18          | 797.44       | 8              |
| 19         | 18            | 19          | 804.31       | 8              |
| 20         | 19            | 20          | 522.15       | 12             |
| 21         | 20            | 21          | 1054.65      | 12             |
| 22         | 21            | 66          | 269.33       | 12             |
| 23         | 3             | 35          | 383.20       | 8              |
| 24         | 35            | 34          | 238.81       | 8              |
| 25         | 34            | 33          | 711.80       | 8              |
| 26         | 33            | 32          | 302.66       | 8              |
| 27         | 32            | 31          | 302.66       | 8              |
| 28         | 31            | 30          | 234.72       | 8              |
| 29         | 30            | 29          | 326.37       | 8              |
| 30         | 29            | 28          | 326.37       | 8              |
| 31         | 28            | 27          | 310.25       | 8              |
| 32         | 27            | 26          | 231.89       | 8              |

Page 2

RSG BANNING PRELIMINARY-WITH FIRE

Link - Node Table: (continued)

| Link ID | Start Node | End Node | Length ft | Diameter in |
|---------|------------|----------|-----------|-------------|
| 33      | 26         | 25       | 231.89    | 8           |
| 34      | 25         | 24       | 201.41    | 8           |
| 35      | 24         | 23       | 368.64    | 8           |
| 36      | 23         | 22       | 368.64    | 8           |
| 37      | 22         | 1        | 329.18    | 8           |
| 38      | 1          | 37       | 280.13    | 8           |
| 39      | 37         | 38       | 378.92    | 8           |
| 40      | 38         | 39       | 378.92    | 8           |
| 41      | 39         | 40       | 368.43    | 8           |
| 42      | 40         | 41       | 368.43    | 8           |
| 43      | 41         | 42       | 283.02    | 8           |
| 44      | 42         | 43       | 465.41    | 8           |
| 45      | 43         | 44       | 465.41    | 8           |
| 46      | 44         | 15       | 428.67    | 8           |
| 47      | 15         | 45       | 781.04    | 8           |
| 48      | 45         | 46       | 1044.65   | 8           |
| 49      | 47         | 48       | 657.72    | 8           |
| 50      | 48         | 46       | 209.70    | 8           |
| 51      | 46         | 49       | 197.41    | 8           |
| 52      | 49         | 50       | 703.70    | 8           |
| 53      | 50         | 51       | 411.70    | 8           |
| 54      | 51         | 52       | 411.70    | 8           |
| 55      | 52         | 53       | 666.35    | 8           |
| 56      | 53         | 54       | 393.50    | 8           |
| 57      | 54         | 55       | 393.50    | 8           |
| 58      | 55         | 56       | 367.25    | 8           |
| 59      | 56         | 57       | 111.52    | 8           |
| 60      | 57         | 58       | 111.52    | 8           |
| 61      | 58         | 59       | 197.30    | 8           |
| 62      | 59         | 60       | 197.30    | 8           |
| 63      | 60         | 61       | 110.35    | 8           |
| 64      | 61         | 62       | 387.62    | 8           |
| 65      | 62         | 63       | 387.63    | 8           |
| 67      | 64         | 65       | 2136.55   | 8           |
| 68      | 69         | 59       | 175.79    | 8           |
| 69      | 70         | 60       | 211.69    | 8           |
| 70      | 73         | 47       | 619.91    | 8           |
| 71      | 75         | 50       | 379.71    | 8           |
| 72      | 74         | 47       | 1282.85   | 8           |
| 73      | 95         | 21       | 612.95    | 10          |
| 74      | 72         | 20       | 1017.37   | 8           |
| 75      | 71         | 19       | 1672.72   | 12          |
| 76      | 90         | 18       | 375.80    | 8           |
| 77      | 89         | 43       | 309.78    | 8           |
| 78      | 88         | 39       | 224.06    | 8           |
| 79      | 84         | 27       | 299.12    | 8           |
| 80      | 96         | 28       | 225.44    | 8           |



Page 3

RSG BANNING PRELIMINARY-WITH FIRE

Link - Node Table: (continued)

| Link ID | Start Node | End Node | Length ft | Diameter in |
|---------|------------|----------|-----------|-------------|
| 81      | 82         | 30       | 409.01    | 8           |
| 82      | 83         | 32       | 242.34    | 8           |
| 83      | 85         | 26       | 416.61    | 8           |
| 84      | 86         | 6        | 353.47    | 8           |
| 85      | 87         | 5        | 294.98    | 8           |
| 86      | 92         | 40       | 555.07    | 8           |
| 87      | 91         | 41       | 420.32    | 8           |
| 88      | 81         | 9        | 698.38    | 8           |
| 89      | 94         | 10       | 429.85    | 8           |
| 90      | 93         | 12       | 446.47    | 8           |
| 91      | 77         | 14       | 1076.61   | 8           |
| 92      | 78         | 13       | 710.10    | 8           |
| 93      | 76         | 16       | 915.90    | 8           |
| 94      | 79         | 12       | 893.68    | 8           |
| 95      | 80         | 11       | 982.16    | 8           |
| 96      | 2          | 65       | 277.36    | 8           |
| 97      | 68         | 66       | 420.92    | 8           |
| 98      | 67         | 97       | 423.97    | 8           |
| 99      | 98         | 7        | 150       | 8           |
| 100     | 63         | 100      | 350.57    | 8           |
| 101     | 63         | 99       | 331.51    | 8           |
| 102     | 31         | 101      | 719.33    | 8           |
| 103     | 72         | 102      | 610.65    | 8           |
| 104     | 72         | 103      | 702.83    | 8           |
| 66      | 64         | 63       | #N/A      | 8 Valve     |

Node Results:

| Node ID | Demand GPM | Head ft | Pressure psi | Quality |
|---------|------------|---------|--------------|---------|
| 1       | 0.00       | 2481.83 | 86.62        | 0.00    |
| 3       | 0.00       | 2479.09 | 99.69        | 0.00    |
| 4       | 0.00       | 2480.96 | 91.51        | 0.00    |
| 5       | 0.00       | 2480.26 | 98.39        | 0.00    |
| 6       | 0.00       | 2479.82 | 97.70        | 0.00    |
| 7       | 0.00       | 2478.33 | 102.03       | 0.00    |
| 8       | 0.00       | 2477.73 | 103.56       | 0.00    |
| 9       | 0.00       | 2476.96 | 102.56       | 0.00    |
| 10      | 0.00       | 2476.33 | 98.45        | 0.00    |
| 11      | 0.00       | 2475.95 | 95.00        | 0.00    |
| 12      | 0.00       | 2475.43 | 88.58        | 0.00    |
| 13      | 0.00       | 2475.26 | 82.63        | 0.00    |
| 14      | 0.00       | 2475.14 | 75.75        | 0.00    |
| 15      | 0.00       | 2475.12 | 72.75        | 0.00    |
| 16      | 0.00       | 2472.04 | 67.13        | 0.00    |
| 17      | 0.00       | 2469.06 | 61.02        | 0.00    |

Page 4

RSG BANNING PRELIMINARY-WITH FIRE

Node Results: (continued)

| Node<br>ID | Demand<br>GPM | Head<br>ft | Pressure<br>psi | Quality |
|------------|---------------|------------|-----------------|---------|
| 18         | 0.00          | 2464.32    | 53.42           | 0.00    |
| 19         | 0.00          | 2459.87    | 46.93           | 0.00    |
| 20         | 0.00          | 2464.45    | 44.82           | 0.00    |
| 21         | 0.00          | 2475.84    | 42.10           | 0.00    |
| 22         | 0.00          | 2481.43    | 89.01           | 0.00    |
| 23         | 0.00          | 2480.97    | 93.44           | 0.00    |
| 24         | 0.00          | 2480.52    | 96.76           | 0.00    |
| 25         | 0.00          | 2480.27    | 98.40           | 0.00    |
| 26         | 0.00          | 2479.98    | 100.52          | 0.00    |
| 27         | 0.00          | 2479.74    | 101.17          | 0.00    |
| 28         | 0.00          | 2479.58    | 106.06          | 0.00    |
| 29         | 0.00          | 2479.45    | 112.45          | 0.00    |
| 30         | 0.00          | 2479.31    | 116.38          | 0.00    |
| 31         | 0.00          | 2479.23    | 117.51          | 0.00    |
| 32         | 0.00          | 2479.19    | 115.59          | 0.00    |
| 33         | 0.00          | 2479.17    | 114.89          | 0.00    |
| 34         | 0.00          | 2479.13    | 112.07          | 0.00    |
| 35         | 0.00          | 2479.12    | 107.73          | 0.00    |
| 36         | 0.00          | 2480.61    | 94.96           | 0.00    |
| 37         | 0.00          | 2480.75    | 83.50           | 0.00    |
| 38         | 0.00          | 2479.28    | 81.72           | 0.00    |
| 39         | 0.00          | 2477.81    | 78.63           | 0.00    |
| 40         | 0.00          | 2476.90    | 75.97           | 0.00    |
| 41         | 0.00          | 2476.23    | 74.22           | 0.00    |
| 42         | 0.00          | 2475.81    | 72.93           | 0.00    |
| 43         | 0.00          | 2475.11    | 70.81           | 0.00    |
| 44         | 0.00          | 2475.11    | 70.63           | 0.00    |
| 45         | 0.00          | 2479.81    | 78.68           | 0.00    |
| 46         | 0.00          | 2486.08    | 80.72           | 0.00    |
| 47         | 0.00          | 2485.95    | 85.89           | 0.00    |
| 48         | 0.00          | 2486.05    | 82.07           | 0.00    |
| 49         | 0.00          | 2487.58    | 81.27           | 0.00    |
| 50         | 0.00          | 2492.91    | 78.46           | 0.00    |
| 51         | 0.00          | 2496.28    | 77.97           | 0.00    |
| 52         | 0.00          | 2499.64    | 78.55           | 0.00    |
| 53         | 0.00          | 2505.08    | 76.59           | 0.00    |
| 54         | 0.00          | 2508.29    | 74.59           | 0.00    |
| 55         | 0.00          | 2511.51    | 72.80           | 0.00    |
| 56         | 0.00          | 2514.51    | 71.84           | 0.00    |
| 57         | 0.00          | 2515.42    | 71.42           | 0.00    |
| 58         | 0.00          | 2516.33    | 70.97           | 0.00    |
| 59         | 0.00          | 2517.94    | 68.89           | 0.00    |
| 60         | 0.00          | 2519.63    | 69.17           | 0.00    |
| 61         | 0.00          | 2520.61    | 63.80           | 0.00    |
| 62         | 0.00          | 2524.06    | 57.67           | 0.00    |
| 63         | 0.00          | 2527.51    | 58.50           | 0.00    |
| 64         | 0.00          | 2666.43    | 113.50          | 0.00    |

Page 5

RSG BANNING PRELIMINARY-WITH FIRE

Node Results: (continued)

| Node<br>ID | Demand<br>GPM | Head<br>ft | Pressure<br>psi | Quality        |
|------------|---------------|------------|-----------------|----------------|
| 65         | 0.00          | 2697.91    | 116.50          | 0.00           |
| 66         | 0.00          | 2478.96    | 41.59           | 0.00           |
| 67         | 0.00          | 2508.22    | 87.22           | 0.00           |
| 69         | 17.52         | 2517.94    | 64.86           | 0.00           |
| 70         | 15.97         | 2519.62    | 67.97           | 0.00           |
| 71         | 2670.40       | 2437.08    | 30.80           | 0.00           |
| 72         | 0.00          | 2463.20    | 44.28           | 0.00           |
| 73         | 48.44         | 2485.92    | 77.39           | 0.00           |
| 74         | 30.92         | 2485.92    | 96.75           | 0.00           |
| 75         | 27.31         | 2492.91    | 80.12           | 0.00           |
| 76         | 52.56         | 2471.97    | 73.38           | 0.00           |
| 77         | 27.31         | 2475.12    | 81.01           | 0.00           |
| 78         | 28.86         | 2475.24    | 87.46           | 0.00           |
| 79         | 40.19         | 2475.39    | 96.65           | 0.00           |
| 80         | 43.80         | 2475.90    | 104.11          | 0.00           |
| 81         | 36.07         | 2476.93    | 107.74          | 0.00           |
| 82         | 15.97         | 2479.31    | 119.33          | 0.00           |
| 83         | 27.83         | 2479.19    | 113.81          | 0.00           |
| 84         | 74.20         | 2479.70    | 101.06          | 0.00           |
| 85         | 20.61         | 2479.98    | 102.56          | 0.00           |
| 86         | 27.83         | 2479.82    | 96.55           | 0.00           |
| 87         | 33.60         | 2480.26    | 90.29           | 0.00           |
| 88         | 102.54        | 2477.75    | 76.65           | 0.00           |
| 89         | 285.98        | 2474.63    | 68.15           | 0.00           |
| 90         | 22.67         | 2464.31    | 54.72           | 0.00           |
| 91         | 34.01         | 2476.21    | 80.56           | 0.00           |
| 92         | 52.04         | 2476.87    | 86.54           | 0.00           |
| 93         | 52.56         | 2475.40    | 87.07           | 0.00           |
| 94         | 46.38         | 2476.31    | 93.75           | 0.00           |
| 95         | 86.57         | 2475.81    | 40.53           | 0.00           |
| 96         | 16.80         | 2479.58    | 107.08          | 0.00           |
| 98         | 16.80         | 2478.33    | 103.27          | 0.00           |
| 99         | 108.72        | 2527.43    | 60.41           | 0.00           |
| 100        | 119.54        | 2527.41    | 59.54           | 0.00           |
| 101        | 46.89         | 2479.19    | 108.84          | 0.00           |
| 102        | 171.59        | 2462.83    | 40.65           | 0.00           |
| 103        | 79.35         | 2463.09    | 40.34           | 0.00           |
| 2          | -959.04       | 2702.00    | 0.00            | 0.00 Reservoir |
| 68         | -2442.81      | 2514.00    | 0.00            | 0.00 Reservoir |
| 97         | -1079.97      | 2516.00    | 0.00            | 0.00 Reservoir |

Page 6

RSG BANNING PRELIMINARY-WITH FIRE

## Link Results:

| Link ID | Flow GPM | Velocity fps | Unit Headloss ft/Kft | Status |
|---------|----------|--------------|----------------------|--------|
| 1       | 1079.97  | 6.89         | 18.36                | Open   |
| 2       | 362.35   | 2.31         | 2.43                 | Open   |
| 3       | 362.35   | 2.31         | 2.43                 | Open   |
| 4       | 362.35   | 2.31         | 2.43                 | Open   |
| 5       | 328.75   | 2.10         | 2.03                 | Open   |
| 6       | 300.92   | 1.92         | 1.72                 | Open   |
| 7       | 349.78   | 2.23         | 2.28                 | Open   |
| 8       | 332.98   | 2.13         | 2.08                 | Open   |
| 9       | 332.98   | 2.13         | 2.08                 | Open   |
| 10      | 296.91   | 1.90         | 1.68                 | Open   |
| 11      | 250.53   | 1.60         | 1.23                 | Open   |
| 12      | 206.73   | 1.32         | 0.86                 | Open   |
| 13      | 113.98   | 0.73         | 0.29                 | Open   |
| 14      | 85.12    | 0.54         | 0.17                 | Open   |
| 15      | 57.81    | 0.37         | 0.08                 | Open   |
| 16      | 640.32   | 4.09         | 6.97                 | Open   |
| 17      | 587.77   | 3.75         | 5.95                 | Open   |
| 18      | 587.77   | 3.75         | 5.95                 | Open   |
| 19      | 565.10   | 3.61         | 5.53                 | Open   |
| 20      | -2105.31 | 5.97         | 8.77                 | Open   |
| 21      | -2356.25 | 6.68         | 10.81                | Open   |
| 22      | -2442.81 | 6.93         | 11.55                | Open   |
| 23      | -48.86   | 0.31         | 0.06                 | Open   |
| 24      | -48.86   | 0.31         | 0.06                 | Open   |
| 25      | -48.86   | 0.31         | 0.06                 | Open   |
| 26      | -48.86   | 0.31         | 0.06                 | Open   |
| 27      | -76.69   | 0.49         | 0.14                 | Open   |
| 28      | -123.58  | 0.79         | 0.33                 | Open   |
| 29      | -139.55  | 0.89         | 0.41                 | Open   |
| 30      | -139.55  | 0.89         | 0.42                 | Open   |
| 31      | -156.35  | 1.00         | 0.51                 | Open   |
| 32      | -230.55  | 1.47         | 1.05                 | Open   |
| 33      | -251.16  | 1.60         | 1.23                 | Open   |
| 34      | -251.16  | 1.60         | 1.23                 | Open   |
| 35      | -251.16  | 1.60         | 1.23                 | Open   |
| 36      | -251.16  | 1.60         | 1.23                 | Open   |
| 37      | -251.16  | 1.60         | 1.23                 | Open   |
| 38      | 466.46   | 2.98         | 3.88                 | Open   |
| 39      | 466.46   | 2.98         | 3.88                 | Open   |
| 40      | 466.46   | 2.98         | 3.88                 | Open   |
| 41      | 363.92   | 2.32         | 2.45                 | Open   |
| 42      | 311.88   | 1.99         | 1.84                 | Open   |
| 43      | 277.87   | 1.77         | 1.49                 | Open   |
| 44      | 277.87   | 1.77         | 1.49                 | Open   |
| 45      | -8.11    | 0.05         | 0.00                 | Open   |
| 46      | -8.11    | 0.05         | 0.00                 | Open   |
| 47      | -590.62  | 3.77         | 6.00                 | Open   |

Page 7

RSG BANNING PRELIMINARY-WITH FIRE

Link Results: (continued)

| Link<br>ID | Flow<br>GPM | Velocity<br>fps | Unit Headloss<br>ft/Kft | Status |
|------------|-------------|-----------------|-------------------------|--------|
| 48         | -590.62     | 3.77            | 6.01                    | Open   |
| 49         | -79.36      | 0.51            | 0.15                    | Open   |
| 50         | -79.36      | 0.51            | 0.15                    | Open   |
| 51         | -669.98     | 4.28            | 7.58                    | Open   |
| 52         | -669.98     | 4.28            | 7.58                    | Open   |
| 53         | -697.29     | 4.45            | 8.17                    | Open   |
| 54         | -697.29     | 4.45            | 8.17                    | Open   |
| 55         | -697.29     | 4.45            | 8.17                    | Open   |
| 56         | -697.29     | 4.45            | 8.17                    | Open   |
| 57         | -697.29     | 4.45            | 8.17                    | Open   |
| 58         | -697.29     | 4.45            | 8.17                    | Open   |
| 59         | -697.29     | 4.45            | 8.17                    | Open   |
| 60         | -697.29     | 4.45            | 8.17                    | Open   |
| 61         | -697.29     | 4.45            | 8.17                    | Open   |
| 62         | -714.81     | 4.56            | 8.55                    | Open   |
| 63         | -730.78     | 4.66            | 8.91                    | Open   |
| 64         | -730.78     | 4.66            | 8.91                    | Open   |
| 65         | -730.78     | 4.66            | 8.91                    | Open   |
| 67         | -959.04     | 6.12            | 14.74                   | Open   |
| 68         | -17.52      | 0.11            | 0.01                    | Open   |
| 69         | -15.97      | 0.10            | 0.01                    | Open   |
| 70         | -48.44      | 0.31            | 0.06                    | Open   |
| 71         | -27.31      | 0.17            | 0.02                    | Open   |
| 72         | -30.92      | 0.20            | 0.03                    | Open   |
| 73         | -86.57      | 0.35            | 0.06                    | Open   |
| 74         | -250.94     | 1.60            | 1.23                    | Open   |
| 75         | -2670.40    | 7.58            | 13.62                   | Open   |
| 76         | -22.67      | 0.14            | 0.01                    | Open   |
| 77         | -285.98     | 1.83            | 1.57                    | Open   |
| 78         | -102.54     | 0.65            | 0.24                    | Open   |
| 79         | -74.20      | 0.47            | 0.13                    | Open   |
| 80         | -16.80      | 0.11            | 0.01                    | Open   |
| 81         | -15.97      | 0.10            | 0.01                    | Open   |
| 82         | -27.83      | 0.18            | 0.02                    | Open   |
| 83         | -20.61      | 0.13            | 0.01                    | Open   |
| 84         | -27.83      | 0.18            | 0.02                    | Open   |
| 85         | -33.60      | 0.21            | 0.03                    | Open   |
| 86         | -52.04      | 0.33            | 0.07                    | Open   |
| 87         | -34.01      | 0.22            | 0.03                    | Open   |
| 88         | -36.07      | 0.23            | 0.03                    | Open   |
| 89         | -46.38      | 0.30            | 0.05                    | Open   |
| 90         | -52.56      | 0.34            | 0.07                    | Open   |
| 91         | -27.31      | 0.17            | 0.02                    | Open   |
| 92         | -28.86      | 0.18            | 0.02                    | Open   |
| 93         | -52.56      | 0.34            | 0.07                    | Open   |
| 94         | -40.19      | 0.26            | 0.04                    | Open   |
| 95         | -43.80      | 0.28            | 0.05                    | Open   |

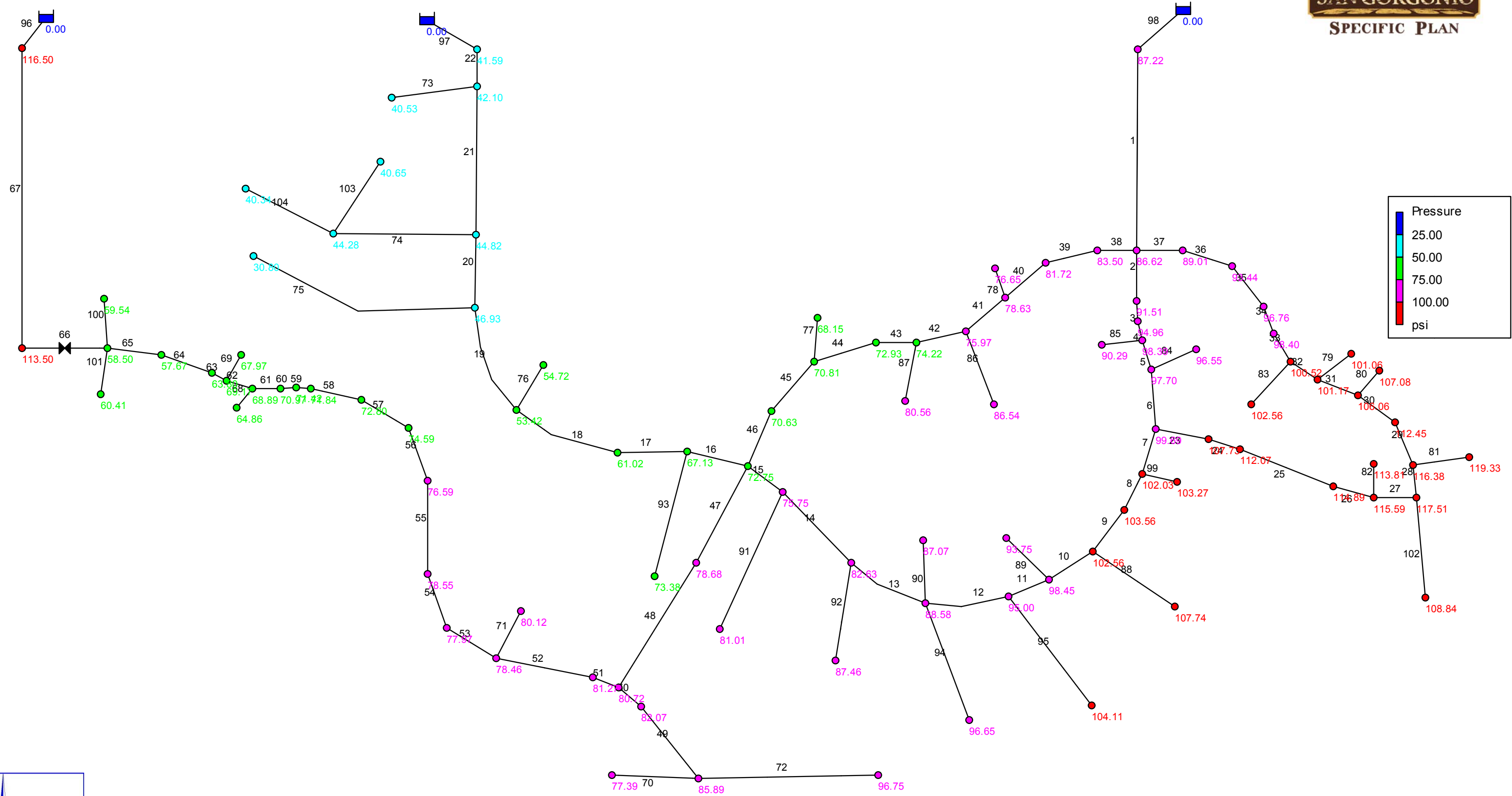
Page 8

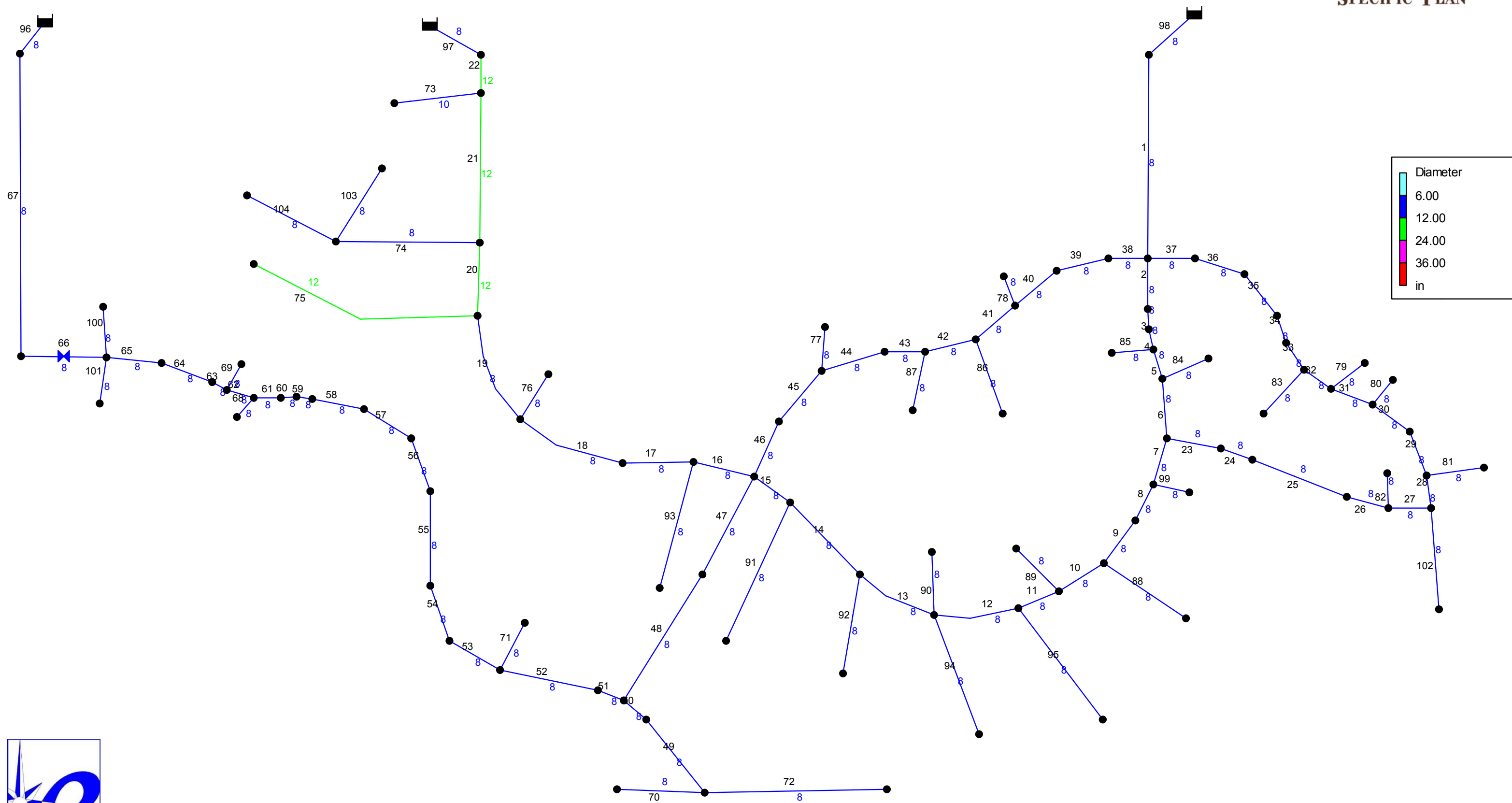
RSG BANNING PRELIMINARY-WITH FIRE

Link Results: (continued)

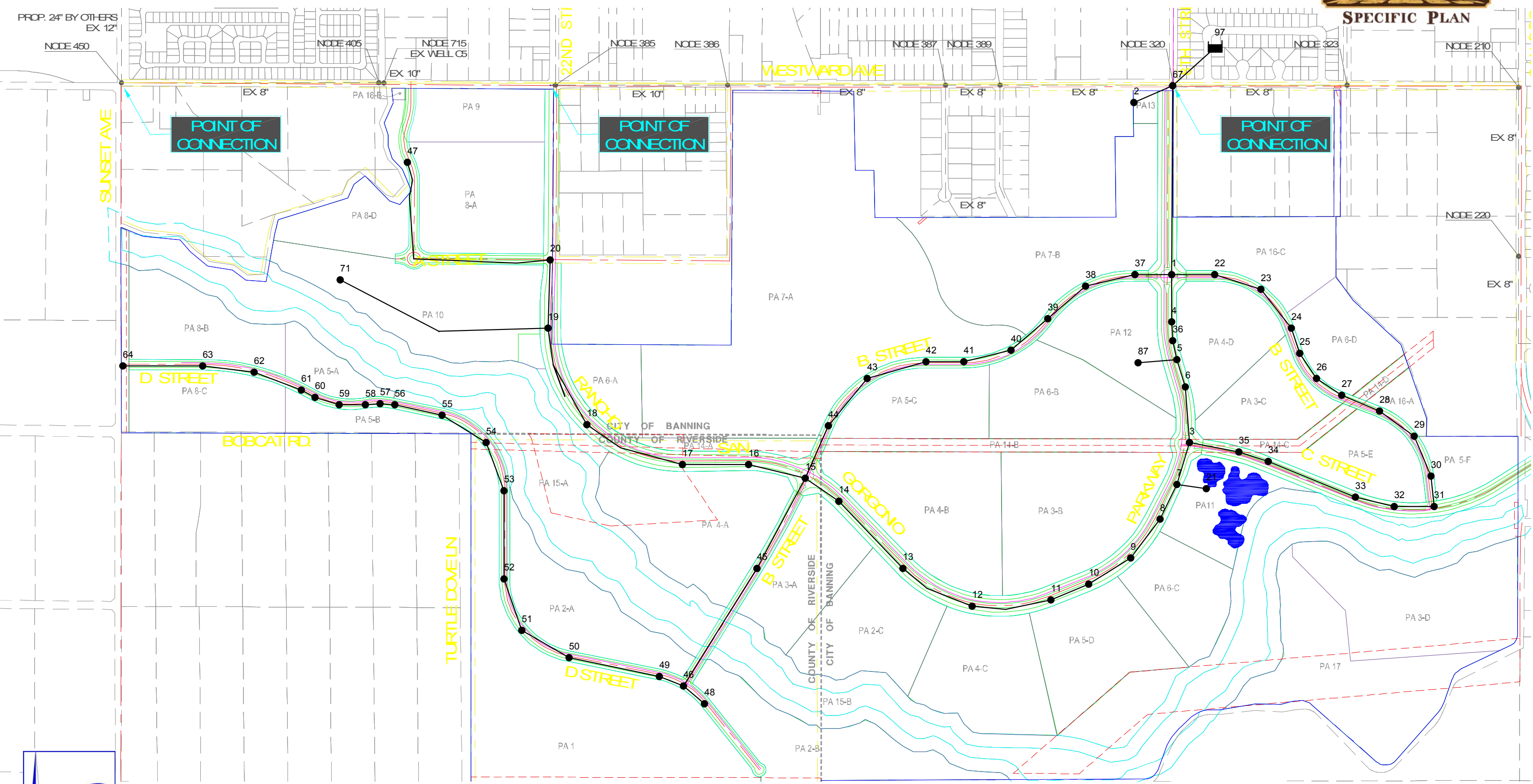
| Link<br>ID | Flow<br>GPM | Velocity<br>fps | Unit Headloss<br>ft/Kft | Status       |
|------------|-------------|-----------------|-------------------------|--------------|
| 96         | 959.04      | 6.12            | 14.74                   | Open         |
| 97         | 2442.81     | 15.59           | 83.26                   | Open         |
| 98         | -1079.97    | 6.89            | 18.36                   | Open         |
| 99         | -16.80      | 0.11            | 0.01                    | Open         |
| 100        | 119.54      | 0.76            | 0.31                    | Open         |
| 101        | 108.72      | 0.69            | 0.26                    | Open         |
| 102        | 46.89       | 0.30            | 0.05                    | Open         |
| 103        | 171.59      | 1.10            | 0.61                    | Open         |
| 104        | 79.35       | 0.51            | 0.15                    | Open         |
| 66         | 959.04      | 6.12            | 138.91                  | Active Valve |

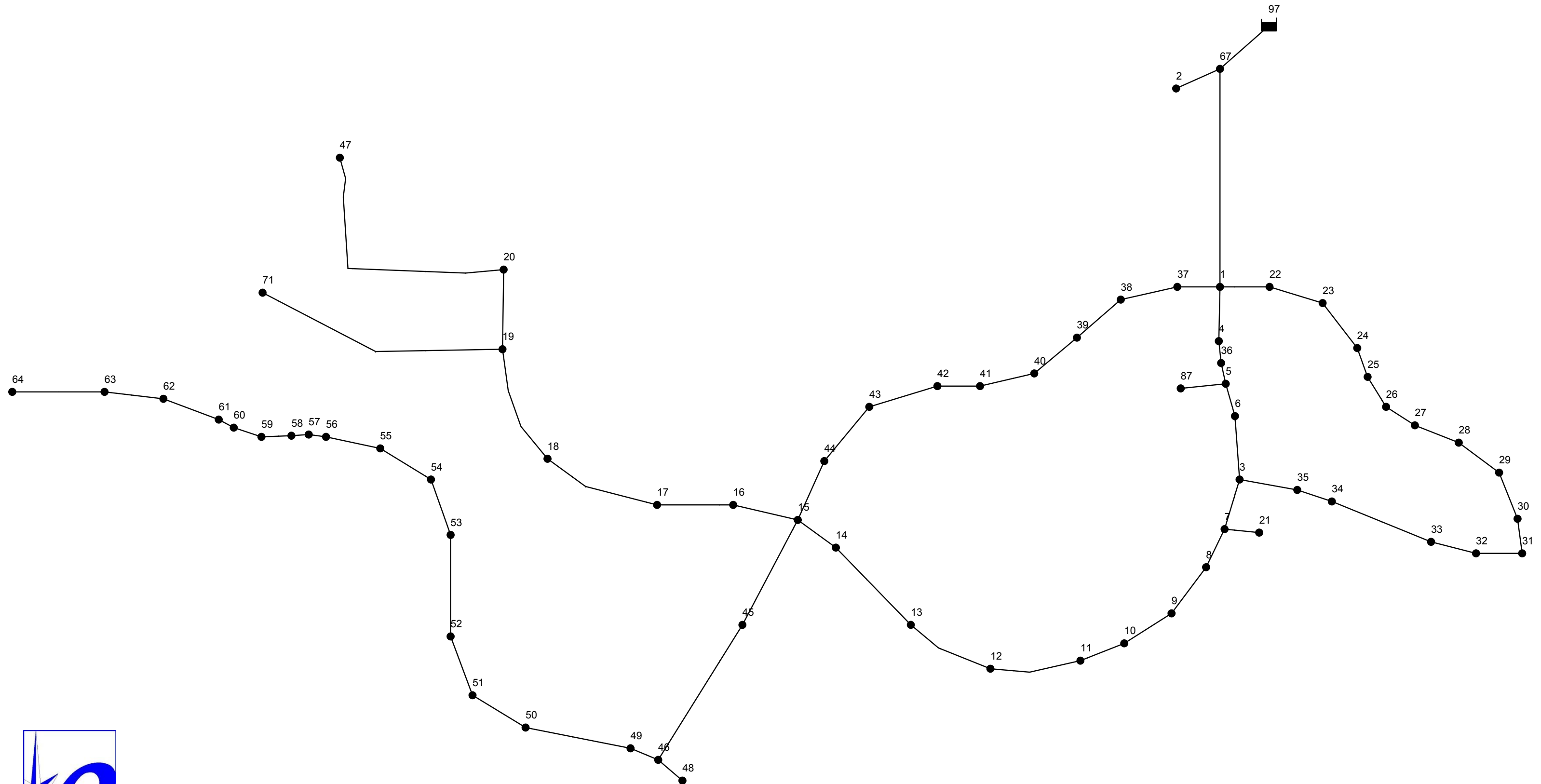


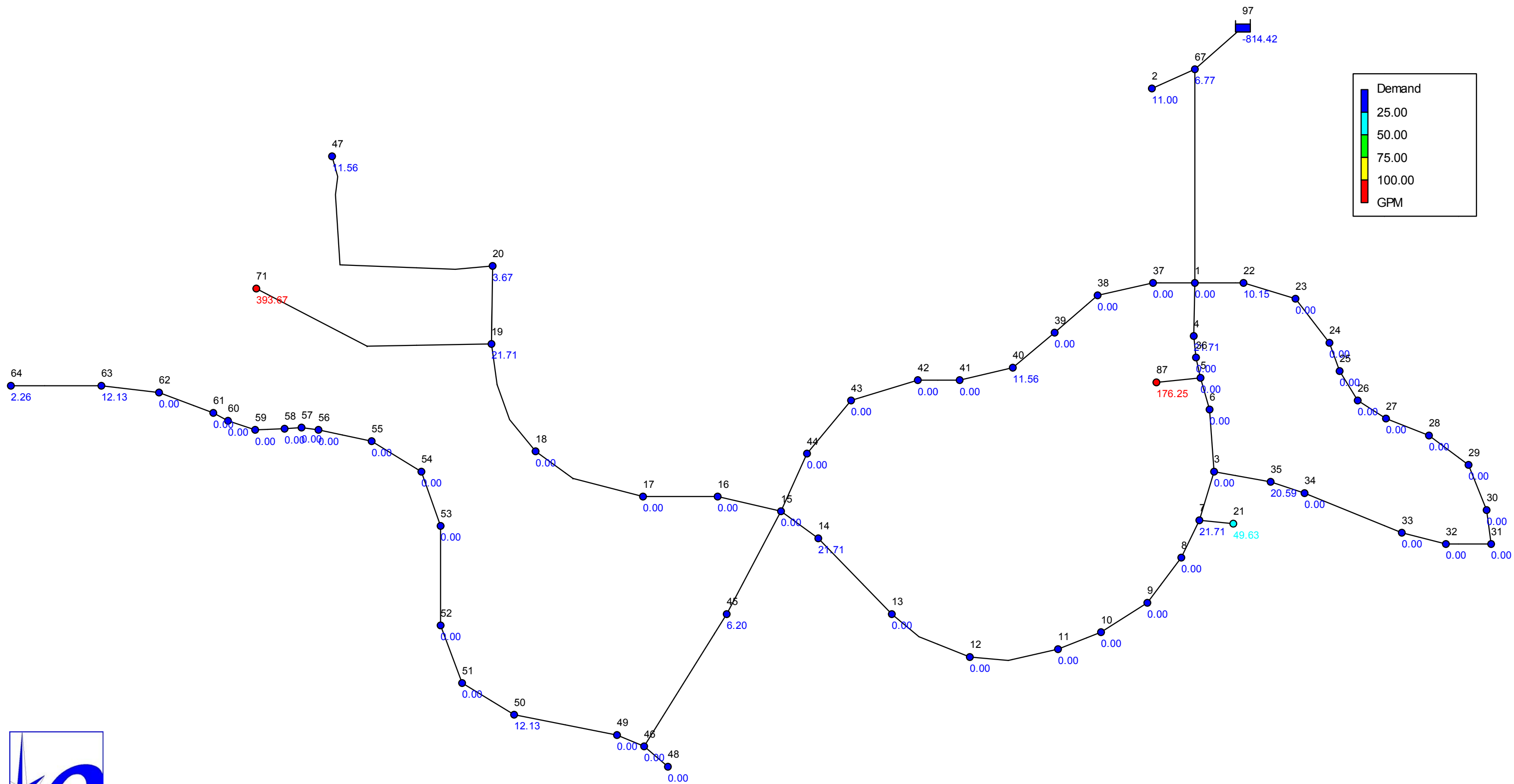




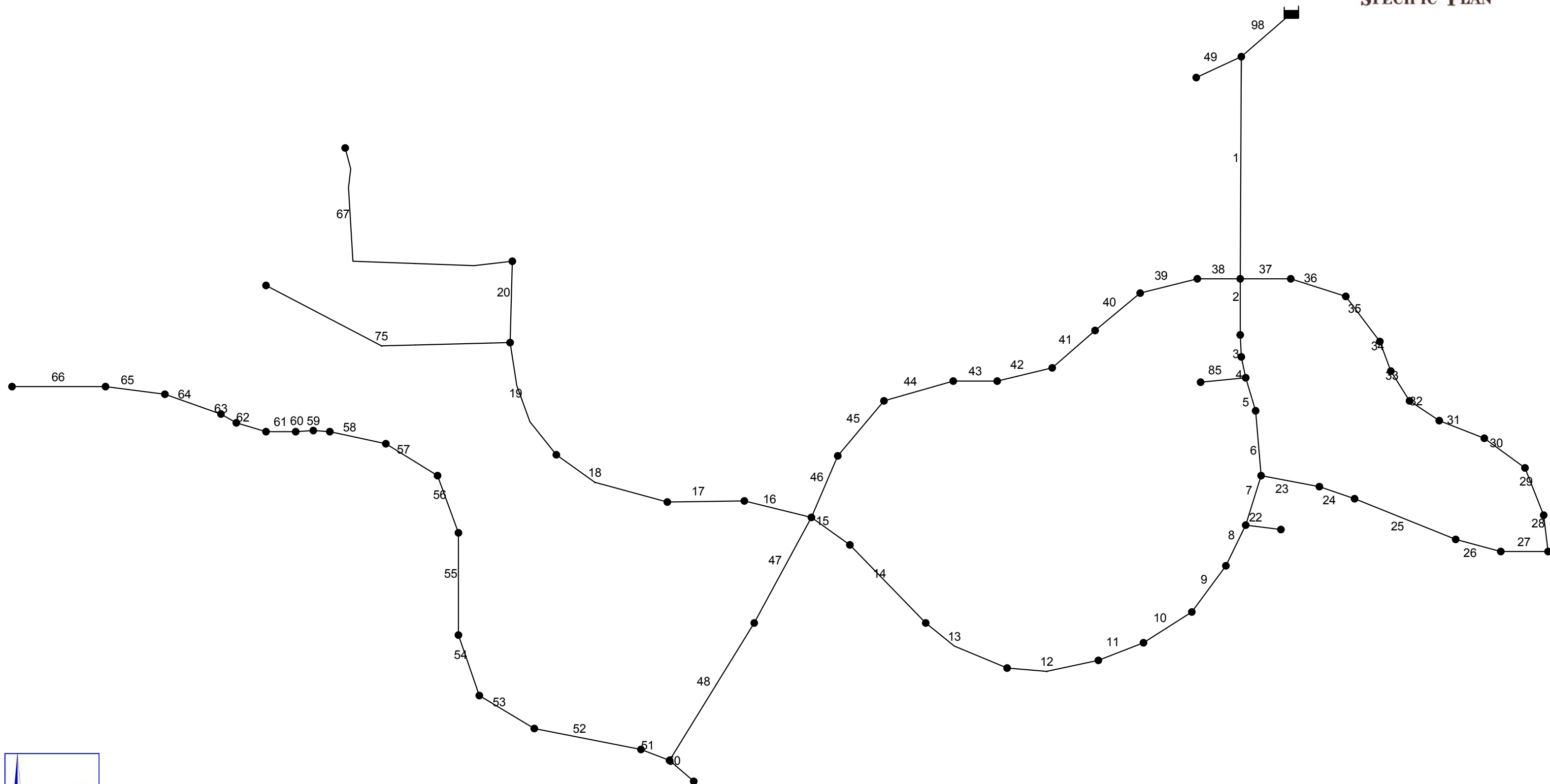
## **Appendix C. Recycled Water System Hydraulics**













Page 1 1/14/2015 4:44:07 PM

```
*****
*                               E P A N E T                               *
*                               Hydraulic and Water Quality                 *
*                               Analysis for Pipe Networks                   *
*                               Version 2.0                                *
*****
```

Input File: RSG-Banning-Prelim-RecycledWater.inp

RSG BANNING PRELIMINARY

Using "2600" Reservoir from City Recycled Water Master Plan

Assume approximately 8850 feet from project, connected by 16" pipe

Link - Node Table:

| Link<br>ID | Start<br>Node | End<br>Node | Length<br>ft | Diameter<br>in |
|------------|---------------|-------------|--------------|----------------|
| 1          | 67            | 1           | 1436.83      | 8              |
| 2          | 1             | 4           | 360.65       | 8              |
| 3          | 4             | 36          | 142.21       | 8              |
| 4          | 36            | 5           | 142.21       | 8              |
| 5          | 5             | 6           | 217.32       | 8              |
| 6          | 6             | 3           | 424.02       | 8              |
| 7          | 3             | 7           | 336.05       | 8              |
| 8          | 7             | 8           | 287.29       | 8              |
| 9          | 8             | 9           | 372.97       | 8              |
| 10         | 9             | 10          | 372.97       | 8              |
| 11         | 10            | 11          | 310.32       | 8              |
| 12         | 11            | 12          | 604.70       | 8              |
| 13         | 12            | 13          | 604.05       | 8              |
| 14         | 13            | 14          | 705.11       | 8              |
| 15         | 14            | 15          | 309.12       | 8              |
| 16         | 15            | 16          | 441.70       | 8              |
| 17         | 16            | 17          | 499.17       | 8              |
| 18         | 17            | 18          | 797.44       | 8              |
| 19         | 18            | 19          | 804.31       | 8              |
| 20         | 19            | 20          | 522.15       | 8              |
| 23         | 3             | 35          | 383.20       | 8              |
| 24         | 35            | 34          | 238.81       | 8              |
| 25         | 34            | 33          | 711.80       | 8              |
| 26         | 33            | 32          | 302.66       | 8              |
| 27         | 32            | 31          | 302.66       | 8              |
| 28         | 31            | 30          | 234.72       | 8              |
| 29         | 30            | 29          | 326.37       | 8              |
| 30         | 29            | 28          | 326.37       | 8              |
| 31         | 28            | 27          | 310.25       | 8              |
| 32         | 27            | 26          | 231.89       | 8              |
| 33         | 26            | 25          | 231.89       | 8              |
| 34         | 25            | 24          | 201.41       | 8              |
| 35         | 24            | 23          | 368.64       | 8              |
| 36         | 23            | 22          | 368.64       | 8              |
| 37         | 22            | 1           | 329.18       | 8              |

Page 2

RSG BANNING PRELIMINARY

Link - Node Table: (continued)

| Link ID | Start Node | End Node | Length ft | Diameter in |
|---------|------------|----------|-----------|-------------|
| 38      | 1          | 37       | 280.13    | 8           |
| 39      | 37         | 38       | 378.92    | 8           |
| 40      | 38         | 39       | 378.92    | 8           |
| 41      | 39         | 40       | 368.43    | 8           |
| 42      | 40         | 41       | 368.43    | 8           |
| 43      | 41         | 42       | 283.02    | 8           |
| 44      | 42         | 43       | 465.41    | 8           |
| 45      | 43         | 44       | 465.41    | 8           |
| 46      | 44         | 15       | 428.67    | 8           |
| 47      | 15         | 45       | 781.04    | 8           |
| 48      | 45         | 46       | 1044.65   | 8           |
| 50      | 48         | 46       | 209.70    | 8           |
| 51      | 46         | 49       | 197.41    | 8           |
| 52      | 49         | 50       | 703.70    | 8           |
| 53      | 50         | 51       | 411.70    | 8           |
| 54      | 51         | 52       | 411.70    | 8           |
| 55      | 52         | 53       | 666.35    | 8           |
| 56      | 53         | 54       | 393.50    | 8           |
| 57      | 54         | 55       | 393.50    | 8           |
| 58      | 55         | 56       | 367.25    | 8           |
| 59      | 56         | 57       | 111.52    | 8           |
| 60      | 57         | 58       | 111.52    | 8           |
| 61      | 58         | 59       | 197.30    | 8           |
| 62      | 59         | 60       | 197.30    | 8           |
| 63      | 60         | 61       | 110.35    | 8           |
| 64      | 61         | 62       | 387.63    | 8           |
| 65      | 62         | 63       | 387.63    | 8           |
| 66      | 63         | 64       | 605.96    | 8           |
| 75      | 71         | 19       | 1672.72   | 8           |
| 85      | 87         | 5        | 294.98    | 8           |
| 98      | 67         | 97       | 8850      | 16          |
| 22      | 21         | 7        | 248.01    | 8           |
| 49      | 2          | 67       | 280.81    | 8           |
| 67      | 20         | 47       | 2108.54   | 8           |

Node Results:

| Node ID | Demand GPM | Head ft | Pressure psi | Quality |
|---------|------------|---------|--------------|---------|
| 1       | 0.00       | 2581.69 | 129.88       | 0.00    |
| 3       | 0.00       | 2579.85 | 143.35       | 0.00    |
| 4       | 21.71      | 2580.82 | 134.78       | 0.00    |
| 5       | 0.00       | 2580.20 | 141.69       | 0.00    |
| 6       | 0.00       | 2580.08 | 141.14       | 0.00    |
| 7       | 21.71      | 2579.35 | 145.80       | 0.00    |
| 8       | 0.00       | 2579.11 | 147.48       | 0.00    |

Page 3

RSG BANNING PRELIMINARY

Node Results: (continued)

| Node<br>ID | Demand<br>GPM | Head<br>ft | Pressure<br>psi | Quality |
|------------|---------------|------------|-----------------|---------|
| 9          | 0.00          | 2578.79    | 146.69          | 0.00    |
| 10         | 0.00          | 2578.48    | 142.71          | 0.00    |
| 11         | 0.00          | 2578.21    | 139.31          | 0.00    |
| 12         | 0.00          | 2577.70    | 132.89          | 0.00    |
| 13         | 0.00          | 2577.19    | 126.80          | 0.00    |
| 14         | 21.71         | 2576.59    | 119.71          | 0.00    |
| 15         | 0.00          | 2576.38    | 116.62          | 0.00    |
| 16         | 0.00          | 2574.90    | 111.70          | 0.00    |
| 17         | 0.00          | 2573.23    | 106.16          | 0.00    |
| 18         | 0.00          | 2570.56    | 99.46           | 0.00    |
| 19         | 21.71         | 2567.87    | 93.73           | 0.00    |
| 20         | 3.67          | 2567.87    | 89.64           | 0.00    |
| 22         | 10.15         | 2581.55    | 132.39          | 0.00    |
| 23         | 0.00          | 2581.40    | 136.96          | 0.00    |
| 24         | 0.00          | 2581.26    | 140.42          | 0.00    |
| 25         | 0.00          | 2581.19    | 142.13          | 0.00    |
| 26         | 0.00          | 2581.10    | 144.34          | 0.00    |
| 27         | 0.00          | 2581.01    | 145.05          | 0.00    |
| 28         | 0.00          | 2580.89    | 149.96          | 0.00    |
| 29         | 0.00          | 2580.77    | 156.36          | 0.00    |
| 30         | 0.00          | 2580.64    | 160.28          | 0.00    |
| 31         | 0.00          | 2580.55    | 161.41          | 0.00    |
| 32         | 0.00          | 2580.43    | 159.46          | 0.00    |
| 33         | 0.00          | 2580.32    | 158.72          | 0.00    |
| 34         | 0.00          | 2580.05    | 155.80          | 0.00    |
| 35         | 20.59         | 2579.95    | 151.43          | 0.00    |
| 36         | 0.00          | 2580.51    | 138.24          | 0.00    |
| 37         | 0.00          | 2581.24    | 127.04          | 0.00    |
| 38         | 0.00          | 2580.62    | 125.64          | 0.00    |
| 39         | 0.00          | 2580.01    | 122.91          | 0.00    |
| 40         | 11.56         | 2579.41    | 120.39          | 0.00    |
| 41         | 0.00          | 2578.85    | 118.69          | 0.00    |
| 42         | 0.00          | 2578.43    | 117.39          | 0.00    |
| 43         | 0.00          | 2577.73    | 115.27          | 0.00    |
| 44         | 0.00          | 2577.02    | 114.78          | 0.00    |
| 45         | 6.20          | 2576.36    | 120.52          | 0.00    |
| 46         | 0.00          | 2576.34    | 119.83          | 0.00    |
| 48         | 0.00          | 2576.34    | 121.19          | 0.00    |
| 49         | 0.00          | 2576.33    | 119.73          | 0.00    |
| 50         | 12.13         | 2576.32    | 114.60          | 0.00    |
| 51         | 0.00          | 2576.32    | 112.65          | 0.00    |
| 52         | 0.00          | 2576.31    | 111.78          | 0.00    |
| 53         | 0.00          | 2576.31    | 107.46          | 0.00    |
| 54         | 0.00          | 2576.31    | 104.06          | 0.00    |
| 55         | 0.00          | 2576.31    | 100.88          | 0.00    |
| 56         | 0.00          | 2576.30    | 98.62           | 0.00    |
| 57         | 0.00          | 2576.30    | 97.80           | 0.00    |

Page 4

RSG BANNING PRELIMINARY

## Node Results: (continued)

| Node<br>ID | Demand<br>GPM | Head<br>ft | Pressure<br>psi | Quality        |
|------------|---------------|------------|-----------------|----------------|
| 58         | 0.00          | 2576.30    | 96.96           | 0.00           |
| 59         | 0.00          | 2576.30    | 94.18           | 0.00           |
| 60         | 0.00          | 2576.30    | 90.06           | 0.00           |
| 61         | 0.00          | 2576.30    | 87.93           | 0.00           |
| 62         | 0.00          | 2576.30    | 80.30           | 0.00           |
| 63         | 12.13         | 2576.29    | 79.64           | 0.00           |
| 64         | 2.26          | 2576.29    | 74.44           | 0.00           |
| 67         | 6.77          | 2596.71    | 125.57          | 0.00           |
| 71         | 393.67        | 2563.14    | 85.13           | 0.00           |
| 87         | 176.25        | 2580.02    | 133.51          | 0.00           |
| 2          | 11.00         | 2596.71    | 124.23          | 0.00           |
| 21         | 49.63         | 2579.34    | 152.23          | 0.00           |
| 47         | 11.56         | 2567.86    | 83.13           | 0.00           |
| 97         | -814.42       | 2600.00    | 0.00            | 0.00 Reservoir |

## Link Results:

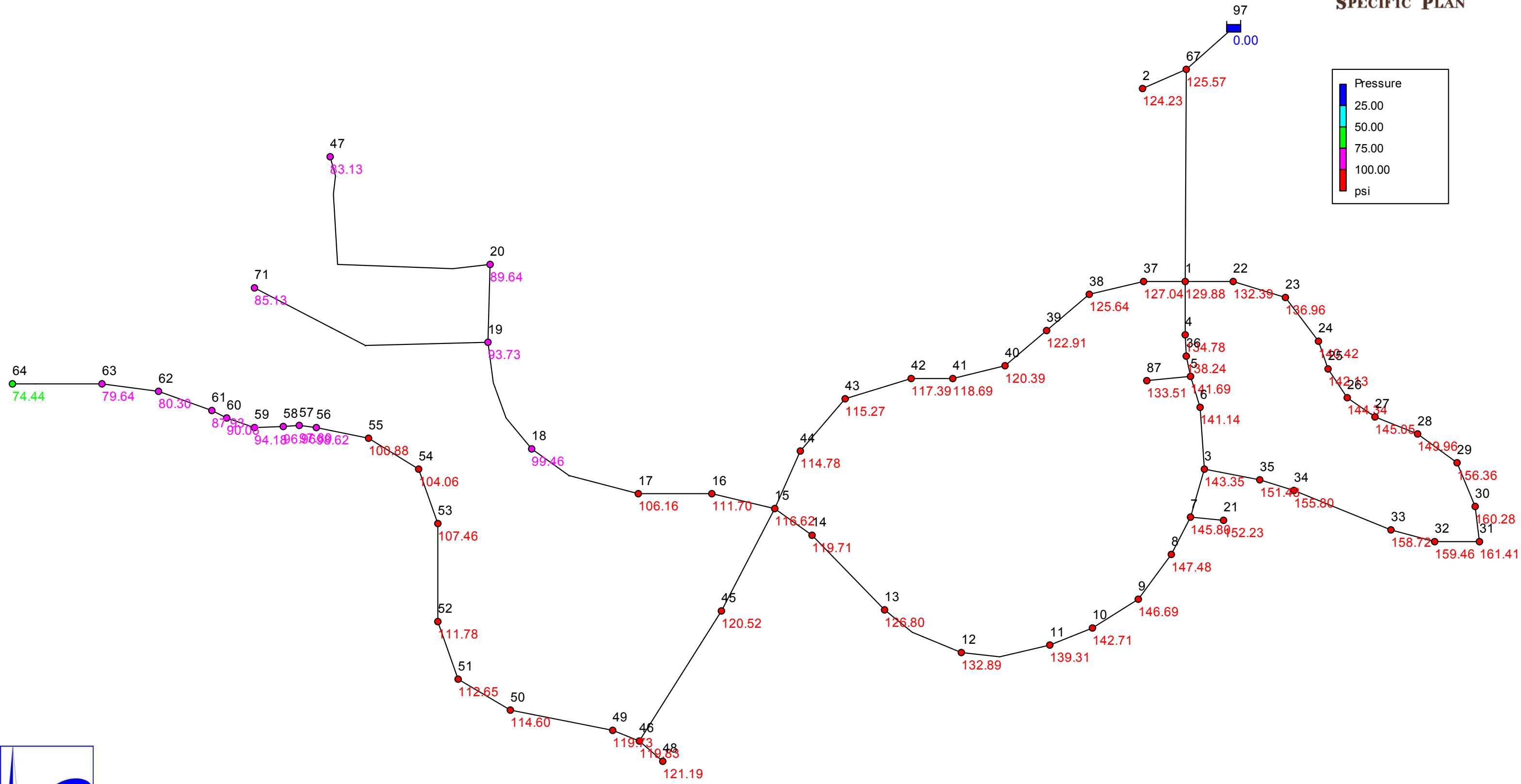
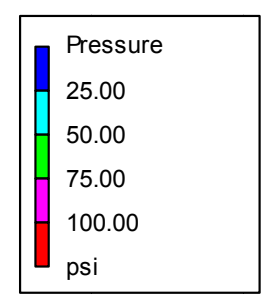
| Link<br>ID | Flow<br>GPM | Velocity<br>fps | Unit Headloss<br>ft/Kft | Status |
|------------|-------------|-----------------|-------------------------|--------|
| 1          | 796.65      | 5.08            | 10.45                   | Open   |
| 2          | 361.48      | 2.31            | 2.42                    | Open   |
| 3          | 339.77      | 2.17            | 2.16                    | Open   |
| 4          | 339.77      | 2.17            | 2.16                    | Open   |
| 5          | 163.52      | 1.04            | 0.56                    | Open   |
| 6          | 163.52      | 1.04            | 0.56                    | Open   |
| 7          | 276.52      | 1.76            | 1.47                    | Open   |
| 8          | 205.17      | 1.31            | 0.85                    | Open   |
| 9          | 205.17      | 1.31            | 0.85                    | Open   |
| 10         | 205.17      | 1.31            | 0.85                    | Open   |
| 11         | 205.17      | 1.31            | 0.85                    | Open   |
| 12         | 205.17      | 1.31            | 0.85                    | Open   |
| 13         | 205.17      | 1.31            | 0.85                    | Open   |
| 14         | 205.17      | 1.31            | 0.85                    | Open   |
| 15         | 183.46      | 1.17            | 0.69                    | Open   |
| 16         | 430.61      | 2.75            | 3.34                    | Open   |
| 17         | 430.61      | 2.75            | 3.34                    | Open   |
| 18         | 430.61      | 2.75            | 3.34                    | Open   |
| 19         | 430.61      | 2.75            | 3.34                    | Open   |
| 20         | 15.23       | 0.10            | 0.01                    | Open   |
| 23         | -113.00     | 0.72            | 0.28                    | Open   |
| 24         | -133.59     | 0.85            | 0.38                    | Open   |
| 25         | -133.59     | 0.85            | 0.38                    | Open   |
| 26         | -133.59     | 0.85            | 0.38                    | Open   |
| 27         | -133.59     | 0.85            | 0.38                    | Open   |
| 28         | -133.59     | 0.85            | 0.38                    | Open   |
| 29         | -133.59     | 0.85            | 0.38                    | Open   |

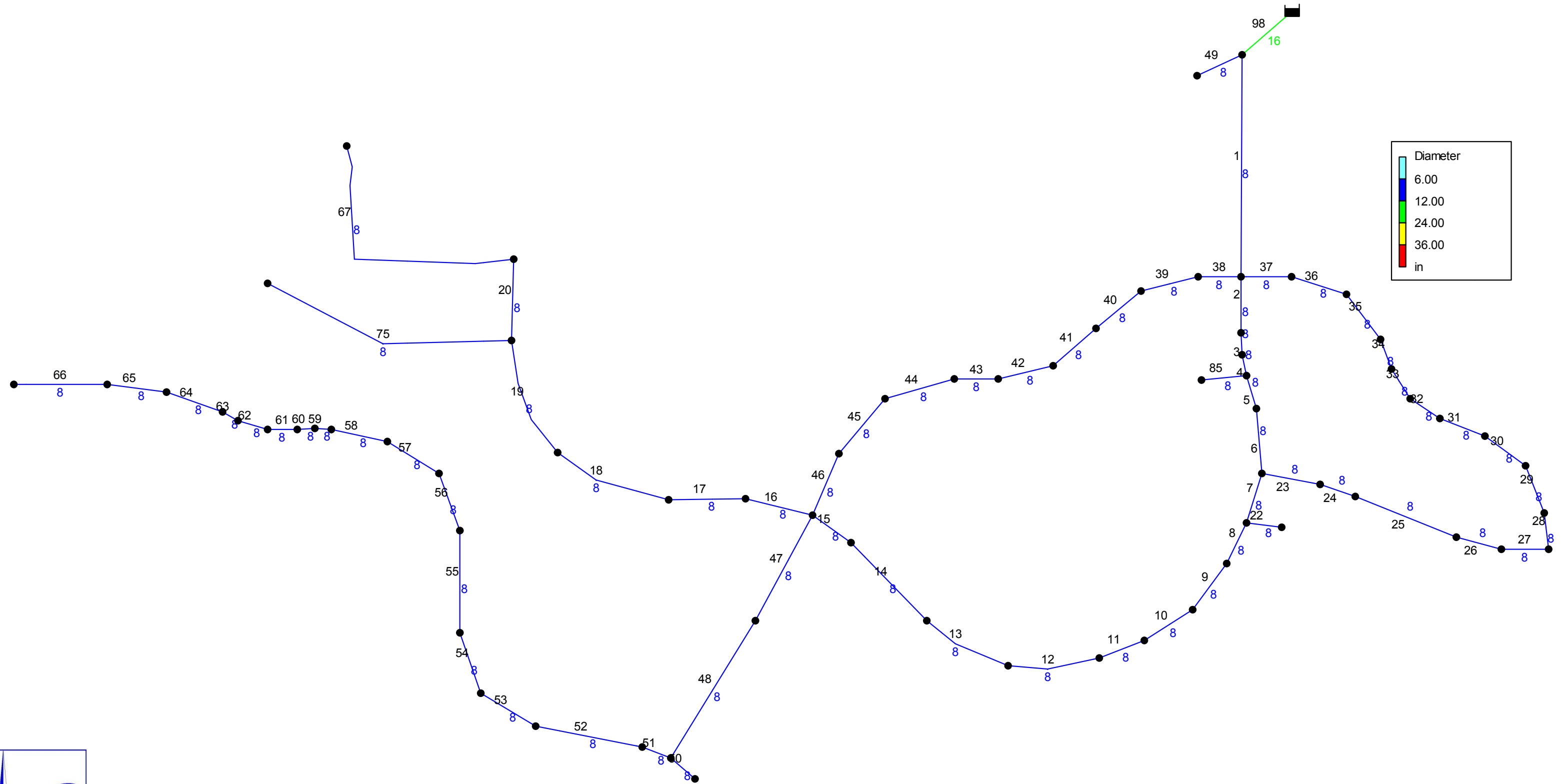
Page 5

RSG BANNING PRELIMINARY

Link Results: (continued)

| Link<br>ID | Flow<br>GPM | Velocity<br>fps | Unit Headloss<br>ft/Kft | Status |
|------------|-------------|-----------------|-------------------------|--------|
| 30         | -133.59     | 0.85            | 0.38                    | Open   |
| 31         | -133.59     | 0.85            | 0.38                    | Open   |
| 32         | -133.59     | 0.85            | 0.38                    | Open   |
| 33         | -133.59     | 0.85            | 0.38                    | Open   |
| 34         | -133.59     | 0.85            | 0.38                    | Open   |
| 35         | -133.59     | 0.85            | 0.38                    | Open   |
| 36         | -133.59     | 0.85            | 0.38                    | Open   |
| 37         | -143.74     | 0.92            | 0.44                    | Open   |
| 38         | 291.43      | 1.86            | 1.62                    | Open   |
| 39         | 291.43      | 1.86            | 1.62                    | Open   |
| 40         | 291.43      | 1.86            | 1.62                    | Open   |
| 41         | 291.43      | 1.86            | 1.62                    | Open   |
| 42         | 279.87      | 1.79            | 1.51                    | Open   |
| 43         | 279.87      | 1.79            | 1.51                    | Open   |
| 44         | 279.87      | 1.79            | 1.51                    | Open   |
| 45         | 279.87      | 1.79            | 1.51                    | Open   |
| 46         | 279.87      | 1.79            | 1.51                    | Open   |
| 47         | 32.71       | 0.21            | 0.03                    | Open   |
| 48         | 26.51       | 0.17            | 0.02                    | Open   |
| 50         | 0.00        | 0.00            | 0.00                    | Open   |
| 51         | 26.51       | 0.17            | 0.02                    | Open   |
| 52         | 26.51       | 0.17            | 0.02                    | Open   |
| 53         | 14.38       | 0.09            | 0.01                    | Open   |
| 54         | 14.38       | 0.09            | 0.01                    | Open   |
| 55         | 14.38       | 0.09            | 0.01                    | Open   |
| 56         | 14.38       | 0.09            | 0.01                    | Open   |
| 57         | 14.38       | 0.09            | 0.01                    | Open   |
| 58         | 14.38       | 0.09            | 0.01                    | Open   |
| 59         | 14.38       | 0.09            | 0.00                    | Open   |
| 60         | 14.38       | 0.09            | 0.01                    | Open   |
| 61         | 14.38       | 0.09            | 0.01                    | Open   |
| 62         | 14.38       | 0.09            | 0.01                    | Open   |
| 63         | 14.38       | 0.09            | 0.01                    | Open   |
| 64         | 14.38       | 0.09            | 0.01                    | Open   |
| 65         | 14.38       | 0.09            | 0.01                    | Open   |
| 66         | 2.26        | 0.01            | 0.00                    | Open   |
| 75         | -393.67     | 2.51            | 2.83                    | Open   |
| 85         | -176.25     | 1.12            | 0.64                    | Open   |
| 98         | -814.42     | 1.30            | 0.37                    | Open   |
| 22         | -49.63      | 0.32            | 0.06                    | Open   |
| 49         | -11.00      | 0.07            | 0.00                    | Open   |
| 67         | 11.56       | 0.07            | 0.00                    | Open   |







**Public Facilities Potable Water Supply Fixture Unit Estimate**

Table 6-5: 2010 CPC: Water Supply Fixture Units (WSFU)

|                                       |        | Neighborhood Park |            | Confluence Park |            | Community Park          |                  |         |                      |                                   |             | Fire Station |             |
|---------------------------------------|--------|-------------------|------------|-----------------|------------|-------------------------|------------------|---------|----------------------|-----------------------------------|-------------|--------------|-------------|
| Appliances, Appurtenances or Fixtures | Public | Restroom          | WSFU       | Restroom        | WSFU       | Restroom at Play Fields | Community Center | Kitchen | Maintenance Building | Restroom at Trailhead Picnic Area | WSFU        |              | WSFU        |
| Clothes washer                        | 4      |                   |            |                 |            |                         |                  |         |                      |                                   | 0           | 2            | 8           |
| Dishwasher                            | 1.5    |                   |            |                 |            |                         |                  | 1       |                      |                                   | 1.5         | 2            | 3           |
| Drinking Fountain or Water Cooler     | 0.5    | 1                 | 0.5        | 1               | 0.5        | 1                       | 2                |         |                      | 1                                 | 2           | 2            | 1           |
| Lavatory                              | 1      | 4                 | 4          | 4               | 4          | 6                       | 6                |         | 2                    | 2                                 | 16          | 8            | 8           |
| Sinks                                 |        |                   |            |                 |            |                         |                  |         |                      |                                   |             |              |             |
| Kitchen                               | 1.5    |                   |            |                 |            |                         |                  | 1       |                      |                                   | 1.5         | 2            | 3           |
| Laundry                               | 1.5    |                   |            |                 |            |                         |                  |         |                      |                                   | 0           | 2            | 3           |
| Service or Mop Basin                  | 3      |                   |            |                 |            |                         |                  | 1       |                      |                                   | 3           |              | 0           |
| Shower, per head                      | 2      |                   |            |                 |            |                         |                  |         |                      |                                   | 0           | 7            | 14          |
| Urinal, flush tank                    | 2      | 1                 | 2          | 1               | 2          | 2                       | 3                |         | 1                    | 1                                 | 14          | 2            | 4           |
| Water Closet, 1.6 GPF Gravity Tank    | 2.5    | 3                 | 7.5        | 3               | 7.5        | 6                       | 6                |         | 2                    | 3                                 | 42.5        | 7            | 17.5        |
| Count                                 |        | 9                 |            | 9               |            | 15                      | 17               | 3       | 5                    | 7                                 |             | 34           |             |
| WSFU                                  |        |                   | 14         |                 | 14         |                         |                  |         |                      |                                   | 80.5        |              | 61.5        |
| <b>GPM</b>                            |        |                   | <b>8.4</b> |                 | <b>8.4</b> |                         |                  |         |                      |                                   | <b>48.3</b> |              | <b>36.9</b> |