City of Coburg

Water Master Plan Update
FINAL

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City of Coburg

Water Master Plan Update -2016-

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Glossary

Absolute Pressure (PSIA)	The pressure in a system after including the impact of atmospheric pressure (14.7 psi at sea level)
A.G.S.	Above Ground Surface, usually measured in feet above the local ground
ANSI	American National Standards Institute. A private, non-profit organization that oversees the development of voluntary consensus standards for products, systems, and services created within the United States. Often combined with ASTM as a dual standard, i.e. ANSI/ASTM
Aquifer	An underground and water bearing geological formation; in Oregon, viable aquifers usually consist of sand and/or gravel, basalt rock, and/or marine sediments (shale, sandstone, etc.)
ASTM	American Society for Testing and Materials. An international standards organization that develops and publishes voluntary consensus technical standards for 15 separate sections, including: iron and steel products, construction, and water and environmental technology equipment and processes used in the water supply field. Often combined with ANSI (ANSI/ASTM) to create a dual standard.
Average Day Demand (ADD)	The total amount of metered (delivered to customers) water in one full year divided by 365 or 366 in leap years
Average Summer Demand (ASD)	The estimated or actual average daily demand during 4 full summer months, typically June, July, August, and September.
Average Winter Demand	The estimated or actual average daily demand during 4 full winter months, typically the months of November, December, January, and February
AWWA	American Water Works Association: A water industry trade group that develops and publishes standards for equipment and chemicals used in the potable water supply industry.
B.G.S	Below Ground Surface, usually measured in feet
BHP or Brake Horsepower	The actual horsepower required to transfer a given volume of fluid, typically water, across a predetermined amount of total dynamic head (TDH), after allowance for the pump's efficiency. (@75% efficiency-1000 GPM @ 100' TDH requires 33.67 BHP)
Coburg, City of Coburg	City of Coburg including all water customers supplied and billed from the city as well as city owned wells, pumps, water storage tanks, and distribution systems.
Cubic Feet (ft^3)	1 cubic foot of water = 7.48 gallons. A measure of water volume, often used for water billing purposes. (100 cubic feet or 748 gallons = 1 unit)
C.F.S or CFS	Cubic feet per second, a measurement of rate of fluid flow (1 CFS = 448.80 GPM)
DEQ	Oregon Department of Environmental Quality. Responsible state agency for wastewater collection, treatment, and discharge as well as for air quality and solid waste disposal
EPA	Environmental Protection Agency, Federal government agency responsible for calculating, establishing, and enforcing national (U.S.) drinking water quality standards
Feet of Head (feet) (ft.hd)	An engineering unit of pressure, usually used to equate a vertical column of water to gauge pressure. 1 foot of water = .433 pounds per square inch (psi) of gauge pressure-2.31 feet of water = 1.0 psi of gauge pressure
Fire Flow	The maximum instantaneous flow of water, typically in GPM, and/or total volume, typically in gallons per day (GPD) or gallons (gal), that is required and/or delivered to a structure(s) or geographical area during sustained fire event. Fire flow is generally expressed in the maximum flow or total volume required to suppress a large fire or group of fires over a period of several hours (usually, 2 hours to 1 day).
Friction or Head Loss	The impediment to flow from a fluid flowing through the interior surfaces of pipe walls, valves, and fittings. Varies with the flow and type and pipe size of the

	material used, i.e. PVC usually results in the lowest friction loss and steel has the highest. Measured in feet of head or psi loss.
F.P.S. or FPS	Feet per second, usually used to indicate water velocity in a pipeline. 5 FPS is generally recognized as the recommended maximum pipeline velocity.
Gauge Pressure (PSIG)	The value of pressure typically observed on and recorded from a standard pressure gauge without including the impact from atmospheric pressure.
GPCD	Gallons Per Capita per Day (AKA: gallons of water consumption or utilized per person per day) (See Per Capita Demand)
GPD	Gallons Per Day, a common measurement of water produced or sold
GPM	Gallons Per Minute, used as a common measurement unit of water flow rate
GR or G	GR=Ground water registrations before 1955 (Oregon) G=Certificate of registration for groundwater sources after 1955 (Oregon)
Groundwater	Naturally occurring water from a water bearing formation (aquifer) at depths $\geq$ 18' B.G.S.
Groundwater Act (Oregon)	In Oregon, a statute, adopted in 1955, that established water well contractor licensing, uniform water well construction standards and submission of well logs, and groundwater rights and permits.
HI	Hydraulic Institute: An independent organization that provides third-party testing and certification, as well as published standards, for pumping and hydraulic equipment in the United States.
HP, Horsepower	Horsepower-mechanical power necessary to perform work, typically used to calculate the work required to transfer a given volume of water against a given total dynamic head. 1000 GPM @ 100' TDH = 25 theoretical HP (THP). Actual or "Brake" HP (BHP) is usually 20-60% higher than the theoretical value due to the pump efficiency; i.e. 25 THP≈30-40 BHP.
Instantaneous Water Demand	The maximum or peak projected or actual demand of water within a water system. Generally, a 10-20 minute demand, however, the instantaneous demand can last up to one hour. An element of the "Peak Hour" Demand.
IPS	International Pipe Size, a classification of standard pipe sizes between ½" up thru 12". Pipe sizes in this classification are intended to match the outside diameter (OD) of standard steel pipe.
L&L	Leakage and Loss; the ratio difference between the total water produced from the source and the metered or sold water delivered to customers. Generally a percentage figure that varies from different water purveyors between 5% (.05) up to 20% (.20). The goal for most water systems is to maintain an L&L ratio of less than 10% (.10).
Maximum Day Demand (MDD)	The maximum actual or projected daily water consumption in a given year. Source capacity and storage requirements are frequently based and sized on this demand along with the fire flow. This combination is frequently used for hydraulic models.
MCL/MCLG/mcl	Maximum contaminant level-Max. allowed level of a given contaminant set by the EPA MCL goal =desired maximum level of a contaminant
Metered (or Sold) Water	The rate or volume of water delivered (and thus, metered) to customers through service connections and water meters. The difference between the "Production" and "Metered" volume of water is considered as unaccounted for or loss water and is not directly compensable. (See definition of L&L above).
MG/L or mg/L	Milligrams per liter; concentration of a mass of a chemical or contaminant per unit volume of water, roughly equal to 1 part per million (1 lb. per million lbs. = 1 mg/L)
MGD or mgd	Million gallons per day (1 MGD = 694.44 GPM or 1.55 CFS)
MSL	Mean Sea Level-elevation above or below normal sea level (usually expressed in feet)-often established by the USGS
NA or N/A	Not applicable, none available
ND or N/D	None detected or non-detectable level of an individual contaminant, chemical, element, or compound (mostly used in water quality tests)

NSF	National Sanitation Foundation; an organization that provides third-party testing and certification of water system components and chemicals. NSF standards 60 (components) and 61 (water treatment chemicals) are used in Oregon as the minimum levels of compliance, per OHA.
OHA or Health Authority	Oregon Health Authority, responsible state agency for the regulation of Public Water Systems in Oregon-Formally known as the Oregon Health Division (OHD)
O.D. (Outside Diameter) I.D. (Inside Diameter)	A cross-sectional measurement of a pipe's outside diameter (OD) or inside diameter (ID). Often used to distinguish a pipe types pressure rating or classification (Example Class 100 = 100 psi pressure rating).
Peak Hour or "Peak" Demand	The maximum hourly flow rate of water within a water system anticipated to occur at any one time in a given year, often expressed in gallons per minute (GPM). The typical duration of the peak hour demand is four hours per day; two (2) hours in the morning hours, generally between 6 AM-8 AM and two (2) hours in the early evening, from 6 PM-8 PM. This value or the maximum day demand with fire flow often determines the source and pumping equipment, water storage, and/or the distribution system sizing and layout.
Per Capita Demand (aka GPCD)	The rate of water consumed or used by a single person per day, expressed in gallons. Can be applied to average, maximum day, or peak hour demands
PSI (psi)	Pounds per square inch, a unit measurement of applied pressure. Note that 1 PSI = 2.31 Feet of water head; 100' of water head = 43.3 psi; 100 psi = 231 feet; Also, See Feet of Head
Production	Used to distinguish the total rate or volume of water delivered from the sources and storage from the total rate or volume sold or delivered to customers. Used for average day, maximum day, and peak hour observations.
Pumping Water Level (PWL)	The stable distance from ground level downward to the lowest water level in a water well during sustained pumping conditions, usually measured in feet B.G.S.
SCADA	Supervisory Control And Data Acquisition. An acronym used to describe an automatic control and data collection system. Often referred to as "telemetry".
Static Water Level (SWL)	The distance from ground level downward to the highest free standing water level in a water well that is not presently under pumping or "static" conditions, usually measured in feet B.G.S.
TDH or T.D.H.	Total Dynamic Head (in feet)-Sum of the vertical lift (lowest water surface to the upper water surface or from the source to point of delivery) plus all delivery pressure, and the sum of all pipe, valve, and minor friction losses.
Unit	Used to determine a total volume of water, often used for billing purposes (Typ. Value: 1 unit = 748 gallons) (or 100 cubic feet)
USGS (U.S.G.S.)	United States Geological Survey
VFD	Variable Frequency Drive, an electric motor controller, placed between the electrical power supply and the motor that automatically varies the frequency, and thus, the speed and capacity of the motor and pump.
Well, Water Well	An artificially created (usually vertical and cylindrical in shape) opening or shaft constructed at and below ground level for the purpose of locating and extracting water. A deep water well is usually defined as a well greater than 20'-30' in total depth.
WRD/OWRD	Oregon State Water Resources Department, State agency responsible for water well construction standards, water well contractor licensing, and water rights appropriations

Executive Summary

Executive Summary

General: This Water System Master Plan Update for the City of Coburg outlines the water system improvements and expansion necessary to accommodate anticipated growth and correct current deficiencies. The time span of this study is 20 years, outlining the projected needs of the water system from Year 2016 to 2036, inclusive.

Scope of Study: A well prepared water system master plan will evaluate several factors. Among these are: projected population growth, adequacy of existing sources, future source expansion, evaluation of water quality parameters, distribution system adequacy for varying demands, water storage requirements, capital improvement requirements, and implementation schedule.

Existing System: The existing water system obtains all of its source water exclusively from two individual groundwater wells (Wells 1 and 2). Both of these wells are grouped 300' apart in a common well field, which is located off Funke Road, Southwest of Coburg. The combined reliable yield from this well field is approximately 1,100 GPM. All source water is pumped directly into the water system and backfed into two (2) ground level storage reservoirs located on Sarah Street for reserve capacity. The combined available water storage is 1,000,000 gallons, which consists of a pair of 500,000 gallon steel ground level storage reservoirs. The only water treatment currently performed is chlorination to control coliform bacteria. All treatment is performed at the wells, contact time for disinfection is performed using a 1,360' 24" diameter waterline, which provides approximately 29 minutes at maximum flow. A booster pump station equipped with three (3) 75 HP booster pumps is situated next to and draws water from the reservoirs. Each pump is capable of 1,300 GPM for a two pump capacity of 2,600 GPM and a three pump combined capacity of 3,900 GPM at a delivery pressure of 65-70 psi. The water system operates as a "closed-loop" type of water system, therefore, there is no elevated reservoir or established hydraulic gradeline in the water system. Although the service pressure within the water system varies slightly with elevation and zone the delivery pressure to residences and industrial customers is generally between 65-75 psi. The elevation of the water system varies slightly, however, most of the city is situated at an elevation between 390'-400' M.S.L.

Population Projections: The City of Coburg, in 2016, had an estimated population of 1,200, up from 1,045 in 2015. Due to presently confirmed and planned development, the City's permanent population is projected to increase to 4, 610 by the year 2036, an average growth rate of 6.96% per year. This level of growth represents a total rate of growth in population of 384% above 2016 levels. In addition to the permanent population the city also experiences a huge influx of shift workers each day. This volume of day to day shift workers (transient) actually dwarfs the permanent population by a factor of 3.0:1. The 2016 estimated transient population is 3,594 with a projected rise in 2036 to 4,240, an annual growth rate of .83%. When combined with the permanent population for water planning purposes, this relates to an equivalent population of 2,386 in 2016 and a projected equivalent population of 6,000 in 2036.

Current Water Requirements: The City's current average daily demand of water is approximately 268,500 gallons per day which equates to a per person usage of 112 gallons per day and includes all water lost through system leakage. This value of water consumption is typical for a city of this size and population distribution. The typical "summer" day water usage averages 510,000 GPD (531 GPM from sources @ 16 hours/day of operation). Current maximum day water demand is approximately 750,000 gallons, an increase of 2.5 times the average day and 1.47 times the average summer day demand. Most of the typical summer day and the maximum day demand typically occurs in July or August. The distribution of water usage within the city is comprised of 48.3% for residential (all types) usage, 43.5% for Commercial and Industrial uses, and approximately 8%-10% for miscellaneous use and system leakage. The currently available water sources can provide water for all current daily uses with 10-16 hours per day of pumping but as the city continues to grow, an additional well will be required to accommodate the increased demands and provide needed redundancy.

Future Water Requirements: Average daily water demand is projected to rise to 675,000 gallons per day, average summer day demands to 1,200,000 GPD, and maximum day demands as high as 1,755,000 gallons, by the year 2036, an increase of 233% over 2016 values. This value reflects limiting the total volume of unaccounted for water (water lost to system leakage) to a maximum of 8% and well operation of 20 hours/day, maximum.

Source of Supply: The City currently derives all source water from established groundwater sources. Although surface water rights for the Willamette River are technically available, future planning has been performed using additional groundwater sources exclusively. This will avoid the high cost and complexity associated with treatment of new surface water supplies. This addition of source capacity will be accommodated through a new Well #3 in the Roberts Road area, expected to increase system flow by 450-500 GPM. Should this flow rate not be realized, the total production may need to originate from a 2-3 acre wellfield site with 2 production wells. Future water supplies are projected to be evenly divided between the two existing and a future single well with capacity evenly divided for a reliable total of 1,400-1,500 GPM.

Water Quality Considerations: Since the City of Coburg uses groundwater exclusively, recent modifications to the Safe Drinking Water Act that affect surface water supplies only will have little or no impact to Coburg. As Coburg routinely chlorinates water delivered to customers, the potential for viruses or coliform bacteria from the sources does not represent a substantial concern to the city. In addition, new monitoring requirements for synthetic and volatile organic contaminants represent an expensive and time consuming task for all water systems. Currently, the greatest water quality concerns for Coburg are control of nitrates and coliform bacteria, monitoring of synthetic organics, and iron and manganese control at the wells.

Water Storage: Given the present lack of redundant source capacity, the present available water storage of 1,000,000 gallons represents a deficit over current water demands and population by 400,000 gallons. As the City continues to grow, additional water storage will be required and is planned as an elevated ground-level water storage vessel at the Diamond Ridge Subdivision location between 2020 and 2025, as well as the replacement of the two (2) existing .50 MG reservoirs with a new 1.0 MG reservoir in later years. Total anticipated water storage volume in 2036 is 1,750,000 gallons from 2 water storage vessels.

Control (SCADA) System: The water system is now controlled utilizing a 2011 vintage radio transmission digital telemetry system. The system is capable of operating the well and booster pumps based on pre-determined system pressure input values. Refill of the two .50 MG water storage reservoirs is accomplished through an operator selectable water level in the reservoirs. This level is sent to a backfed pressure sustaining control valve that opens and allows refill of the reservoirs from the wells through the distribution system. The control system, while providing rudimentary control, does not include adequate trending or historical tracking capability and lacks the finite control needed between the well pumps and the refill cycle of the Sarah Street Reservoirs. In addition, the proposed inclusion of a new .75 MG elevated reservoir in the Diamond Ridge subdivision in Phase II will necessitate a revision to the control system to permit automatic and controlled filling of this vessel from the three (3) wells. The revision to the control system is planned for Phase II improvements.

Hydraulic Analysis: Computer modeling indicates that the water distribution system can accommodate current average and maximum day demands. Fire flow along with coincident peak water system demands for specific locations such as the Rears Manufacturing building and the industrial area, however, is limited due to present pipeline and hydraulic limitations. Improvements are recommended to alleviate this situation and improve water service, specifically intertie and loop connections of 12" waterlines throughout the core area of the city.

Capital Improvement Program: Specific improvements have been divided into three phases of work at roughly five to seven year intervals. This will allow improvements to occur commensurate with system growth and availability of funding. Phase I improvements, planned for Years 2016-2020, represent improvements that are immediately needed to correct current source deficiencies and provide needed additional source capacity and redundancy. Phase I includes development of a third well, replacement of pump control valves and installation of a surge anticipator valve at Well #1, perform well rehabilitation and maintenance on Wells #1 and #2, and a 12" transmission pipeline and I-5 bore to convey water to the east side of I-5. The estimated cost of Phase I is $1,812,510.00. Phase II (2020-2025) work includes a new 12" transmission line to the Diamond Ridge reservoir site, construction of a new 750,000 gallon reservoir at the Diamond Ridge site, upgrading of the SCADA system, and three new 12" intertie pipelines. Phase II is estimated to cost $2,166,007.50. Phase III (2025-2036) improvements include demolition of the existing two 500,000 gallon reservoirs and replacement with a new 1,000,000 gallon reservoir at the existing booster pump station site, an additional bore under I-5 and connection to the east waterline, and a 6" pipeline replacement project. Phase III is projected to be a total of $2,438,734.50. The total cost of all phases of work I-III, is $6,417,252.00. (2016 dollars).

Recommendations

1) Review, revise if necessary, and adopt this Master Plan.

2) Immediately begin Phase I, Priority I improvements-Locate available land for Well #3, proceed with a 6" test well and production well.

3) In tandem with new well development, prepare groundwater application for .75-1.0 CFS (336-450 GPM) of additional water rights and submit to Water Resources Department for future (20 years) uses.

4) Begin routine monitoring program for all wells-Monitor static and pumping levels, nitrates, iron and manganese, corrosion potential, and discharge rates.

5) Determine and implement funding options for Phase I-III improvements

6) Develop an inventory and destructive testing program for existing asbestos cement pipe in the distribution system and implement a 5-10 year testing and monitoring program for AC waterline integrity. Prepare a future replacement schedule based on condition of tested sections.

7) Develop an Emergency Plan applicable to water system functions for storms, earthquakes, source contamination, extreme or multiple well failure, or waterline breaks

8) Prepare and develop a Well Recharge Area Protection Plan. Work with local landowners to develop alternate methods of fertilizer application. Verify operational status and distances to nearby septic tanks and drainfields.

9) Track nitrates and distribution system and lead and copper corrosion effects upon implementation of the new well.

Chapter One

Introduction and Background

Chapter One
Introduction and Background

Introduction

Water is essential for the survival of all life on earth. Without it, crops and cities fail and entire civilizations have been known to collapse. A primary responsibility of most municipalities is the delivery of safe and adequate water supplies to its citizenry. As cities grow and expand, water supplies often become scarce, contaminated, and overburdened. A water system master plan assists the citizens and leaders in government by providing the necessary information needed towards making the often difficult decisions regarding preserving and enhancing current water supplies as well as predicting and planning for future needs. A properly prepared master plan must include accurate and reasonable predictions of population growth, current and future water use projections, regulatory and aesthetic water quality impacts, and other factors necessary to make informed and intelligent decisions. A master plan should not be considered as a political document, therefore, the authors should not be asked or required to be concerned or involved with any particular resistance or endorsement of growth or development within a given community. Alternatively, what it should be is an independent technical appraisal of the state of the current water system and currently needed improvements as well as a dynamic and flexible technical reference and planning document with reasonable and practical assumptions; a document that is also used as an informational resource and guide that is periodically reviewed and updated to address changes in the planning or growth of the community and water system. A well-prepared master plan will follow and enhance the vision and unique needs of the community it was developed to serve. With this goal in mind, this Master Plan Update is dedicated to the citizens of Coburg, Oregon.

City History

The city was originally named Diamond after John Diamond, an early pioneer in the area, on whose land claim the city was located. The city's current name comes from a stallion that was named after the Coburg district of Bavaria, Germany, from whence the horse had been imported. The Coburg Historic District was placed on the National Register of Historic Places in 1986. The period of significance of the buildings in the district dates back to 1875.

Background

The City of Coburg is located approximately 2 miles from the northern edge of the Eugene-Springfield Metropolitan area. Coburg's new wastewater treatment plant was constructed in July, 2013. With this recent development Coburg's population is expected to grow substantially over the next 20 years with an estimated population in 2036 of 4,610 with an accompanying industrial and commercial transient employment population of 4,240.

The first water system master plan was completed in 1966 by CH2M and the second by HGE, Inc in 1995. The master plan was then updated in 1999 to accommodate planned industrial growth. In May, 2006 a master plan update was completed by Branch Engineering. With the recent development of the wastewater treatment plant the population is expected to dramatically increase in the City of Coburg over the next 20 years. Improvements that will need to be made to the water system to handle this projected increase, specifically major improvements of a new reservoir and well field, necessitate update to the water system master plan.

Topography

The City of Coburg, Oregon is located in Lane County approximately five miles north of the city of Eugene. The city has a rich history and is home to a National Historic District and a number of annual festivals. The first settlers arrived in 1847 and the city was incorporated in 1906. It is surrounded by flat, arable land and the city extends primarily to the west of the Interstate 5 corridor although it also straddles I-5. The city is generally flat as the elevation of most of the city varies between an average of 390'-400' MSL, however the Coburg Hills rise to over 1,000 feet in elevation immediately to the east of the city.

Climatic Conditions

The climate of Coburg resembles that of most Willamette Valley communities (Tables 1-1 and 1-2). The area has a temperate climate with definite seasonal changes consisting of moderately warm, dry summers and mild, wet winters. The annual average precipitation of 39.2 inches occurs during the fall/winter/spring seasons with very little rain occurring during the summer months. The average yearly temperature ranges between 51 and 54 degrees. Normal average January temperature is 46 degrees and the normal maximum August temperature is 82 degrees. The driest month is usually July. Prevailing winds are from the west and northwest during the summer months and from the south and southwest during winter storm periods.

Authorization

Preparation of this Master Plan update was authorized by the City of Coburg. This report has been prepared by 4B Engineering and Consulting of Keizer, Oregon with authorization from the City Engineer: Branch Engineering of Springfield, Oregon.

Scope of Study

The primary purpose of this master plan is to update and supplement all previous master plans using current population and water use data in addition to evaluation of allowable growth in specific areas. The scope of study and planning includes the following specific items:

1. Evaluate the existing water sources to determine their individual and combined adequacy and reliability.
2. Address appurtenant water quality and water rights issues affecting the existing and potential new sources.
3. Perform hydraulic analysis and technical review of the existing distribution system, using computer modeling, to determine if inadequacies exist, and if so, the degree and scope of correction required.

4. Evaluate existing storage and booster pumping facilities for average day, maximum day, peak hour and emergency adequacy and determine if additional reserve storage and/or booster pumping capacity is needed to accommodate the present and future demands and for the adequacy of flow for fire protection.
5. Prepare cost estimates and determine potential sources of funding for necessary system improvements along with a proposed timetable for implementation.
6. When possible, specific details and recommendations from the 2006 Master Plan Update have been included within this report, however, several topics such as: growth projections, water use data, and specific improvements and implementation schedule have been revised for current (2016) conditions.

Time Span of Study

This master plan evaluates and estimates the needed improvements between the years 2016 and 2036, inclusive. Specific improvements may be delayed or advanced depending on actual city growth, economic factors, industrial water use and growth, and City Council direction. Periodic review and updating of the master plan, generally occurring between a 10-20 year interval, may be necessary depending on specific factors such as the actual rates of population growth, source limitations, and water quality regulatory changes. A citizen committee or task force is often assembled and utilized to facilitate oversight, input, and review of a master plan. This committee should be formed at least 4-6 months before actual modification of the master plan is begun to insure adequate time is allowed for review and gaining knowledge of the water system. Participation and input from citizens is important to the ultimate success of a master plan and will often produce a final document addressing local concerns and interests, resulting in a plan with manageable and realistic goals. This often results in a greater level of acceptance from the community and regulatory agencies.

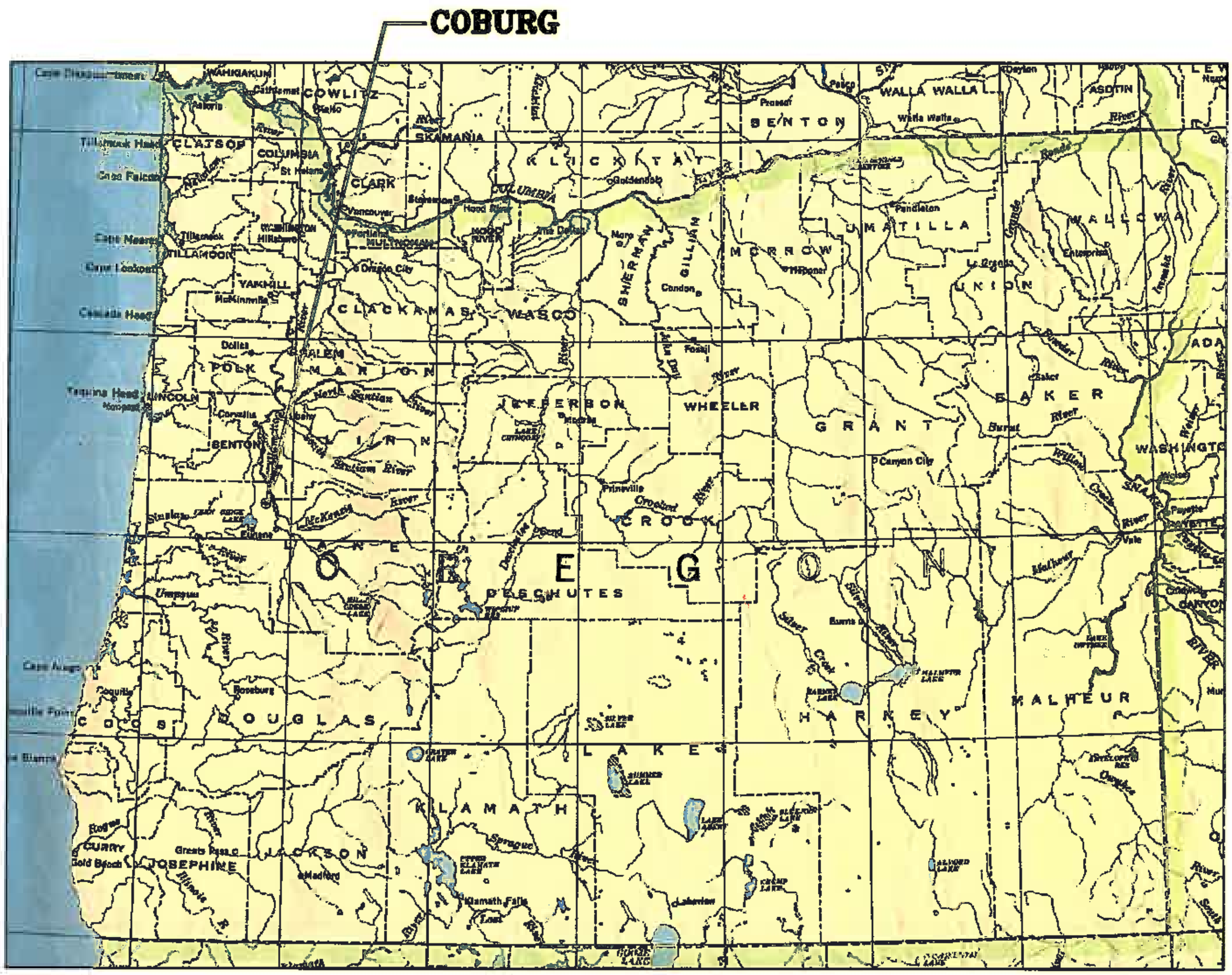
Table 1-1
Coburg/Eugene/Springfield Average Climate Data

Month	Average High (°F)	Average Low (°F)	Warmest on Record (°F)	Coldest on Record (°F)	Average Dew Point (°F)	Average Precipitation (inches)
January	46°	33°	69°	-4°	40°	7.65"
February	51°	35°	78°	-3°	41°	6.35"
March	56°	37°	80°	18°	42°	5.8"
April	61°	39°	89°	25°	41°	3.66"
May	67°	43°	93°	28°	48°	2.66"
June	73°	47°	102°	32°	50°	1.53"
July	81°	51°	105°	39°	50°	0.64"
August	82°	51°	108°	35°	50°	0.99"
September	77°	47°	103°	30°	48°	1.54"
October	65°	41°	94°	17°	49°	3.35"
November	52°	37°	76°	12°	37°	8.44"
December	46°	33°	68°	-12°	39°	8.29"
Avg. Yearly	63°	41°	-	-	44°	50.9" (4.24"/month avg.)

Table 1-2
Maximum Daily Temperatures: 2000-2015

Year	Date	Temperature (°F)
2000	June 26 June 27 June 28	92 degrees 99 degrees* 94 degrees
2001	July 3 August 9 August 12	91 degrees 96 degrees* 94 degrees
2002	August 12 August 13 August 14	96 degrees 104 degrees* 96 degrees
2003	July 28 July 29	99 degrees 101 degrees*
2004	July 22 July 23 July 24	99 degrees 104 degrees* 99 degrees
2005	July 26 July 27 August 4	96 degrees 98 degrees* 97 degrees
2006	July 23 July 24 July 25	104 degrees 105 degrees* 101 degrees
2007	July 10 July 11 August 2	103 degrees* 103 degrees* 95 degrees
2008	June 28 June 29 August 17	100 degrees 101 degrees* 98 degrees
2009	July 28 July 29 July 30	107 degrees* 107 degrees* 106 degrees
2010	July 25 August 14 August 15	96 degrees 100 degrees 101 degrees*
2011	August 20 August 21 September 10	96 degrees* 96 degrees* 95 degrees
2012	August 4 August 5 August 16	102 degrees 103 degrees* 97 degrees
2013	July 23 July 24 July 25	96 degrees* 96 degrees* 96 degrees*
2014	July 15 July 16 August 11	97 degrees 97 degrees 100 degrees*
2015	July 2 July 30 July 31	101 degrees 105 degrees* 102 degrees

*-Highest Temperature of the year



Location Map of Coburg, Oregon
Figure 1-1

Chapter Two

Existing System

Chapter Two
Existing System

General: Specific details regarding the early water system are not known, however, general data is available as well as improvements performed after 1980.

Table 2-1
Chronology of Water System History

Year	Improvement
1847	Coburg's first families (Spores and Diamond families) arrive and establish a city, the city is named Diamond
1865	Coburg receives its' new name, First school is built in Coburg
1878	Coburg has its first railroad built between Coburg and Brownsville
1881	The railroad is sold to Southern Pacific and a standard rail line is built
1894	New school house is built across from present fire station
1906	First mayor is elected-George Drury
1914	First mint crop is planted and has been planted every year since
1915	Major fire destroys 4 blocks of downtown Coburg
1920	Coburg population is 291
1940	Well #1 Drilled
1950-60	Well #1 Deepened
1977	Well #2 Constructed
2000	Well #2 Pump Replaced-New 50 HP Submersible
2008	Sarah Street Reservoirs emptied and interior and exterior coating touched up
2013	Well #2 Motor Replaced, New 5" Drop Pipe Installed

Groundwater Sources

The City of Coburg currently (2016) uses two wells to the southwest of the city, off of Funke Road, as the sole water sources. The two wells are capable of producing approximately 1,100 gallons per minute combined flow (550 gpm from Well #1 and 550 gpm from Well #2). Well #1 was constructed in 1948 and deepened in the 1950's or 60's. Well #2 was constructed in early 1977.

The building for Well #1 contains the well, along with the electrical and chlorine equipment for both wells. The building for Well #2 contains only the well and the related mechanical piping. The well site has a back-up generator for both wells and radio controls also housed within the fenced boundaries for Well #1. The master meter combines the flow of the two wells. Chlorination is accomplished by being injected into a 1,360' long, 24-inch diameter transmission waterline that acts as a chlorine contact chamber. Combined well "C.T" (contact time) at maximum flow is approximately 29 minutes.

In 2000 the pump for Well #2 was modified to a new 50 HP submersible pump. In 2013 the motor for Well #2 was replaced. Presently, neither well pump has a pump control or surge valve. Installation of pump control valves and a surge anticipator valve is scheduled for Phase I improvements to lessen the impact from potentially damaging pressure surges. Water surface depth is recorded daily by publics works staff to monitor well performance. Past data shows that static water levels are relatively consistent.

Table 2-2A
Well Data

Well Number	Year Drilled (Replaced)	Dia.	Depth	Casing Depth	SWL	Perforations or Screened	Seal Depth	Seal Material	Production
Well #1	1940? (1960's deepened?)*	12"	197'	194'	9.5'	110'-167' (Perfs)	Unk (24'?)	Unk	Unk
Well #2	1977	10"	200'	83'	23' (1977)	Screened at 85'-99' and 120'-167'	74'	Cement	475 GPM @ 80' PWL (1977)

*The well log for deepening of Well #1 was unable to be located in the state's data base. The above data was obtained from a downhole video inspection in 2009.

Table 2-2B
Well Pump Data

Well Number	Pump Type	Pump HP	Year Installed	Approximate Pump Capacity
1	Vertical Turbine	50 HP	1975	550 GPM @ 60-70 psi
2	Submersible	50 HP	2000	550 GPM @ 60-70 psi

Water Rights

Coburg's current water rights are summarized in Table 2-3. There is presently enough water rights to cover the existing supply wells, although water rights certificates 37211 and 44837 are for abandoned wells and should be transferred to the new well upon the finalization of construction along with additional new water rights. Water rights Certificate 44838 and Permit G-13183 are for existing Coburg city wells #1 and #2. All existing water rights have no limitations for annual quantity.

Table 2-3
Water Rights

Application Number	Permit Number	Certificate Number	Water Source	Priority Date	Authorized Max Rate (in CFS)	Max Diverted Rate to Date (in CFS)
G-1726	G-1580	37211	Abandoned Well	4/19/1960	0.31	0.31
G-4283	G-4032	44837	Abandoned Well	3/18/1968	0.1	0.1
G-4284	G-4033	44838	Well #1	3/18/1968	0.3	0.3
G-13877	G-13183	None	Well #1 and #2	11/16/1994	2.0	2.0

Water Distribution System

Table 2-4
Distribution System

Nominal Size (Inch)	Total Length (Feet)	Type(s)
2"	4,740'	PVC, Steel
3"	1,653'	PVC
4"	1,056'	Steel
6"	14,255'	PVC, Steel, AC
8"	16,408'	PVC, AC
12"	18,877'	PVC, AC
24"	1,360'	Ductile Iron

Total Length: 58,032'-10.99 Miles:

Table 2-5
Water Meter Distribution (April, 2016)

Size	Number of Accounts	% of Total	Class
3/4"	323	81.4%	Residential
3/4"	27	6.8%	Commercial
1"	16	4.0%	Commercial
1-1/2"	8	2.0%	Commercial
2"	18	4.5%	Commercial
3"	3	.7%	Commercial
4"	1	.3%	Commercial
6"	1	.3%	Commercial
TOTAL	**397**	**100%**	**81.4% Residential Meters** **18.6% Commercial Meters**

Major commercial customers include Eugene Kamping World, Coburg North, and Rears Manufacturing all with 3" water meters; Marathon Coach with the 4" water meter; and Serenity Lane with the 6" water meter.

Booster Pump Systems

The City of Coburg utilizes one booster pump station. This pump station building presently houses three 75 HP centrifugal style booster pumps, each driven by a Variable Frequency Drive (VFD). The booster pump system was updated in 2011, this upgrade included replacement of all booster pumps, piping, and electrical systems, which reduced leakage and excessive energy usage through these mechanical, electrical, pump, and control system upgrades. The booster pump station controls the filling and drawdown of both reservoirs at the site. This booster pump station serves the normal day to day peak demands along with the ability to serve a fire flow of up to 3,500 gpm anywhere in the city. This site is also equipped with an automatic-start back-up generator capable of running all three booster pumps.

Storage Facilities

Coburg has two water storage reservoirs located adjacent to the booster pump station site on Sarah Street. Both reservoirs are backfed from the water system by a 12" connection and fill valve. Both reservoirs are showing their advanced age as they have never been completely repainted or resealed. It is recommended that both reservoirs be drained and demolished once the new 1,000,000 gallon reservoir recommended in Phase II in the Capital Improvement Plan is constructed.

Table 2-6
Existing Storage Facilities

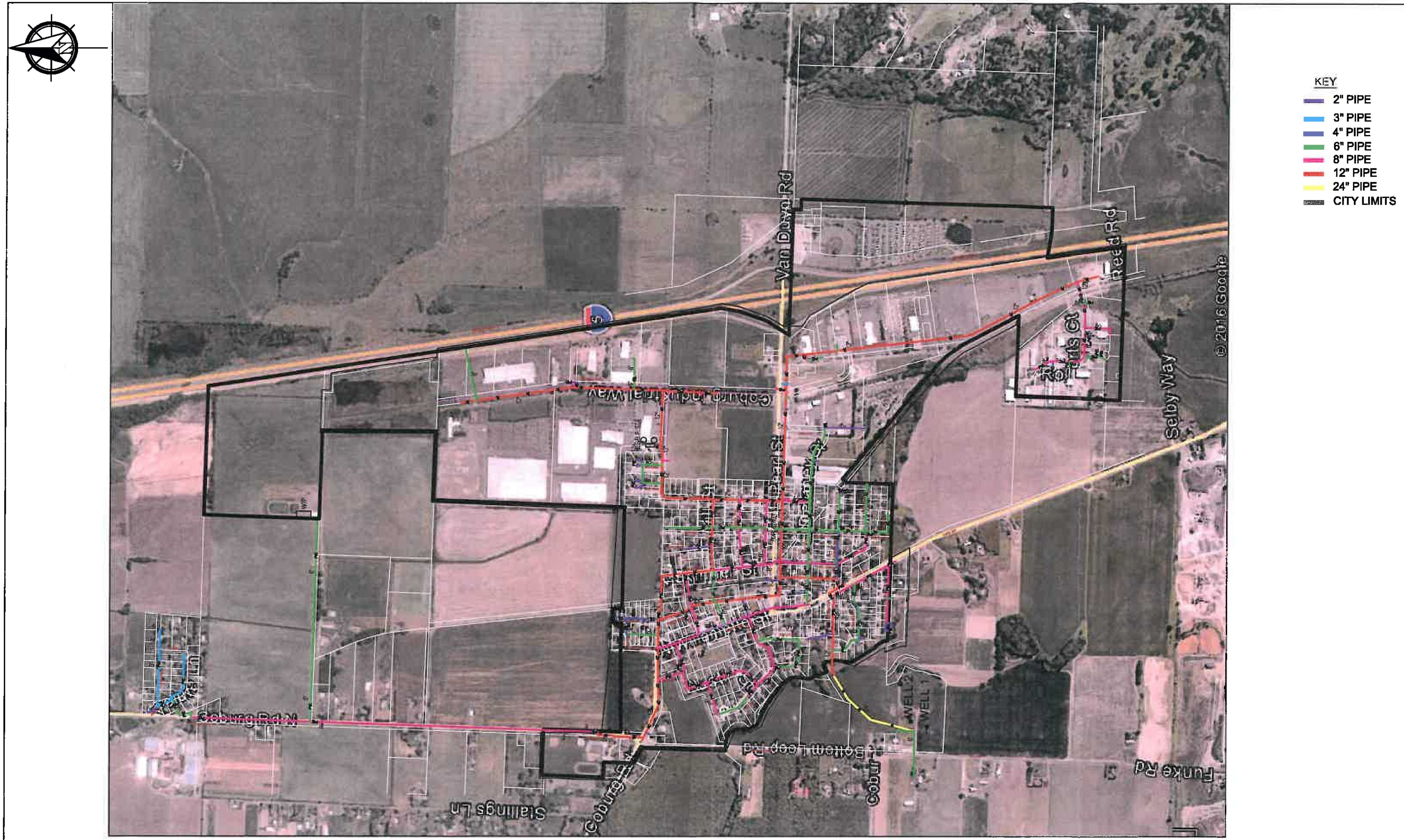
Water Storage Reservoir Location and Year Constructed	Nominal Diameter and Height	Rated Water Storage (in Gallons)	Material and Type of Construction	Reservoir Floor Elevation (Ft-MSL)	Maximum Water Surface Elevation (Ft-MSL)
(2) Reservoirs at Sarah Street site Circa: 1976-1981	52' x 32'	(2) 500,000 gal. (1,000,000 gal. total)	Welded and Coated Steel	397.5'	429.5'

Recent Major Operation and Maintenance Work

Since 2000, the City of Coburg has embarked on various repairs to the water system. This included recoating of one of the storage reservoirs and replacement of a well pump motor.

2008: Both .50 million gallon water storage reservoirs were emptied and inspected. One of the reservoirs received a recoating to the interior and exterior surfaces. The other reservoir received a "touch up" repair to various surfaces.

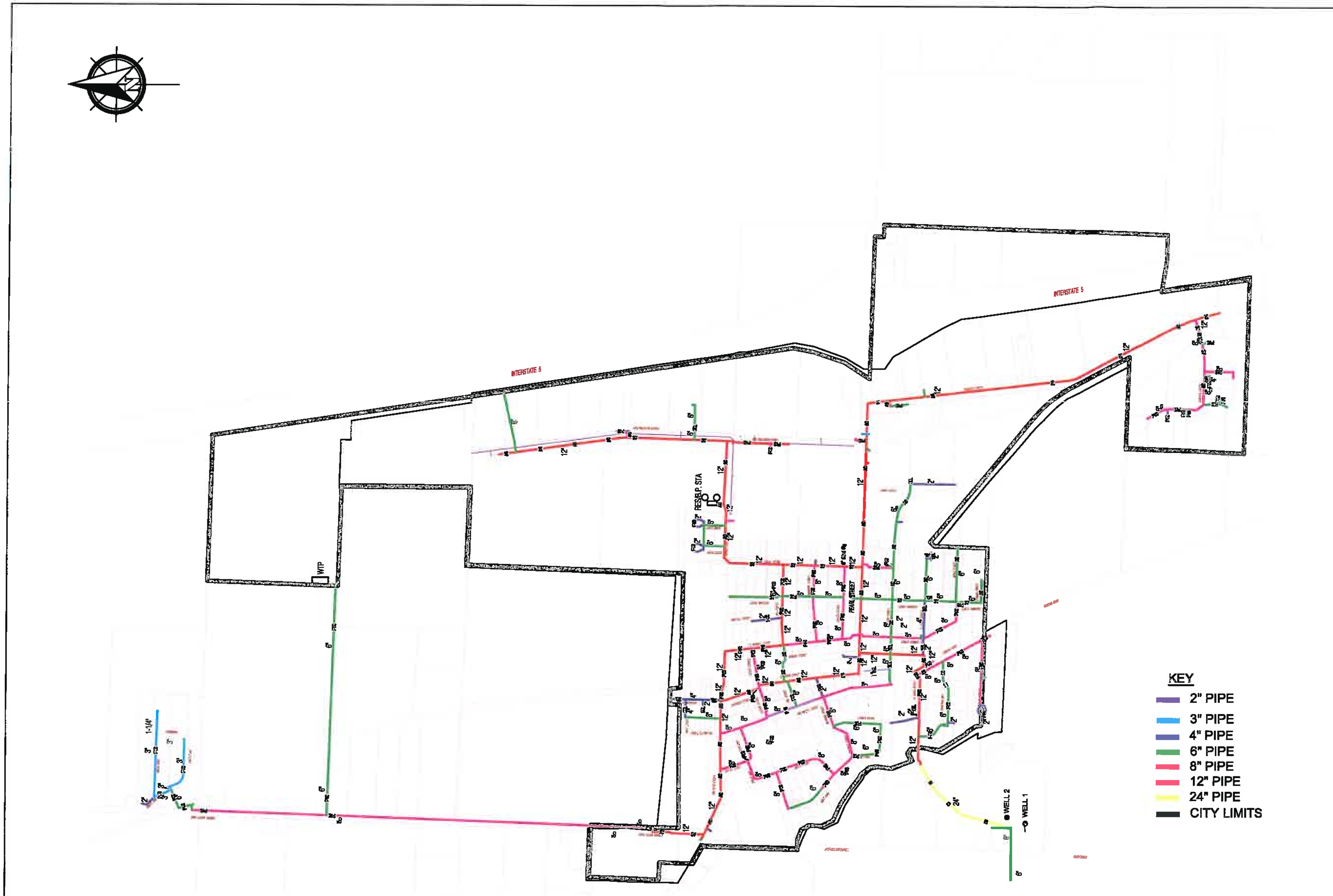
2013: Well #2: The submersible motor in this well was replaced with a new 50 HP Franklin motor. The 5" drop pipe and drop cable was also replaced at this time.



Scale: 1"=1,000'-0"

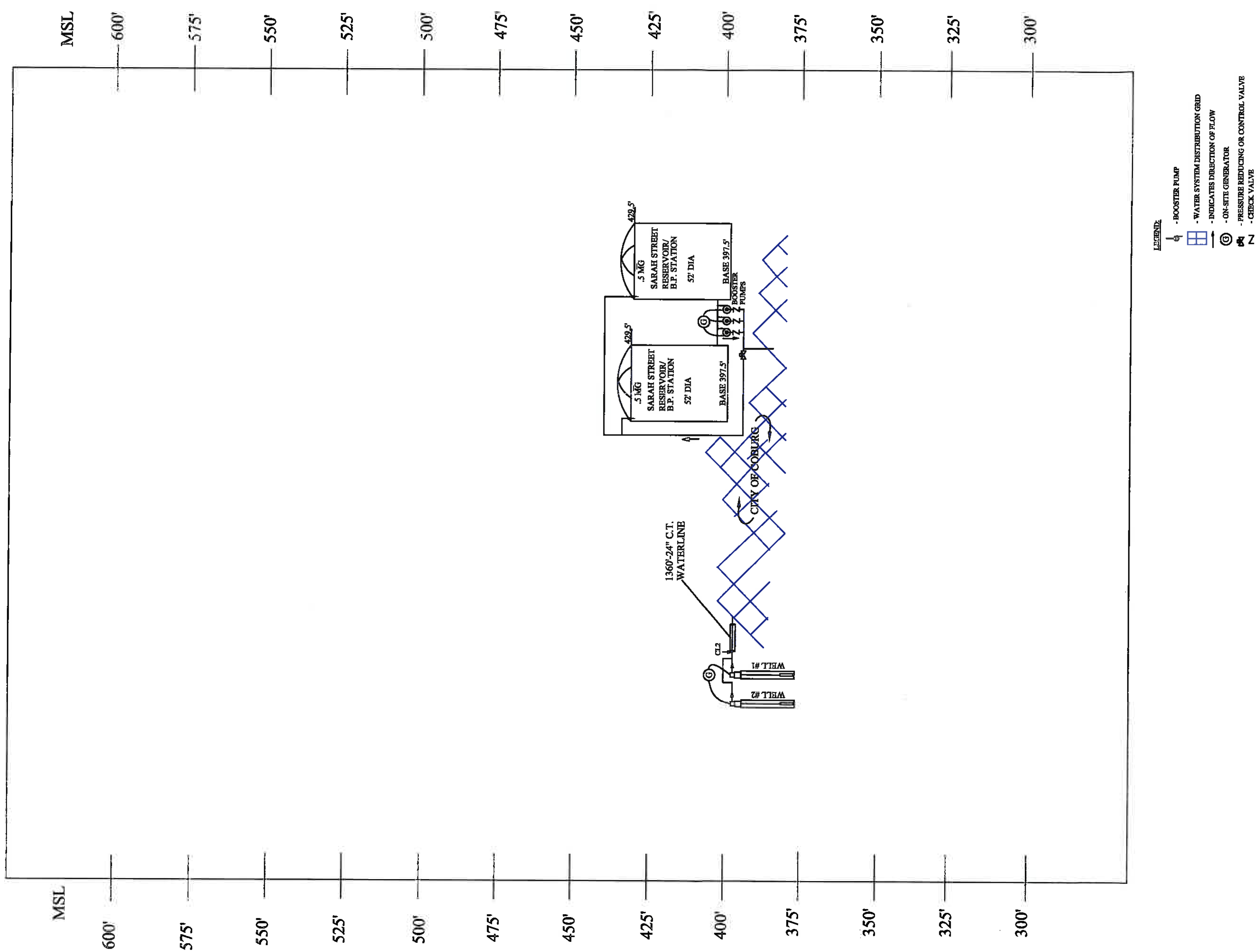
8A

System Aerial Map-2016
Figure 2-1



Water Distribution System-2016
Figure 2-2

Scale: 1"=1,000'-0"



Municipal Water System
Configuration-2016
Figure 2-3

Scale: 1"=1,000'-0"

Water System Service Area
Figure 2-4

Chapter Three

Population and Land Use

Chapter Three
Population and Land Use

Population Increase Projection

As indicated in Table 3-1, the population in Lane County, during the years 1990-2000 and 2000-2010, increased slightly less than the overall state average. Several independent sources were consulted during preparation of this study to obtain a verification of the Coburg Urbanization Study Update population projections. These sources include: United States Census Report, Mid-Willamette Council of Governments, Lane County Planning Department, Portland State University Center for Population Research and Census, and the State Office of Economic Analysis. All of these sources project an increase of population within Lane County and Coburg (when applicable) over the next 20 years. For Coburg, this is due to the influx of new residents due to the recent construction of a city sewerage system as well as an expected shift of urban population.

Table 3-1
1990/2000/2010 U.S. Census

	Lane County	Oregon State Average
1990 Population	282,912	2,842,321
2000 Population	322,977	3,421,399
% of Change, 1990-2000	12.4% (1.17%/year)	20.4% (1.87%/Year)
2010 Population (Census)	351,715	3,831,074
% of Change, 2000-2010	8.17% (.78%/year)	11.97% (1.13%/Year)

Table 3-2
2016 Population Projections:
2010-2035 Lane County (1)

Year	Lane County	% Increase
2008 (Actual) (2)	345,880	-
2010 (Actual) (2)	351,715	-
2015 (1)	362,150	0.9%
2020 (Forecast) (2)	384,930	0.9%
2030 (Forecast) (2)	420,481	0.9%
2035 (Forecast) (2)	435,615	0.9%

(1) PSU Population Center
(2) Population Forecasts for Lane County, its Cities and Unincorporated Area 2008-2035

The period between 2015-2035 represents a net county projected population growth of 20.28% (73,465 or 0.927% per year). This growth is expected to partially mirror the growth of Coburg.

Population Increase Projection-Statewide

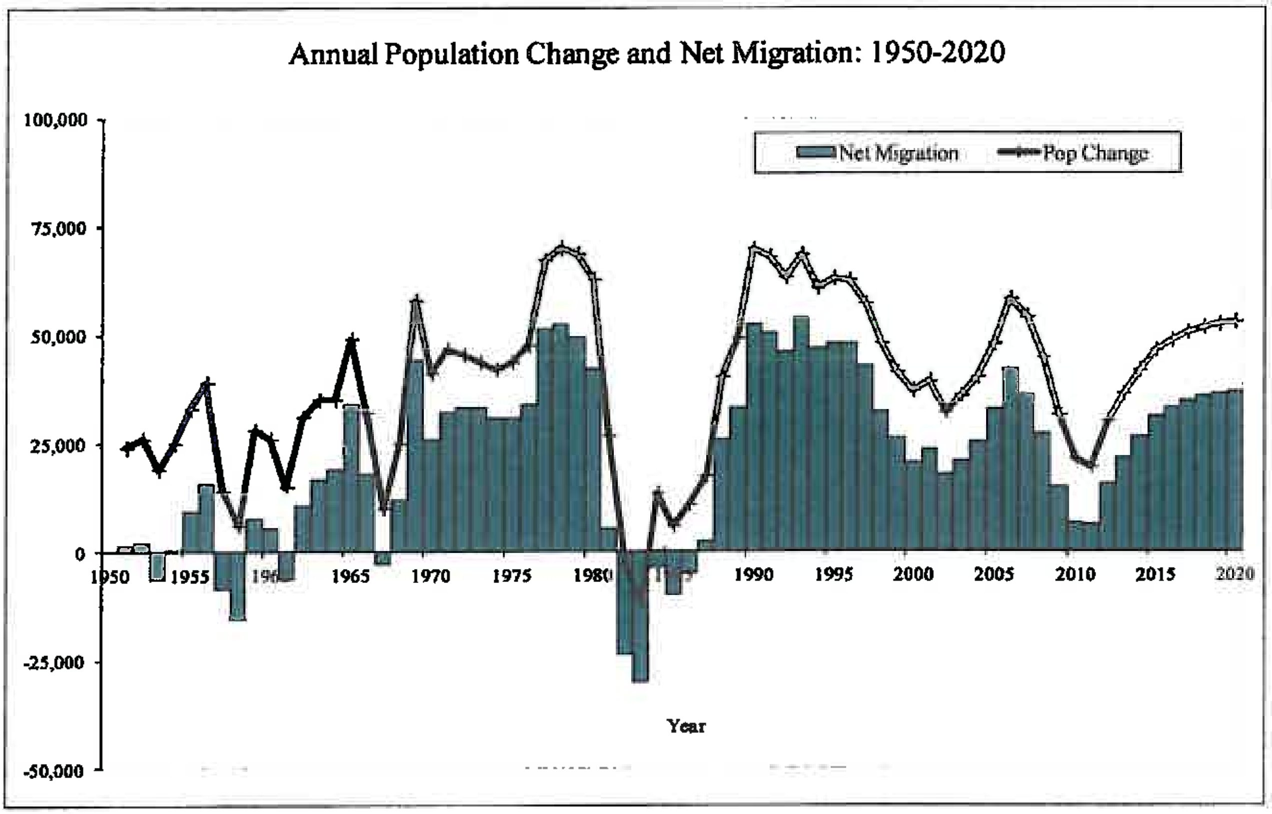
Between 1980 and 2000, the population of Oregon increased from 2.64 million to 3.42 million, an increase of 29.5%. Based on current projections, the population growth rate of Oregon is expected to continue to grow faster than the United States as a whole over the next thirty years. Several forces will affect the future demographics of Oregon's population:

(1) During the next 5-10 years, rapid growth is expected for age groups: 18-24 years old, 45-64 year olds, and those over 75.

(2) Migration of residents from other states is expected to continue at a rapid pace.

(3) Slower or flattened growth is expected for those of school age population (5-17 year olds), 25-44 year olds, and 65-74 year old individuals over the next 5-10 years.

Table 3-3
Annual State of Oregon Population Change



During the evaluation of future residential population growth in Coburg two distinct sources were used: 1) Coburg Urbanization Study Update, Lane Country Council of Government (LCOG), June, 2014; and 2) Portland State University, Center for Population Research, May, 2016. Projections for future transient population growth, however, are limited to the exclusive use of the LCOG draft report. Additional sources and/or verification of these values should be ascertained to insure the use of reliable data for all projections.

Projected Growth for Coburg: 2000-2036

Table 3-4
City of Coburg
Past and Projected Population Growth

Year	Residential Population (Permanent)	Residential Annual Growth Rate	Transient Population	Transient Annual Growth Rate
2000 (1)	1,035	N/A	N/A	N/A
2010 (2)	1,103	N/A	3,420	N/A
2015 (3)	1,045	N/A	3,564	0.83%
2016	1,200 (4)	14.8%	3,594 (4)	0.83%
2020	1,934 (2)	12.6%	3,715 (2)	0.83%
2025	2,628 (2)	6.32%	3,871 (2)	0.83%
2030	3,363 (2)	5.0%	4,035 (2)	0.83%
2035	4,354(2)	5.3%	4,205 (2)	0.83%
2036	4,610 (2)	5.88%	4,240 (2)	0.83%

(1) 2000 and 2010 populations are based on data received from US Census
(2) Coburg Urbanization Study Update
(3) PSU Population Center
(4) Independent Estimate

Table 3-5
City of Coburg
Equivalent Population for Water Planning

Year	Population
2015	2,221
2016	2,386
2020	3,160
2025	3,905
2030	4,695
2035	5,742
2036	6,000

Land Use

General: Land use within the City of Coburg is defined in eight basic categories:

Residential
Traditional Residential District (TR)
Traditional Medium Residential (TMR)

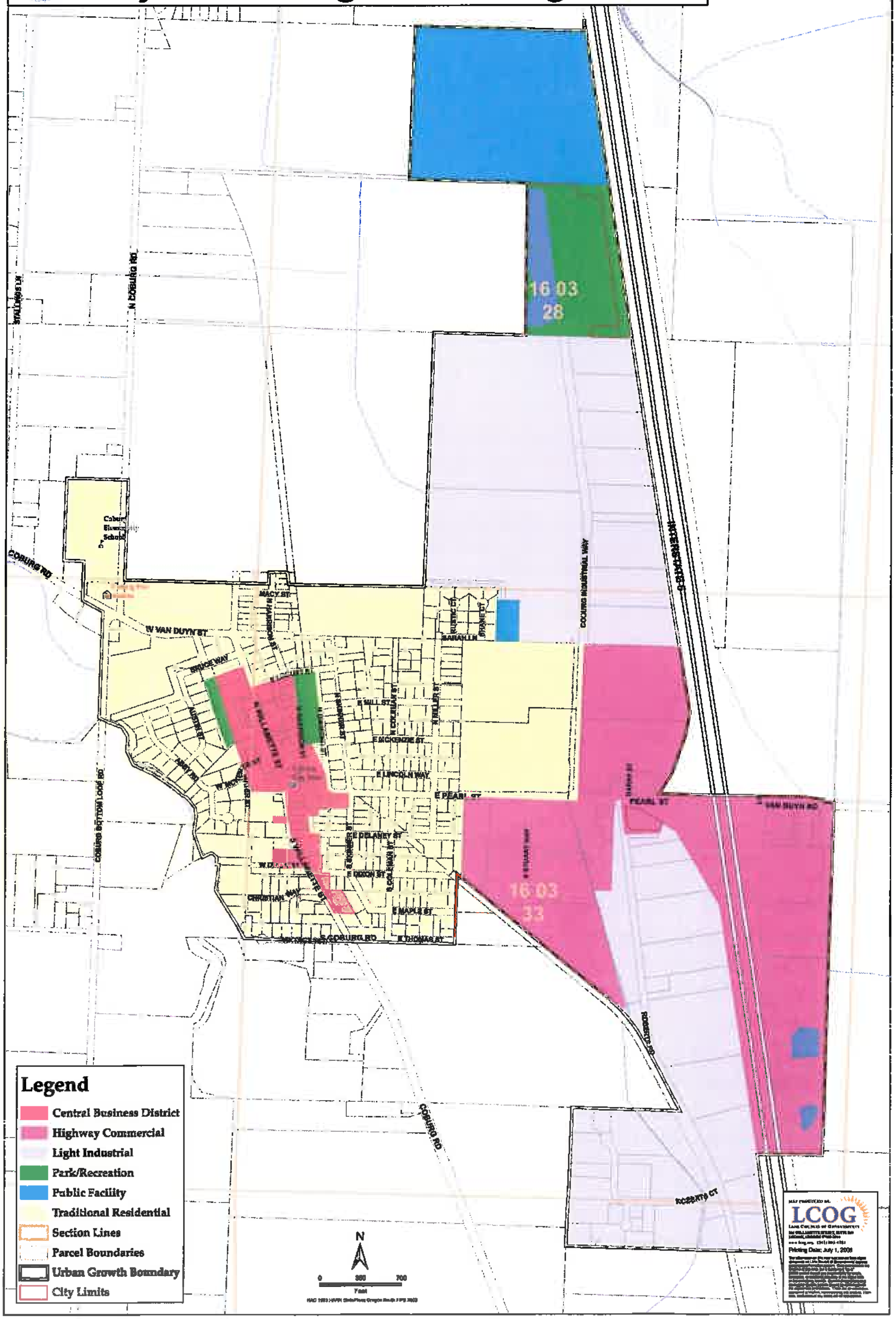
Commercial
Central Business District (C-1)
Highway Commercial District (C-2)

Industrial
Light Industrial District (LI)
Campus Industrial (CI)

Parks
Parks, Recreation, Open Space District (PRO)

Misc
Flood Plain Sub-Distrct (FP)

City of Coburg Plan Designations



12A

FIGURE 3-1

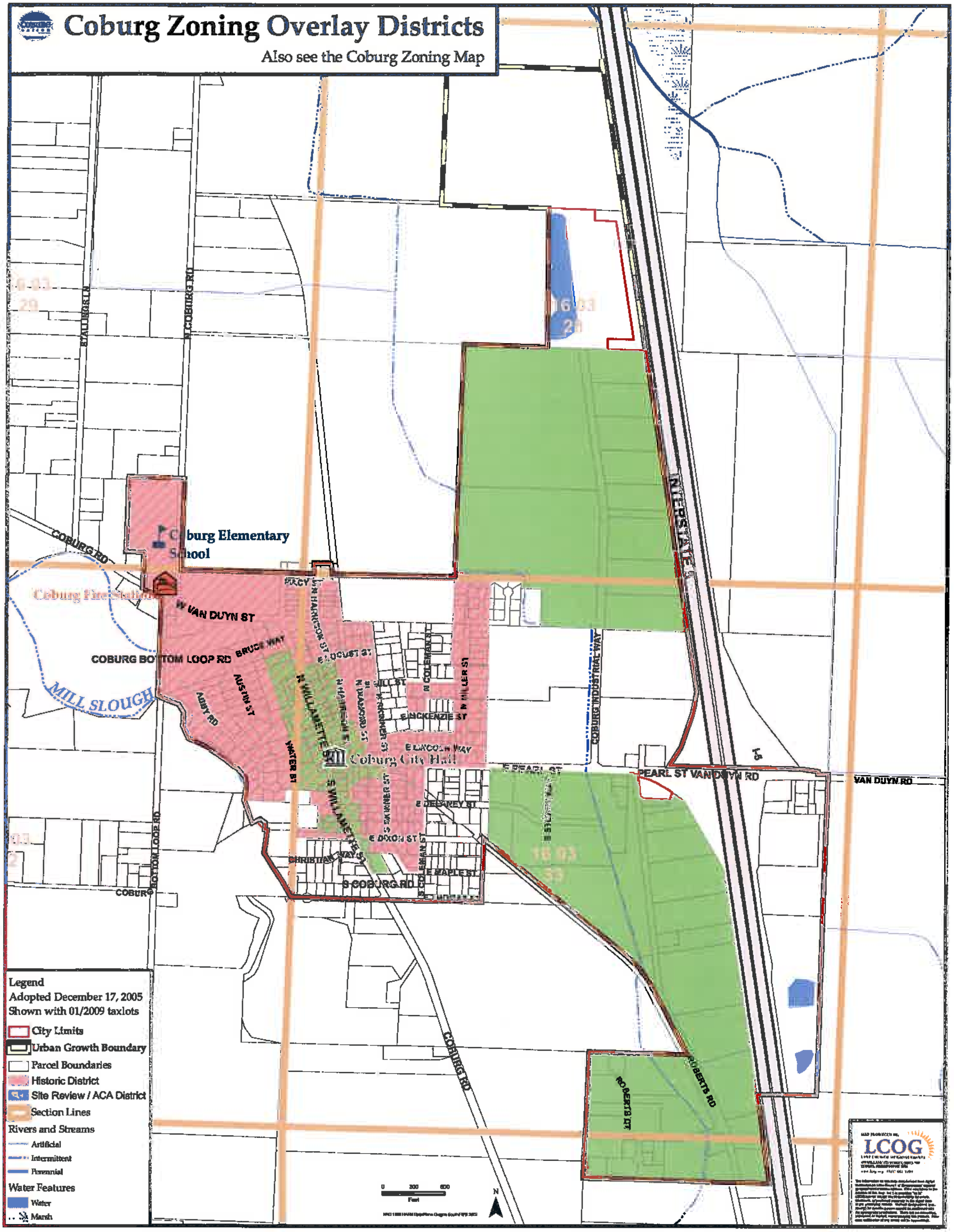


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FIGURE 3-2

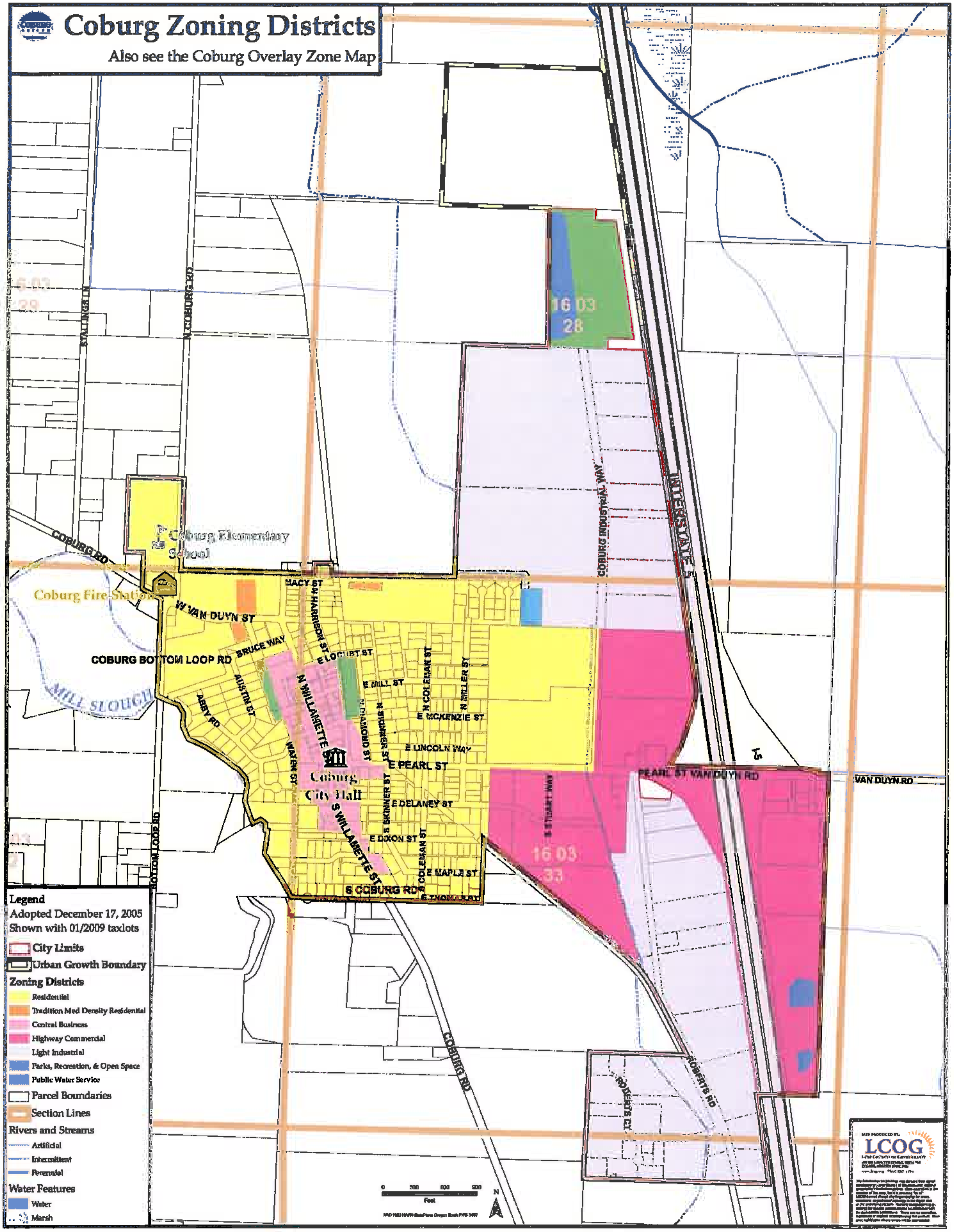

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FIGURE 3-3

Chapter Four

Water Requirements

Chapter Four
Water Requirements

Historical records of pumping (production) records were evaluated between the four years of 2012-2015.

Table 4-1A
Total Production: 2012-2015

Month/Year	Total Well Production (in Gallons)	
January, 2012	4,347,996	
February, 2012	4,318,002	
March, 2012	4,759,000	
April, 2012	4,866,001	
May, 2012	5,701,996	
June, 2012	7,564,000	
July, 2012	11,212,998	
August, 2012	14,320,998	
September, 2012	10,061,998	
October, 2012	6,446,002	
November, 2012	4,853,996	
December, 2012	4,031,996	
TOTALS	**82,484,983**	
January, 2013	4,621,996	Estimated Residential Population: 1,000 Estimated Trans. Population: 3,498 Average Day Consumption: 245,824 GPD Average Day/Per Cap: 114.1 GPCD
February, 2013	3,992,001	
March, 2013	5,530,988	
April, 2013	6,015,999	
May, 2013	9,202,000	
June, 2013	10,465,994	
July, 2013	10,465,994	
August, 2013	13,476,701	
September, 2013	9,075,955	
October, 2013	5,397,994	
November, 2013	4,598,995	
December, 2013	6,880,994	
TOTALS	**89,725,611**	

January, 2014	5,250,003	Estimated Residential Population: 1,045 Estimated Trans. Population: 3,530 Average Day Consumption: 242,300 GPD Average Day/Per Cap: 109.64 GPCD
February, 2014	4,644,000	
March, 2014	4,432,992	
April, 2014	5,023,000	
May, 2014	7,533,003	
June, 2014	9,479,000	
July, 2014	12,914,998	
August, 2014	14,369,005	
September, 2014	9,147,000	
October, 2014	6,148,000	
November, 2014	4,966,002	
December, 2014	4,530,000	
TOTALS	**88,437,003**	
January, 2015	4,711,001	Estimated Residential Population: 1,045 Estimated Transient Population: 3,564 Average Day Consumption: 250,000 GPD Average Day/per Capita: 112.5 GPCD 2013-15 (3 Year Average) Gallons/Per Cap Day = 112.08 Use for Planning = 112.50
February, 2015	4,253,000	
March, 2015	5,021,997	
April, 2015	4,731,997	
May, 2015	9,229,998	
June, 2015	10,015,997	
July, 2015	13,491,997	
August, 2015	13,033,002	
September, 2015	10,160,996	
October, 2015	6,911,998	
November, 2015	5,350,997	
December, 2015	4,489,000	
TOTALS	**91,401,980**	
January, 2016	5,285,001	Estimated Population: 1,200 Estimated Transient Population: 3,594 Average Day Consumption: 289,500 Average Day/per Capita: 112.5 GPCD
February, 2016	4,448,999	
March, 2016	5,834,003	
April, 2016	5,885,997	
4 MONTH TOTAL	**21,454,000**	

Table 4-1B
Water Requirement/Monthly Water Production and Metered Sales (in Gallons)
2012-2015

Month/Year	Total Well Production (in gallons)	Total Estimated Residential Metered Sales (in gallons)	Total Estimated Comm./Indus. Sales (in gallons)	Total Estimated City Parks Use (in gallons)	Unaccounted Water (Percent)
January, 2012	4,347,996	2,100,082	1,895,726	47,828	
February, 2012	4,318,002	2,085,595	1,882,649	47,498	
March, 2012	4,759,000	2,298,597	2,074,924	52,349	
April, 2012	4,866,001	2,350,278	2,121,576	53,526	
May, 2012	5,701,996	2,754,064	2,486,070	62,721	
June, 2012	7,564,000	3,653,412	3,297,904	83,204	
July, 2012	11,212,998	5,415,878	4,888,867	123,343	
August, 2012	14,320,998	6,917,042	6,243,955	157,530	
September, 2012	10,061,998	4,859,045	4,387,031	110,682	
October, 2012	6,446,002	3,113,419	2,810,457	70,906	

November, 2012	4,853,996	2,344,488	2,116,342	53,394	
December, 2012	4,031,996	1,947,454	1,757,950	44,352	
TOTALS	**82,484,983**	**39,839,354**	**35,963,451**	**907,333**	**Assumed 7%**
January, 2013	4,621,996	2,232,424	2,015,190	50,841	
February, 2013	3,992,001	1,928,136	1,740,512	43,912	
March, 2013	5,530,988	2,671,467	2,411,510	60,840	
April, 2013	6,015,999	2,905,727	2,622,976	66,176	
May, 2013	9,202,000	4,444,566	4,012,072	101,222	
June, 2013	10,465,994	5,055,075	4,563,173	115,126	
July, 2013	10,465,994	5,055,075	4,563,173	115,126	
August, 2013	13,476,701	6,509,247	5,875,842	148,244	
September, 2013	9,075,955	4,383,686	3,957,116	99,836	
October, 2013	5,397,994	2,607,231	2,353,525	59,378	
November, 2013	4,598,995	2,221,315	2,005,162	50,589	
December, 2013	6,880,994	3,232,520	3,000,113	75,691	
TOTALS	**89,725,611**	**43,246,469**	**39,120,364**	**986,981**	**Assumed 7%**
January, 2014	5,250,003	2,535,751	2,289,001	57,750	
February, 2014	4,644,000	2,243,052	2,024,784	51,084	
March, 2014	4,432,992	2,141,135	1,932,785	48,763	
April, 2014	5,023,000	2,426,109	2,190,028	55,253	
May, 2014	7,533,003	3,638,440	3,284,389	82,863	
June, 2014	9,479,000	4,578,357	4,132,844	104,269	
July, 2014	12,914,998	6,237,944	5,630,939	142,065	
August, 2014	14,369,005	6,940,229	6,264,883	158,059	
September, 2014	9,147,000	4,418,001	3,988,092	100,617	
October, 2014	6,148,000	2,969,484	2,680,228	67,628	
November, 2014	4,966,002	2,398,579	2,165,177	54,626	
December, 2014	4,530,000	2,187,990	1,975,080	49,830	
TOTALS	**88,437,003**	**42,715,071**	**38,558,230**	**972,807**	**Assumed 7%**
January, 2015	4,711,001	2,275,413	2,053,996	51,821	
February, 2015	4,253,000	2,054,199	1,854,308	46,783	
March, 2015	5,021,997	2,425,625	2,189,590	55,242	
April, 2015	4,731,997	2,285,555	2,063,151	52,052	
May, 2015	9,229,998	4,458,089	4,024,279	101,530	
June, 2015	10,015,997	4,837,726	4,366,974	110,176	
July, 2015	13,491,997	6,516,635	5,882,510	148,412	
August, 2015	13,033,002	6,294,940	5,682,389	143,363	
September, 2015	10,160,996	4,907,761	4,430,194	111,771	
October, 2015	6,911,998	3,338,495	3,013,631	76,032	
November, 2015	5,350,997	2,584,532	2,333,035	58,861	
December, 2015	4,489,000	2,168,188	1,957,205	49,379	
TOTALS	**91,401,980**	**44,147,158**	**39,851,262**	**1,005,422**	**Assumed 7%**
January, 2016	5,285,001	2,552,655	2,304,260	58,135	
February, 2016	4,448,999	2,148,867	1,939,764	48,938	
March, 2016	5,834,003	2,817,823	2,543,625	64,174	
April, 2016	5,885,997	2,842,937	2,566,295	64,746	
4 MONTH TOTAL	**21,454,000**	**10,362,282**	**9,535,944**	**235,993**	**Assumed 7%**

The data contained within Table 4-1A reflects the raw production from the sources and is indicative of the total output of water into the system. The data within Table 4-1B reflect the total production data as well as assumed (sold) water consumption for residential and commercial demands. A 7% unaccounted for water was assumed for calculations.

Introduction

Determining the individual water use within a city or water district can be a very challenging exercise. Factoring of the daily, monthly, and yearly water consumption of a water purveyor can be in the form of per capita (per person), per pressure zone or subdivision, per zoning, or per facility. In most cases of a water system with a large industrial use component, the water consumed by the specific process (i.e. bakery, food processing, etc.) can provide a meaningful value with predictable water uses. In other cases, however, the industrial and/or commercial water consumption is not directed towards the manufacturing process but from the volume of water consumed by workers. In a straight 8-hour workday this volume of water can be drawn from storage and then replenished during the 12-16 hours of closure. In situations such as Coburg the consumption of water for industrial (transient) workers tends to be spread out over the full day, commensurate with the three work shifts during a full day. For planning purposes for Coburg, the use of water for transient population shall be assumed to occur evenly throughout a 24 hour day while the water use for the residential population will be assumed to occur at normal usage patterns. This type of water use pattern avoids the large spikes associated with a typical water system during early morning and evening hours as the water use for transient workers is assumed to occur evenly throughout the day. Although the daily water use for Coburg is based on an "equivalent population" that provides an approximate 3:1 ratio of a transient worker as opposed to a permanent resident, this type of analysis has been shown to be extremely accurate for prediction of water use in similar scenarios, such as the "Three Day" water consumption common to vacation, resort, and beach communities where the peak water demands area assumed to coincide with the influx of vacationers over long weekends. In cases such as Coburg the same relationship exists however, the usage pattern is spread out over a full day and the added water consumption is not limited to just 2 to 3 days but is continuous throughout the week.

Typical Water System Demand Patterns

Generally, most potable water supply systems deliver water to consumers at varying rates throughout any given day (Figure 4-1). Three distinct terms are typically used to quantify the water system demand at any specific time or period. An "average daily demand" is used to express the amount of water either produced or consumed during any given day of the year. This value is determined by dividing the total yearly volume of water produced by 365 days/year. A "Maximum Day Demand" is used to equate the maximum amount of water either produced or consumed during any single day. Most often, maximum day demands occur during the months of July or August, however, they can occur as early as May or as late as October.

This type of water demand often occurs during the days with the highest yearly temperatures. A maximum day demand can also occur, however, during a day with large or several fires, during pipeline flushing, or during a prolonged dry spell. A "Peak Hour Demand" is used to express the highest water demand occurring during any hour of any day. Although the term implies that this demand occurs over one hour, it can last as long as four hours or as little as 10 minutes. The determination of the current and future demand patterns were based on an average of the demand patterns for the preceding three full years between 2013-2015. Since this period displayed very consistent water usage these three years are believed to provide the most reliable average data and to guard against any potential "single-year" bias:

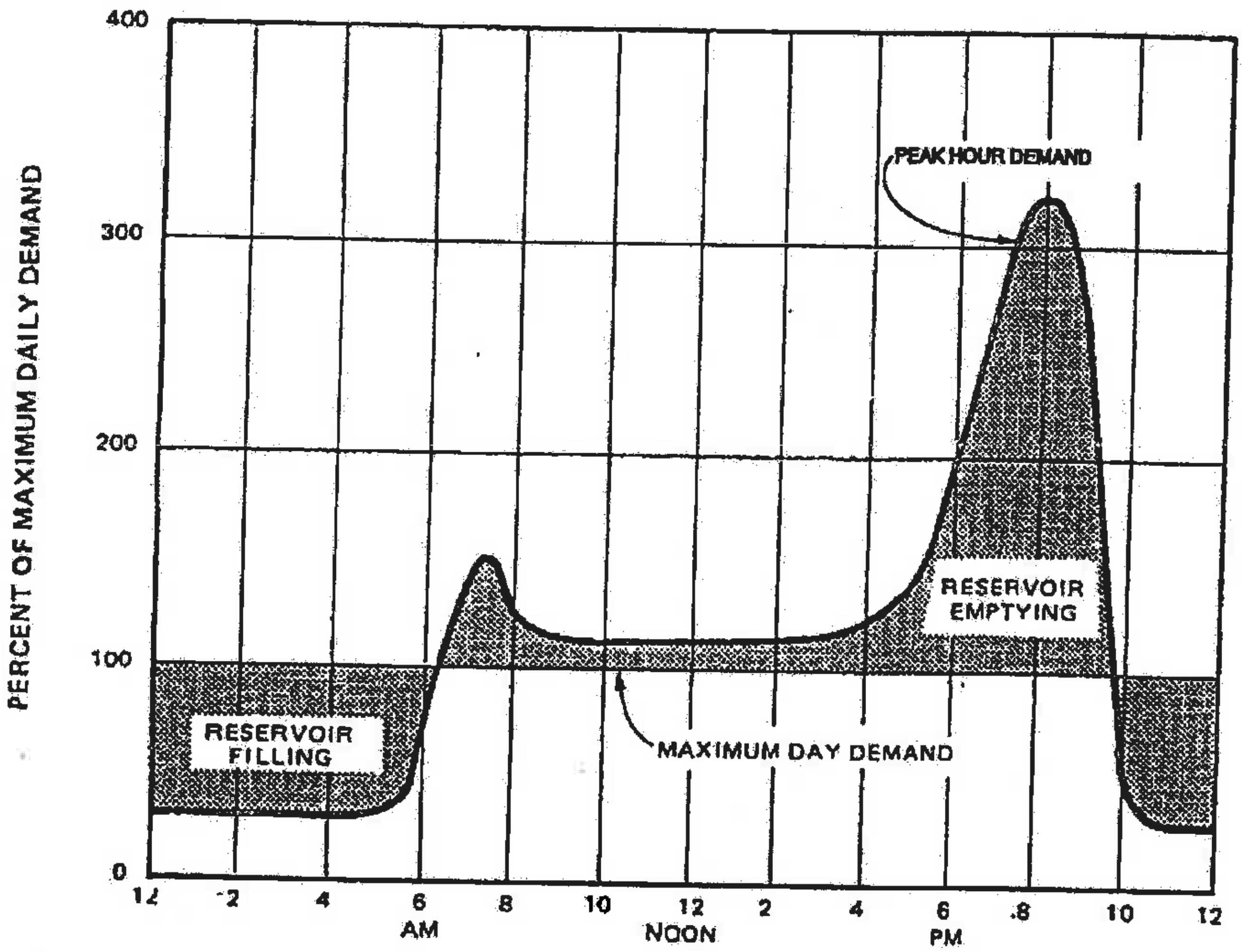
Table 4-2
City of Coburg
Water System Demand Patterns

Year	Parameter	Value (GPD)
2013	Average Day Demand	245,824 GPD
2014	Average Day Demand	242,300 GPD
2015	Average Day Demand	250,000 GPD
Average	**Average Day Demand**	**246,041 GPD**
2013	Average Summer Day Demand	386,173 GPD
2014	Average Summer Day Demand	440,065 GPD
2015	Average Summer Day Demand	427,823 GPD
Average	**Average Summer Day Demand**	**418,020 GPD**
2013	Equivalent Population	2,154
2014	Equivalent Population	2,210
2015	Equivalent Population	2,221
Average	**Equivalent Population**	**2,195**

1) Average Daily Per Capita Water Use: 246,041 GPD/2,195 = 112.1 GPCD
   Use: 112.50 GPCD for plan
2) Average Summer Usage: 418,020 GPD/2,195 = 190.44 GPCD = 1.70x Avg. GPCD
   Factor: 1.70- Use 1.75 x ADD for plan
3) Maximum Day Demand-Factor = 1.33-1.52 x ASD-Average = 1.47
   Use Highest Value of the two:
   1) 1.47 x ASD = 281.30 GPCD
   2) ADD x 2.6 = 292.50 GPCD-Use 292.5 GPCD for plan

Commercial/Industrial Water Use (Transient Use)

The Coburg community water usage consists of approximately 50% residential use and 48% commercial use, with the rest of the water being used by city parks and buildings. An analysis indicates that the majority of the current non-residential water demands consist of mostly commercial and industrial establishments along Coburg Industrial Way. Most of the water consuming commercial establishments consist of heavy equipment repair shops, truck stops, coach manufacturing, and camping and RV sales, however, the greatest and most predictable consumption of water coincides with the workers who come into the city each day. This is referred to as the "transient" population which, when factored for the lower daily use and consumption of water combined with their presence in the city for only 8-10 hours per day, create a population roughly equivalent to 33% (1/3) of a permanent resident. A review of water consumption records indicate that the actual current commercial water demands cannot be equitably included within the full per capita usage. Instead, future commercial and industrial growth will be assumed to coincide with the current equivalent population and the expected population growth and will be factored using an adjusted per capita usage.



Typical Demand Pattern During Day of Maximum Use

Figure 4-1

Based on design criteria previously stated, the following values will be used for planning purposes:

Table 4-3
Projected Residential Water Demands: 2015-2036

	2015	2016	2020	2025 (1)	2030 (1)	2035 (1)	2036 (1)
Design Population	1,045	1,200	1,934	2,628	3,363	4,354	4,610
Average Daily Demand (2)	117,562	135,000	217,575	295,650	378,337	489,825	518,625
Average Winter Demand	70,537	81,000	130,545	177,390	227,002	293,895	311,175
Average Summer Demand	206,909	237,600	382,932	520,344	665,873	862,092	912,780
Maximum Daily Demand (3)	305,662	351,000	565,695	768,690	983,677	1,273,545	1,348,425
Peak Hour (4)	916,986 (637 GPM)	1,053,000 (731 GPM)	1,697,000 (1,179 GPM)	2,306,000 (1,600 GPM)	2,951,031 (2,050 GPM)	3,820,635 (2,653 GPM)	4,045,270 (2,810 GPM)

(1) Years 2025-2036 reflect increased daily demand to accommodate the higher rate of projected city growth during this time span
(2) Average Daily Demand is based on 112.5 gallons per capita/day
(3) Maximum Daily Demand is based on 292.5 gallons per capita/day
(4) Peak Hour Demand is assumed to be 3 x Maximum *Day* Demands

Table 4-4
Projected Equivalent Water Demands: 2015-2036

	2015	2016	2020	2025	2030	2035	2036
Design Residential Population	1,045 (Est.)	1,200 (Est.)	1,934	2,628	3,363	4,354	4,610
Transient Population	3,564 (Est.)	3,594 (Est.)	3,715	3,872	4,035	4,205	4,240
Equivalent Population	2,221(Est.)	2,386 (Est.)	3,160	3,906	4,695	5,742	6,000
Average Daily Demand (1)	249,862 (173.5 GPM)	268,425 (186 GPM)	355,500 (246.9 GPM)	439,425 (305.2 GPM)	528,187 (366.8 GPM)	645,975 (448.6 GPM)	675,000 (468.8 GPM)
Average Winter Demand (2)	149,917 (104.1 GPM)	161,055 (111.8 GPM)	213,300 (148.1 GPM)	263,655 (183.1 GPM)	316,912 (220 GPM)	387,585 (269.2 GPM)	405,000 (281.3 GPM)
Average Summer Demand (3)	439,757 (305.4 GPM)	472,428 (328 GPM)	625,680 (434.5 GPM)	773,388 (537 GPM)	929,609 (645.6 GPM)	1,136,916 (789.6 GPM)	1,188,000 (825 GPM)
Maximum Daily Demand (4)	649,641 (451.1 GPM)	697,905 (484.65 GPM)	924,300 (641.9 GPM)	1,142,505 (793.4 GPM)	1,373,286 (953.7 GPM)	1,679,535 (1,166.4 GPM)	1,755,000 (1,218.8 GPM)
Peak Hour (5)	1,624,100 (1,128 GPM)	1,745,000 (1,212 GPM)	2,310,750 (1,605 GPM)	2,856,263 (1,984 GPM)	3,434,400 (2,385 GPM)	4,198,000 (2,915 GPM)	4,392,000 (3,050 GPM)

(1) Average Daily Demand is based on 112.5 gallons per capita/day
(2) Average Day Winter Demand is based on 67.5 GPCD
(3) Average Daily Summer Demand is based on 197 GPCD
(4) Maximum Daily Demand is based on 292 gallons per capita/day
(5) Peak Hour Demand is assumed to be 2.5 x Maximum *Day* Demands

Table 4-5
Required Source Capacity: 2015-2036

	2015	2016	2020	2025	2030	2036
Design Residential Population	1,045	1,200	1,934	2,628	3,363	4,610
Transient Population	3,564	3,594	3,715	3,872	4,035	4,240
Equivalent Population	2,221	2,386	3,160	3,906	4,695	6,000
Average Day Demand (in GPM)						
A) Sources @ 12 hours/day	347	398	494	610	734	938
B) Sources @ 18 hours/day	231	249	329	407	489	625
C) Sources @ 20 hours/day	208	224	296	366	440	563
Average Summer Demand (in GPM)						
A) Sources @ 16 hours/day	458	492	652	806	968	1,238
B) Sources @ 18 hours/day	407	437	580	716	861	1,100
C) Sources @ 20 hours/day	365	394	521	645	775	990
Maximum Day Demand (in GPM)						
A) Sources @ 18 hours/day	602	646	856	1,058	1,272	1,625
B) Sources @ 20 hours/day	542	582	770	952	1,145	1,463
C) Sources @ 22 hours/day	492	529	700	866	1,040	1,330
Peak Hour Demand-(2 hours (120 minute) Duration Assumed						
1) Source Contribution-Flow Rate (in GPM)						
A) With 3 Sources @ 1500 GPM	N/A	N/A	(-) 105	(-) 484	(-) 885	(-) 1,550
B) With 2 Sources @ 1,100 GPM	(-) 128	(-) 131	(-) 505	(-) 884	(-) 1,285	(-) 1,950
C) With 1 Source @ 500 GPM	(-) 628	(-) 712	(-) 1,105	(-) 1,481	(-) 1,885	(-) 2,550
D) No Sources Online	(-) 1,128	(-) 1,212	(-) 1,605	(-) 1,984	(-) 2,385	(-) 3,050
2) Storage Contribution-Volume in Gallons						
A) With 3 Sources @ 1,500 GPM	N/A	N/A	12,600	58,080	106,200	,186,000
B) With 2 Sources @ 1,100 GPM	15,360	15,720	60,160	106,080	193,680	234,000
C) With 1 Source @ 500 GPM	75,360	85,440	132,600	178,080	262,200	306,000
D) No Sources Online	135,360	145,440	192,600	238,080	268,200	366,000
Fire Flow-Based on Population Estimate						
Design Population (Residential)	1,045	1,200	1,934	2,628	3,363	4,610
Required Fire Flow (in GPM)	1,033	1,100	1,400	1,627	1,836	2,143
Commercial Fire Flow (in GPM)	3,500	3,500	3,500	3,500	3,500	3,500
Maximum Volume (in Gallons) (Based on 4 hours of Commercial fire flow)	840,000	840,000	840,000	840,000	840,000	840,000
Maximum Day Demand with Commercial Fire Flow (in GPM) (Duration = 4 hours)						
A) With 3 sources @ 1,500 GPM	2,451	2,485	2,642	2,794	2,954	3,219
B) With 2 sources @ 1,100 GPM	2,951	2,885	3,042	3,194	3,354	3,619
C) With 1 source @ 500 GPM	3,451	3,485	3,642	3,794	4,045	4,219
Maximum Day Demand (Volume in gallons) with Commercial Fire Flow (Duration = 4 hours)						
A) With 3 sources @ 1,500 GPM	588,240	596,400	634,080	670,560	708,960	772,560
B) With 2 sources @ 1,100 GPM	708,240	692,400	730,080	766,560	804,960	868,560
C) With 1 source @ 500 GPM	828,240	836,400	874,080	910,560	970,800	1,012,560

Chapter Five

Future Water Sources

Chapter Five
Future Water Sources

Groundwater

The current total permitted capacity under valid permits (1,214 GPM) for Wells #1 and #2 and abandoned wells is adequate to supply all current water demands, however, the existing source capacity (1,100 GPM) does not fulfill this requirement. Currently, the wells are operated as needed to maintain water pressure in the system and in the reservoirs using a control system. A new control system, proposed in the second phase of improvements will allow enhanced automatic operation of all wells, optimizing source capacity and reliability.

Wells #1 and #2 produce the required capacity and daily volume for the city, with low to moderate levels of iron, manganese, and hardness. The risk at this site, associated with nitrates and proximity to agricultural activity, however, necessitates the implementation of redundant source capacity.

For planning purposes, each existing well in the wellfield will be initially limited to an average flow of 550 GPM (1,100 GPM total). It is possible, however, that in future years the combined flow from these two wells may be lowered to 1,050 GPM as the wells decline due to increased age. This has been factored for future years between 2020-2036.

Based on the criteria established in Tables 4-3 and 4-4, the current recommendation is to immediately pursue development of a third well. This is felt to be the highest priority as additional source capacity is presently needed for increase future demand as well as to provide a back-up and redundant source to the two existing wells. In addition, since each well site requires approximately one acre, available land for a new wellfield may be severally limited or expensive in future years, necessitating on immediate move in this direction. For planning purposes, the following schedule is recommended:

Table 5-1
Recommended Groundwater Source Development Schedule

	2015	2016	2020	2025	2030	2036
Well #1	550 GPM	550 GPM	525 GPM	525 GPM	525 GPM	525 GPM
Well #2	550 GPM	550 GPM	525 GPM	525 GPM	525 GPM	525 GPM
Well #3	----	----	450 GPM	450 GPM	450 GPM	450 GPM
Total Available Capacity (1)	1,100 GPM	1,100 GPM	1,500 GPM	1,500 GPM	1,500 GPM	1,500 GPM
Total Required Capacity (2)	542 GPM	582 GPM	770 GPM	952 GPM	1,145 GPM	1,463 GPM
Net Reserve (+) Deficit (<>)	+558 GPM	+518 GPM	+730 GPM	+548 GPM	+355 GPM	+37 GPM

(1) Based on full capacity of all sources
(2) Based on Maximum Day Demand @ 20 max. hrs/day of pumping

The above schedule reflects an implementation of a new well (or two wells) from the Roberts Road vicinity and a slight reduction in flow from the two existing wells, although up to 170 GPM of combined flow can be lost in Year 2036 and the combined well output will still satisfy the projected daily demand using 22 hours per day of well operation. Due to the known water quality concerns from Wells #1 and #2, as well as constraints on space and well limitations, an increase in flow or adding more wells at this site is not feasible. A program to periodically rehabilitate and maintain the capacity of Wells #1 and #2 and transmission pipeline, resulting in no expansion of this source is recommended. The new well #3, to be located adjacent to the I-5 region, will provide an additional measure of source and well field redundancy. As previously outlined, Wells #1 and #2 are not planned to be increased in future projections due to the historical consistency, relatively stable capacities, and uncertain future water quality from these wells. To avoid well interference between wells in the well field, a slight reduction in flow from each well is anticipated as additional wells are developed. Combined with Well #3 this results in a total well capacity of 1,500 GPM in future years.

Given the hydrogeology of this area and the construction of existing wells it is believed that lowering the yield from each existing well and adding a third well to produce the total water required, will provide long-term advantages to the wells and well pumps. A discussion of local hydrogeologic characteristics and recommended well construction standards can be found in later sections of this chapter.

Water Right Implications

To satisfy the proposed groundwater development schedule, the City will need to obtain and secure additional water rights, plus an application to modify existing rights from abandoned wells will be required. The city currently holds valid permits for 2.71 CFS (1,216 GPM) for all sources. All of the permits are for year round use. These permitted flows are currently in excess of the required capacity and only the future water demands will need to be modified. It is recommended that the city immediately embark with an application to secure an additional groundwater right of at least .75 CFS (336 GPM) to protect use through Year 2036.

Local Hydrogeology

The City of Coburg is located in a broad synclinal trough (valley) known as the Willamette Valley. The Willamette Valley was formed 30-60 million years ago through a downward folding of the subsurface layered rock formation. The material at the surface over much of the valley is a sandy to clayey silt that settled from ponded water. This silt, known as Willamette Silt, is comprised of a permeable fine-grained deposit that transmits water readily to the underlying alluvium (sand and gravel) formation. The alluvial deposits and silts underlying the Coburg area were largely derived due to erosion and runoff from surrounding mountains. These deposits consist of layers of clay, silt, and sand and gravel. This alluvium material, chiefly consisting of sand and gravel, is also referred to as an unconsolidated material and provides the available groundwater for Coburg and nearby agricultural wells. Water percolates through the pores of sand and gravel by head created from the recharge point. Sand and gravel, due to its available pore spacing, is a much better conveyor of water to a well than clay or sandstone which does not permit water to transmit as easily.

Although several areas were evaluated, the specific locality that displayed the highest potential to meet all six criteria for future wells was in the southern region of the city, in the Roberts Road area abutting Interstate-Five. The primary concerns remain that this area is situated on the fringe between the younger and older alluvium and is within an area with known industrial activity. Without discounting these issues, this area remains the overall best potential site for obtaining the stated design flow of 400-500 GPM. Due to the uncertainties associated with this area and the lack of higher producing wells to corroborate the well yield, it is highly recommended that the city first procure a test well site on option, construct and test pump a test well, and determine the projected flow rate and water quality from the site before investing in a full scale production water well.

Coburg Wells

Near and in Coburg, the sand and gravel beds are hydraulically continuous and can exceed a saturated thickness of 10 - 45 feet covering tens of square miles, generally within the Willamette River floodplain. Properly constructed wells in these deposits can typically obtain yields of 100 to over 500 gallons per minute. The yield of an individual well, however, can vary significantly depending on the specific area, thickness of aquifer, and amount of cementation (binding together) that occurs within the formation. The alluvium in the area is often referred to as "younger or older alluvium". The terms "younger" or "older" alluvium refer to the relative geologic age of deposition of each of these types of alluvium. Younger alluvium has been more recently deposited and is constantly subject to washing and regrading of material due to the action of the Willamette River during floods. The older alluvium is established alluvium that underlies the younger alluvium and/or Willamette silt.

The Coburg area straddles the rough dividing line between both types of alluvium with the highest well capacity occurring to the west, in the younger alluvium. The younger alluvium bounds the Willamette River to the west and extends roughly to Coburg to the east. This type of alluvium is characterized by high production wells due to good hydraulic connection with the Willamette River and lack of cementation. Water from the younger alluvium, however, also generally contains higher levels of iron, manganese, and hardness and is more susceptible to Nitrates and contamination due to the shallow depth, exposure to land applied nitrogen fertilizers from local agricultural practices, and a lack of overlying sealing material. Annual recharge to the younger alluvium is established to be between 8"-15". The existing wells are an example of wells constructed in the younger alluvium. This area is heavily agricultural in practice and elevated nitrate levels periodically observed at the wells may be the result of the application of nitrogen fertilizers often used in agricultural practices. The older alluvium is located generally east of Coburg and underlies virtually all of the city. This type of alluvium does not yield the high flows common to the younger and shallower alluvium but it does generally have a higher degree of aquifer protection. The older alluvium is dependent on direct precipitation and inter-zonal leakage from the younger alluvium for recharge. The younger alluvium is known to be at its thickest and most extensive point in the vicinity of the Willamette River which accounts for the higher proportional yield from these wells as opposed to other wells in the older alluvium. In the area around Coburg, sand-and-gravel beds in younger alluvium are continuous and hydraulically connected with sand-and-gravel beds in the adjacent older alluvium. When pumping is applied, the two units respond as a continuous aquifer. Discontinuity, cementation, and hydraulic losses, however, account for the difference in yield between these two formations. The older alluvium is typically overlain by 15 to 45 feet of clay and silt that provides good wellhead protection when proper well construction practices are employed. A similar aquifer situation to Coburg exists in the Independence area, adjacent to the Willamette River. Wells next to the river obtain water from the young alluvium and individual wells are often capable of pumping up to 1,000 GPM. Wells on the upper bench, however, are constructed in the older alluvium and it requires up to three (3) wells to produce a total of 500 GPM. It is believed that this same type of scenario exists in Coburg. For planning purposes, therefore, the city is recommended to secure a new well site within the younger alluvium, if possible, as well as prepare to construct up to 3 wells to generate the total design flow of 450-500 GPM. This determination can best be made through construction of a test well before investing in a full scale production well.

Underlying the younger and older alluvium is semi-consolidated and consolidated shale (claystone), sandstone, and basalt materials. Wells in these formations are not productive ($\leq$ 50 GPM) in this area for municipal purposes and encountering salt water is a definite potential, particularly in wells below 400' in depth. For these reasons, exploration of groundwater below 400' in depth is not recommended.

Future Well #3 (Roberts Road)

Extensive investigation has been conducted to ascertain the best overall site for the future Well #3. Several factors were employed in this evaluation, including:

1) Sufficient distance from the existing wells and industrial activities to provide sanitary protection in the event of well and/or industrial contamination;

2) Adequate spacing to avoid direct well interference between wells during simultaneous operation;

3) Adequate overlying clay layer to properly seal the well;

4) Close proximity to existing infrastructure, i.e., city waterline and power, for connection;

5) Adequate land ($\approx$1 acre) to construct the well and provide a minimal protection radius.

6) Region with adequate groundwater. An investigation of the local area indicates that a well with 400-450 GPM capacity is feasible, although two wells may be needed to generate the total flow.

Recommended Well Construction Standards

In order to optimize future well production, the following recommendations should be considered when constructing new wells:

1. New wells should be a minimum of 12" diameter, with a 12" diameter well recommended at all new well sites to allow well screen installation, if feasible.

2. New wells shall be cement grout sealed to a minimum depth of 25', 5' into an impervious layer such as clay, if possible.

3. Formation sampling shall occur at no more than 5' intervals and at every change in formation to facilitate well screen selection.

4. New wells shall be drilled through the water-bearing formation to a minimum of five feet below the bottom of the aquifer. This five foot extension below the aquifer shall remain and be used for accumulation of sand.

5. New wells shall be test pumped for a minimum of twelve hours. During this period, any existing wells (including existing city wells) within ½ mile should also be operated and monitored to determine the interference potential.

6. Generally, the well construction shall comply with Water Well Construction standards as issued by the State of Oregon Water Resources Department

7. To optimize the full extent of the aquifer, a stainless steel well screen, properly sized to retain approximately 40% of the formation, should be specified for a naturally packed well.

Well Interference Potential

Given the close proximity of the two wells within City of Coburg's Funke Road Well Field the possibility of well interference between these wells certainly exists. Fortunately, both wells are not frequently required to be in simultaneous use, but if an emergency or a period of extended use occurred, the potential exists for prolonged pumping from both wells. If this occurred for an extended period of time, or should sustained pumping from nearby irrigation wells occur, Wells #1 and #2 would most likely incur a drop in production of up to 10%-25%. The high variable in drop of production would be related to the time of year of use (summer greater than winter), available water stored in the aquifer from recent recharge, nearby agricultural water use, plugging of the well screen or perforations, and the rate and duration of pumping from both wells.

Even though the potential exists for interference between the two wells and nearby agricultural wells, the possibility of direct interference to nearby irrigation wells is low when considering the actual capacity of the two wells versus the available yield and distance to actively used irrigation wells. Since most of the future water sources are projected to originate from the Roberts Road well, the city must insure that adequate land is available for future well development and spacing. Each well site should be dedicated to 1-2 acres minimum of city owned land for adequate sanitary control as well as necessary well spacing. To prevent interference between the existing two wells and a new well, the city should embark on a well level monitoring program. This program should include both static and pumping water levels regularly obtained throughout the year. A competent hydrogeologist should be consulted before siting and drilling a new test well 3 to optimize the site selection. Excessive aquifer draft or well interference may require purchase of available irrigation water rights or possibly consideration of extensive development of the existing wells.

The greatest potential for well interference actually occurs within the Well Field itself. It is believed that with proper balancing of flows from each of the two wells and normal pumping hours of less than 18 - 20 hours per day, the wells can operate together with minimal interference.

Possible Intertie Connection to EWEB

In addition to examination of groundwater for additional source capacity an evaluation of the potential to provide an intertie with a neighboring water purveyor, the Eugene Water and Electric Board (EWEB) was also performed. Essentially, this connection between entities would occur on Coburg Road, near Armitage Park. The proposal assumed a deliverable capacity between 1,200-1,500 GPM, depending on available capacity from EWEB. System pressures are dissimilar, therefore, an intertie booster pump station may also be needed for the higher flow range during EWEB's maximum day demand. The projected cost of this intertie was between $2,200,000.00 to $3,100,000.00 (2013 dollars) depending on the actual alignment selected.

The determination as to whether an intertie with EWEB would be preferable to expansion of groundwater resources is dependent on three separate factors:

1. Would the intertie be adequate in capacity to sufficiently offset other needed improvements to the Coburg water system?

2. Is adequate land and access to groundwater available for the needed additional flow?

3. Cost?

Responses:

1. The projected capacity of the intertie is between 1,200-1,500 GPM. While this capacity is adequate to accommodate all 20 year projected water demands in Coburg, it is inadequate to offset the required fire flow demands, and duration, therefore, a new storage reservoir and continuation of the existing reservoirs and booster pump station will still be required. Unless the city plans to disconnect the existing groundwater

source and switch to EWEB water, continuation of the existing source would also need to be maintained. This factor is therefore not favorable to Coburg.

2. A long history of the use in local groundwater by Coburg indicates the source to be a reasonably stable and productive potable water source. The sustained capacity of the two existing wells (approximately 1,100 GPM) is not believed to be compromised or threatened by existing groundwater uses or the added burden that will be imposed on the aquifer from a third city well at 400-500 GPM. This analysis indicates that the EWEB intertie will not appreciably conserve or offset the existing withdrawal or use from the local aquifer and this factor is also deemed to be not favorable to Coburg.

3. The potential cost of each option is the final determining factor in this analysis. Based on the 2013 study by Branch Engineering, the projected cost of an EWEB water system intertie to Coburg would be between $2,200,000.00 to $3,100,000.00, depending on the selected alignment and route. From the 2016 Water System Master Plan Update, the projected cost for a third well land acquisition, test and production well, and pumping facility will be approximately between $830,000.00-$900,000.00. This analysis only examines any offsetting advantage gained from the EWEB intertie to lower the future additional source capacity, since a primary determining factor, fire flow will still require water storage to handle the 4 hour duration.

<u>Summary</u>

Although an intertie with EWEB would help protect Coburg from a potential situation with short or long term aquifer contamination the long and successful history that Coburg has enjoyed using local groundwater resources, combined with the relative certainty of being able to procure additional groundwater and the cost differential results in the EWEB intertie as an unfavorable option and is not recommended at this time.

<u>Improvements to Existing Sources</u>

In addition to the source expansion program through additional groundwater development referenced herein, it is vital that the existing two wells in the Funke Road wellfield be regularly maintained. Although a loss of production can occur from many potential causes, the most likely cause is plugging of the openings (well screen slots or perforations) in the well casing due to physical (sand and/or gravel) obstructions or blocking due to chemical scaling from precipitated compounds. In either case, routine rehabilitation of each well should be performed at 5-15 year intervals (or, at the intervals determined from periodic well testing). These procedures will consist of disabling and pulling the well pump, using a drilling machine or specialized equipment to bail the well, perform a chemical acid treatment of the well, and swabbing to remove incrustation, loose scale, and gravel blocking the openings in the well, test pumping to verify yield, reinstalling and reactivating the well pump. This procedure should be conducted on each well immediately as an O&M item to provide a baseline and historical data. The downtime for each well should be assumed at 1-2 weeks. In addition to well rehabilitation, the Capital Improvement Plan

(CIP) Phase I also includes a retrofit of both wellheads to install pump control valves at each wellhead and a surge anticipator valve on the common discharge pipe. The pump control valves will allow an orderly hydraulic transition for the well pumps to pump into the water system and avoid the dangerous pressure surges that can result during these transitions. The proposed surge anticipator valve will open to relieve these surges, should they occur. Due to the present configuration of the water system as a "closed loop" type of water system, however, the surge function of this valve should be disabled and the pressure relief function only used at this time. In the future, following activation of the new .75 MG reservoir, the surge function of the valve can be activated. These relatively low-cost improvements are believed to be important enough to the operation of the water system that they have been included as an immediate improvement in the CIP.

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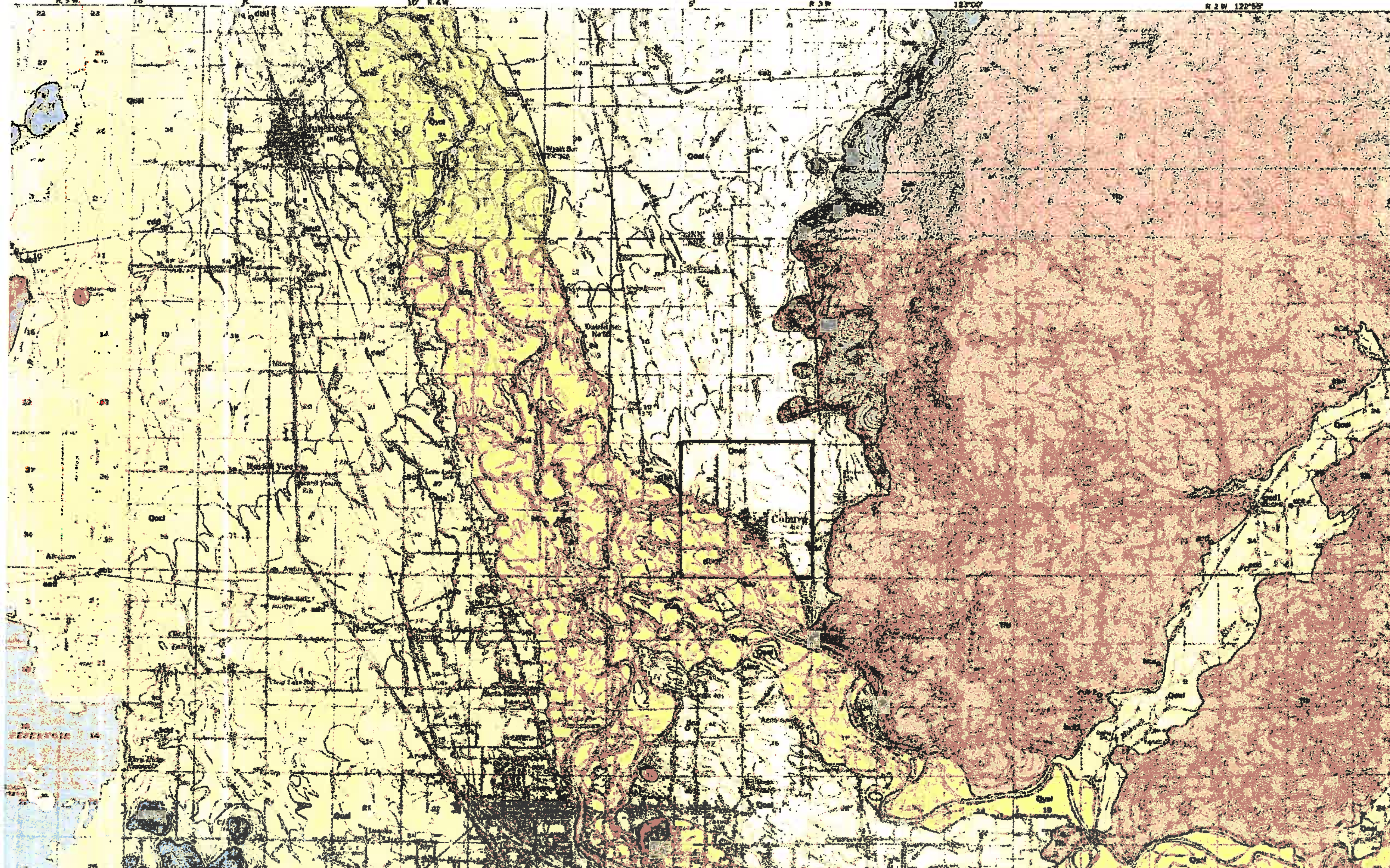


EXPLANATION

UNCONSOLIDATED DEPOSITS

Holocene — QUATERNARY

Qyal

Younger alluvium

Assorted coarse gravel and sand with some silt. Clean and pervious at most places. Occurs along the Willamette and McKenzie Rivers. Yields moderate to large quantities of water to wells

Pleistocene and Holocene

Qoal

Older alluvium

Largely sand and gravel, with mixtures of sand, silt, and clay beneath the flood plains of the Willamette and McKenzie Rivers. Is somewhat finer, less sorted, and less pervious than the younger alluvium. Tends to be of finer materials below a depth of 100 feet. Yields moderate to large quantities of water to properly constructed wells in the valley plain. Includes some terrace deposits in the southwestern part of the area and some younger alluvial deposits along the Long Tom River and other smaller streams; these deposits are of finer materials and yield water slowly to wells

CONSOLIDATED ROCKS

Oligocene and Miocene — TERTIARY

Tlb, Tlbb

Little Butte Volcanic Series

Tlb, *Little Butte Volcanic Series, undifferentiated; volcanic rocks, predominantly dacitic and andesitic flows and tuffs, with some rhyolitic flows and some basalts. Poor aquifer; yields small quantities of water to wells*

Tlbb, *basalt flows; olivine basalt with some sedimentary materials. Yield little water to wells*

Oligocene or younger

Ti

Intrusive rocks

Dikes and sills of diabasic and basaltic composition. Yield little water to wells

Oligocene

Te

Eugene Formation

Marine-deposited sediments consisting of coarse- to fine-grained arkosic, micaceous sandstone, with interbedded shale and occasional lenses of fine volcanic ash. Generally yields water slowly to wells

Eocene and Oligocene

Tf

Fisher Formation

Largely tuff and breccia with large amounts of basaltic and rhyolitic debris. Yields small quantities of water to wells

Eocene

Ts

Spencer Formation

Marine deposited, consisting of a sequence of tuffaceous sandstone, shale, and mudstone. Yields water slowly to wells. Contains saline water locally

Tty

Tyee Formation

Marine sandstone beds interbedded with siltstone and mudstone. In places, intruded by igneous rocks. Yields water slowly to wells. Contains water of poor chemical quality locally

Contact

Dashed where approximately located

Fault

Dashed where inferred; dotted where concealed

abs

Well and number

A — — — A'

Line of section. See plate 2

FIGURE 5-1

Chapter Six

Water Quality

Chapter Six
Water Quality

Water quality issues will continue to significantly impact both surface and groundwater sources over the next 20 years. Strict new regulations and monitoring requirements are either presently in effect or due to be enacted during the next 2-5 years. Many of these new regulations apply to both surface and groundwater sources while some only apply to one type of source. A complete and detailed background and discussion of the Safe Drinking Water Act and its provisions can be found on the OHA/EPA websites. The water quality discussion in this update will be limited to the current and projected contaminant issues expected to impact the City of Coburg. As the City of Coburg currently utilizes only groundwater sources, the impact of proposed groundwater regulations will primarily be discussed.

Background

In 1974, the U.S. Congress passed the Safe Drinking Water Act (SDWA) with the purpose of establishing a uniform set of regulations and water quality standards. These regulations and standards applied to all "Public Water Systems" throughout the United States with the Environmental Protection Agency (EPA) providing the primary role in setting the standards. The intent of the SDWA was for individual states to assume "primacy" and provide implementation and enforcement of these standards. Oregon was one of the last states to accept primacy for the SDWA, assuming this role in 1986. The 1986 SDWA amendments were passed by Congress at the same time Oregon assumed primacy. These amendments at that time provided the most stringent regulations and standards in the history of the United States with all public water systems impacted in some form. Under those amendments, the number of individual contaminants regulated totaled 111 by 1995 with 25 new contaminants regulated every three years into the future. In addition, new regulations were enacted which provided for mandatory filtration of surface water, disinfection requirements, and lead and copper testing. The current monitoring requirements are outlined in Table 6-1. The City of Coburg by virtue of its population and number of services is classified as a "Community Water System" serving greater than 1,001 people but less than 2,500.

The SDWA, in 1996, underwent considerable changes that effected virtually every public water system in the country. The 1996 amendments, as opposed to previous SDWA laws, were prepared with assistance and input from the regulated community. This law was passed by Congress and signed into law by President Clinton on August 6, 1996 as Public Law 104-182. As expected, the SDWA revision included some relaxation in some areas and increased enforcement in other areas. A summary of the current SDWA is as follows:

Current Status of Oregon Drinking Water Quality Standards

Drinking water contaminants are defined as any substance present in drinking water that could have an adverse impact on human health if present in sufficient concentrations. Although water systems are required to routinely monitor water quality, the simple presence of a single or several contaminants does not necessarily mean that the water presents a health risk. There are currently 88 different regulated contaminants established by the United States Environmental Protection Agency (EPA). They are typically grouped into five categories:

1) Microbial Contaminants-8

   This group includes contaminants such as viruses, bacteria, and parasites; which usually result from sewage or septic system activity, agricultural and livestock operations, and/or wildlife. Turbidity is also included in this group.

2) Disinfectants and Disinfectant By-Products-7

   Chemicals used in water disinfection and the by-products that are formed as the result from the reaction between the chemicals and natural substances in the water.

3) Inorganic Chemicals-16

   This group includes such chemicals as metals and salts, which can be naturally occurring or can result from stormwater runoff, industrial or domestic wastewater discharge, and other types of industrial and commercial activity.

4) Organic Chemicals-53

   This group includes the volatile (VOC) and synthetic (SOC) organic contaminants, such as pesticides and herbicides, that originate from a variety of sources, such as agricultural, urban stormwater runoff, industrial, commercial, and even residential uses. Frequently, the organic chemicals detected in groundwater come from industrial processes and/or petroleum production, distribution, or storage. This class of contaminants often has a high affinity of "sticking" to water molecules in transit to groundwater settings and then traveling many miles down gradient to a pumping well, where they are ultimately detected. Due to that characteristic, many organic contaminants "age" and form into "daughter" products when ultimately discovered. Facilities such as gasoline stations, dry cleaning, and agricultural operations are often the originating source of organic contaminants.

5) Radiological Contaminants-4

   This category includes naturally occurring radioactive contaminants, or those that form from oil and gas production or mining operations. This class includes Radon, a radioactive gas that is often present in older, hard rock groundwater formations, such as granite.

<u>Health Authority Classification</u>

The City of Coburg water system is regulated by the State of Oregon Health Authority Drinking Water Section (OHA-DHS) and the EPA. The identification number for the water system is PWS ID: 4100200 (41 refers to the State: Oregon). Refer to Figure 6-1 for OHA sample schedule.

Table 6-1
Community Water Systems Routine Chemical Monitoring (1)

Chemicals	Ground Water	Last Test	Next Test Due
Inorganics	Every 9 Years (4)	5/2/2002	**5/2/2011**
Arsenic	Every 3	2/4/2013	**2/4/2016**
Nitrate	Annually (2)	1/11/2016	1/11/2017
Nitrite	Every 9 Years	5/2/2002	**5/2/2011**
Asbestos AC Pipe	Every 9 Years (3)	11/22/2004	**11/22/2013**
Organics (SOC & VOC)	Every 6 Years	2/4/2013	2/4/2019
Lead and Copper	Every 3 Years	7/2/2014	7/2/2017
Stage 2 DBP	Annually	8/7/2015	8/7/2016
Rad-Gross Alpha	Every 9 Years	3/6/2009	3/6/2018
Rad-Radium/Uranium	Every 6 Years	10/9/2009	**10/9/2015**

(1) This table describes the routine monitoring currently required for the City of Coburg waivers, reductions, wellhead protection programs, or detections will affect the sampling requirements. You will find details on number, location, and timing of samples in the OHA rule book.

(2) Nitrate: testing for systems can be reduced to annually after 4 consecutive quarters of sampling below 5 mg/L and a reduction is requested in writing. Some wells require quarterly monitoring of Nitrates.

(3) Asbestos: routine monitoring is one sample every nine years. Monitoring will go to one sample every 3 years if the system exceeds Lead or Cooper action levels.

(4) Reflects a Modified Schedule based on a Monitoring Reduction from 3 to 9 years.

Aesthetic Concerns

Given the characteristics of Coburg's source water, aesthetic (taste, odor, and staining) problems are currently the greatest ongoing area of water quality concern. The city's finished water from the combined wells do not contain appreciable levels of iron, manganese, or hardness, which are the primary causes of staining. Customers in close proximity to wells with higher levels of iron or manganese, however, may experience staining. Long detention periods in pipelines or reservoirs can also cause isolated incidences of taste and odor complaints that can usually be remedied by line flushing or tank drain/refill cycles.

Trihalomethanes (Disinfection-By Products)

Common disinfection treatment used to kill micro-organisms in drinking water, such as chlorine, can react with naturally occurring organic and inorganic material in water to form disinfection by-products. These disinfection by-products are suspected carcinogens over a lifetime of exposure. These contaminants were Trihalomethanes (TTHM) and Haloacetic Acid (HAA5). Coburg presently performs sampling of two locations the North Miller St site and the High HHA5 site yearly. Testing results are shown in Table 6-2.

Table 6-2
Community Water Systems Routine Chemical Monitoring

Date	Test	North Miller St SS	High HAA5 Site
8/7/2015	TTHM	ND	0.0115
8/7/2015	HAA5	ND	ND
8/7/2014	TTHM	0.00705	0.019
8/7/2014	HAA5	ND	ND
9/2/2011	TTHM	0.00063	N/A
9/2/2011	HAA5	ND	N/A
8/7/2008	TTHM	0.0033	N/A
8/7/2008	HAA5	ND	N/A

Inorganic Contaminants

Inorganic contaminants, commonly referred to as "Primary" contaminants, include 15 regulated metals and minerals such as Arsenic, Barium, Cadmium, etc. Inorganics can be either naturally-occurring or present due to agricultural or industrial uses. Inorganic contaminants most often originate from the source of water supply, but can also be present due to water contact with pipeline and storage tank materials. For most inorganic contaminants, health concerns are related to long-term or lifetime exposures with the exception of Arsenic, Nitrates and Nitrites. These final two contaminants can seriously affect infants in short-term exposures by interfering with the transfer of oxygen from the lungs to the bloodstream.

Arsenic

Arsenic is a regulated inorganic contaminant that has recently been under increased scrutiny by the EPA. The current maximum contaminant level of .010 mg/L is easily met by Coburg's source water. The Arsenic Rule was implemented in 2001 which lowered the MCL or MCLG from .050 mg/L to .010 mg/L. This is expected to create a severe hardship on many utilities. Currently, all of the city's tests for Arsenic show levels less than .005 mg/L. Increased or more precise monitoring may be required in the future, however, as of the date of this plan, this potential is not known.

Nitrates

As previously indicated, Nitrates in drinking water can cause elevated Nitrogen levels in blood, especially in infants and young children occasionally resulting in "blue baby" syndrome. The maximum contaminant level (MCL) allowed for public water systems is 10 mg/L. Both wells presently have nitrate concentrations below this level. Well #1 and Well #2 blended water shows a nitrate level of between 5.0 mg/L to as high as 6.5 mg/L. Historically test results show the Well #2 is the well with the higher nitrates with a high level of between 5.9 mg/L-6.1 mg/L. Nitrates often occur in shallow groundwater sources from exposure to nitrogen based fertilizers or the application of wastewater from dairies or cities. The best method to protect against an elevated level of nitrates is through proper management of area of land application and the aquifer's recharge zone. This is accomplished by implementing adequate setbacks between the well's influence zone and land application of wastewater or fertilizers. In addition, any nearby application of these constituents should be conducted to insure that adequate dispersion of nitrogen through sprinklers is performed and that the application of fertilizer or wastewater does not exceed the nitrogen uptake rate of the crop.

Coliform Bacteria

The Total Coliform Rule affected all public water systems in Oregon beginning in 1991. Coliform bacteria is the primary measure of the microbial quality of drinking water. Coliform is a group of generally harmless bacteria that are naturally present in the environment and are used as an indicator that other, potentially harmful, bacteria may be present. All Oregon water suppliers, within the projected population ranges of Coburg, are required to test for coliform bacteria according to the following monitoring guidelines:

Table 6-3
Coliform Monitoring Frequency

Population	Samples per Month
1,001-2,500	2
2,501-3,300	3

Lead and Copper Rule

The primary purpose of this rule is to address possible lead and copper contamination from materials commonly found in customer services. The rule was promulgated by the EPA on June 7, 1991 and the City has performed 11 rounds of testing to date. The rule established "Action" levels of .015 mg/l for lead and 1.3 mg/l for copper. None of the sources has naturally occurring lead or copper. Since the City's distribution system does not contain any known lead, copper would be the most expected element to occur. The first round of lead and Copper testing was performed in 1993. The 90th percentile Copper level observed in this first round was 0.15 mg/l, well below the action level of 1.35 mg/L. The city is now on a three year testing cycle with the most recent testing, performed in June of 2014, indicated no detectable lead and a 0.15 mg/L level for copper.

Radiological (Gross Alpha)

The current federal rule for radiological sampling (Radionuclides) requires 1 sample every 9 years, depending on the well. All past tests that have been performed have indicated low levels or no presence of any Radionuclides. Radioactivity is uncommon from shallow ground water sources and is generally found in deep groundwater sources that are subject to a much longer and greater natural radioactivity exposure such as basalt or granite.

Secondary Contaminants

Secondary contaminants are not regulated contaminants but do include water quality parameters that can affect aesthetic conditions and taste and odor concerns. Because aesthetic water quality conditions are often the most apparent to customers, a discussion of their impact is included. An analysis for the majority of secondary contaminants that most often affects the aesthetic quality was performed on each well on June 17, 2016 (copies in Appendix). The results indicated that water from both wells is substantially identical in nature and free from most secondary contaminants.

Table 6-4
Secondary Contaminants

Parameter	Suggested Limit	Well #1	Well #2
pH	6.5-8.5	7.73	7.36
Alkalinity	None	125 mg/L	170 mg/L
Arsenic	0.010	0.0041	ND
Calcium	None	N/A	5.27
Chloride	<250 mg/L	N/A	11.3
Hardness	<250 mg/L	113 mg/L	184 mg/L
Iron	.3 mg/L	ND	ND
Manganese	.05 mg/L	ND	ND
Sodium	20 mg/L	14.5 mg/L	13.9 mg/L
Sulfate	250 mg/L	10.7 mg/L	11.0 mg/L
Total Solids	500	232	326
Zinc	5	ND	1.94

*ND-None Detected

Groundwater Specific Issues

In addition to the previously outlined observations and recommendations regarding VOC, SOC, bacteria, and other water quality concerns, new regulations have impacted the use and treatment of groundwater. The recently adopted Groundwater Disinfection Rule has had a significant impact on Coburg since many of the sources were previously deemed as potentially vulnerable to viral contamination. Viral and/or bacterial pathogens, often found in fecal contamination from animal and human feces, can readily reach groundwater and, in turn, drinking water supplies, through shallow or even deep wells via a route of inadequate or defective well depth or sanitary seals, broken or corroded well casings, wellhead flooding, failed septic systems, and/or wells constructed too close to a septic drainfield, in addition to other means. Waterborne diseases, caused from viral or bacterial pathogens, usually results in gastrointestinal symptoms, such as diarrhea and/or vomiting, that usually does not require medical attention for healthy adults, but can be very serious, or even fatal, to high-risk groups of the population, such as young children, the elderly, and people with compromised immune systems. Although the available data does not indicate that any more than a small percentage of wells or aquifers actually have the presence of fecal contamination, the severity of the possible health impacts, and the number of affected water consumers potentially exposed to the pathogens, indicated that some type of regulatory response was needed. The GWR applies to more than 150,000 public water systems serving more than 100 million consumers in the United States and is also applicable to water systems where ground water supplies are mixed with surface water supplies in which the ground water system is not treated to the same level as the surface water supply. The rule was originally proposed by the EPA on May 10, 2000, signed into law on October 11, 2006, published in the Federal Register on November 8, 2006, and took effect on January 8, 2007.

The Science of the GWR

A basic understanding of the Ground Water Rule requires some discussion of the science and logic behind the reasons for the rule. As previously indicated above, the GWR has been promulgated to provide for an increased level of protection against viral and bacterial pathogens in public water systems that use ground water. Specifically, the EPA is concerned with ground water systems that are exposed or susceptible to fecal contamination because these systems are at a far greater risk of passing harmful pathogens into a water supply. Several viral pathogens are known to exist in ground water aquifers, such as Hepatitis A and E, Coxsackie viruses, Echovirus, and Noroviruses, while bacterial pathogens found in ground water include the well-known strain of Escherichia coli (E. coli), in addition to other lesser-known bacterial pathogens such as Salmonella and Shigella. Due to the known relationship between the possible coincidental presence of fecal contamination and pathogenic viruses and bacteria in a water supply, and the fact that presumptive and rapid laboratory tests for viruses are not readily available, the EPA has established the presence of fecal contamination in a ground water supply as the prime indicator for the possible presence of pathogenic viruses or bacteria. In addition, fecal contamination is presumed to be present when one or more specific fecal indicators in the water are present. The three fecal indicators that have been selected for use in the Ground Water Rule are: E. coli, enterococci, and coliphage. Each of these indicators can be easily detected via various analytical methods commonly available through approved testing labs. Although fecal indicators, by themselves, are not typically harmful when ingested, their presence in ground water is a presumptive indication that fecal contamination is also present, which, in turn, provides a strong indication that viral and/or bacterial pathogens, or at the very least, a pathway for these pathogens, may also be present into the ground water supply. This, in a nutshell, forms the basis of the science of the Ground Water Rule. In order to identify ground water systems at risk to fecal contamination, the EPA has established a "risk-targeted" approach to identify these systems. The risk targeted approach relies on and evaluates four major components:

1) Periodic Sanitary Surveys of ground water systems that require the evaluation of eight critical elements: 1. source, 2. treatment, 3. distribution system, 4. finished water storage, 5. pumps, pump facilities, and controls, 6. monitoring, reporting, and data collection, 7. system management and operation, and 8. operator compliance with state requirements. The sanitary surveys will be used to identify water systems with significant deficiencies or systems that already have source water problems;

2) Source water monitoring that is triggered when a water system identifies a confirmed positive coliform sample during its routine Total Coliform Rule monitoring as well as state optional assessment monitoring at high risk systems;

3) Corrective action is required when a water system is identified to have a significant deficiency or source water contamination, and;

4) Compliance monitoring to ensure that an adequate level of treatment is provided to reliably treat drinking water in order to achieve at least 99.99% (4-log) inactivation or removal of viruses.

The projected average cost to implement the GWR is less than $5.00 per year for 90% of the U.S. households served by public ground water systems. Over $3.6 billion dollars has been earmarked to ensure that drinking water systems comply with the Safe Drinking Water Act. Much of these funds are already available for low-interest loans to qualified water systems. The city is taking a proactive approach.

Chapter Seven

Water Storage Requirements

Chapter Seven
Water Storage Requirements

Background

Water storage is provided for several reasons:

1. To equalize supply and demand for daily flow variations, maximum day, and peak hour requirements.
2. To provide emergency reserve supply during pipeline breaks, mechanical failures, and power outages.
3. To provide water for fire protection.

As previously outlined, in Chapter Four; the estimated future average day, maximum day, and peak hour demands are as follows:

Year	Equivalent Population	Average Day (GPD)	Maximum Day (GPD)	Peak Hour (GPM)
2016	2,386	268,425	697,905	1,212 GPM
2020	3,160	355,500	924,300	1,605 GPM
2025	3,906	439,425	1,142,505	1,984 GPM
2036	6,000	675,000	1,755,000	3,050 GPM

In the determination of required storage volume, several factors must be evaluated. Among these are: Operational storage (daily fluctuations), fire protection storage, reserve emergency storage, and source reliability.

Operational Storage

Operational or equalizing storage provides reserve water during variations in system demands that occur within one day of normal operation. This reserve storage is used to allow the sources to pump at a continuous rate. Given the fact that Coburg's water system consists of mostly residential and industrial/commercial demands, a factor of 25% of average day demand will be used for operational storage. This value is commonly used for systems of this type and size.

Fire Protection Storage

As previously stated in this report under "Fire Flow," the quantity of water required for effective fire fighting varies according to population and type of development. Since the Coburg system consists of one single pressure zone, fire reserve will be calculated for the total population and for the industrial component. Fire flow used for this study will be 3,500 GPM for current conditions and for Year 2036. This flow is typical for the Year 2036 projected equivalent population of 6,000 and is also felt to be adequate to accommodate a large fire within the downtown core area and in the industrial district. For both scenarios, storage requirements will be based on four (4) hours fire flow duration. The current required fire storage, therefore, is 3,500 GPM X 240 minutes = 840,000 gallons.

Reserve Emergency Storage

This requirement is dependent on several factors. Among these are: source reliability (including pumping facilities), power reliability, pipeline integrity, and available standby facilities. See Table 7-1 for the most common expected emergencies and the corresponding duration of outage:

Table 7-1
Typical Water System Emergencies (in order of likelihood)

Emergency Type	Maximum Expected Duration (Days)	Affected Wells
1. Power Outage (localized)	½-1	Any
2. Regional Power Outage (Major)	1-3	All
3. Pumping Equipment Failure	2-3	Typically only one
4. Water main break	1-2	Varies as to location of break
5. System contamination (back flow, cross-connection, etc.)	2-3	None
6. Aquifer Contamination	Indefinite	One Well field

The most common emergencies expected to disrupt the normal water system operation are numbers 1,2,3 and 4. The maximum expected duration of these emergencies is approximately 2-3 days. Each type of emergency applies to Coburg uniquely and will be discussed separately.

In the case of Coburg, all existing sources are located within 300' of each other and all source flow is transmitted through one 24" transmission pipeline to the city. Proposed improvements include the installation of a new parallel 12" transmission main from the wells to the city. This will lessen the exposure due to the loss of the transmission main. The three wells will each contribute varying flows to the system and the greatest impact to the system would involve the loss of Wells #1 and #2. The loss of these wells (1,100 GPM) would require Wells #3 to operate continuously to compensate for this loss of flow. The two wells alone can accommodate the maximum day demands through the Year 2020, therefore, a sustained loss (more than 2-3 days) of either well will not result in either extreme water rationing or emergency use of water from the reservoirs, however, the loss of the entire wellfield would create an immediate emergency. For this reason, implementation of the new well is considered to be the highest priority. The addition of this well, planned by 2018, will effectively substitute for either of the two current wells should a prolonged shutdown occur. With this new well in service, the city will have total redundancy in source, pumping equipment, and standby facilities. The loss of either existing well will still provide the other well plus the new well (450 GPM). This total available capacity of up to 1,500 GPM is not adequate to meet current and future maximum day demands. A two week duration of consecutive maximum day demands is very unlikely in Oregon and planning for this extreme event is not considered to be economically or realistically feasible. Almost any conceivable failure, with the exception of a massive well field contamination or a catastrophic well failure, can generally be repaired within one week. By 2020, continued growth will necessitate the addition of a third well. A third Well #3 is planned to be developed within the study period. These three total wells will provide needed redundancy and increased capacity of facilities through the end of the study period.

Power reliability is a current concern due to the fact that all wells are served by the same primary power source provider. A sustained outage, in the absence of standby facilities, could result in a severe depletion of storage before power restoration. Even though the proposed new well will also be served by the same utility, the locations are served by different feeders from different directions. Power failure to one well, therefore, will not necessarily result in power failure to any other wells. In enhancement, the availability of standby generators will allow emergency operation of either (or both) the existing Funke Road wells. The proposed addition of telemetry control at the City shops will notify system operators immediately upon power failure at any site which will significantly lessen response time to activate standby equipment. A long power outage, therefore, will not prevent operation of the wells as there are currently automatic standby facilities at the two existing wells and are planned at the proposed new well. This will allow operation of at least one well field should a sustained outage occur.

For planning purposes, an ultimate reserve emergency storage equivalent to two days of average day demand ending with Year 2036 average daily demand will be used. This reserve combined with the operational storage also provides one full day of maximum day demand (without compromising fire protection) through each year of the study period. This value is often used as the minimum storage requirement for municipalities.

The proposed schedule for addition of water storage is shown on Table 7-2.

Table 7-2
Required Storage Volume (in Gallons)

Factor	2015	2016	2020	2025	2030	2036
Criteria A: **1) Operating or Equalizing Storage (25% of ADD)**	62,466 g	72,366 g	88,875 g	109,865 g	132,047 g	168,750 g
2) 2 days of ADD	499,724 g	578,924 g	711,000 g	878,850 g	1,056,374 g	1,350,000 g
3) Fire Protection (3,500 GPM X 4 hours)	840,000 g	840,000 g	840,000 g	840,000 g	840,000 g	840,000 g
Total Required Storage	1,402,190 g	1,431,290 g	1,639,815 g	1,828,751 g	2,028,426 g	2,358,750 g
(-) Existing Storage	<1,000,000 g>	<1,000,000 g>	<1,000,000 g>	<1,750,000 g>	<1,750,000 g>	<1,750,000 g>
Surplus (+)/ Deficit (-)	(-) 402,190 g	(-) 431,290 g	(-) 639,815 g	(+) 78,751 g	(-) 278,426 g	(-) 608,750 g
(-) Offsetting Source Contribution (24 hours)	0	0	<720,000 g> (@ 500 GPM)	<720,000 g> (@ 500 GPM)	<720,000 g> (@ 500 GPM)	<720,000 g> (@ 500 GPM)
Net Required Storage Surplus (+)/ Deficit (-) "A"	**(-) 402,190 g**	**(-) 431,290 g**	**(+) 80,185 g**	**(+) 641,249 g**	**(+) 441,574 g**	**(+) 111,250 g**
Criteria B: **Minimum Required Reserve Water Storage for Daily Demands (Fire flow and 4 Hours of Peak hour)**	1,110,720 g	1,130,880 g	1,225,200 g	1,316,160 g	1,412,400 g	1,572,000 g
Surplus (+)/ Deficit (-) "B"	**(-) 110,720 g**	**(-) 130,880 g**	**(-) 225,200 g**	**(+) 433,840 g**	**(+) 337,600 g**	**(+) 178,000 g**

As seen in Table 7-2 there are two (2) separate criteria used to determine the volume of water storage needed for a potable water system. Criteria "A" uses typical factors universally applied to water systems for normal planning purposes to arrive at the "nominal" volume of water that is desirable. Criteria "B" utilizes the two minimum factors applied to water storage in a day-to-day function. The two factors applied in Criteria B are the required water storage always reserved for fire protection and the volume needed to accommodate the typical peak hour demand over one day. The presumed Peak Hour Demand is applied for 4 hours (2 hours in the morning hours and 2 hours in the early evening). Refill of this demand is assumed to occur during the interval between the 2 demand periods. By using either criteria, additional water storage is currently needed in volume between 110,000 gallons up to 402,000 gallons. For the purpose of this study, since source capacity is greater than all projected average and maximum daily demands, criteria "B" is being used as the minimum volume of water required for storage by the City of Coburg. The proposed schedule for water storage addition calls for a new 750,000 gallon reservoir to be placed at the elevated Diamond Ridge site between 2020 to 2025, plus replacement of the two (2) existing .50 MG steel reservoirs with a new single bolted-steel reservoir. This improvement is needed to replace the two existing reservoirs, neither of which is seismically sound and are both approaching the end of their service life. At a minimum, both storage vessels would require recoating and refurbishing, a total cost estimated to rival that of a new vessel. This reservoir will replace the existing reservoirs during the mid-span of the study period, between 2025-2030. The new 1,000,000 gallon reservoir will be placed in the corner of the existing reservoir site over part of the land now occupied by one of the two reservoirs. The second reservoir is planned for demolition and removal once the new reservoir is activated.

Emergency Plan

The City of Coburg is advised to develop an Emergency Plan that will address the water usage curtailment and notification procedures during a sustained power outage, fire, or equipment failure. This is especially important given the high reliance on the Funke Road Wells and Sarah Street Reservoir and Booster Pump Station. This plan should include, at a minimum, the following items:

1. Classification and severity of emergency. The most common and expected conditions would include:

    1. Power outages
    2. Well or pump failure
    3. Pipeline break
    4. Cross-connection contamination
    5. Source contamination
    6. Extreme system demand due to fire and/or unusually high demands

2. Expected duration of failure and impact to both systems.

3. Public notification procedures and phone numbers for each customer, if necessary.

4. Corrective procedures for each separate incident.

5. Emergency Plan coordinator and emergency contact phone numbers and names for both cities.

6. Regulatory agency notification procedures and contact persons

Chapter Eight

Hydraulic Analysis of the Water System

Chapter Eight
Hydraulic Analysis of the Water System

General

Extensive hydraulic analysis has been performed on the City of Coburg's water distribution system. These analyses included evaluation of the existing system at average day, maximum day, and fire flow during maximum day demands and future 2036 peak hour demands. Recommendations for specific distribution system improvements are based on data obtained from the computer modeling.

Analysis of the water system was performed using computer modeling simulation via the KY Pipe 2016, Version 8.003 hydraulic simulation computer model, manufactured by KY Pipe. The actual modeling procedure was performed by Brooke Saltarello, 4B Engineering in Keizer, Oregon. The Program has a maximum limitation of 2,000 pipes, 2,000 junctions (nodes), 250 pumps, and 250 tanks. The Hazen-Williams formula was used to calculate friction losses. Coefficients of friction (C values) used in the model ranged from 100 for all steel pipe to 120 for Asbestos-Cement pipe and 140 for PVC pipe. These values are typical and appropriate for the respective pipe material and age, particularly as the interior surfaces of the waterlines age and develop a scale coating (deposition) lining. All pipe sizes were entered as nominal sizes, i.e. 6 inch inside diameter for all 6" sizes, regardless of type. Minor losses such as tees, ells, and valves have been disregarded.

System Models

To be effective, system models must evaluate four system components: the supply system (sources and reservoirs); water demands; the distribution system; and the variations within the system; such as elevation and friction factors. Variations in each of these four components were used in computing existing the future scenarios and represented expansions or additions to the system.

Assumptions of the Computer Modeling Analysis

1. Elevations of all nodes were based on topographical information obtained from USGS maps. Elevations were ascertained at City pipeline locations, *not* from individual residences. Residual pressures are determined at pipelines, therefore, losses due to elevation and friction head to each individual residence must be determined individually. All node elevations were set based on elevations from USGS maps.

2. The following beginning hydraulic grade line (water surface) elevations, reflecting expected draft, were used for the system modeling:

A. Sarah Street Reservoir/Pump Station (Base)	397.5 MSL (All conditions)
B. Future 750,000 Gallon Reservoir	540 MSL (Base)
	565 MSL (Overflow)

3. Internal conditions of individual pipelines cannot be realistically determined, therefore, average friction factors based on pipe material type and age were used. Calculated friction factors (C Valves) ranged from a low of 100 to a maximum of 140 for 2016 conditions. The "C" values used in 2020 models were 140 for PVC, 120 for AC pipe, and 100 for steel and cast iron. For 2025 simulations, the "C" values represented continued aging and roughness of the pipe's interior, 135 was used for the older PVC pipe and 120 for AC pipe. In 2036 models, the representative friction factors ("C" values) were 140 for new PVC pipe, 130 for older PVC, and 110 for the remaining AC pipe. All of the remaining steel pipe in the system was assumed to have been replaced by 2036.

4. Contributions and losses from smaller pipes (2" and smaller) were disregarded from models. Residual pressures were calculated at major pipeline points. Additional losses due to service meters, service lines, elevational increases, and smaller distribution lines must be calculated and subtracted from original residual pressures to obtain residual pressures at individual residences.

5. Minimum required residual pressure during maximum day and peak hour demands at all locations was 40 psi at all flow conditions. Minimum desired residual pressure was 50 psi at all flow conditions. Minimum required residual pressure during fire flow conditions was 30 psi. Maximum desired pipeline velocity was placed at 8 FPS during all fire flow scenarios with 5 FPS the maximum velocity for all other simulations.

6. Node demands were based on estimates for specific areas. Individual residences were grouped together at nodes based on the number of residences in close proximity to the node. There are a total of 127 nodes in all models (95 residential and 37 commercial).

7. Each node (existing and future) was assigned a flow value to approximate the estimated flow to a group of residential demands under varying conditions. The following flow values were used for each individual simulation:

   A. 2016 Maximum Day
      2.39 GPM per residential node
      6.96 GPM per commercial node
   B. 2016 Maximum Day with 3,500 GPM fire flow
      2.39 GPM per residential node
      6.96 GPM per commercial node
   C. 2016 Maximum Day with 3,000 GPM fire flow in Downtown Area
      2.39 GPM per residential node
      6.96 GPM per commercial node
   D. 2016 Peak Hour
      5.58 GPM per residential node
      16.16 GPM per commercial node
   E. 2016 Average Day, Filling Reservoir
      .86 GPM per residential node
      2.50 GPM per commercial node

F. 2020 Maximum Day and 3,500 GPM fire flow
 3.18 GPM per residential node
 9.19 GPM per commercial node
G. 2025 Maximum Day and 3,500 GPM fire flow
 3.93 GPM per residential node
 11.36 GPM per commercial node
H. 2025 Peak Hour with Upper Reservoir Only
 9.8 GPM per residential node
 28.42 GPM per commercial node
I. 2025 Average Day with 3 Pumps On and No Booster Pump Station/Reservoir in Operation
 1.51 GPM per residential node
 4.37 GPM per commercial node
J. 2025 Maximum Day and 3,000 GPM fire flow in Downtown Area
 3.93 GPM per residential node
 11.36 GPM per commercial node
K. 2036 Maximum Day
 6.03 GPM per residential node
 17.46 GPM per commercial node
L. 2036 Maximum Day and 3,500 GPM fire flow
 6.03 GPM per residential node
 17.46 GPM per commercial node

Future year simulations incorporated all currently known proposed developments at their respective locations as well as estimated future demands at critical nodes. These demands varied from 5 GPM to 30 GPM and were placed to simulate expected demands during maximum day and extreme peak hour conditions. Future demands were placed based in areas of projected future growth. Fire flows were simulated during all maximum day computer runs, except for the initial calibration model run.

Year 2016 Distribution System Modeling Data

Current year hydraulic analysis was performed on the distribution system to determine the adequacy of the system in delivering the current required flow with adequate residual pressures. For Year 2016, computer modeling was performed for 5 specific scenarios:

1. Maximum Day Demand without fire flow (used as the calibration model)
2. Peak Hour Demand
3. Maximum Day Demand with coincidental 3,500 GPM @ I-5 Industrial Zone
4. Maximum Day Demand with coincidental 3,000 GPM fire flow in the Downtown Business District
5. Average Day Demand with Refill of Reservoir

The initial set of hydraulic analysis were conducted using current maximum day flow demands. The test indicated no flow delivery limitations within the distribution system. A second full set of models including one at Maximum Day Demands (+) Fire Flow of 3,500 GPM in the industrial region plus an additional model for maximum day demand (+) 3,000

GPM fire flow in the downtown business district were performed. Wells operating during Year 2016 simulations were Well #1 (nominal flow = 500 GPM) and Well #2 (nominal flow = 500 GPM).

1. Year 2016 Maximum Day Demands-Existing System

Pressures were well above the minimum desired pressure of 50 psi, averaging between 65-72 psi with a high of 78 psi. Pipeline velocities were well below acceptable limits with typical velocities of .50-4.9 FPS throughout the grid. While the refill cycle for the Sarah Street Reservoirs was occurring, the delivery rate from both well pumps was slightly lower than the curve data.

2. Peak Hour Demand-Existing System (Wells Operational)

Peak hour demands (1,067 GPM) were simulated for the current distribution system configuration and population with the reservoir fill valve off. This simulation demonstrated typical pressures within the grid ranged between a low of 65 to a high of 76 psi. The model verifies the substantial contribution to system pressure provided by the well pumps and demonstrates that the two well pumps can currently provide peak hour demands with adequate residual pressure throughout the system without contribution from the booster pump station.

3. Distribution System Efficiency of Source Delivery to Sarah Street Reservoirs (Conducted during 2016 Average Day Demands)

A simulation was performed to verify the feasibility of utilizing the existing distribution system as a transmission means for the combined flow of Well #1 and Well #2 to the reservoirs. During this simulation, all node demands were set to average day demands and all surplus water is delivered to the reservoirs via the existing distribution system. The results of this model indicate adequate pressure exists in the system during this scenario. Well pump flows total 1,000 GPM and residual pressures within the distribution system generally averaged between 70-75 psi with a high of 79 psi. There was approximately 837 GPM filling the reservoirs. This flow rate verifies the present sizing of the fill valve.

4. Year 2016 Maximum Day Demands with 3500 GPM Coincidental Fire Flow at the Industrial Zone-Existing System with Wells "On" and Two Booster Pumps

This model was performed to determine the water distribution system's capability (with source assistance) to deliver maximum day demands combined with a high fire flow and just two booster pumps in operation. This 3500 GPM demand was placed at nodes in the industrial zone vicinity. Both wells were active during this simulation to create a normal situation. This location is representative of a large fire that might be expected in the city. Residual pressures throughout the distribution system were mostly averaging between 50-60 psi with a few nodes displaying values as low as 23 psi @ the fire flow node. Pipeline velocities in the distribution system were generally limited to 3 FPS with only a few exceeding 10 FPS. This simulation confirmed that two booster pumps alone can create the flow necessary to fight a large conflagration along with maximum day demands in the city while maintaining adequate residual pressures in the water system.

5. Year 2016 Maximum Day Demands with 3,000 GPM Fire Flow in Downtown Core

A 3,000 GPM fire flow during maximum day demands was established in the downtown area with just two of the three booster pumps in operation. This model resulted in residual pressures averaging between 55-65 psi in the system with 57 psi at the fire flow node. For the most part pipeline velocities averaged less than 1 FPS with only a few pipelines exceeding 6 FPS. Each of the two operating booster pumps delivered 1,150 GPM (2,300 GPM total) with the two well pumps contributing the balance. This scenario verifies that the existing booster pump system can generate the water needed for a large fire within the city with just two pumps in operation.

Year 2016 Distribution System Summary- Existing System

The various models performed on the current distribution system presents the following conclusions:

1. The existing distribution system is adequate for all current average and maximum day demands, with or without direct source contribution. Over 700 GPM is available from the wells for reservoir fill during current max day demands.

2. The existing two well sources can easily accommodate Year 2016 Peak Hour Demands at above-average values of residual pressures without booster pumps. During this scenario, however, there is no or little surplus water available for refill of the two (2) reservoirs.

3. Maximum day demands combined with fire flow or Peak Hour demands using two booster pumps result in adequate pressure values throughout the city with several locations displaying pressure higher than 60 psi.

4. Contributions from the wells are assumed during maximum day demands with coincidental fire flow demands with two booster pumps to avoid dangerously low pressures.

5. Immediate corrections to the distribution system are not required to provide a needed factor of safety although additional analysis may reveal that selected interties of existing waterlines may improve residual pressures in the grid during fire flow conditions.

6. Year 2020 Maximum Day Demands with 3 Sources in Operation

This model was conducted to verify the transmitting capability of the existing distribution system during 2020 Maximum Day Demands with 3 sources (2-existing and 1 new source) in operation. This simulation verifies that the existing distribution system can easily transmit needed flows to the Sarah Street reservoir site to refill the reservoirs at a flow rate of 836'± GPM during maximum day demands. Maximum pipeline velocity was just over 9.5 FPS. Residual pressures throughout the water system remained at acceptable values between 70-78 psi. The proposed new well, Well #3, has a hydraulic simulated performance of 449 GPM at 67 psi of pressure.

Year 2025 Distribution System Improvements

The 2020-2025 improvements, including a new .75 MG elevated reservoir and pipeline interties, are the minimum level of work considered to be required to improve system hydraulics. Additional simulations were performed following incorporation of these improvements with only two booster pumps in simultaneous operation during fire flow conditions, the results follow:

7. Year 2025 Maximum Day Demand with 3500 GPM Fire Flow at Industrial Zone After Improvements (All Wells "ON")

This simulation verified a substantial increase in residual pressures after completion of the proposed new reservoir and pipeline improvements. Pressure levels throughout the grid generally averaged 65-73 psi with the lowest observed pressure of 41 psi occurring at the withdrawal of the fire flow, an increase of 18 psi over 2016 values. Pipeline velocities were considerably lower and more evenly distributed within the grid. Typical velocities in major pipelines ranged between .5-2.0 FPS with the highest velocity of 10 FPS in the region of the fire flow. The three wells contributed 1,540 GPM. This simulation was performed with all available wells operable.

8. Year 2025 Maximum Day Demand with 3,000 GPM Fire Flow in Downtown Core- After Improvements

A second fire flow simulation was performed during maximum day demands to verify available fire flow capacity to the downtown business district. A 3,000 GPM demand was placed in the downtown core during Year 2025 maximum day demands but after the addition of the new .75 MG reservoir and distribution system improvements. The results of this model were also very favorable as residual pressure levels were between 65-75 with typical pressures of 65 psi or higher throughout the grid. Residual pressure at the point of fire flow was observed at 68.5 psi. Pipeline velocities were well distributed with a maximum velocity of 5.2 FPS. Most of the velocities within the grid were between 1-3 FPS, well below the maximum desired velocity of 13 FPS. There were no residual pressures below the minimum acceptable level of 30 psi. Flow from the new elevated reservoir was essentially static with only 125 GPM of flow passed from the water system into the tank at fire flow conditions as most of the fire flow and system demands were originating from the wells and booster pump station. This value tends to verify the new reservoir's proposed base elevation of 540'± and overflow elevation of 565'±.

9. & 10. Year 2025 Peak Hour Demands-After Improvements

Two individual peak hour simulation were performed:

1. Peak hour demands with all wells operational. The effects on residual pressures during operation of the wells is significant with an average increase in pressure of 15 psi observed with both wells operational. Pressure distribution throughout the

grid was between 75-83 psi during contribution from the wells and 60-65 psi with all wells deactivated. During this scenario, the reservoir was refilling at a rate of 1,083 GPM, generating a velocity in the serving 12" waterline of 3.0 FPS, well below the maximum of 5 FPS. In both cases, all pressures were well above the minimum desired pressure of 50 psi. Pipeline velocities were generally between .5-3 FPS with no velocities above 5 FPS. The distribution of flow and uniformity of pressure is significantly improved during simultaneous well operation and reservoir contribution.

2. Peak Hour Demands with all sources deactivated. This simulation was performed to verify the proposed elevation and setting of the new reservoir. During this simulation, all wells and booster pumps have been deactivated and the water supply to the city is being delivered from the new 750,000 gallon reservoir under gravity conditions. Residual pressures throughout the grid averaged between 45-52 psi with the lowest observed pressure of 45 occurring at just one node. Pipeline velocities ranged between .10-5.0 FPS, the highest velocity, 5.46 FPS, was observed in the 12" transmission line between the grid and the reservoir.

Year 2025 Hydraulic Analysis Summary

1. The revised distribution system can accommodate current average and maximum day demands with minimal pressure loss within the city. All node residual pressures were above the minimum desired pressure level of 50 psi.

2. A maximum day demand combined with a high intensity (3500 GPM) fire flow results in typically expected pressure drops throughout the city. Residual pressures at several locations drop into values between 60-70 psi.

3. The distribution system is not currently capable of accepting more than approximately 1600 GPM of total source capacity due to pressure increases seen in the grid.

4. The addition of a 750,000 gallon elevated reservoir (ground-level setting) in the Phase II improvements is a logical and needed enhancement to the water system. Computer hydraulic simulations confirm that a Base Elevation of 540'± combined with an overflow elevation of 565'± and a 12" diameter inter-connecting pipeline is the appropriate location and sizing.

5. Distribution system and reservoir improvements greatly improve water delivery throughout the city under all flow conditions.

6. After Year 2020-2025 improvements are complete, the distribution system is capable of accommodating all Year 2025 average day, maximum day, maximum day with coincidental fire flow (3500 GPM) and peak hour demands.

Year 2036 Hydraulic Modeling Data

For Year 2036, 2 distinct computer simulations were performed to determine any further needed improvements and the effectiveness of the proposed improvements.

These were: Maximum Day w/ 3500 GPM Fire Flow at the Industrial Area
Maximum Day Demands

Year 2036 Distribution System Modeling Data

Several computer simulations were performed for anticipated water system demands for the Year 2036. These models included elements of new residential development and assumed industrial water demands. These simulations were performed assuming the implementation of additional distribution system improvements.

For Year 2036 computer models, the following values were assumed:

Equivalent Population: 6,000
"C" value for AC Pipe lowered to 110
"C" value for New (Installed since 2020) PVC pipe: 140
"C" value for Old PVC pipe: 130
Average Day per Capita Use: 112 GPCD
Maximum Day per Capita Use: 291 GPCD
Peak Hour Factor: 2.5x Maximum Day Demand
Fire Flow: 3,500 GPM (in Industrial Area)
Wells #1 and #2 Combined Design Capacity: 1,000-1,050 GPM
Well #3 Design Capacity: 450 GPM

11. Year 2036 Maximum Day Demand

This model was the first model (and lowest projected daily flow model) performed for Year 2036. This model was performed to answer two questions:

1. Can the water system accommodate projected maximum day demands without significant pressure losses?

And,

2. Can the water system accept the ultimate combined well field capacity (≈1,500 GPM) without severe pressure increases within the distribution grid?

The results of this model were yes for both questions. Pressure distribution throughout the city ranged between 64-76 psi with average values between 68-72 psi. Pipeline velocities were between .25-6.0 FPS with virtually all pipes within the gird contributing to flow distribution. During maximum day events, the pressure within the city is projected to rise between 5-10 psi higher than normal with all sources operable. This situation will be worse at flow conditions less than maximum day demands. To prevent commensurately higher pressures than desired, combined operation of all sources should be limited to a reservoir water level elevation of 555' or less and Well #3 equipped with either a VFD or pressure reducing valve to control high pressures. Although this model indicates that a flow rate of 248 GPM will be contributed from the .75 MG reservoir with 527 GPM filling the 1.0 MG reservoir, this value can be offset with a control system adjustment and/or an assumed lower water surface elevation in the new reservoir.

12. Year 2036 Maximum Day Demands with 3500 GPM Fire Flow in the Industrial Zone

This simulation was performed using the same basic criteria as the Year 2016 model except various local water demands were adjusted upwards to simulate projected growth in that specific area. The results from this computer simulation indicated good pressure and velocity distribution thorough the grid. Virtually all of the pipelines within the system contributed to the system demands.

Typical velocities were in the range of 1-5 FPS with the highest observed velocity of 10 FPS occurring in a few of the 12" lines in the vicinity of the fire. Residual pressures throughout the city were above acceptable minimum levels and averaged between 63-73 psi. Residual pressure at the point of fire flow withdrawal and a few other nearby nodes was 36-37 psi, well above the minimum level of 30 psi. The contribution from the .75 MG reservoir was calculated to be 896 GPM. Starting with full reservoirs, over a four-hour assumed fire flow duration, that rate equals a total withdrawn volume of 215,040 gallons, well within the reservoir capacity of 750,000 gallons or less than 50% of the desired residual reservoir capacity of 375,000 gallons. The withdrawal rate from the 1,000,000 Sarah Street reservoir is 2,247 GPM, or 539,280 gallons. Once again, this volume is just above the desired reserve capacity of 500,000 gallons. The combined use of storage equals 754,320 gallons, or 43% of the total storage volume of 1.75 MG in 2036, below the desired limit of 50%. These criteria verify the proposed sizing of both vessels. As with all previous fire flow simulations this model was performed with all of the sources (3 wells) operable and the simultaneous use of two of the three total booster pumps. This provides adequate redundancy for a fire flow condition fed from electrically driven water booster pumps.

Additional Hydraulic Models

Although not included within this report, additional simulations were performed to assist with model calibration, alternate well operation scenarios, and alternate pipeline improvements. A set of models was evaluated simulating the effect of a dedicated parallel 12" transmission main. This 12" PVC main was inserted from the 24" well field transmission main where it was then connected to the existing 12" main in the city. The purpose of this set of simulations was to determine the viability and cost effectiveness of a new redundant transmission main.

Year 2036 Hydraulic Analysis Summary

1. The distribution system, after completion of all proposed improvements, can accommodate all projected average day, maximum day and peak hour demands for all periods between 2016 to 2035, ending at the Year 2036. System-wide residual pressures are acceptable and pipeline velocities are within normal limits.

2. Fire flow availability throughout the city is greatly enhanced following the incorporation of the phased improvements. Fire flows as high as 3,500 GPM are available in most locations within the city, particularly in the industrially zoned area.

3. An increase in system-wide pressure may be developed during simultaneous operation of all wells at flows less than maximum day demands. The implementation of pressure control, using a VFD on Well #3 is recommended to prevent this occurrence.

4. Extension and inter-connection of the existing 24" wellfield main to a parallel 12" PVC waterline is recommended to optimize water delivery to all quadrants within the city and provide redundancy against potential failure of the 24" main.

5. An initial, followed in future years by an additional, I-5 crossing is recommended at the northern and southern end to the east side of the distribution system. This crossing will provide needed capacity, redundancy, looping, and reinforcement for the eastern zone of the city on both sides of the freeway and provide an alternate route for feeding water from the .75 MG reservoir to the city.

Service Levels

Computer modeling and topographical analysis indicates that the existing proposed new reservoir elevation is adequate to provide water throughout the city with the exception of elevations above 470' MSL. This limitation is due to the relative elevations within this area as opposed to specific inadequacies of the distribution system. All proposed development above 470' MSL should be planned with booster pumping for water service.

Distribution System Evaluation-AC Pipe

Introduction

As discussed in previous chapters of this report, the distribution system serving much of the City of Coburg uses a high percentage of asbestos cement pipe (AC). AC pipe comprises approximately 3.9 miles (36.6%) of the total pipe length of 11 miles. The 1993-1994 AC corrosion event in the nearby City of Monmouth which resulted in severe (albeit short term) loosening and loss of asbestos fibers has created a concern regarding the long-term viability of continued use of the pipe. Although the corrective measures employed have been very successful in abating internal waterline corrosion in Monmouth, due to the high percentage of AC pipe in Coburg, a discussion of the continued use of AC pipe is warranted.

Background

Asbestos-cement (AC) pipe has been in use in the United States since 1930. It is made by mixing Portland cement and asbestos fiber under pressure and heating it to produce a hard and strong product. Although AC pipe was first developed and used in Germany during the 1920's, its light weight, corrosion resistance, and smooth interior pipe wall properties soon met with favor from engineers and water systems in the US. By 1940, the pipe was used extensively throughout North America. It is estimated that there is currently over 200,000 miles of AC pipe in service in the United States. AC pipe is available in sizes from 4" up to 42" and pressure classes of 100, 150, and 200 psi. AC pipe was used as

SECTION 3 - DETAIL REQUIREMENTS:

3.1 Pipe:

3.12 Hydrostatic Strength: Each standard, random and short length of Tran-site water pipe shall be designed to have sufficient strength to withstand an internal hydrostatic pressure listed under Table II when applied as specified in Section 4.22.

TABLE II

A		B	
Routine Hydrostatic Pressure, psi		Sampling Hydrostatic Test pressure, psi	
Class	Test Pressure	Class	Test Pressure
100	350	100	400
150	525	150	600
200	700	ZOO	800

3. 13 Flexural Strength: Each standard length of Transite water pipe in sizes 3, 4, 6, and 8 inches shall have sufficient flexural strength to withstand, without failure, the total loads listed in Table III when applied at the third points of a 9-foot span for 10-foot lengths and a 12-foot span for 13-foot lengths in the manner specified in section 4.23.

TABLE III - Applied Flexural Loads

		Total Applied Load., Pounds	
Pipe Size	Class	10 foot lengths	13 foot lengths
3	100	750	--
	150	830	--
	200	.910	--
4	100	1200	1000
	150	1470	1200
	200	1870	1400
6	100	2800	2300
	150	3700	2800
	200	4900	3700
8	100	--	4800
	150	--	5700
	200	--	7600

3.14 Crushing Strength: Transite water pipe shall have the crushing strength indicated in Table IV when tested in accordance with the ASTM 3-Edge Bearing Method as specified in Section 4.24.

TABLE IV - Applied Crushing Loads

Nominal Pipe	Crushing Strength per Linear Ft. ,Lb		
Size, Inches	Class 100	Class 150	Class 200
3	4,600	6,700	8,800
4	4,100	5,400	8,700
6	4,000	5,400	9,000
8	4,000	5,500	9,300
10	4,400	7,000	11,000
12	5,200	7,600	**11,800**

Material Specifications DS-335-64
Transite Asbestos – Cement Water Pipe

new and replacement pipe by many Oregon communities during the 1950's, 1960's, and early 1970's. Since the mid-1970's, PVC pipe has largely replaced AC pipe in water systems due to its properties of ease of installation, durability, cost, and corrosion resistance.

The first AWWA standard for the application, manufacturing specifications, and installation guidelines were issued in 1953. Since that time the standard has been revised several times. Most of the AC pipe now in service in Coburg was originally installed during the decades of 1950's-1960's and 1960'-1970's. AC pipe generally has an expected service life of between 30-50 years, largely dependent on pressure cycles and internal and external corrosion factors.

A cursory examination of the well water quality parameters for water pumped by Coburg indicates that water corrosive to AC pipe should not be an issue. The water displays adequate background levels of calcium hardness and an elevated pH level ($\geq$ 7.5) that is generally favorable to the continued integrity of this material.

Due to the age of the pipe and cyclic pressure conditions, however, it is recommended that selected sections of 6" and 12" AC pipe be removed from the system during the Phase I work and tests for hydrostatic (burst) strength and structural integrity (crush) testing be conducted. These lab tests can be performed at numerous testing laboratories on the West coast. The results from these tests will provide the data needed for developing a long-range replacement program.

Distribution System Evaluation-Remaining Pipe Types

The city utilizes AWWA C-900 Class 150 PVC (PolyVinyl Chloride) pipe as the standard for all new pipe. This pipe is very durable, lightweight, and has excellent corrosion resistance and smooth interior walls. The pipe is generally impervious to chemical attacks and normal corrosion and incrustation problems associated with potable water systems. C-900 PVC also has excellent surge capacity due to a 2.5 to 1 safety factor. Generally, it is recommended that all new PVC pipe used within the City of Coburg comply with the following specifications:

Material Specifications for PVC Pipe

All pipe installed for and in the City of Coburg shall be PVC (PolyVinyl Chloride) type pipe. The pipe shall be manufactured from PVC resin compound in compliance with ATSM D1784, cell class 12454B. The pressure ratings shall be class 150 psi (DR18). Each pipe shall be 20' in length and equipped with an integral bell gasket complying with ASTM F477. Installation shall be in compliance with AWWA standard M23 and the City of Coburg standards. A suitable tracer wire shall be installed with the pipe.

Cast Iron and Galvanized Pipe

The city also has approximately 1360' of cast/ductile iron and 3352' of galvanized steel in the distribution system. While the cast and ductile iron pipe appears to be in fair condition, the steel pipe (mostly 2") is undersized and prone to corrosion and leakage. Replacement of all steel pipe is anticipated to occur by contracting to construction contractors over the next 20 years in a pipeline replacement program specified in the Phase III (2025-2036) improvement plan. The city may wish to delete this work from the proposed capital improvement program and perform this work with city forces as maintenance funds permit. All hydraulic analysis performed for Year 2036 assumes replacement of all existing steel pipe (2" and 4") with 6" or larger PVC pipe by that time.

Chapter Nine

Related Issues

Chapter Nine
Related Issues

This section covers topics that are ancillary to the overall Master Plan.

Cross Connection Control Program

The City currently has an active cross connection program in effect. Given the variations of system pressure, OHA regulations, and potential for backflow, a cross connection program is definitely warranted. The Cross Connection program is currently operated and supervised by three city employees who are certified as cross connection inspectors. Potential cross connection problems of greatest concern would include: industrial and commercial facilities, facilities with fire sprinkler systems or supplemental booster pumps, and areas with marginal or greater pressures due to friction loss and/or elevation.

Corrosion Control

Given the current water quality of the wells, the corrosive effect of water on most system components is not felt to be severe. This is due to the average pH, calcium hardness, and alkalinity of the well water. Further testing may need to be performed to determine any changes in the corrosivity of the water.

Operator Certification and Training

The current level of operator certification required for the City of Coburg is Water Distribution I. According to information obtained from the OHA data base, the City of Coburg, as May, 2016, employs a total of 2 certified operators, with 1 certified at WD1 and 1 certified at WD4. Robert Butler presently is the DRC operator (direct responsible charge) with DL4 and TL1 levels for the city.

Conservation Plan

The City of Coburg updated their Water Management and Conservation Plan in November, 2008. The plan includes elements of water conservation, procedure for voluntary or mandatory water rationing, and general information about the water system. In addition, to encourage conservation of water, the following steps are recommended:

1. Implement a zonal leak detection program.

2. Establish and implement water rates based on sliding fee. Charge at minimum flat rate for first 1,000 gallons or 100 cubic feet then an increasing unit amount above base flow.

3. Test all service meters at a 10 year maximum interval, using a statiscal percentage of all service meters from various locations within the city. For accuracy a minimum of 1% (.01) should be evaluated.

4. Test all Master and production meters at 5 year maximum intervals.

5. Hold public forums and encourage conservation through direct mailings and billing stuffers.

6. Periodically tour and examine the distribution system network to visually discover leaks. Perform leak detection survey and correction.

7. Encourage the installation of low flow devices such as: low flow shower heads, low flow toilets, and efficient irrigation practices such as drip irrigation on all new and existing services. Consider possible rebate or purchase program for water conservation devices.

Emergency Plan

The City of Coburg's water system is susceptible to various types of emergencies. These include: power outages, flooding, and storm damage. A procedure for each scenario should be addressed and all personnel fully informed and trained. The following items are specific incidents that may affect the water system with specific recommended corrective action. Each plan must have a person in responsible charge that will assume leadership and direction. In the case of Coburg, the Public Works Supervisor or Director should assume this role. Communication methods other than telephone or cell phones should be available. This can be short wave, citizens band, or two-way radio.

Power Outages

This is expected to be the most common and frequent emergency. Since standby power facilities are available at several wells, the City should undertake the following steps during a power outage:

1. Verify if the outage is a local type affecting only one or both wells or widespread throughout the city.

2. If localized, activate all available back-up sources, notify the serving utility of outage.

3. If widespread, notify the serving utility and ask for estimated time for service restoration.

4. If outage is expected to last for several hours, activate the back-up generators as necessary to maintain system pressure.

5. Notify the customers through door-to-door contact and/or public address to conserve water and limit use.

Flooding

1. All well heads should be at least 1'-2' above highest anticipated 100 Year flood levels.

2. All electrical facilities and equipment should be well above any flood levels.

3. All water lines in flood prone areas should be inspected regularly for adequate restraint and support.

Earthquakes

1. Verify structural integrity of all storage vessels - Repair any cracking or settlement.

2. All pumps and mechanical equipment should be firmly anchored to a support base.

3. Pipelines on exposed slopes are especially prone to failure and/or sliding. These pipes should be buttressed and adequately supported.

4. Reinforce support of all creek crossings.

5. After an earthquake, immediately inspect all storage facilities to determine structural condition. If failure is imminent, emergency draining may be required. Only drain if absolutely necessary as fire protection and fresh water will be scarce.

6. Develop a standby plan with the Fire District to dedicate locations for alternate source of fire protection supply if water system is not functioning.

7. All new structures should be designed for IBC Seismic Zone 4. All reservoirs should be periodically examined and repaired where necessary.

Storm Damage Prevention

Maintain areas surrounding well sites, and storage facilities free of loose or broken tree limbs that could interrupt power and/or damage facilities. Remove dead trees or trees with bad root system that could fall on a facility during a storm.

1. Periodically examine all electrical services and poles at facilities. Notify utility if loose connections, guy cables, poles, or damage to other electrical equipment is apparent.

2. Verify security of all facilities; bolt down buildings to foundation, if necessary. Install weather stripping on doors and/or windows.

System Contamination and Security

1. Maintain security at all sites. Prevent unauthorized entry to all well, reservoir, and pump sites. Fence all sites not currently secured. Install lockable gates across access roads. Bar all windows into building. Install dead bolt locks.

2. Post all sites with appropriate signage that states "High Voltage", "No Trespassing" or similar warning language.

3. Maintain control of all keys; maintain inventory and list of holders.

4. Change or re-key locks at 5-10 year intervals or after any breach of security.

5. Implement and maintain a cross connection program.

6. If contamination occurs, determine severity, type and likely origin. Discontinue use of source if under suspicion. Verify presence with follow-up Testing before re-activation of source.

7. Notify required regulatory agencies and public, if appropriate.

Wells

1. Maintain all well heads in sanitary condition, screen all vents and access ports.

2. Limit animal and human activity in the vicinity of well areas.

Operation and Maintenance

Effective management of a water system requires several considerations. These include advance planning and budgeting, good record keeping, adequate expansion and replacement funding, proper maintenance procedures, and efficient operation. The following recommended procedures for effective system management are:

1. Maintain complete and accurate water distribution mapping. Update map as required when new pipes to system are added. Verify and identify all valve locations. Correct errors on mapping when excavations uncover unknown or incorrect data.

2. Maintain water rights on all sources, perform testing as required by regulatory agencies. Secure and maintain easements where water mains cross private properties, etc.

3. Develop accurate records of water production from all sources. Develop historical records against water revenue to track system loss.

4. Establish and implement a systematic meter testing program.

5. Develop and maintain good communications with all regulatory agencies such as: Health Division, Water Resources Department, etc.

6. Prepare Operation and Maintenance manual for entire system. Include items such as: emergency procedures, pump data, service instruction, etc.

7. Secure and maintain list of emergency assistance with phone numbers including electricians, pump servicemen, utility contacts, etc.

8. Develop a set of basic standards as they relate to the water system. In general, these standards should include requirements for pipeline material and installation, fire hydrants, cross-connection control, service lines and meters, pipeline locating, and coordination of utilities.

9. Perform daily/weekly inspections of all facilities. Record operating hours and production. Check well pumping levels. Check water levels in reservoirs.

10. Update maps at least once yearly.

11. Exercise all motors at least weekly.

12. Seasonally check all electrical connections, condition, etc.

Chapter Ten

Capital Improvement Program

Chapter Ten
Capital Improvement Program

The Capital Improvement Plan (CIP) for the 2016 Coburg Water System Master Plan Update has been developed to coincide with the known and well-established strengths and historical success of the existing water system while recognizing the need to provide for future growth. In order to accommodate the projected growth and financial limitations, the CIP has been divided into three (3) phases of implementation:

Phase I: 2016-2020

Project No.	Year	Description	Estimated Cost
1A	2016-17	Purchase 2 Acres of property and drill test well at Roberts Road site	$200,000.00
1B	2016-17	400-500 GPM Production well at Roberts Road site (1 or 2 wells)	$225,000.00
1C	2017-18	Pump station at Roberts Road site	$300,000.00
2	2017-18	Install pump control valves at Wells #1 and #2 and install surge anticipator valve at Well #1	$26,000.00
3	2018-19	I-5 bore and 12” transmission line	$540,600.00
4	2018-19	Remove segments of 6” and 12” AC pipe from distribution system and perform burst and crush tests to determine condition	$15,000.00
5	2019-20	Perform well rehabilitation and maintenance procedures on Wells #1 and #2	$36,000.00
		Sub-total Phase I	$1,342,600.00
		(+) 15% Engineering, Administration, Survey, and Legal	$201,390.00
		(+) 20% Contingency	$268,520.00
		Total Phase I	$1,812,510.00

Phase II: 2020-2025

Project No.	Year	Description	Estimated Cost
1	2020-21	3,750' of 12” transmission line to reservoir site	$402,900.00
2	2020-21	New 750,000 gallon reservoir at city property east of I-5	$622,200.00
3	2021-22	Upgrade SCADA controls	$175,000.00
4	2022-23	12” intertie waterline at Coburg Industrial	$78,100.00
5	2023-24	12” intertie waterline at Van Duyn Street	$93,175.00
6	2024-25	12” intertie at Vintage Street	$233,075.00
		Sub-total Phase II	$1,604,450.00
		(+) 15% Engineering, Administration, Survey, and Legal	$240,667.50
		(+) 20% Contingency	$320,890.00
		Total Phase II	$2,166,007.50

Phase III: 2025-2036

Project No.	Year	Description	Estimated Cost
1	2025-26	Replace and demo (2) 500,000 gallon ground level reservoirs with new 1,000,000 gallon reservoir at existing booster pump station site	$739,500.00
2	2027-28	I-5 bore and connection to 12" transmission line	$436,050.00
3	2025-36	6" pipeline replacement project (See Table 10-1)	$630,920.00
		Sub-total Phase III	$1,806,470.00
		(+) 15% Engineering, Administration, Survey, and Legal	$270,970.50
		(+) 20% Contingency	$361,294.00
		Total Phase III	$2,438,734.50

Total of Phases I-III: $6,417,252.00

Table 10-1
Phase III, Project 3 Waterline Improvements Breakdown

Length	Size	Project Location	Estimated Cost
1,045'	6"	Harrison and Macy Streets	$80,125.00
320'	6"	Christian Way	$40,800.00
540'	6"	Coleman Street (from Mill Street to north end of line)	$54,060.00
1,408'	6"	Coleman Street (between Lincoln and Thomas)	$99,450.00
234'	6"	Thomas Street (Coleman to east end of line)	$36,200.00
994'	6"	East Dixon Street (Diamond Street to east end of line)	$77,525.00
2,226'	6"	Delaney Street (between Willamette and Stuart)	$144,330.00
395'	6"	East of Coburg Industrial	$44,880.00
558'	6"	Maple Street (Coleman to east end of line)	$53,550.00
		TOTAL	**$630,920.00**

Conditions of Estimates

1. Construction costs are based on an average of similar local municipal projects completed between 2010-2016 and adjusted for 2016 cost using an ENR Construction Cost Index of 10,379 (July, 2016), Unless otherwise indicated, estimates do not include the costs of land acquisition, right-of-way or easement purchase, or costs associated with funding or financing. Service line replacement and new hydrants are included on applicable new mains and sub-mains. New pipeline costs are based on the use of ductile iron pipe with minimal asphalt removal and restoration. While substantial effort has been performed to prepare accurate estimates, the City is cautioned that additional factors such as: rock excavation, specific design and construction criteria; inflation, and local work and economic conditions can have a substantial impact on the actual construction costs. Caution should be employed when using these estimates. Estimates are subject to a +20% to -15% variation in accordance with criteria established by the American Association of Cost Estimating Engineers.

2. The 2016 Coburg Water Master Plan Update Capital Improvement Program has been developed and planned to accommodate the projected population and water service growth within the current (2016) city limits and urban growth boundary. Any future expansion of the urban growth or water service boundaries will require a separate analysis and capital improvement program for the intended expansion.

Phase I Improvements (2016-2020)

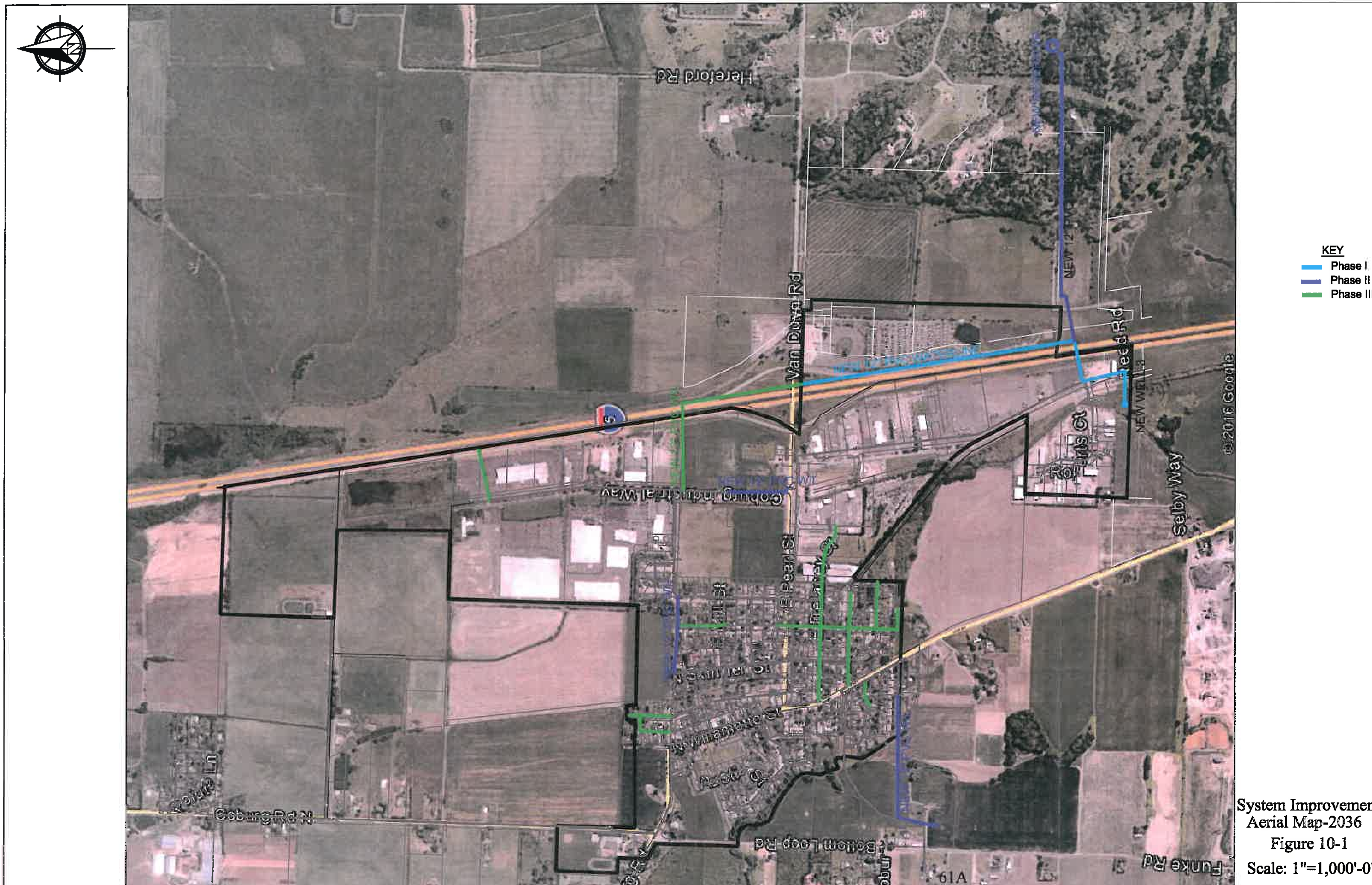
Priority #	Projected Year	Description	Growth/ Operation and Maintenance
1A	2016-17	Purchase 2 Acres of property and drill test well at Roberts Road site	100% Growth 0% O&M
1B	2016-17	400-500 GPM Production well at Roberts Road site (1 or 2 wells)	100% Growth 0% O&M
1C	2017-18	Pump station at Roberts Road site	100% Growth 0% O&M
2	2017-18	Install pump control valves at Wells #1 and #2 and install surge anticipator valve at Well #1	0% Growth 100% O&M
3	2018-19	I-5 bore and 12" transmission line	100% Growth 0% O&M
4	2018-19	Remove segments of 6" and 12" AC pipe from distribution system and perform burst and crush tests to determine condition	0% Growth 100% O&M
5	2019-20	Perform well rehabilitation and maintenance procedures on Wells #1 and #2	0% Growth 100% O&M

Phase II Improvements (2020-2025)

Priority #	Projected Year	Description	Growth/ Operation and Maintenance
1	2020-21	12" transmission line to reservoir site	75% Growth 25% O&M
2	2020-21	New 750,000 gallon reservoir at city property east of I-5	75% Growth 25% O&M
3	2021-22	Upgrade SCADA controls	75% Growth 25% O&M
4	2022-23	12" intertie waterline at Coburg Industrial	50% Growth 50% O&M
5	2023-24	12" intertie waterline at Van Duyn Street	50% Growth 50% O&M
6	2024-25	12" intertie at Vintage Street	50% Growth 50% O&M

Phase III Improvements (2025-2036)

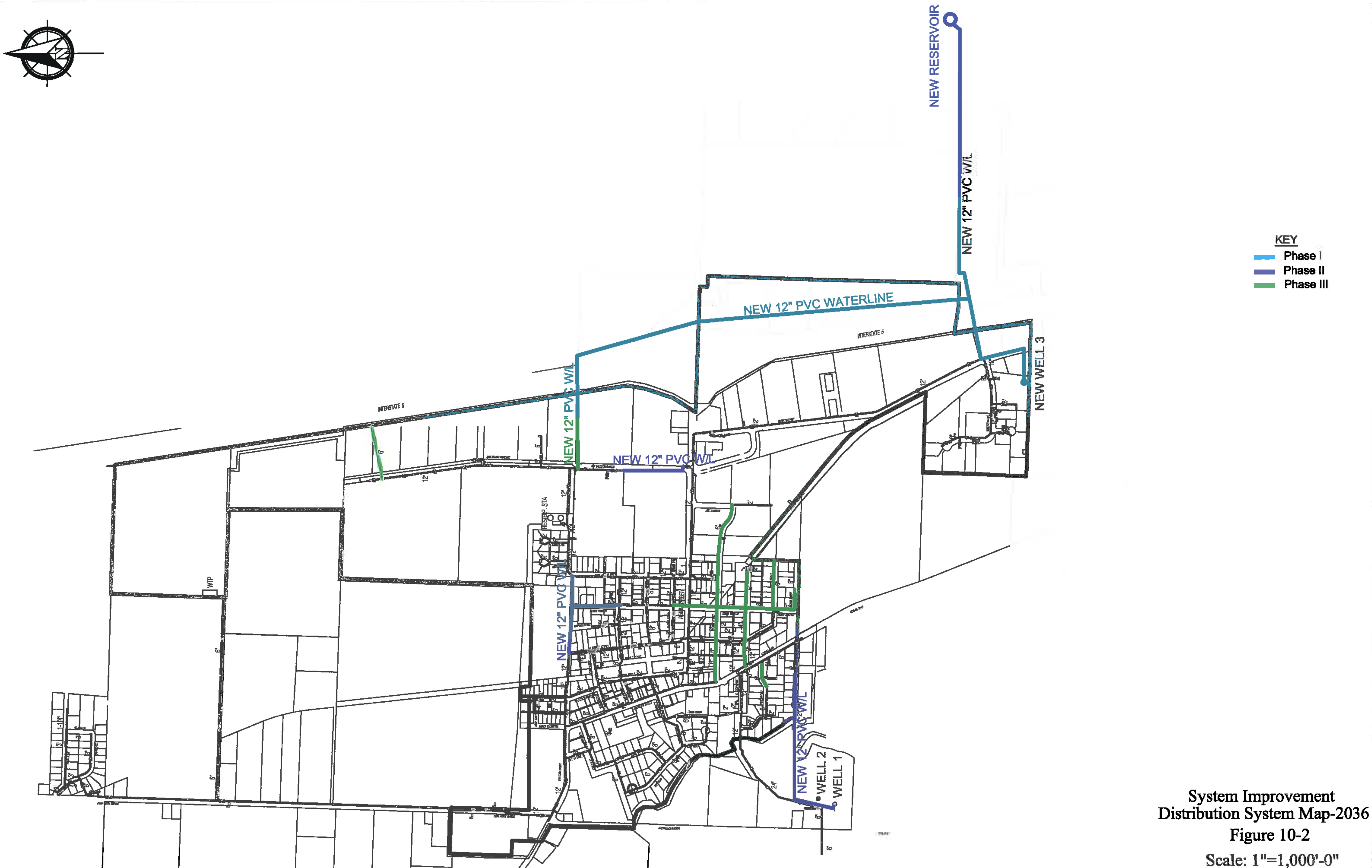
Priority #	Projected Year	Description	Growth/ Operation and Maintenance
1	2025-26	Replace and demo (2) 500,000 gallon ground level reservoirs with new 1,000,000 gallon reservoir at existing booster pump station site	0% Growth 100% O&M
2	2027-28	I-5 bore and connection to 12" transmission line	100% Growth 0% O&M
3	2025-36	6" pipeline replacement project (See Table 10-1)	0% Growth 100% O&M



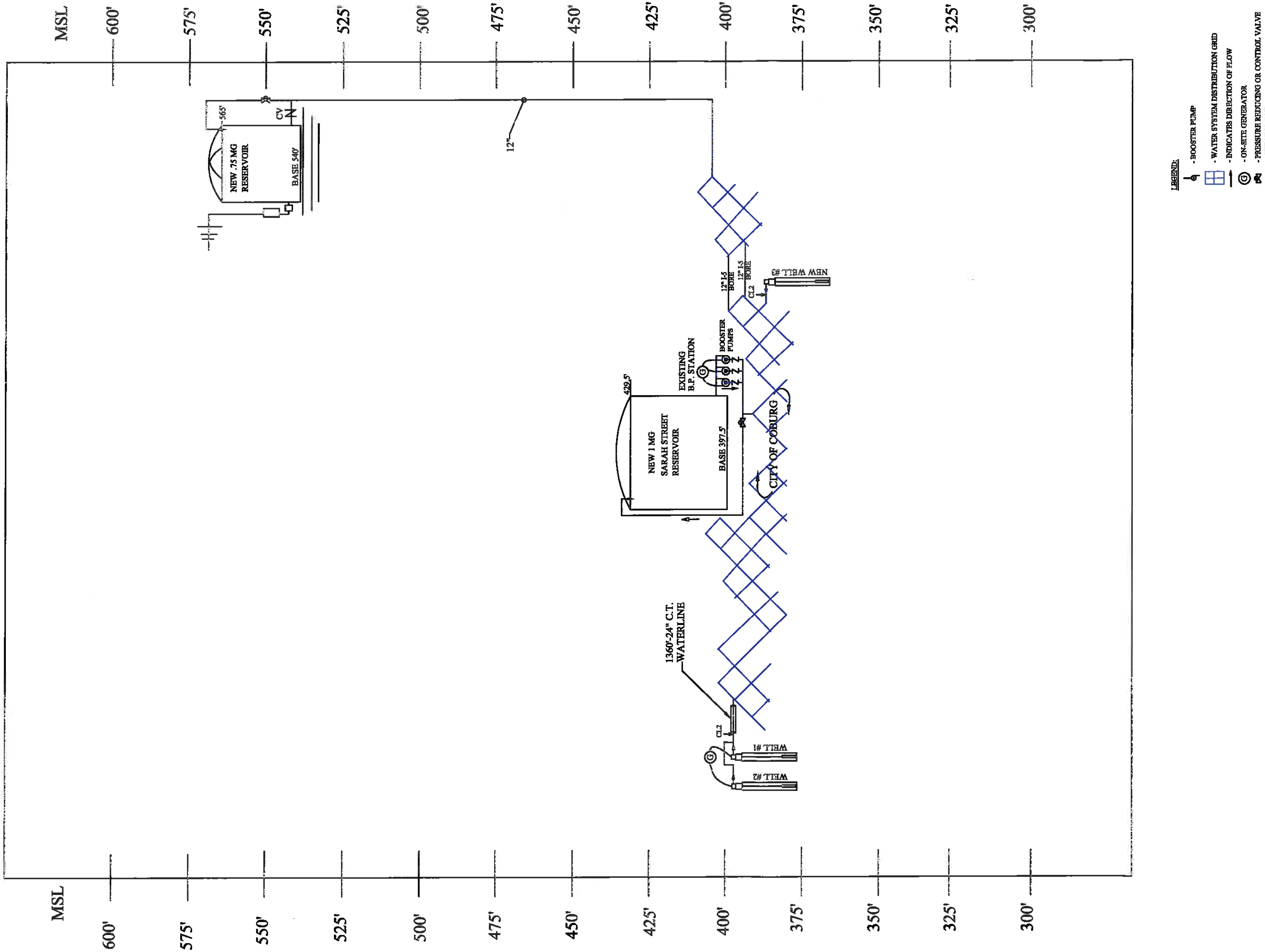
System Improvement Aerial Map-2036

Figure 10-1

Scale: 1"=1,000'-0"



System Improvement
Distribution System Map-2036
Figure 10-2
Scale: 1"=1,000'-0"



Municipal Water System
Configuration-2036
Figure 10-3

Chapter Eleven

Financial Planning

Chapter Eleven
Financial Planning

The proposed improvements outlined in the preceding sections of this study will require substantial sums of money to implement. This portion of the study will provide information on various funding sources and options the City can pursue to finance the improvements.

A complete revenue analysis is beyond the scope of this study. The City should employ the services of a rate analyst to evaluate current operating costs, depreciation, and improvement program to assist in establishing revised systems development charges or water rates before the City begins extensive improvements.

Financing Capital Improvements

If the city requires funding there are several options that exist to adequately fund the proposed capital improvements outlined in this study. These include the sale of General Obligation, Bancroft, or Revenue Bonds; government loans or grants; use of system development charges and system revenue. Each type will be addressed separately.

General Obligation (G.O.) Bonds

This form of debt is backed by the "full faith and credit" of the taxing entity and as the name implies, is a general obligation of the entity. Generally, these types of bonds are obtained at a slightly better interest rate than Revenue Bonds. Issuance of these types of bonds must be approved by a simple majority of the registered voters within the City. Current Oregon statute places a ceiling limitation of G.O. debt which is based on the size of the City as well as the total valuation within the City.

Financing by General Obligation bonds is accomplished by the following procedure:

1. The City's engineer prepares a detailed cost estimate to determine the total funds required for construction.

2. An election is held within the City.

3. When voter approval is granted, bonds are offered for sale and the money for actual design and construction is obtained prior to preparation of final engineering plans and the start of construction.

General Obligation Bonds are usually retired through ad valorem taxation and/or water use revenues. Ad valorem taxation affects all property within the City that will ultimately benefit by the water system, whether the property is presently developed or not. Taxes levied from G.O. Bonds are outside the limits imposed by Measure Five. Construction costs are more equally distributed among all property owners and the program does not impose a penalty on existing residential or business development if they are not benefited. General Obligation Bonds are typically issued for repayment within 20 - 40 years.

Bancroft Act (Improvement Bonds)

Under an Oregon law known as the Bancroft Act, cities and districts may assess a portion of the cost of water lines against the property directly benefited. All property within the assessment area is assessed on an equal basis, regardless of whether it is developed or not. Many communities will assess and allow repayment on a deferred basis. Assessments are applied as a property lien against benefited properties and must be repaid through non-taxing revenues. Many times, cash payments are made by affected property owners and the City issues bonds and levies assessments only on the unpaid balance. If the Improvement Bond Option is taken, the City sells Bancroft Bonds to finance construction costs and the property owner may repay the assessment in 20 semi-annual installments with simple interest. This option is limited by the *effect* of Measure Five that limits assessments to *$10/$1000* assessed value without voter approval. Given the limitations of Improvement Bonds, this type of financing is generally not advantageous for improvements of this type.

Revenue Bonds

This type of funding must be procured by a vote of the citizenry and is prompted by the city. This type of debt is backed by the revenues generated by proceeds from the system itself. These bonds constitute a lien against earnings of the utility, which they are financing. Bonds may be issued for varying periods of time and at interest rates depending upon the bond market. Bonds are repaid by revenue (after operation and maintenance expenses) derived from the City. The City protects the bond purchasers by agreeing to establish and maintain water rates sufficient to pay the annual bond payment plus a 30 - 50% reserve.

Limited Tax Bond

Under current Oregon law, bonds may be issued and sold up to one-half of one percent of Real Market Value (RMV) of the affected entity without election or vote. Taxes which are levied to meet the debt service, however, are subject to the limits of Measure Five.

Government Loans or Grants

Several government agencies, both state and federal, are available for possible financing of water system improvements:

1. **Rural Economic & Community Development:** The RECD provides financial assistance for water supply and waste disposal facilities in rural areas and towns up to 10,000 people. Borrowers must be unable to obtain needed funds from other sources at reasonable rates and terms; have legal capability to borrow and repay loans, pledge security for loans, and operate the facilities; and be financially sound through taxing, assessments, revenues or other forms of income to pay 0 & M costs an retire the debt. Maximum term on a loan is 40 years and loan rates reflect the current market.

2. **Oregon Community Development Block Grant Program (CDBG):** Preference to these grants is given to projects which primarily benefit low and moderate income persons and projects needed to resolve violations of health standards. The maximum grant amount is $500,000 which can include costs relative to right-of-way, engineering, construction, and grant administration.

3. **Special Public Works Fund:** This program provides loan and grant assistance to eligible municipalities or districts for the construction of publicly owned infrastructure needed to create or retain permanent jobs or improve the community's ability to keep or attract business and industry. This type of funding would most likely not be as attractive as others due to the minimum interest rate of 6.5% and documented job creation requirement.

4. **Drinking Water State Revolving Fund (DWSRF):** The primary purpose of this fund is to make loans to water systems for construction projects to improve health and to meet safe drinking water standards. After State legislative approval, the Oregon Economic Development Dept. (OEDD) will assume administrative responsibility for this program in Oregon.

Also available for financing consideration are: Water Resources Department Water Development Loan Fund and Economic Development Administration Public Works Grant.

Systems Development Charge (SDC)

Oregon law allows municipalities and service districts the ability to charge a reimbursement
system development charge, an improvement system development charge, or a combination of the two. The methodology and implementation of SDC's in Oregon is regulated by Oregon Revised Statues 223.297-314 which became effective on July 1, 1991. The reimbursement SDC's is developed to recover the costs of existing capital improvements or improvements under construction. An improvement SDC's is designed to recover the costs associated with planned capital improvements. Under current Oregon law, local governments are allowed the ability to assess SDC's for the following types of improvements:

1. Water supply, treatment, and distribution

2. Wastewater collection, transmission, treatment, and disposal.

3. Drainage and flood control

4. Transportation

5. Parks and Recreation

Guidelines for the calculation and implementation of SDC's must follow specific criteria outlined in the Statute and administrative rules. The legislation requires the reimbursement

SDC's to be established by an ordinance or resolution setting forth the methodology used to calculate the charge. This procedure must consider the cost of existing facilities, prior contributions by existing users, the value of unused capacity, and other relevant factors. The primary objective of the methodology must be that future system users contribute no more than an equitable share of the capital costs of existing facilities.

Additional provisions of the law require the deposit of SDC's revenues into dedicated accounts; annual accounting of revenues and expenditures, creation of an administrative appeals procedure to allow a citizen or other interested part the opportunity of challenging an expenditure of SDC's revenues, and expenditure of reimbursement fees only on improvements associated with the specific system that the fees were assessed.

REFERENCES

City of Coburg Water System Master Plan; Branch Engineering; May, 2006

Population Forecasts for Land County, Its Cities, and Unincorporated Areas 2008-2035; Portland State University; May, 2009

Coburg Urbanization Study Update; Lane Council of Governments; April, 2010 with June, 2014 Updates

Coordinated Population Forecast 2015-2065-Lane County; Portland State University; June, 2015

Water Management and Conservation Plan; Branch Engineering; November, 2008, Revised January 2012

City of Independence Water Master Plan; 4B Engineering

City of Monmouth Water Master Plan; 4B Engineering

4B Engineering Planning Criteria

Appendix

WATERLAB CORP.

2603 - 12th Street, SE
Salem, OR 97302
Voice: (503) 363-0473
FAX: (503) 363-8900

TEST REPORT

TO: 4-B Engineering & Consulting
3700 River Rd N Suite 2
Keizer, OR 97303

06/22/2016

4BENG

PO#:

Collection Information

Date: 06/17/2016
Time: 1000
By: B Saltarello

Lab #: 20160617-083
Location: well #1 hose bib

Lab Receipt Information

06/17/2016
1406
RD

Case Narrative

The analyses were performed according to the guidelines in the WATERLAB Corp Quality Assurance Program. This report contains analytical results for the sample(s) as received by the laboratory.

WATERLAB Corp certifies that this report is in compliance with the requirements of NELAC. No unusual difficulties were experienced during analysis of this batch except as noted below or qualified with data flags on the reports.

Analyte	Method	Acc*	Results	Qual	MRL	Units	EPA Limit	Analysis Date	Time	Tech
Ground Water Series / Rush										
pH	EPA 150.1	A	7.73	H		pH units	6.5 - 8.5	06/17/2016	1554	AS
Specific Conductance	SM2510B	A	285.		1.	umhos/cm		06/21/2016		AS
Alkalinity, Total	SM2320 B	A	125.		10.	mg/l CaCO3		06/21/2016		AS
Arsenic	SM3113B	A	0.0041		0.002	mg/l	0.010	06/21/2016		BEM

ND- No Detection at @ MRL
SM-"Standard Methods for the Examination of Water & Wastewater", 19th ed
EPA- "Methods for Chemical Analysis for Water and Wastes",USEPA
MRL-"Method Reporting Limit"
* Accreditation
A- Waterlab Corporation, ORELAP 100039
The EPA Level of 0.015 mg/liter (or ppm) also listed as 15 ppb is an ACTION LEVEL, NOT A SAFE HEALTH STANDARD. There is NO safe level of lead in drinking water. This Action Level does NOT mean that waters with lower levels are safe.
The results relate only to the parameters tested or to the sample as received by the laboratory.
This report shall not be reproduced except in full, without the written approval of Waterlab Corporation.
H = Analysis performed outside of method specified holding time. pH holding time is 15 minutes.

Approved by: Bettie E. Myers

WATERLAB CORP.

2603 - 12th Street, SE
Salem, OR 97302
Voice: (503) 363-0473
FAX: (503) 363-8900

TEST REPORT

Analyte	Method	Acc*	Results	Qual	MRL	Units	EPA Limit	Analysis Date Time		Tech
Hardness as CaCO3	SM2340C	A	113.		10.	mg/l CaCO3	250	06/22/2016		AS
Iron	SM3111B	A	ND		0.1	mg/l	0.3	06/21/2016		BEM
Manganese	SM3111B	A	ND		0.01	mg/l	0.05	06/21/2016		BEM
Nitrogen, Nitrate	EPA 300.0		1.28		0.2	mg/l N		06/17/2016	1956	AS
Tannin/Lignin	Hach 8193		0.2			mg/l		06/20/2016		AS
Total Solids, Dissolved	SM2540 C	A	232.			mg/l		06/20/2016		AS
Calcium	SM3111B	A	4.27		2	mg/l		06/22/2016		bem
Chloride	EPA300.0	A	7.08		0.2	mg/l	250	06/17/2016		bem
Fluoride	EPA300.0	A	ND		0.2	mg/l	4.0	06/17/2016		bem
Sodium	SM3111B	A	14.5		1.0	mg/l	20.	06/22/2016		bem
Sulfate	EPA300.0	A	10.7		1.5	mg/l	250	06/17/2016		bem
Zinc	SM3111 B	A	ND		0.1	mg/l	5.0	06/22/2016		bem

ND- No Detection at @ MRL
SM-"Standard Methods for the Examination of Water & Wastewater",18th ed
EPA- "Methods for Chemical Analysis for Water and Wastes",USEPA
MRL-"Method Reporting Limit"
* Accreditation
A- Waterlab Corporation, ORELAP 100039
The EPA Level of 0.015 mg/liter (or ppm) also listed as 15 ppb is an ACTION LEVEL, NOT A SAFE HEALTH STANDARD. There is NO safe level of lead in drinking water. This Action Level does NOT mean that waters with lower levels are safe.
The results relate only to the parameters tested or to the sample as received by the laboratory.
This report shall not be reproduced except in full, without the written approval of Waterlab Corporation.
H = Analysis performed outside of method specified holding time. pH holding time is 15 minutes.

Approved by: Bitti E. Myers

WATERLAB CORP.

2603 - 12th Street, SE
Salem, OR 97302
Voice: (503) 363-0473
FAX: (503) 363-8900

TEST REPORT

TO: 4-B Engineering & Consulting
3700 River Rd N Suite 2
Keizer, OR 97303

06/22/2016

4BENG

PO#:

Collection Information

Date: 06/17/2016
Time: 1005
By: B Saltarello
Lab #: 20160617-084
Location: well #2 hose bib

Lab Receipt Information

06/17/2016
1406
RD

Case Narrative

The analyses were performed according to the guidelines in the WATERLAB Corp Quality Assurance Program. This report contains analytical results for the sample(s) as received by the laboratory.

WATERLAB Corp certifies that this report is in compliance with the requirements of NELAC. No unusual difficulties were experienced during analysis of this batch except as noted below or qualified with data flags on the reports.

Analyte	Method	Acc*	Results	Qual	MRL	Units	EPA Limit	Analysis Date	Time	Tech
Ground Water Series / Rush										
pH	EPA 150.1	A	7.36	H		pH units	6.5 - 8.5	06/17/2016	1600	BEM
Specific Conductance	SM2510B	A	422.		1.	umhos/cm		06/21/2016		AS
Alkalinity, Total	SM2320 B	A	170.		10.	mg/l CaCO3		06/21/2016		AS
Arsenic	SM3113B	A	ND		0.002	mg/l	0.010	06/21/2016		BEM

ND- No Detection at @ MRL
SM-"Standard Methods for the Examination of Water & Wastewater",19th ed
EPA- "Methods for Chemical Analysis for Water and Wastes",USEPA
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Approved by: Bettie E. Myers

WATERLAB CORP.

2603 - 12th Street, SE
Salem, OR 97302
Voice: (503) 363-0473
FAX: (503) 363-8900

TEST REPORT

Analyte	Method	Acc*	Results	Qual	MRL	Units	EPA Limit	Analysis Date	Time	Tech
Hardness as CaCO3	SM2340C	A	184.		10.	mg/l CaCO3	250	06/22/2016		AS
Iron	SM3111B	A	ND		0.1	mg/l	0.3	06/21/2016		BEM
Manganese	SM3111B	A	ND		0.01	mg/l	0.05	06/21/2016		BEM
Nitrogen, Nitrate	EPA 300.0		6.07		0.2	mg/l N		06/17/2016	2018	AS
Tannin/Lignin	Hach 8193		0.2			mg/l		06/20/2016		AS
Total Solids, Dissolved	SM2540 C	A	326.			mg/l		06/20/2016		AS

ND- No Detection at @ MRL
SM-"Standard Methods for the Examination of Water & Wastewater",18th ed
EPA- "Methods for Chemical Analysis for Water and Wastes",USEPA
MRL-"Method Reporting Limit"
* Accreditation
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The results relate only to the parameters tested or to the sample as received by the laboratory.
This report shall not be reproduced except in full, without the written approval of Waterlab Corporation.
H = Analysis performed outside of method specified holding time. pH holding time is 15 minutes.

Approved by: Bettie E. Myers

Well #1

LANE 68362

LANE 68362

WELL I.D. # L 94517

(1) LAND OWNER Well Number Well #1

Name City of Coburg

Address P.O. Box 8326

City Coburg State OR Zip 97408

(2) TYPE OF WORK

☒ New Well ☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment

(3) DRILL METHOD:

☐ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger

☐ Other

(4) PROPOSED USE:

☐ Domestic ☒ Community ☐ Industrial ☐ Irrigation

☐ Thermal ☐ Injection ☐ Livestock ☐ Other

(5) BORE HOLE CONSTRUCTION:

Special Construction approval ☐ Yes ☐ No Depth of Completed Well 197 ft.

Explosives used ☐ Yes ☐ No Type ____ Amount ____

HOLE			SEAL			
Diameter	From	To	Material	From	To	Sacks or pounds

How was seal placed: Method ☐A ☐B ☐C ☐D ☐E

☐ Other

Backfill placed from ____ ft. to ____ ft. Material ____

Gravel placed from ____ ft. to ____ ft. Size of gravel ____

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	12	0	197		☒	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Drive Shoe used ☐ Inside ☐ Outside ☐ None

Final location of shoe(s)

(7) PERFORATIONS/SCREENS:

☐ Perforations Method ____

☐ Screens Type ____ Material ____

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
110	167					☒	☐
						☐	☐
						☐	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour

☐ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
			1 hr.

Temperature of water ____ Depth Artesian Flow Found ____

Was a water analysis done? ☐ Yes By whom ____

Did any strata contain water not suitable for intended use? ☐ Too little

☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other ____

Depth of strata: ____

(9) LOCATION OF WELL by legal description:

County Lane Latitude ____ Longitude ____

Township 16S N or (S) Range 3.0 E or (W) WM.

Section 32 NE 1/4 SE 1/4

Tax Lot ____ Lot ____ Block ____ Subdivision ____

Street Address of Well (or nearest address) 32501 Coburg Loop Rd.

(10) STATIC WATER LEVEL:

9.5 ft. below land surface. Date 3/25/09

Artesian pressure ____ lb. per square inch Date ____

(11) WATER BEARING ZONES:

Depth at which water was first found ____

From	To	Estimated Flow Rate	SWL

(12) WELL LOG:

Ground Elevation 390

Material	From	To	SWL
For Material, see			
LANE 7553, Located 350 feet			
north of LANE 68362.			

RECEIVED

MAY 27 2011

WATER RESOURCES DEPT

SALEM, OREGON

Date started ____ Completed ____

SOURCE OF DATA/INFO Department files, Well log LANE 7573 for Well #2 and down hole video

COMPILED BY: Marc A Norton

DATE: Aug 24, 2009

WELL INFORMATION REPORT 11/16/2000

T 11252

LANE 7553

Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem Oregon 97301-1266
(503) 986-0900
www.wrd.state.or.us

Application for
Well ID Number

L 94516
4-4-08 by MM
Log Lane 7553

Do not complete if the well already has a Well I.D Number.

I. OWNER INFORMATION

Current Owner Name *(please print)*: City of Coburg Public Works
Mailing Address: PO Box 8316
City, State, Zip: Coburg OR 97408
Mailing Address *(to send Well I.D.)*:
City, State, Zip:

II. WELL INFORMATION *(Do not complete this section if the well report is attached.)*

Township: 16 S (North/South) Range: 3W (East/West) Section: 32
Tax Lot: 2002 County Lane NE 1/4 SE 1/4
Street Address of Well, City: Funke Rd.
Owner at time the well was constructed, (if known): City
If the property had a different street address in the past:

III. GENERAL WELL INFORMATION *(Do not complete this section if the well report is attached)*

Use of Well (domestic, irrigation, commercial, industrial, monitoring):
Date Well Constructed: Total Well Depth: Casing Diameter:
Other Information: 44.13284, -123.07029 by M. Norton
2ft casing ht above cement floor @ GL

SUBMITTED BY *(please print)*: Michael Mattick
District 2 Watermaster
220 5th St.
Springfield, Oregon 97477
PHONE:

Send application to Oregon Water Reso[...] [...]uite A; Salem, Oregon 97301-1266; fax (503) 986-0902. Applications are processed and Well I.D. Numbers are mailed every Tuesday.

For Official Use of the Oregon Water Resources Department
Received Date: Well Log Number: Well Identification:

RECEIVED
APR 15 2008
WATER RESOURCES DEPT
SALEM OREGON

Well #2

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the
WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310
within 30 days from the date of well completion.

WATER WELL REPORT LANE 7553
LANE 7553
STATE OF OREGON
(Please type or print)
(Do not write above this line)

RECEIVED
AUG 25 1977
WATER RESOURCES DEPT.
SALEM, OREGON

State Well No. 16S/3W-32-d
State Permit No.

(1) OWNER:
Name: CITY OF COBURG
Address: COBURG, OREGON

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable ☒ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐

CASING INSTALLED: Threaded ☐ Welded ☒
10" Diam. from +2 ft. to 83 ft. Gage .365
10" Diam. from 75 ft. to 84 ft. Gage .365
10" Diam. from 101 ft. to 122 ft. Gage .365
10" Diam. from 167 ft. to 200 ft. Gage .365

PERFORATIONS: Perforated? ☐ Yes ☒ No.
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS: Well screen installed? ☒ Yes ☐ No
Manufacturer's Name: JOHNSON WELL SCREEN
Type: TELESCOPE Model No. S. STEEL
Diam. 10 Slot size 130 Set from 85 ft. to 99 ft.
Diam. 10 Slot size 50-160 Set from 120 ft. to 167 ft.

(8) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☒ Yes ☐ No If yes, by whom? CARTER'S
Yield: 475 gal./min. with 57 ft. drawdown after 12 hrs.
" " " "
" " " "
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water 52° Depth artesian flow encountered ft.

CONSTRUCTION:
Well seal—Material used: CEMENT
Well sealed from land surface to 74 ft.
Diameter of well bore to bottom of seal 14 in.
Diameter of well bore below seal 10 in.
Number of sacks of cement used in well seal 91 sacks
How was cement grout placed? GROUT PUMP
BOTTOM UP

RECEIVED
MAY 27 2011
WATER RESOURCES DEPT
SALEM, OREGON

Was a drive shoe used? ☒ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County: LANE Driller's well number: 2960-22W
¼ SE ¼ Section 32 T. 16S R. 3W W.M.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found 14 ft.
Static level 23 ft. below land surface. Date 4-29-77
Artesian pressure lbs. per square inch. Date

(12) WELL LOG: Diameter of well below casing 10"
Depth drilled 200 ft. Depth of completed well 200 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
CLAY, GRAVEL & COBBLES	0	4	
COBBLES, GRAVEL & SAND	4	26	
COARSE SAND	26	32	
GRAVEL, SAND, BROWN CLAY	32	38	
GRAVEL, SAND	38	74	
BROWN CLAY, SAND & GRAVEL	74	83	
GRAVEL - MEDIUM	83	92	23
GRAVEL, SAND, SMALL COBBLES	92	99	
BROWN CLAY, SAND & GRAVEL	99	103	
BLUE & BLACK CLAY, SAND & GRAV.	103	119	
GRAVEL, SAND	119	133	
WELL GRADED SAND	133	137	
GRAVEL, SAND & BLUE CLAY	137	142	
BLUE CLAY, SAND & GRAVEL	142	154	
GRAVEL, SAND & BLUE CLAY	154	167	
BLUE CLAY, SAND & GRAVEL	167	189	
CEMENTED SAND & GRAVEL	189	198	23
CRUMBLY SHALE	198	200	

Work started 4-4-77 19 Completed JULY 22 1977
Date well drilling machine moved off of well JUNE 22, 1977

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Chas M. Christensen (Drilling Machine Operator) Date JULY 22, 1977
Drilling Machine Operator's License No. 972

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name: CARTER'S DRILLING & PUMP SERVICE (Person, firm or corporation) (Type or print)
Address: 330 S. 3RD STREET, SPRINGFIELD, OREGON
[Signed] (Water Well Contractor)
Contractor's License No. 126 Date JULY 22, 1977

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*45656-119

T 11252

Well #3 (WWTP)

LANE 69599

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

WELL I.D. # L 97367

START CARD # 199951

Instructions for completing this report are on the last page of this form.

(1) LAND OWNER
Well Number
Name City of Coburg
Address PO Box 8316
City Coburg State OR Zip 97408

(2) TYPE OF WORK
☑ New Well
☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment ☐ Conversion

(3) DRILL METHOD
☑ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger ☐ Cable Mud
☐ Other

(4) PROPOSED USE
☐ Domestic ☑ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☐ Other

(5) BORE HOLE CONSTRUCTION
Special Construction: ☐ Yes ☑ No
Depth of Completed Well 140 ft.
Explosives used: ☐ Yes ☑ No Type Amount

BORE HOLE Diameter	From	To	SEAL Material	From	To	Sacks or Pounds
10"	0	20	bentonite	0	20	32 sacks
6"	20	140	chips			

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☑ Other as per OAR 690-210-340
Backfill placed from ft. to ft. Material
Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6"	+2	140	.250	☑	☐	☑	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Drive Shoe used ☐ Inside ☐ Outside ☑ None
Final location of shoe(s) 140'

(7) PERFORATIONS/SCREENS
☑ Perforations Method Star
☐ Screens Type Material

From	To	Slot Size	Number	Diameter	Tele/pipe size	Casing	Liner
20	25	1x3/8	75		PS	☑	☐
32	60	1x3/8	560		PS	☑	☐
79	85	1x3/8	100		PS	☑	☐
105	108	1x3/8	60		PS	☑	☐
129	134	1x3/8	100		PS	☑	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☑ Pump ☐ Bailer ☐ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
130 gpm	13.40		3.5 hours
well output	may fluctuate		

Temperature of water 50 Depth Artesian Flow Found
Was a water analysis done? ☐ Yes By whom
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other
Depth of strata:

(9) LOCATION OF WELL (legal description)
County Lane
Tax Lot 200 Lot
Township 16 S Range 3 W WM
Section 28 NW 1/4 NW 1/4
Lat ° ' " or . (degrees or decimal)
Long ° ' " or . (degrees or decimal)
Street Address of Well (or nearest address) Near 91593 N. Coburg Road Eugene, OR 97408

(10) STATIC WATER LEVEL
2 ft. below land surface. Date 1-19-09
ft. below land surface. Date
Artesian pressure lb. per square inch Date

(11) WATER BEARING ZONES
Depth at which water was first found 10'

From	To	Estimated Flow Rate	SWL
10	34	75 gpm	2
34	138	100 gpm	2

(12) WELL LOG
Ground Elevation

Material	From	To	SWL
topsoil	0	5	2
sand/gravels	5	60	2
clay, tan	60	79	2
sand/gravels	79	81	2
clay, w/sand/gravels	81	84	2
clay, red	84	94	2
clay, tan red	94	105	2
clay w/sand & gravel	105	108	2
clay, tan/red	108	130	2
clay, tan w/sand & gravel	130	134	2
sand, cemented ,tan	134	138	2
tuffs, dark grey	138	140	2

Date Started 1-12-09 Completed 1-19-09

(unbonded) Water Well Constructor Certification
I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

WWC Number Date

Signed

(bonded) Water Well Constructor Certification
I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 636 Date 5-8-09

Signed Paul Christensen V-Pres
Christensen Well Drilling Co.

RECEIVED
MAY 11 2009
WATER RESOURCES DEPT
SALEM, OREGON

ORIGINAL – WATER RESOURCES DEPARTMENT FIRST COPY – CONSTRUCTOR SECOND COPY – CUSTOMER 06/16/2004

Contact Information (Click to Collapse...)

Current contact information

OWNER:
CITY OF COBURG
COBURG, OR 97401

Water Right Information (Click to Collapse...)

Status: Non-Cancelled
County: Lane
File Folder Location: Salem
Watermaster District: 2

Workflow (Click to Collapse...)

Application: G 1726
Permit: G 1580 document
Certificate: 37211 document, paper map
- Signature: 12/22/1970
- Type: Original

Order(s)

Order Origin	Volume-Page	Signature	Description
Special	14-471	3/10/1966	EXTENSIONS OF TIME FOR CERTAIN PERMITS

- View right with Web Mapping
- View Places of Use from Water Rights in the Same Area
- View Reported Water Use

Scanned Documents (Click to Expand...)

Point(s) of Diversion (Click to Collapse...)

POD 1 - WELL NO 3 > MCKENZIE RIVER

Place(s) of Use (Click to Collapse...)

Add TRS grouping

Use - MUNICIPAL USES (Primary); Priority Date: 4/19/1960

Water Right Genealogy (Click to Collapse...)

--No genealogy records available for this water right, try the family link below instead.

View Water Rights in same Family **Report Errors with Water Right Data**

CERTIFICATE NO. 37211

RECEIVED APR 18 1960 STATE ENGINEER SALEM, OREGON
RECEIVED APR 18 1960 STATE ENGINEER SALEM, OREGON

Permit No. G- 1580

APPLICATION FOR A PERMIT

To Appropriate the Ground Waters of the State of Oregon

I, City of Coburg (Name of applicant)

of Coburg (Postoffice Address), county of Lane,

state of Oregon, do hereby make application for a permit to appropriate the following described ground waters of the state of Oregon, SUBJECT TO EXISTING RIGHTS:

If the applicant is a corporation, give date and place of incorporation

June, 1906 Coburg Oregon

1. Give name of nearest stream to which the well, tunnel or other source of water development is situated McKenzie River (Name of stream) tributary of Willamette River

2. The amount of water which the applicant intends to apply to beneficial use is .... cubic feet per second or 250 gallons per minute.

3. The use to which the water is to be applied is Municipal water supply for water users in the City of Coburg.

4. The well or other source is located 357.79 ft. S. 67° 00' E. (N. or S.) and ...... ft. (E. or W.) from the Southwest corner of Isaac Van Duyn Donation Land Claim Number 61, Township 16 South, (Section or subdivision) Range 3 West of the Willamette Meridian, Lane County, Oregon. (If preferable, give distance and bearing to section corner)

(If there is more than one well, each must be described. Use separate sheet if necessary)

being within the NE¼ of the NE¼ of Sec. 32, Twp. 16 S., R. 3 W, W. M., in the county of Lane

5. The ...... (Canal or pipe line) to be ...... miles in length, terminating in the ...... (Smallest legal subdivision) of Sec. ......, Twp. ...... R. ......, W. M., the proposed location being shown throughout on the accompanying map.

6. The name of the well or other works is City of Coburg Well No. 3.

DESCRIPTION OF WORKS

7. If the flow to be utilized is artesian, the works to be used for the control and conservation of the supply when not in use must be described.

8. The development will consist of one well (Give number of wells, tunnels, etc.) having a diameter of 12 inches and an estimated depth of 69 feet. It is estimated that 69 feet of the well will require steel (Kind) casing. Depth to water table is estimated 15± (Feet)

G1—13-66—3.5M

CANAL SYSTEM OR PIPE LINE—

9. (a) Give dimensions at each point of canal where materially changed in size, stating miles from headgate. At headgate: width on top (at water line) .... feet; width on bottom .... feet; depth of water .... feet; grade .... feet fall per one thousand feet.

(b) At .... miles from headgate: width on top (at water line) .... feet; width on bottom .... feet; depth of water .... feet; grade .... feet fall per one thousand feet.

(c) Length of pipe, ... ft.; size at intake, ... in.; in size at .... ft. from intake .... in.; size at place of use .... in.; difference in elevation between intake and place of use, ... ft. Is grade uniform? .... : Estimated capacity, ... sec. ft.

10. If pumps are to be used, give size and type 20 HP Vertical Turbine

Give horsepower and type of motor or engine to be used Have not purchased pump yet.

11. If the location of the well, tunnel, or other development work is less than one-fourth mile from a natural stream or stream channel, give the distance to the nearest point on each of such channels and the difference in elevation between the stream bed and the ground surface at the source of development

12. Location of area to be irrigated, or place of use Municipal Supply City of [illegible]

Township N. or S.	Range E. or W. of Willamette Meridian	Section	Forty-acre Tract	Number Acres To Be Irrigated
16 S	3 W	32	NE¼ NE¼	Municipal
			SE¼ NE¼	
			NE¼ SE¼	
		33	NE¼ NW¼	
			NW¼ NW¼	
			SW¼ NW¼	
			SE¼ NW¼	
			NE¼ SW¼	
			NW¼ SW¼	

(If more space required, attach separate sheet)

Character of soil ....

Kind of crops raised ....

1580

[illegible] to supply the city of Coburg

in Lane county, having a present population of 768

and an estimated population of 785 in 19 60

ANSWER QUESTIONS 14, 15, 16, 17 AND 18 IN ALL CASES

14. Estimated cost of proposed works, $ 4,000.00

15. Construction work will begin on or before May 1, 1960

16. Construction work will be completed on or before May 1, 1960

17. The water will be completely applied to the proposed use on or before June 1, 1960

18. If the ground water supply is supplemental to an existing water supply, identify any application for permit, permit, certificate or adjudicated right to appropriate water, made or held by the applicant. Well No. 1- Registration No. GR-1240, Certificate No. GR-1198

Well No. 2- Registration No. GR-1239, Certificate No. GR-1197

CITY OF COBURG

Raleigh E. Manley

(Signature of applicant)

Remarks: Raleigh E. Manley, Mayor

STATE OF OREGON, }
County of Marion, } *ss.*

This is to certify that I have examined the foregoing application, together with the accompanying maps and data, and return the same for

In order to retain its priority, this application must be returned to the State Engineer, with corrections on or before , 19

WITNESS my hand this day of , 19

STATE ENGINEER

By

ASSISTANT

STATE OF OREGON, } ss.
County of Marion, }

PERMIT

This is to certify that I have examined the foregoing application and do hereby grant the same, SUBJECT TO EXISTING RIGHTS and the following limitations and conditions:

The right herein granted is limited to the amount of water which can be applied to beneficial use and shall not exceed 0.56 *cubic feet per second measured at the point of diversion from the well or source of appropriation, or its equivalent in case of rotation with other water users, from* well No. 3.

The use to which this water is to be applied is municipal

If for irrigation, this appropriation shall be limited to -- *of one cubic foot per second or its equivalent for each acre irrigated and shall be further limited to a diversion of not to exceed* ... *acre feet per acre for each acre irrigated during the irrigation season of each year;*

and shall be subject to such reasonable rotation system as may be ordered by the proper state officer.

The well shall be cased as necessary in accordance with good practice and if the flow is artesian the works shall include proper capping and control valve to prevent the waste of ground water.

The works constructed shall include an air line and pressure gauge or an access port for measuring line, adequate to determine water level elevation in the well at all times.

The permittee shall install and maintain a weir, meter, or other suitable measuring device, and shall keep a complete record of the amount of ground water withdrawn.

The priority date of this permit is April 19, 1960

Actual construction work shall begin on or before June 6, 1961 *and shall thereafter be prosecuted with reasonable diligence and be completed on or before October 1, 19*61

*Complete application of the water to the proposed use shall be made on or before October 1, 19*62

WITNESS my hand this 6th *day of* June, *19*60

Lewis A. Stanley
STATE ENGINEER

Application No. G-1726

Permit No. G-1580

PERMIT

TO APPROPRIATE THE GROUND WATERS OF THE STATE OF OREGON

This instrument was first received in the office of the State Engineer at Salem, Oregon, on the 19th *day of* April *1960, at* 8:00 *o'clock* A. *M.*

Returned to applicant:

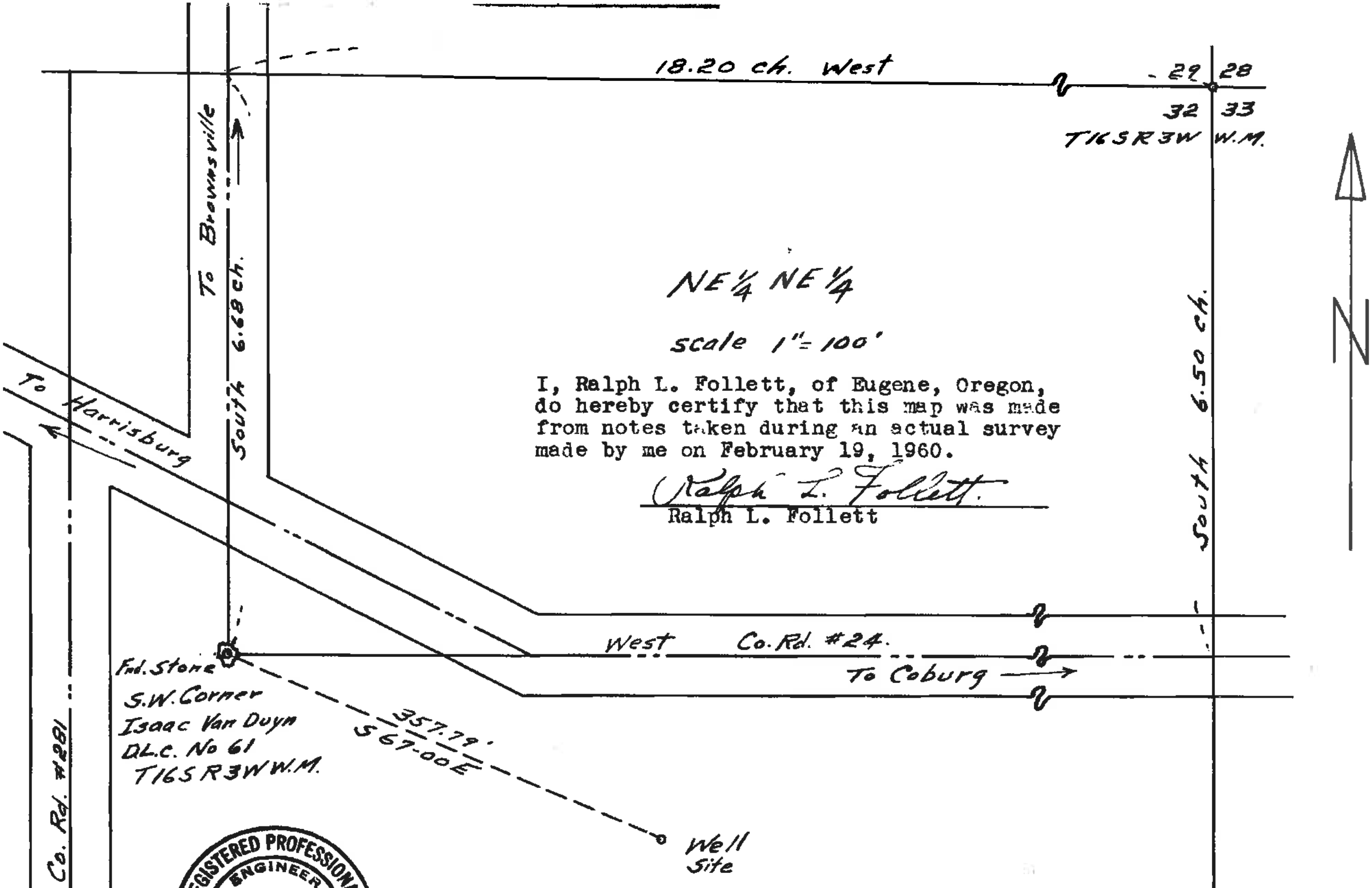
Approved:

Recorded in book No. ... *of Ground Water Permits on page* 1580

STATE ENGINEER

Drainage Basin No. 2 *page* 966

State Printing



I, Ralph L. Follett, of Eugene, Oregon, do hereby certify that this map was made from notes taken during an actual survey made by me on February 19, 1960.

Ralph L. Follett
Ralph L. Follett

REGISTERED PROFESSIONAL ENGINEER
1851
Ralph L. Follett
OREGON
JULY 9, 1937
RALPH L. FOLLETT

R. L. FOLLETT
Engineering & Surveying
15 Ascot Drive
Eugene, Oregon
Phone DI 4-7486

CITY OF COBURG WELL LOCATION

Sec. 32, T. 16 S., R. 3 W., W. M.

Application No. G-1726
No. G-1580

Job No. 60-6

Job 60-6

STATE OF OREGON

COUNTY OF LANE

CERTIFICATE OF WATER RIGHT

This Is to Certify, *That* CITY OF COBURG

of Coburg *, State of* Oregon *, has made proof to the satisfaction of the STATE ENGINEER of Oregon, of a right to the use of the waters of* Well No. 3

a tributary of McKenzie River (Willamette River) *for the purpose of* municipal

under Permit No. G-1580 *of the State Engineer, and that said right to the use of said waters has been perfected in accordance with the laws of Oregon; that the priority of the right hereby confirmed dates from* April 19, 1960

that the amount of water to which such right is entitled and hereby confirmed, for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed 0.31 cubic foot per second

or its equivalent in case of rotation, measured at the point of diversion from the stream. The point of diversion is located in the NE¼ NE¼, as projected within Diamond DLC 44, Section 32, T. 16 S., R. 3 W., W. M. Well located South 67° 00', East 357.79 feet from the SW Corner, Isaac Van Duyn DLC 61.

The amount of water used for irrigation, together with the amount secured under any other right existing for the same lands, shall be limited to - - - - - - - - *of one cubic foot per second per acre,*

and shall conform to such reasonable rotation system as may be ordered by the proper state officer.

A description of the place of use under the right hereby confirmed, and to which such right is appurtenant, is as follows:

E½ NE¼
NE¼ SE¼
Section 32

NW¼
N½ SW¼
Section 33
T. 16 S., R. 3 W., W. M.

The right to the use of the water for the purposes aforesaid is restricted to the lands or place of use herein described.

WITNESS the signature of the State Engineer, affixed

this date. December 22, 1970

CHRIS L. WHEELER

State Engineer

Recorded in State Record of Water Right Certificates, Volume 29 *, page* 37211

Contact Information (Click to Collapse...)

Current contact information

OWNER:
CITY OF COBURG
BOX 328 CITY HALL
COBURG, OR 97401

Workflow (Click to Collapse...)

- **Application: G 4283**
- **Permit: G 4032** document , paper map
- **Certificate: 44837** document , paper map
  - Signature: 10/17/1977
  - Type: Original
- View right with Web Mapping
- View Places of Use from Water Rights in the Same Area
- View Reported Water Use

Water Right Information (Click to Collapse...)

Status: Non-Cancelled
County: Lane
File Folder Location: Salem
Watermaster District: 2

Scanned Documents (Click to Expand...)

Point(s) of Diversion (Click to Collapse...)

- POD 1 - WELL NO 4 > MCKENZIE RIVER

Place(s) of Use (Click to Collapse...)

Add TRS grouping

- **Use - MUNICIPAL USES (Primary); Priority Date: 3/18/1968**

Water Right Genealogy (Click to Collapse...)

---***No genealogy records available for this water right, try the family link below instead.***

View Water Rights in same Family **Report Errors with Water Right Data**

RECEIVED
DEC 11 1967
STATE ENGINEER
SALEM, OREGON

CERTIFICATE NO. 44837

RECEIVED
JAN 18 1968
STATE ENGINEER
SALEM, OREGON

Permit No. G- G 4032

APPLICATION FOR A PERMIT

To Appropriate the Ground Waters of the State of Oregon

I, City of Coburg
(Name of applicant)

of City Hall, Coburg *, county of* Lane *,*
(Postoffice Address)

state of Oregon *, do hereby make application for a permit to appropriate the following described ground waters of the state of Oregon, SUBJECT TO EXISTING RIGHTS:*

If the applicant is a corporation, give date and place of incorporation

June 1906, Coburg, Oregon

1. Give name of nearest stream to which the well, tunnel or other source of water development is situated McKenzie River
(Name of stream)

tributary of Willamette River

2. The amount of water which the applicant intends to apply to beneficial use is 0.67 *cubic feet per second or* 300 *gallons per minute.*

3. The use to which the water is to be applied is municipal

4. The well or other source is located 77 *ft.* N (N. or S.) *and* 74 *ft.* E (E. or W.) *from the* SW *corner of* the H. A. Davis DLC No. 41 (the well is approximately
(Section or subdivision)

351 feet South and 1121 feet west of the N. E. corner of Section 29)
(If preferable, give distance and bearing to section corner)

(If there is more than one well, each must be described. Use separate sheet if necessary)

being within the NE ¼ of the NE ¼ *of Sec.* 29 *, Twp.* 16S *, R.* 3W *,*

W. M., in the county of Lane

5. The Pipeline *to be* 0.05 *miles*
(Canal or pipe line)

in length, terminating in the NE ¼ of the NE ¼ *of Sec.* 29 *, Twp.* 16S *,*
(Smallest legal subdivision)

R. 3W *, W. M., the proposed location being shown throughout on the accompanying map.*

6. The name of the well or other works is Coburg Well No. 3 (Sears)

DESCRIPTION OF WORKS

7. If the flow to be utilized is artesian, the works to be used for the control and conservation of the supply when not in use must be described.

8. The development will consist of one drilled well *having a*
(Give number of wells, tunnels, etc.)

diameter of 12 *inches and an estimated depth of* 201 *feet. It is estimated that* 201 *feet of the well will require* 0.25 inch steel *casing. Depth to water table is estimated* 6 feet
(Kind) (Feet)

on November 4, 1963.

GI— —3.586

CANAL SYSTEM OR PIPE LINE— **G 4032**

9. *(a) Give dimensions at each point of canal where materially changed in size, stating miles from headgate. At headgate: width on top (at water line)* .... *feet; width on bottom* .... *feet; depth of water* .... *feet; grade* .... *feet fall per one thousand feet.*

(b) At .... *miles from headgate: width on top (at water line)* .... *feet; width on bottom* .... *feet; depth of water* .... *feet; grade* .... *feet fall per one thousand feet.*

(c) Length of pipe, 250 *ft.; size at intake,* 6 *in.; in size at* .... *ft. from intake* .... *in.; size at place of use* 6 *in.; difference in elevation between intake and place of use,* 0 ± *ft. Is grade uniform?* Yes *Estimated capacity,* 0.67 *sec. ft.*

10. *If pumps are to be used, give size and type* deepwell turbine pump, 10-inch bowls, 4 stage, 300 gpm at 152 feet of head, 95 foot setting

Give horsepower and type of motor or engine to be used 20 Horsepower electric motor.

11. *If the location of the well, tunnel, or other development work is less than one-fourth mile from a natural stream or stream channel, give the distance to the nearest point on each of such channels and the difference in elevation between the stream bed and the ground surface at the source of development*

12. *Location of area to be irrigated, or place of use* (Municipal service area)

Township N. or S.	Range E. or W. of Willamette Meridian	Section	Forty-acre Tract	Number Acres To Be Irrigated
16S	3W	20, 21, 22	(all of the	
"	"	27, 28, 29	listed sections	
"	"	32, 33, 34	are in future	
17S	3W	3 & 4	service area)	

(If more space required, attach separate sheet)

Character of soil ....

Kind of crops raised ....

G 4032

MUNICIPAL SUPPLY—

13. To supply the city of Coburg

in Lane *county, having a present population of* 900

and an estimated population of 6850 *in* 1995

ANSWER QUESTIONS 14, 15, 16, 17 AND 18 IN ALL CASES

14. Estimated cost of proposed works, $ 10,000

15. Construction work ~~will begin~~ began *on or before* October 8, 1963

16. Construction work ~~will be~~ was *completed on or before* July 1, 1964

17. The water ~~will be~~ was *completely applied to the proposed use on or before* July 1, 1964

18. If the ground water supply is supplemental to an existing water supply, identify any application for permit, permit, certificate or adjudicated right to appropriate water, made or held by the applicant. Certificates GR-1197 and GR-1198, Permit G-1580, and application for permit for Coburg Well No. 4.

City of Coburg
Raleigh E. Manley
(Signature of applicant)
Raleigh E. Manley, Mayor

Remarks:

The well was drilled, the pump installed and the water appropriated in 1963 and 1964.

STATE OF OREGON,
County of Marion, } *ss.*

This is to certify that I have examined the foregoing application, together with the accompanying maps and data, and return the same for

In order to retain its priority, this application must be returned to the State Engineer, with corrections on or before ...., *19*......

WITNESS my hand this .... *day of* ...., *19*......

STATE ENGINEER

By

ASSISTANT

STATE OF OREGON, }
County of Marion, } ss.

PERMIT

This is to certify that I have examined the foregoing application and do hereby grant the same, SUBJECT TO EXISTING RIGHTS and the following limitations and conditions:

The right herein granted is limited to the amount of water which can be applied to beneficial use and shall not exceed 0.67 *cubic feet per second measured at the point of diversion from the well or source of appropriation, or its equivalent in case of rotation with other water users, from* Well No. 3

The use to which this water is to be applied is municipal

If for irrigation, this appropriation shall be limited to ------------ *of one cubic foot per second or its equivalent for each acre irrigated and shall be further limited to a diversion of not to exceed* .... *acre feet per acre for each acre irrigated during the irrigation season of each year;*

and shall be subject to such reasonable rotation system as may be ordered by the proper state officer.

The well shall be cased as necessary in accordance with good practice and if the flow is artesian the works shall include proper capping and control valve to prevent the waste of ground water.

The works constructed shall include an air line and pressure gauge or an access port for measuring line, adequate to determine water level elevation in the well at all times.

The permittee shall install and maintain a weir, meter, or other suitable measuring device, and shall keep a complete record of the amount of ground water withdrawn.

The priority date of this permit is March 18, 1968

Actual construction work shall begin on or before October 23, 1969 *and shall thereafter be prosecuted with reasonable diligence and be completed on or before October 1, 19*70

*Complete application of the water to the proposed use shall be made on or before October 1, 19*71

WITNESS my hand this 23rd *day of* October, 19 68

STATE ENGINEER

pc

Application No. G- 4283

Permit No. G- G 4032

PERMIT

TO APPROPRIATE THE GROUND WATERS OF THE STATE OF OREGON

This instrument was first received in the office of the State Engineer at Salem, Oregon, on the 18th *day of* March *19*68, *at* 8:00 *o'clock* A. *M.*

Returned to applicant:

Approved: October 23, 1968

Recorded in book No. ...... *of Ground Water Permits on page* G 4032

CHRIS L. WHEELER
STATE ENGINEER

Drainage Basin No. 2 *page* 162

$25.00

State Printing

STATE OF OREGON

COUNTY OF LANE

CERTIFICATE OF WATER RIGHT

This Is to Certify, That CITY OF COBURG

of Box 328, City Hall, Coburg, State of Oregon, 97401, has made proof to the satisfaction of the Water Resources Director, of a right to the use of the waters of Well No. 4

a tributary of McKenzie River for the purpose of municipal

under Permit No. G-4032 and that said right to the use of said waters has been perfected in accordance with the laws of Oregon; that the priority of the right hereby confirmed dates from March 18, 1968

that the amount of water to which such right is entitled and hereby confirmed, for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed 0.10 cubic foot per second

or its equivalent in case of rotation, measured at the point of diversion from the stream.

The point of diversion is located in the NE¼ NE¼, as projected within H. A. Davis DLC 41, Section 29, T. 16 S., R. 3 W., W. M., 77 feet North and 74 feet East from the SW Corner, H. A. Davis DLC 41

The amount of water used for irrigation, together with the amount secured under any other right existing for the same lands, shall be limited to ------------ of one cubic foot per second per acre,

and shall conform to such reasonable rotation system as may be ordered by the proper state officer.

A description of the place of use under the right hereby confirmed, and to which such right is appurtenant, is as follows:

NW¼ NW¼
As projected within H. A. Davis DLC 41 & Robert B. Cochran DLC 42
Section 28

NE¼ NE¼
As projected within H. A. Davis DLC 41, Robert B. Cochran
DLC 42, John James Brown DLC 56, & Mannaweather Brown DLC 58
Section 29
T. 16 S., R. 3 W., W. M.

The right to the use of the water for the purposes aforesaid is restricted to the lands or place of use herein described. and is subject to the existing minimum flow policies established by the Water Policy Review Board.

WITNESS the signature of the Water Resources Director, affixed

this date. October 17, 1977

James E. Sexson
Water Resources Director

Recorded in State Record of Water Right Certificates, Volume 36, page 44837

Contact Information (Click to Collapse...)

Current contact information

OWNER:
CITY OF COBURG
PO BOX 328 CITY HALL
COBURG, OR 97401

Workflow (Click to Collapse...)

- **Application: G 4284**
- **Permit: G 4033** document , paper map
- **Certificate: 44838** document , paper map
  - Signature: 10/17/1977
  - Type: Original
- View right with Web Mapping
- View Places of Use from Water Rights in the Same Area
- View Reported Water Use

Water Right Information (Click to Collapse...)

Status: Non-Cancelled
County: Lane
File Folder Location: Salem
Watermaster District: 2

Scanned Documents (Click to Expand...)

Point(s) of Diversion (Click to Collapse...)

- POD 1 - WELL NO 5 > MCKENZIE RIVER

Place(s) of Use (Click to Collapse...)

Add TRS grouping

- **Use - MUNICIPAL USES (Primary); Priority Date: 3/18/1968**

Water Right Genealogy (Click to Collapse...)

No genealogy records available for this water right, try the family link below instead.

View Water Rights in same Family **Report Errors with Water Right Data**

RECEIVED
DEC 11 1967
STATE ENGINEER
SALEM OREGON

RECEIVED
JAN 18 1968
STATE ENGINEER
SALEM OREGON

CERTIFICATE NO. 44838

Permit No. G- G 4033

APPLICATION FOR A PERMIT

To Appropriate the Ground Waters of the State of Oregon

I, City of Coburg
(Name of applicant)

of City Hall, Coburg, *county of* Lane,
(Postoffice Address)

state of Oregon, *do hereby make application for a permit to appropriate the following described ground waters of the state of Oregon,* SUBJECT TO EXISTING RIGHTS:

If the applicant is a corporation, give date and place of incorporation

June 1906, Coburg, Oregon

1. Give name of nearest stream to which the well, tunnel or other source of water development is situated McKenzie River
(Name of stream)

tributary of Willamette River

2. The amount of water which the applicant intends to apply to beneficial use is 1.11 *cubic feet per second or* 500 *gallons per minute.*

3. The use to which the water is to be applied is municipal

4. The well or other source is located 615± *ft.* N (N. or S.) *and* 520± *ft.* E (E. or W.) *from the* SW *corner of* John Diamond DLC #44 (well is approx. 1599± ft. N. and 787± ft. W. of the S. E. Corner of Section 32)
(Section or subdivision)
(If preferable, give distance and bearing to section corner)

(If there is more than one well, each must be described. Use separate sheet if necessary.)

being within the NE ¼ of the SE ¼ *of Sec.* 32, *Twp.* 16S, *R.* 3W, *W. M., in the county of* Lane.

5. The pipeline (Canal or pipe line) *to be* 0.4 *miles in length, terminating in the* SW ¼ of the NW ¼ (Smallest legal subdivision) *of Sec.* 33, *Twp.* 16S, *R.* 3W, *W. M., the proposed location being shown throughout on the accompanying map.*

6. The name of the well or other works is Coburg Well No. 4

DESCRIPTION OF WORKS

7. If the flow to be utilized is artesian, the works to be used for the control and conservation of the supply when not in use must be described.

8. The development will consist of one drilled well (Give number of wells, tunnels, etc.) *having a diameter of* 12 *inches and an estimated depth of* 201 *feet. It is estimated that* 173 *feet of the well will require* ¼ inch steel (Kind) *casing. Depth to water table is estimated* 14 feet (Feet) on September 11, 1963.

G1— —2.5M

CANAL SYSTEM OR PIPE LINE—

G 4033

9. (a) *Give dimensions at each point of canal where materially changed in size, stating miles from headgate. At headgate: width on top (at water line)* .... *feet; width on bottom* .... *feet; depth of water* .... *feet; grade* .... *feet fall per one thousand feet.*

(b) *At* .... *miles from headgate: width on top (at water line)* .... *feet; width on bottom* .... *feet; depth of water* .... *feet; grade* .... *feet fall per one thousand feet.*

(c) *Length of pipe,* 2000 + *ft.; size at intake,* 6 *in.; in size at* .... *ft. from intake* .... *in.; size at place of use* 6 *in.; difference in elevation between intake and place of use,* 0 ± *ft. Is grade uniform?* yes *Estimated capacity,* 1.1 *sec. ft.*

10. *If pumps are to be used, give size and type* deepwell turbine pump, 10 inch bowls, 5 stage, 500 gpm @ 196 feet of head, ~~80~~ 90 foot setting.

Give horsepower and type of motor or engine to be used 30 Horsepower Electric Motor.

11. *If the location of the well, tunnel, or other development work is less than one-fourth mile from a natural stream or stream channel, give the distance to the nearest point on each of such channels and the difference in elevation between the stream bed and the ground surface at the source of development*

12. *Location of area to be irrigated, or place of use* (Municipal service area)

Township N. or S.	Range E. or W. of Willamette Meridian	Section	Forty-acre Tract	Number Acres To Be Irrigated
16S	3W	20, 21, 22	(all of this	
"	"	27, 28, 29	listed sections	
"	"	32, 33, 34	are in future service	
17S	3W	3 & 4	area.)	

(If more space required, attach separate sheet)

Character of soil ....

Kind of crops raised ....

G 4033

MUNICIPAL SUPPLY—

13. *To supply the city of* Coburg

in Lane *county, having a present population of* 900

and an estimated population of 6850 *in 19*95.

ANSWER QUESTIONS 14, 15, 16, 17 AND 18 IN ALL CASES

14. *Estimated cost of proposed works, $* 10,000

15. *Construction work* ~~will begin~~ began *on or before* 8/13/63

16. *Construction work* ~~will be~~ was *completed on or before* January 1, 1964

17. *The water* ~~will be~~ was *completely applied to the proposed use on or before* January 1, 1964.

18. *If the ground water supply is supplemental to an existing water supply, identify any application for permit, permit, certificate or adjudicated right to appropriate water, made or held by the applicant.* Certificates GR-1197 and GR-1198, Permit G-1580 and application for permit for Coburg Well No. 3.

City of Coburg
Raleigh E. Manley
Raleigh E. Manley, Mayor

Remarks:

The well was drilled, the pump installed, and the water appropriated in 1963. The municipal system uses the complete capacity of the installation for beneficial use. Final proof for issuance of a water right certificate can be taken up at any time.

STATE OF OREGON, }
County of Marion, } *ss.*

This is to certify that I have examined the foregoing application, together with the accompanying maps and data, and return the same for ....

In order to retain its priority, this application must be returned to the State Engineer, with corrections on or before ...., *19*......

WITNESS my hand this .... *day of* ...., *19*......

....
STATE ENGINEER

By ....
ASSISTANT

STATE OF OREGON, }
County of Marion, } *ss.*

PERMIT

This is to certify that I have examined the foregoing application and do hereby grant the same, SUBJECT TO EXISTING RIGHTS and the following limitations and conditions:

The right herein granted is limited to the amount of water which can be applied to beneficial use and shall not exceed 1.11 *cubic feet per second measured at the point of diversion from the well or source of appropriation, or its equivalent in case of rotation with other water users, from* Well No. 4

The use to which this water is to be applied is municipal

If for irrigation, this appropriation shall be limited to ---------- *of one cubic foot per second or its equivalent for each acre irrigated and shall be further limited to a diversion of not to exceed* ...... *acre feet per acre for each acre irrigated during the irrigation season of each year;*

and shall be subject to such reasonable rotation system as may be ordered by the proper state officer.

The well shall be cased as necessary in accordance with good practice and if the flow is artesian the works shall include proper capping and control valve to prevent the waste of ground water.

The works constructed shall include an air line and pressure gauge or an access port for measuring line, adequate to determine water level elevation in the well at all times.

The permittee shall install and maintain a weir, meter, or other suitable measuring device, and shall keep a complete record of the amount of ground water withdrawn.

The priority date of this permit is March 18, 1968

Actual construction work shall begin on or before October 23, 1969 *and shall thereafter be prosecuted with reasonable diligence and be completed on or before October 1, 19*70

*Complete application of the water to the proposed use shall be made on or before October 1, 19*71

WITNESS my hand this 23rd *day of* October, 19*68

[signature]
STATE ENGINEER

PC

Application No. G- 4284
Permit No. G- G 4033

PERMIT
TO APPROPRIATE THE GROUND WATERS OF THE STATE OF OREGON

This instrument was first received in the office of the State Engineer at Salem, Oregon, on the 18th *day of* March, *19*68, *at* 8:00 *o'clock* A. *M.*

Returned to applicant:

Approved: October 23, 1968

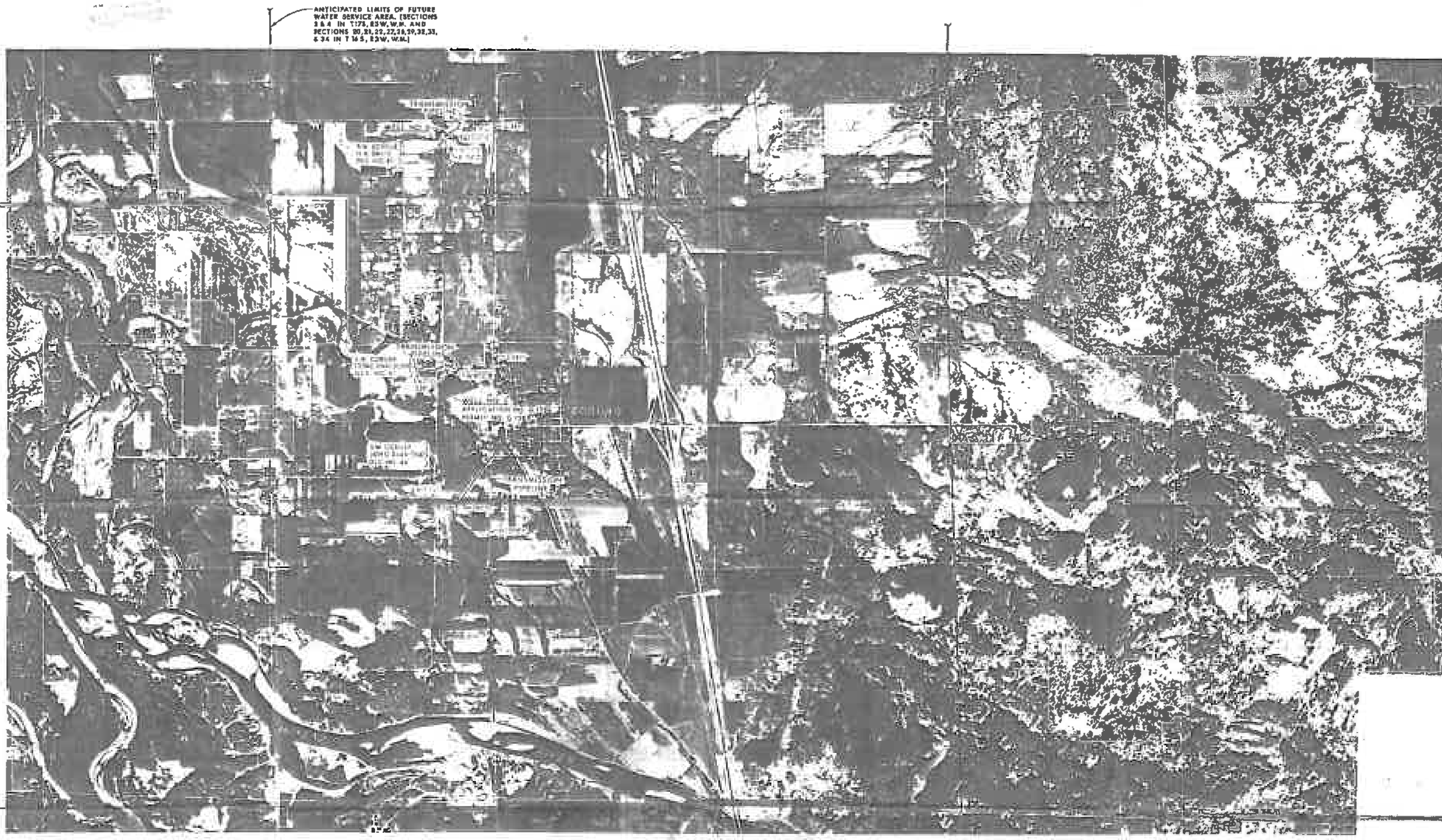
Recorded in book No. ...... *of Ground Water Permits on page* G 4033

CHRIS L. WHEELER
STATE ENGINEER

Drainage Basin No. 2 *page* 102

State Printing

$27⁰⁰



Application No. G-4283 + G-4284
Permit No. G-4032 + G-4033

CITY OF COBURG
WATER RIGHT APPLICATION MAP

SCALE: 1" = 400' DATE: OCT. 1966 OWNER NO.	CORNELL, HOWLAND, HAYES & MERRYFIELD ENGINEERS SEATTLE CORVALLIS BOISE	SHEET 1 OF 1 DWG NO. G3555-2

STATE OF OREGON

COUNTY OF LANE

CERTIFICATE OF WATER RIGHT

This Is to Certify, *That* CITY OF COBURG

of P. O. Box 328, City Hall, Coburg *, State of* Oregon, 97401 *, has made proof to the satisfaction of the Water Resources Director, of a right to the use of the waters of* Well No. 5

a tributary of McKenzie River *for the purpose of* municipal

under Permit No. G-4033 *and that said right to the use of said waters has been perfected in accordance with the laws of Oregon; that the priority of the right hereby confirmed dates from* March 18, 1968

that the amount of water to which such right is entitled and hereby confirmed, for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed 0.30 cubic foot per second

or its equivalent in case of rotation, measured at the point of diversion from the stream. The point of diversion is located in the NE¼ SE¼, as projected within Jonathan Thomas DLC 60, Section 32, T. 16 S., R. 3 W., W. M., 615 feet South and 520 feet East from the SW Corner, John Diamond DLC 44

The amount of water used for irrigation, together with the amount secured under any other right existing for the same lands, shall be limited to ____________ *of one cubic foot per second per acre,*

and shall conform to such reasonable rotation system as may be ordered by the proper state officer.

A description of the place of use under the right hereby confirmed, and to which such right is appurtenant, is as follows:

SEE NEXT PAGE

SW¼ SW¼
As projected within Isaac Van Duyne DLC 61
Section 28

S½ SE¼
As projected within Nancy Ferguson DLC 43,
Mannaweather Brown DLC 58, & Isaac Van Duyne DLC 61
Section 29

N½ NE¼
As projected within Nancy Ferguson DLC 43, John
Diamond DLC 44, Mannaweather Brown DLC 58, & Isaac Van Duyne DLC 61
SE¼ NE¼
As projected within John Diamond DLC 44
Section 32

NW¼
As projected within John Diamond DLC 44 and Isaac Van Duyne DLC 61
N½ SW¼
NW¼ SE¼
Both as projected within John Diamond DLC 44
and Jonathon Thomas DLC 60
Section 33
T. 16 S., R. 3 W., W. M.

The right to the use of the water for the purposes aforesaid is restricted to the lands or place of use herein described. and is subject to the existing minimum flow policies established by the Water Policy Review Board.

WITNESS the signature of the Water Resources Director, affixed this date. October 17, 1977

James E. Sexson
Water Resources Director

Recorded in State Record of Water Right Certificates, Volume 36 *, page* 44838

Contact Information (Click to Collapse...)

Current contact information

OWNER:
CITY OF COBURG
PO BOX 8316
COBURG, OR 97408

Water Right Information (Click to Collapse...)

Status: Non-Cancelled
County: Lane
File Folder Location: Salem
Watermaster District: 2

Workflow (Click to Collapse...)

Application: G 13877
Permit: G 13183 document , paper map
Signature: 7/28/1997

Permit Workflow

Action	Date	Result	Complete
Permit Issued	7/28/1997		
Completion Date [C Date]	10/1/2001		
Extension Application Received	8/6/2003		ANN REECI
Extension Comment Period Ends	8/19/2003		ANN REECI
Extension PFO 315 Issued	6/13/2006	Propose to Approve	ANN REECI
Extension FO Issued	8/18/2006	Extended	ANN REECI
Extended Completion Date [Extension C Date]	10/1/2020		ANN REECI

Order(s)

Order Origin	Volume-Page	Signature	Description
Special	85-390	9/14/2011	T-11252 APPROVING POA
Special	89-131	3/21/2013	WMCP FOR THE CITY OF COBURG

Transfer(s)

Transfer	Transfer type	Status
T11252 ()	Permit Amendment	Approved

View right with Web Mapping
View Places of Use from Water Rights in the Same Area
View Reported Water Use

Scanned Documents (Click to Expand...)

Point(s) of Diversion (Click to Collapse...)

POD 1 - A WELL > MILL SLOUGH
POD 2 - A WELL > MILL SLOUGH

Place(s) of Use (Click to Collapse...)

Add TRS groupin

Use - MUNICIPAL USES (Primary); Priority Date: 11/16/1994

Water Right Genealogy (Click to Collapse...)

Permit: G 13183
- Inchoate: T 11252 CF (AMN)
  - Permit: G 13183 *

View Water Rights in same Family   Report Errors with Water Right Data

STATE OF OREGON

COUNTY OF LANE

PERMIT TO APPROPRIATE THE PUBLIC WATERS

THIS PERMIT IS HEREBY ISSUED TO

CITY OF COBURG (541) 485-6266
PO BOX 8316
COBURG, OREGON 97408

The specific limits and conditions of the use are listed below.

APPLICATION FILE NUMBER: G-13877

SOURCE OF WATER: A WELL IN WILLAMETTE RIVER BASIN

PURPOSE OR USE: MUNICIPAL USE

MAXIMUM RATE: 2.0 CUBIC FEET PER SECOND

PERIOD OF USE: YEAR ROUND

DATE OF PRIORITY: NOVEMBER 16, 1994

POINT OF DIVERSION LOCATION: NE 1/4 SE 1/4, SECTION 32, T16S, R3W, W.M.; 615 FEET SOUTH AND 520 FEET EAST FROM THE SW CORNER OF JOHN DIAMOND DLC 44

THE PLACE OF USE IS LOCATED AS FOLLOWS:

WITHIN THE CITY OF COBURG SERVICE AREA

Measurement, recording and reporting conditions:

A. Before water use may begin under this permit, the permittee shall install a meter or other suitable measuring device as approved by the Director. The permittee shall maintain the meter or measuring device in good working order, shall keep a complete record of the amount of water used each month and shall submit a report which includes the recorded water use measurements to the Department annually or more frequently as may be required by the Director. Further, the Director may require the permittee to report general water use information, including the place and nature of use of water under the permit.

B. The permittee shall allow the watermaster access to the meter or measuring device; provided however, where the meter or measuring device is located within a private structure, the watermaster shall request access upon reasonable notice.

If substantial interference with a senior water right occurs due to withdrawal of water from any well listed on this permit, then use of water from the well(s) shall be discontinued or reduced and/or the schedule of withdrawal shall be regulated until or unless the Department approves or implements an alternative administrative action to mitigate the interference. The Department encourages junior and senior appropriators to jointly develop plans to mitigate interferences.

The water user shall develop a plan to monitor and report the impact of water use under this permit on water levels within the aquifer that provides water to the permitted well(s). The plan shall be submitted to the Department within one year of the date the permit is issued and shall be subject to the approval of the Department. At a minimum, the plan shall include a program to periodically measure static water levels within the permitted well(s) or an adequate substitute such as water levels in nearby wells. The plan shall also stipulate a reference water level against which any water-level declines will be compared. If a well listed on this permit (or replacement well) displays a total static water-level decline of 25 or more feet over any period of years, as compared to the reference level, then the water user shall discontinue use of, or reduce the rate or volume of withdrawal from, the well(s). Such action shall be taken until the water level recovers to above the 25-foot decline level or until the Department determines, based on the water user's and/or the Department's data and analysis, that no action is necessary because the aquifer in question can sustain the observed declines without adversely impacting the resource or senior water rights. The water user shall in no instance allow excessive decline, as defined in Commission rules, to occur within the aquifer as a result of use under this permit.

STANDARD CONDITIONS

The wells shall be constructed in accordance with the General Standards for the Construction and Maintenance of Water Wells in Oregon. The works shall be equipped with a usable access port, and may also include an air line and pressure gauge adequate to determine water level elevation in the well at all times.

The use shall conform to such reasonable rotation system as may be ordered by the proper state officer.

Prior to receiving a certificate of water right, the permit holder shall submit the results of a pump test meeting the department's standards, to the Water Resources Department. The Director may require water level or pump test results every ten years thereafter.

Failure to comply with any of the provisions of this permit may result in action including, but not limited to, restrictions on the use, civil penalties, or cancellation of the permit.

This permit is for the beneficial use of water without waste. The water user is advised that new regulations may require the use of best practical technologies or conservation practices to achieve this end.

By law, the land use associated with this water use must be in compliance with statewide land-use goals and any local acknowledged land-use plan.

The use of water shall be limited when it interferes with any prior surface or ground water rights.

The Director finds that the proposed use(s) of water described by this permit, as conditioned, will not impair or be detrimental to the public interest.

Actual construction of the well shall begin within one year from permit issuance. Complete application of water to the use shall be made on or before October 1, 2001.

Issued July 28, 1997

Martha O. Pagel, Director
Water Resources Department

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* * * * * * * * * * * * * K Y P I P E * * * * * * * * * * * *
*                                                           *
*  Pipe Network Modeling Software                           *
*                                                           *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)               *
*  Version: 8.003 (vr8)  10/29/2015                         *
*  Company:  4BEngineer    Serial #:  591127                *
*  Interface:  Classic                                      *
*  Licensed for Pipe2016                                    *
*                                                           *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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Date & Time: Wed Jun 22 09:23:33 2016

Master File : C:\Users\4B Engineering\Documents\CITY DOCUMENTS\COBURG\MODELING\2016 max day.KYP\2016 max day.P2K (1)

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****************************************************
S U M M A R Y   O F   O R I G I N A L   D A T A
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U N I T S   S P E C I F I E D

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

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

VALVE LABEL	VALVE TYPE	VALVE SETTING (ft or gpm)
RV-1	PSV	563.65

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

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-1	J-1	J-2	280.00	1.25	140.0000	0.00
P-2	J-2	J-3	606.60	3.00	140.0000	0.00
P-4	J-3	J-6	193.40	3.00	140.0000	0.00

P-5	J-6	J-4	600.30	3.00	140.0000	0.00
P-6	J-6	J-7	378.00	6.00	140.0000	0.00
P-7	J-7	J-9	1386.50	8.00	140.0000	0.00
P-8	J-9	J-8	2435.90	6.00	140.0000	0.00
P-9	J-9	J-13	3328.60	8.00	140.0000	0.00
P-10	J-10	J-109	76.70	12.00	120.0000	0.00
P-11	J-10	J-131	434.80	12.00	120.0000	0.00
P-12	J-13	J-10	565.60	8.00	120.0000	0.00
P-13	J-12	J-14	503.90	12.00	140.0000	0.00
P-14	J-12	J-16	176.50	4.00	100.0000	0.00
P-15	J-16	J-15	179.60	4.00	100.0000	0.00
P-17	J-15	J-18	130.00	4.00	100.0000	0.00
P-18	J-15	J-19	181.70	4.00	100.0000	0.00
P-19	J-20	J-12	181.70	12.00	120.0000	0.00
P-20	J-19	J-20	353.40	6.00	140.0000	0.00
P-21	J-21	J-22	373.10	12.00	120.0000	0.00
P-22	J-22	J-20	140.30	12.00	120.0000	0.00
P-23	J-22	J-25	224.90	8.00	140.0000	0.00
P-24	J-21	J-26	277.90	8.00	140.0000	0.00
P-25	J-25	J-24	278.00	8.00	140.0000	0.00
P-26	J-24	J-23	320.90	8.00	140.0000	0.00
P-27	J-23	J-12	425.10	12.00	120.0000	0.00
P-28	J-26	J-25	378.90	8.00	140.0000	0.00
P-29	J-26	J-28	423.90	8.00	140.0000	0.00
P-30	J-28	J-30	377.90	8.00	140.0000	0.00
P-31	J-28	J-29	689.00	8.00	140.0000	0.00
P-32	J-27	J-29	200.00	8.00	140.0000	0.00
P-33	J-30	J-27	418.10	6.00	140.0000	0.00
P-34	J-29	J-33	260.50	6.00	140.0000	0.00
P-35	J-31	J-32	334.50	6.00	140.0000	0.00
P-36	J-33	J-31	381.70	6.00	140.0000	0.00
P-37	J-33	J-129	287.60	6.00	140.0000	0.00
P-39	J-32	J-35	297.30	8.00	140.0000	0.00
P-40	J-35	J-24	320.70	8.00	140.0000	0.00
P-41	J-35	J-38	287.70	6.00	140.0000	0.00
P-42	J-36	J-23	30.00	8.00	140.0000	0.00
P-43	J-36	J-37	383.70	8.00	140.0000	0.00
P-44	J-38	J-36	277.70	12.00	140.0000	0.00
P-45	J-37	J-14	289.60	12.00	140.0000	0.00
P-46	J-37	J-39	308.50	12.00	140.0000	0.00
P-47	J-39	J-38	401.60	6.00	120.0000	0.00
P-48	J-38	J-34	299.60	12.00	120.0000	0.00
P-49	J-34	J-41	596.00	12.00	120.0000	0.00
P-51	J-41	J-42	56.70	12.00	120.0000	0.00
P-52	J-32	J-43	1029.30	6.00	130.0000	0.00
P-53	J-43	J-42	319.60	6.00	140.0000	0.00
P-54	J-43	J-47	172.10	6.00	130.0000	0.00
P-55	J-45	J-120	609.30	6.00	120.0000	0.00
P-56	J-46	J-45	326.60	6.00	120.0000	0.00
P-57	J-47	J-46	388.10	6.00	120.0000	0.00
P-58	J-42	J-48	189.00	12.00	120.0000	0.00
P-59	J-48	J-50	366.00	12.00	120.0000	0.00
P-60	J-48	J-47	322.80	8.00	140.0000	0.00
P-61	J-50	J-53	319.10	12.00	120.0000	0.00

P-62	J-46	J-50	319.80	6.00	140.0000	0.00
P-63	J-45	J-51	339.30	8.00	140.0000	0.00
P-64	J-51	J-118	576.50	12.00	120.0000	0.00
P-66	J-48	J-56	196.60	8.00	140.0000	0.00
P-67	J-53	J-51	31.90	12.00	120.0000	0.00
P-68	J-54	J-53	172.10	12.00	120.0000	0.00
P-69	J-54	J-57	316.80	12.00	120.0000	0.00
P-70	J-56	J-62	432.00	8.00	140.0000	0.00
P-71	J-55	J-56	268.20	8.00	140.0000	0.00
P-72	J-55	J-39	349.50	8.00	140.0000	0.00
P-73	J-57	J-61	312.10	8.00	140.0000	0.00
P-74	J-57	J-59	321.70	12.00	120.0000	0.00
P-75	J-59	J-130	561.90	12.00	120.0000	0.00
P-76	J-59	J-60	324.20	12.00	140.0000	0.00
P-77	J-60	J-64	216.10	12.00	140.0000	0.00
P-78	J-61	J-55	460.20	8.00	140.0000	0.00
P-79	J-60	J-61	318.60	6.00	140.0000	0.00
P-80	J-62	J-54	307.10	8.00	140.0000	0.00
P-81	J-62	J-61	323.30	6.00	140.0000	0.00
P-82	J-60	J-63	540.80	6.00	120.0000	0.00
P-83	J-64	J-39	278.70	12.00	140.0000	0.00
P-85	J-58	J-75	540.00	12.00	120.0000	0.00
P-86	J-75	J-66	71.90	12.00	120.0000	0.00
P-87	J-68	J-66	219.60	12.00	120.0000	0.00
P-88	J-68	J-69	649.80	6.00	140.0000	0.00
P-89	J-69	J-68	213.90	12.00	120.0000	0.00
P-90	J-58	J-71	329.80	12.00	120.0000	0.00
P-91	J-71	J-70	430.40	6.00	130.0000	0.00
P-92	J-71	J-112	318.00	12.00	120.0000	0.00
P-93	J-73	J-121	70.70	6.00	140.0000	0.00
P-94	J-73	J-111	298.20	12.00	120.0000	0.00
P-95	J-75	J-123	4.00	12.00	120.0000	0.00
P-96	J-123	O-Pump-3	6.30	12.00	120.0000	0.00
P-97	J-123	O-Pump-2	9.90	12.00	120.0000	0.00
P-98	R-1	J-122	12.50	12.00	120.0000	0.00
P-99	J-123	O-Pump-1	19.20	12.00	120.0000	0.00
P-100	O-RV-1	R-1	27.10	6.00	140.0000	0.00
P-101	I-Pump-1	J-122	11.90	12.00	120.0000	0.00
P-102	I-Pump-2	J-122	8.90	12.00	120.0000	0.00
P-103	J-74	J-67	171.50	12.00	120.0000	0.00
P-104	J-74	J-76	609.80	6.00	140.0000	0.00
P-105	J-77	J-49	383.00	12.00	120.0000	0.00
P-106	J-77	J-78	106.80	12.00	140.0000	0.00
P-107	J-49	J-80	226.20	12.00	120.0000	0.00
P-108	J-80	J-82	55.60	12.00	120.0000	0.00
P-109	J-80	J-113	1038.40	12.00	120.0000	0.00
P-110	J-82	J-79	182.50	6.00	140.0000	0.00
P-111	J-83	J-81	228.60	12.00	120.0000	0.00
P-112	J-83	J-116	295.10	8.00	120.0000	0.00
P-113	J-84	J-117	106.10	8.00	120.0000	0.00
P-114	J-84	J-87	253.10	6.00	140.0000	0.00
P-115	J-86	J-84	333.90	8.00	120.0000	0.00
P-116	J-86	J-89	388.40	8.00	140.0000	0.00
P-117	J-43	J-92	334.00	12.00	120.0000	0.00

P-118	VP-1	J-90	103.70	24.00	120.0000	0.00
P-119	J-91	J-97	168.70	12.00	140.0000	0.00
P-120	J-92	J-91	130.20	12.00	120.0000	0.00
P-122	J-93	J-47	326.60	8.00	140.0000	0.00
P-123	J-93	J-94	366.00	4.00	130.0000	0.00
P-124	J-93	J-96	576.50	8.00	140.0000	0.00
P-125	J-91	J-95	86.50	12.00	140.0000	0.00
P-126	J-97	J-102	631.00	12.00	140.0000	0.00
P-127	J-97	J-100	291.10	8.00	140.0000	0.00
P-128	J-98	J-99	107.60	8.00	140.0000	0.00
P-129	J-98	J-101	670.90	8.00	140.0000	0.00
P-130	J-100	J-98	429.00	8.00	140.0000	0.00
P-131	J-100	J-103	302.20	6.00	120.0000	0.00
P-132	J-102	J-88	308.70	12.00	140.0000	0.00
P-133	J-103	J-127	438.60	6.00	140.0000	0.00
P-134	J-90	J-88	1360.00	24.00	120.0000	0.00
P-135	VP-2	J-90	51.10	24.00	120.0000	0.00
P-136	J-46	J-104	332.30	6.00	120.0000	0.00
P-137	J-104	J-105	429.80	6.00	120.0000	0.00
P-138	J-104	J-96	316.00	6.00	120.0000	0.00
P-139	J-96	J-106	549.40	6.00	120.0000	0.00
P-140	J-96	J-107	464.20	6.00	120.0000	0.00
P-141	J-58	J-108	650.10	12.00	140.0000	0.00
P-143	I-Pump-3	J-122	12.80	12.00	120.0000	0.00
P-145	J-11	J-74	182.50	12.00	120.0000	0.00
P-146	J-110	J-11	324.00	12.00	120.0000	0.00
P-147	J-111	J-110	348.40	12.00	120.0000	0.00
P-148	J-112	J-73	378.60	12.00	120.0000	0.00
P-149	J-113	J-114	851.10	12.00	120.0000	0.00
P-150	J-114	J-115	451.70	12.00	120.0000	0.00
P-151	J-115	J-83	950.10	12.00	120.0000	0.00
P-152	J-116	J-86	247.50	8.00	120.0000	0.00
P-153	J-117	J-85	512.90	8.00	120.0000	0.00
P-154	J-118	J-77	693.90	12.00	120.0000	0.00
P-155	J-119	J-44	151.90	6.00	120.0000	0.00
P-156	J-120	J-119	139.90	6.00	120.0000	0.00
P-157	J-121	J-72	124.10	6.00	140.0000	0.00
P-160	J-127	J-128	143.40	6.00	140.0000	0.00
P-161	J-128	J-102	117.00	6.00	140.0000	0.00
P-162	J-129	J-31	763.20	6.00	140.0000	0.00
P-163	J-130	J-69	184.80	12.00	120.0000	0.00
P-164	J-131	J-21	294.10	12.00	120.0000	0.00
P-165	J-75	I-RV-1	17.90	6.00	140.0000	0.00

P U M P/L O S S   E L E M E N T   D A T A

THERE IS A DEVICE AT NODE Pump-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 3)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
210.00	0.00	80.00
185.00	800.00	80.00

160.00	1000.00	80.00
110.00	1400.00	80.00

THERE IS A DEVICE AT NODE Pump-2 ....> (ID= 3)

THERE IS A DEVICE AT NODE Pump-3 ....> (ID= 3)

THERE IS A DEVICE AT NODE VP-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
230.00	0.00	75.00
224.00	210.00	75.00
222.00	315.00	75.00
211.00	420.00	75.00
178.00	525.00	75.00
130.00	630.00	75.00

THERE IS A DEVICE AT NODE VP-2 DESCRIBED BY THE FOLLOWING DATA: (ID= 2)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
395.00	0.00	75.00
290.00	240.00	75.00
205.00	400.00	75.00
140.00	580.00	75.00
90.00	640.00	75.00

N O D E   D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
J-1		2.39	388.00	
J-2		2.39	386.00	
J-3		2.39	389.00	
J-4		2.39	388.00	
J-6		2.39	389.00	
J-7		2.39	389.00	
J-8		2.39	390.00	
J-9		2.39	391.00	
J-10		2.39	395.00	
J-11		6.96	395.00	
J-12		2.39	399.00	
J-13		2.39	396.00	
J-14		2.39	400.00	
J-15		2.39	399.00	

J-16	2.39	399.00
J-18	2.39	402.00
J-19	2.39	399.00
J-20	2.39	397.00
J-21	2.39	399.00
J-22	2.39	397.00
J-23	2.39	400.00
J-24	2.39	401.00
J-25	2.39	399.00
J-26	2.39	398.00
J-27	2.39	392.00
J-28	2.39	391.00
J-29	2.39	392.00
J-30	2.39	390.00
J-31	2.39	399.00
J-32	2.39	402.00
J-33	2.39	393.00
J-34	2.39	403.00
J-35	2.39	403.00
J-36	2.39	400.00
J-37	2.39	405.00
J-38	2.39	401.00
J-39	2.39	401.00
J-41	2.39	403.00
J-42	2.39	403.00
J-43	2.39	405.00
J-44	6.96	403.00
J-45	2.39	403.00
J-46	2.39	403.00
J-47	2.39	403.00
J-48	2.39	403.00
J-49	6.96	414.00
J-50	2.39	403.00
J-51	2.39	403.00
J-53	2.39	403.00
J-54	2.39	403.00
J-55	2.39	401.00
J-56	2.39	403.00
J-57	2.39	401.00
J-58	6.96	399.00
J-59	2.39	401.00
J-60	2.39	399.00
J-61	2.39	401.00
J-62	2.39	402.00
J-63	2.39	399.00
J-64	2.39	401.00
J-66	2.39	403.00
J-67	6.96	393.00
J-68	2.39	399.00
J-69	2.39	400.00
J-70	6.96	400.00
J-71	6.96	399.00
J-72	6.96	399.00
J-73	6.96	399.00

J-74	6.96	393.00
J-75	2.39	397.50
J-76	6.96	393.00
J-77	6.96	403.00
J-78	6.96	403.00
J-79	6.96	403.00
J-80	6.96	403.00
J-81	6.96	413.00
J-82	6.96	403.00
J-83	6.96	412.00
J-84	6.96	404.00
J-85	6.96	408.00
J-86	6.96	404.00
J-87	6.96	404.00
J-88	2.39	399.00
J-89	6.96	404.00
J-90	2.39	398.00
J-91	2.39	401.00
J-92	2.39	401.00
J-93	2.39	404.00
J-94	2.39	403.00
J-95	2.39	401.00
J-96	2.39	403.00
J-97	2.39	401.00
J-98	2.39	399.00
J-99	2.39	399.00
J-100	2.39	399.00
J-101	2.39	397.00
J-102	2.39	396.00
J-103	2.39	399.00
J-104	2.39	403.00
J-105	2.39	403.00
J-106	2.39	405.00
J-107	2.39	405.00
J-108	6.96	403.00
J-109	2.39	396.00
J-110	6.96	397.00
J-111	6.96	399.00
J-112	6.96	399.00
J-113	6.96	405.00
J-114	6.96	412.00
J-115	6.96	412.00
J-116	6.96	404.00
J-117	6.96	405.00
J-118	6.96	403.00
J-119	6.96	403.00
J-120	6.96	403.00
J-121	6.96	399.00
J-122	2.39	397.50
J-123	2.39	397.50
J-127	2.39	396.00
J-128	2.39	396.00
J-129	2.39	395.00
J-130	2.39	403.00

J-131		2.39	399.00	
I-Pump-1		0.00	397.50	
I-Pump-2		0.00	397.50	
I-Pump-3		0.00	397.50	
R-1		----	397.50	415.00
O-RV-1		0.00	397.50	
VP-1	WELL 1	----	398.00	398.00
VP-2	WELL 2	----	398.00	398.00
O-Pump-3		0.00	397.50	
O-Pump-2		0.00	397.50	
O-Pump-1		0.00	397.50	
I-RV-1		----	397.50	563.65

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

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

MAXIMUM AND MINIMUM PRESSURES = 5

MAXIMUM AND MINIMUM VELOCITIES = 5

MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

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

NUMBER OF PIPES ....(P) = 154

NUMBER OF END NODES ....(J) = 127

NUMBER OF PRIMARY LOOPS ....(L) = 25

NUMBER OF SUPPLY NODES ....(F) = 3

NUMBER OF SUPPLY ZONES ....(Z) = 1

==

Case: 0

RESULTS OBTAINED AFTER 15 TRIALS: ACCURACY = 0.44039E-06

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

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

STATUS CODE: XX -CLOSED PIPE   CV -CHECK VALVE

P I P E N A M E	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f

P-1	J-1	J-2	-2.39	0.52	0.00	0.62	1.87	1.87
P-2	J-2	J-3	-4.78	0.06	0.00	0.22	0.10	0.10
P-4	J-3	J-6	-7.17	0.04	0.00	0.33	0.20	0.20
P-5	J-6	J-4	2.39	0.02	0.00	0.11	0.03	0.03
P-6	J-6	J-7	-11.95	0.01	0.00	0.14	0.02	0.02
P-7	J-7	J-9	-14.34	0.01	0.00	0.09	0.01	0.01
P-8	J-9	J-8	2.39	0.00	0.00	0.03	0.00	0.00
P-9	J-9	J-13	-19.12	0.03	0.00	0.12	0.01	0.01
P-10	J-10	J-109	2.39	0.00	0.00	0.01	0.00	0.00
P-11	J-10	J-131	-26.29	0.00	0.00	0.07	0.00	0.00
P-12	J-13	J-10	-21.51	0.01	0.00	0.14	0.02	0.02
P-13	J-12	J-14	136.70	0.03	0.00	0.39	0.06	0.06
P-14	J-12	J-16	3.61	0.00	0.00	0.09	0.03	0.03
P-15	J-16	J-15	1.22	0.00	0.00	0.03	0.00	0.00
P-17	J-15	J-18	2.39	0.00	0.00	0.06	0.01	0.01
P-18	J-15	J-19	-3.56	0.00	0.00	0.09	0.03	0.03
P-19	J-20	J-12	35.74	0.00	0.00	0.10	0.01	0.01
P-20	J-19	J-20	-5.95	0.00	0.00	0.07	0.00	0.00
P-21	J-21	J-22	4.79	0.00	0.00	0.01	0.00	0.00
P-22	J-22	J-20	44.08	0.00	0.00	0.13	0.01	0.01
P-23	J-22	J-25	-41.68	0.01	0.00	0.27	0.04	0.04
P-24	J-21	J-26	-35.86	0.01	0.00	0.23	0.03	0.03
P-25	J-25	J-24	-50.88	0.02	0.00	0.32	0.06	0.06
P-26	J-24	J-23	34.93	0.01	0.00	0.22	0.03	0.03
P-27	J-23	J-12	106.96	0.02	0.00	0.30	0.05	0.05
P-28	J-26	J-25	-6.82	0.00	0.00	0.04	0.00	0.00
P-29	J-26	J-28	-31.43	0.01	0.00	0.20	0.03	0.03
P-30	J-28	J-30	-10.16	0.00	0.00	0.06	0.00	0.00
P-31	J-28	J-29	-23.66	0.01	0.00	0.15	0.02	0.02
P-32	J-27	J-29	-14.94	0.00	0.00	0.10	0.01	0.01
P-33	J-30	J-27	-12.55	0.01	0.00	0.14	0.02	0.02
P-34	J-29	J-33	-40.99	0.05	0.00	0.47	0.17	0.17
P-35	J-31	J-32	-48.16	0.08	0.00	0.55	0.23	0.23
P-36	J-33	J-31	-28.60	0.03	0.00	0.32	0.09	0.09
P-37	J-33	J-129	-14.79	0.01	0.00	0.17	0.03	0.03
P-39	J-32	J-35	127.66	0.10	0.00	0.81	0.35	0.35
P-40	J-35	J-24	88.21	0.06	0.00	0.56	0.18	0.18
P-41	J-35	J-38	37.06	0.04	0.00	0.42	0.14	0.14
P-42	J-36	J-23	74.42	0.00	0.00	0.47	0.13	0.13
P-43	J-36	J-37	87.64	0.07	0.00	0.56	0.18	0.18
P-44	J-38	J-36	164.45	0.02	0.00	0.47	0.08	0.08
P-45	J-37	J-14	-134.31	0.02	0.00	0.38	0.05	0.05
P-46	J-37	J-39	219.56	0.04	0.00	0.62	0.13	0.13
P-47	J-39	J-38	-49.11	0.13	0.00	0.56	0.32	0.32
P-48	J-38	J-34	-178.89	0.04	0.00	0.51	0.12	0.12
P-49	J-34	J-41	-181.28	0.07	0.00	0.51	0.12	0.12
P-51	J-41	J-42	-183.67	0.01	0.00	0.52	0.13	0.13
P-52	J-32	J-43	-178.21	3.13	0.00	2.02	3.04	3.04
P-53	J-43	J-42	362.66	3.16	0.00	4.11	9.88	9.88
P-54	J-43	J-47	434.66	2.73	0.00	4.93	15.85	15.85
P-55	J-45	J-120	20.88	0.04	0.00	0.24	0.07	0.07
P-56	J-46	J-45	75.45	0.23	0.00	0.86	0.72	0.72

P-57	J-47	J-46	90.58	0.39	0.00	1.03	1.01	1.01
P-58	J-42	J-48	176.60	0.02	0.00	0.50	0.12	0.12
P-59	J-48	J-50	250.74	0.08	0.00	0.71	0.23	0.23
P-60	J-48	J-47	-269.14	0.45	0.00	1.72	1.40	1.40
P-61	J-50	J-53	316.91	0.11	0.00	0.90	0.35	0.35
P-62	J-46	J-50	68.56	0.14	0.00	0.78	0.45	0.45
P-63	J-45	J-51	52.18	0.02	0.00	0.33	0.07	0.07
P-64	J-51	J-118	132.24	0.04	0.00	0.38	0.07	0.07
P-66	J-48	J-56	192.62	0.15	0.00	1.23	0.75	0.75
P-67	J-53	J-51	82.45	0.00	0.00	0.23	0.03	0.03
P-68	J-54	J-53	-232.07	0.03	0.00	0.66	0.20	0.20
P-69	J-54	J-57	268.43	0.08	0.00	0.76	0.26	0.26
P-70	J-56	J-62	83.01	0.07	0.00	0.53	0.16	0.16
P-71	J-55	J-56	-107.22	0.07	0.00	0.68	0.25	0.25
P-72	J-55	J-39	30.98	0.01	0.00	0.20	0.03	0.03
P-73	J-57	J-61	-68.68	0.03	0.00	0.44	0.11	0.11
P-74	J-57	J-59	334.71	0.12	0.00	0.95	0.39	0.39
P-75	J-59	J-130	667.06	0.78	0.00	1.89	1.39	1.39
P-76	J-59	J-60	-334.74	0.09	0.00	0.95	0.29	0.29
P-77	J-60	J-64	-294.86	0.05	0.00	0.84	0.23	0.23
P-78	J-61	J-55	-73.85	0.06	0.00	0.47	0.13	0.13
P-79	J-60	J-61	-44.65	0.07	0.00	0.51	0.20	0.20
P-80	J-62	J-54	38.75	0.01	0.00	0.25	0.04	0.04
P-81	J-62	J-61	41.87	0.06	0.00	0.48	0.18	0.18
P-82	J-60	J-63	2.39	0.00	0.00	0.03	0.00	0.00
P-83	J-64	J-39	-297.25	0.07	0.00	0.84	0.23	0.23
P-85	J-58	J-75	-97.44	0.02	0.00	0.28	0.04	0.04
P-86	J-75	J-66	-657.50	0.10	0.00	1.87	1.35	1.35
P-87	J-68	J-66	659.89	0.30	0.00	1.87	1.36	1.36
P-88	J-68	J-69	-62.10	0.24	0.00	0.70	0.38	0.38
P-89	J-69	J-68	600.18	0.24	0.00	1.70	1.14	1.14
P-90	J-58	J-71	83.52	0.01	0.00	0.24	0.03	0.03
P-91	J-71	J-70	6.96	0.00	0.00	0.08	0.01	0.01
P-92	J-71	J-112	69.60	0.01	0.00	0.20	0.02	0.02
P-93	J-73	J-121	13.92	0.00	0.00	0.16	0.02	0.02
P-94	J-73	J-111	41.76	0.00	0.00	0.12	0.01	0.01
P-95	J-75	J-123	2.39	0.00	0.00	0.01	0.00	0.00
P-96	J-123	O-Pump-3	0.00	0.00	0.00	0.00	0.00	0.00
P-97	J-123	O-Pump-2	0.00	0.00	0.00	0.00	0.00	0.00
P-98	R-1	J-122	2.39	0.00	0.00	0.01	0.00	0.00
P-99	J-123	O-Pump-1	0.00	0.00	0.00	0.00	0.00	0.00
P-100	O-RV-1	R-1	555.28	0.59	0.00	6.30	21.75	21.75
P-101	I-Pump-1	J-122	0.00	0.00	0.00	0.00	0.00	0.00
P-102	I-Pump-2	J-122	0.00	0.00	0.00	0.00	0.00	0.00
P-103	J-74	J-67	6.96	0.00	0.00	0.02	0.00	0.00
P-104	J-74	J-76	6.96	0.00	0.00	0.08	0.01	0.01
P-105	J-77	J-49	111.36	0.02	0.00	0.32	0.05	0.05
P-106	J-77	J-78	6.96	0.00	0.00	0.02	0.00	0.00
P-107	J-49	J-80	104.40	0.01	0.00	0.30	0.04	0.04
P-108	J-80	J-82	13.92	0.00	0.00	0.04	0.00	0.00
P-109	J-80	J-113	83.52	0.03	0.00	0.24	0.03	0.03
P-110	J-82	J-79	6.96	0.00	0.00	0.08	0.01	0.01
P-111	J-83	J-81	6.96	0.00	0.00	0.02	0.00	0.00
P-112	J-83	J-116	48.72	0.02	0.00	0.31	0.08	0.08

P-113	J-84	J-117	13.92	0.00	0.00	0.09	0.01	0.01
P-114	J-84	J-87	6.96	0.00	0.00	0.08	0.01	0.01
P-115	J-86	J-84	27.84	0.01	0.00	0.18	0.03	0.03
P-116	J-86	J-89	6.96	0.00	0.00	0.04	0.00	0.00
P-117	J-43	J-92	-977.92	0.94	0.00	2.77	2.82	2.82
P-118	VP-1	J-90	532.35	0.00	0.00	0.38	0.03	0.03
P-119	J-91	J-97	-985.09	0.36	0.00	2.79	2.15	2.15
P-120	J-92	J-91	-980.31	0.37	0.00	2.78	2.83	2.83
P-122	J-93	J-47	-72.55	0.04	0.00	0.46	0.12	0.12
P-123	J-93	J-94	2.39	0.00	0.00	0.06	0.01	0.01
P-124	J-93	J-96	67.77	0.06	0.00	0.43	0.11	0.11
P-125	J-91	J-95	2.39	0.00	0.00	0.01	0.00	0.00
P-126	J-97	J-102	-895.19	1.14	0.00	2.54	1.80	1.80
P-127	J-97	J-100	-92.29	0.06	0.00	0.59	0.19	0.19
P-128	J-98	J-99	2.39	0.00	0.00	0.02	0.00	0.00
P-129	J-98	J-101	2.39	0.00	0.00	0.02	0.00	0.00
P-130	J-100	J-98	7.17	0.00	0.00	0.05	0.00	0.00
P-131	J-100	J-103	-101.85	0.38	0.00	1.16	1.25	1.25
P-132	J-102	J-88	-1006.60	0.69	0.00	2.86	2.24	2.24
P-133	J-103	J-127	-104.24	0.43	0.00	1.18	0.98	0.98
P-134	J-90	J-88	1008.99	0.14	0.00	0.72	0.10	0.10
P-135	VP-2	J-90	479.03	0.00	0.00	0.34	0.03	0.03
P-136	J-46	J-104	-55.82	0.14	0.00	0.63	0.41	0.41
P-137	J-104	J-105	2.39	0.00	0.00	0.03	0.00	0.00
P-138	J-104	J-96	-60.60	0.15	0.00	0.69	0.48	0.48
P-139	J-96	J-106	2.39	0.00	0.00	0.03	0.00	0.00
P-140	J-96	J-107	2.39	0.00	0.00	0.03	0.00	0.00
P-141	J-58	J-108	6.96	0.00	0.00	0.02	0.00	0.00
P-143	I-Pump-3	J-122	0.00	0.00	0.00	0.00	0.00	0.00
P-145	J-11	J-74	20.88	0.00	0.00	0.06	0.00	0.00
P-146	J-110	J-11	27.84	0.00	0.00	0.08	0.00	0.00
P-147	J-111	J-110	34.80	0.00	0.00	0.10	0.01	0.01
P-148	J-112	J-73	62.64	0.01	0.00	0.18	0.02	0.02
P-149	J-113	J-114	76.56	0.02	0.00	0.22	0.03	0.03
P-150	J-114	J-115	69.60	0.01	0.00	0.20	0.02	0.02
P-151	J-115	J-83	62.64	0.02	0.00	0.18	0.02	0.02
P-152	J-116	J-86	41.76	0.01	0.00	0.27	0.06	0.06
P-153	J-117	J-85	6.96	0.00	0.00	0.04	0.00	0.00
P-154	J-118	J-77	125.28	0.04	0.00	0.36	0.06	0.06
P-155	J-119	J-44	6.96	0.00	0.00	0.08	0.01	0.01
P-156	J-120	J-119	13.92	0.00	0.00	0.16	0.03	0.03
P-157	J-121	J-72	6.96	0.00	0.00	0.08	0.01	0.01
P-160	J-127	J-128	-106.63	0.15	0.00	1.21	1.02	1.02
P-161	J-128	J-102	-109.02	0.12	0.00	1.24	1.07	1.07
P-162	J-129	J-31	-17.18	0.03	0.00	0.19	0.03	0.03
P-163	J-130	J-69	664.67	0.26	0.00	1.89	1.38	1.38
P-164	J-131	J-21	-28.68	0.00	0.00	0.08	0.00	0.00
P-165	J-75	I-RV-1	555.28	0.39	0.00	6.30	21.75	21.75

P U M P/L O S S   E L E M E N T   R E S U L T S

NAME	FLOWRATE gpm	INLET HEAD ft	OUTLET HEAD ft	PUMP HEAD ft	EFFIC-ENCY %	USEFUL POWER Hp	INCREMTL COST $	TOTAL COST $	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. ft
Device "Pump-1" is closed											
Pump-1	0.00	17.50	166.54	0.0	75.00	0.	0.0	0.0	**	**	50.7
Device "Pump-2" is closed											
Pump-2	0.00	17.50	166.54	0.0	75.00	0.	0.0	0.0	**	**	50.7
Device "Pump-3" is closed											
Pump-3	0.00	17.50	166.54	0.0	75.00	0.	0.0	0.0	**	**	50.7
VP-1	532.35	0.00	174.98	175.0	75.00	0.	0.0	0.0	**	**	33.2
VP-2	479.03	0.00	174.98	175.0	75.00	0.	0.0	0.0	**	**	33.2

N O D E   R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		2.39	565.33	388.00	177.33	76.84
J-2		2.39	565.86	386.00	179.86	77.94
J-3		2.39	565.91	389.00	176.91	76.66
J-4		2.39	565.94	388.00	177.94	77.11
J-6		2.39	565.95	389.00	176.95	76.68
J-7		2.39	565.96	389.00	176.96	76.68
J-8		2.39	565.97	390.00	175.97	76.25
J-9		2.39	565.97	391.00	174.97	75.82
J-10		2.39	566.01	395.00	171.01	74.11
J-11		6.96	563.99	395.00	168.99	73.23
J-12		2.39	566.01	399.00	167.01	72.37
J-13		2.39	566.00	396.00	170.00	73.67
J-14		2.39	565.99	400.00	165.99	71.93
J-15		2.39	566.01	399.00	167.01	72.37
J-16		2.39	566.01	399.00	167.01	72.37
J-18		2.39	566.01	402.00	164.01	71.07
J-19		2.39	566.01	399.00	167.01	72.37
J-20		2.39	566.01	397.00	169.01	73.24
J-21		2.39	566.02	399.00	167.02	72.37
J-22		2.39	566.02	397.00	169.02	73.24
J-23		2.39	566.03	400.00	166.03	71.95
J-24		2.39	566.04	401.00	165.04	71.52
J-25		2.39	566.03	399.00	167.03	72.38

J-26	2.39	566.03	398.00	168.03	72.81
J-27	2.39	566.05	392.00	174.05	75.42
J-28	2.39	566.04	391.00	175.04	75.85
J-29	2.39	566.05	392.00	174.05	75.42
J-30	2.39	566.04	390.00	176.04	76.28
J-31	2.39	566.13	399.00	167.13	72.42
J-32	2.39	566.21	402.00	164.21	71.16
J-33	2.39	566.09	393.00	173.09	75.01
J-34	2.39	566.10	403.00	163.10	70.67
J-35	2.39	566.10	403.00	163.10	70.68
J-36	2.39	566.04	400.00	166.04	71.95
J-37	2.39	565.97	405.00	160.97	69.75
J-38	2.39	566.06	401.00	165.06	71.53
J-39	2.39	565.93	401.00	164.93	71.47
J-41	2.39	566.17	403.00	163.17	70.71
J-42	2.39	566.18	403.00	163.18	70.71
J-43	2.39	569.33	405.00	164.33	71.21
J-44	6.96	565.94	403.00	162.94	70.61
J-45	2.39	565.98	403.00	162.98	70.63
J-46	2.39	566.22	403.00	163.22	70.73
J-47	2.39	566.61	403.00	163.61	70.90
J-48	2.39	566.15	403.00	163.15	70.70
J-49	6.96	565.86	414.00	151.86	65.80
J-50	2.39	566.07	403.00	163.07	70.66
J-51	2.39	565.96	403.00	162.96	70.62
J-53	2.39	565.96	403.00	162.96	70.62
J-54	2.39	565.93	403.00	162.93	70.60
J-55	2.39	565.94	401.00	164.94	71.47
J-56	2.39	566.01	403.00	163.01	70.64
J-57	2.39	565.84	401.00	164.84	71.43
J-58	6.96	564.02	399.00	165.02	71.51
J-59	2.39	565.72	401.00	164.72	71.38
J-60	2.39	565.81	399.00	166.81	72.29
J-61	2.39	565.88	401.00	164.88	71.45
J-62	2.39	565.94	402.00	163.94	71.04
J-63	2.39	565.81	399.00	166.81	72.29
J-64	2.39	565.86	401.00	164.86	71.44
J-66	2.39	564.14	403.00	161.14	69.83
J-67	6.96	563.99	393.00	170.99	74.10
J-68	2.39	564.44	399.00	165.44	71.69
J-69	2.39	564.68	400.00	164.68	71.36
J-70	6.96	564.01	400.00	164.01	71.07
J-71	6.96	564.01	399.00	165.01	71.51
J-72	6.96	564.00	399.00	165.00	71.50
J-73	6.96	564.00	399.00	165.00	71.50
J-74	6.96	563.99	393.00	170.99	74.10
J-75	2.39	564.04	397.50	166.54	72.17
J-76	6.96	563.99	393.00	170.99	74.10
J-77	6.96	565.88	403.00	162.88	70.58
J-78	6.96	565.88	403.00	162.88	70.58
J-79	6.96	565.84	403.00	162.84	70.57
J-80	6.96	565.85	403.00	162.85	70.57
J-81	6.96	565.77	413.00	152.77	66.20
J-82	6.96	565.85	403.00	162.85	70.57

J-83		6.96	565.77	412.00	153.77	66.63
J-84		6.96	565.72	404.00	161.72	70.08
J-85		6.96	565.72	408.00	157.72	68.34
J-86		6.96	565.73	404.00	161.73	70.08
J-87		6.96	565.72	404.00	161.72	70.08
J-88		2.39	572.84	399.00	173.84	75.33
J-89		6.96	565.73	404.00	161.73	70.08
J-90		2.39	572.97	398.00	174.97	75.82
J-91		2.39	570.65	401.00	169.65	73.51
J-92		2.39	570.28	401.00	169.28	73.35
J-93		2.39	566.57	404.00	162.57	70.45
J-94		2.39	566.56	403.00	163.56	70.88
J-95		2.39	570.65	401.00	169.65	73.51
J-96		2.39	566.50	403.00	163.50	70.85
J-97		2.39	571.01	401.00	170.01	73.67
J-98		2.39	571.06	399.00	172.06	74.56
J-99		2.39	571.06	399.00	172.06	74.56
J-100		2.39	571.06	399.00	172.06	74.56
J-101		2.39	571.06	397.00	174.06	75.43
J-102		2.39	572.15	396.00	176.15	76.33
J-103		2.39	571.44	399.00	172.44	74.73
J-104		2.39	566.35	403.00	163.35	70.79
J-105		2.39	566.35	403.00	163.35	70.79
J-106		2.39	566.50	405.00	161.50	69.98
J-107		2.39	566.50	405.00	161.50	69.98
J-108		6.96	564.02	403.00	161.02	69.78
J-109		2.39	566.01	396.00	170.01	73.67
J-110		6.96	563.99	397.00	166.99	72.36
J-111		6.96	564.00	399.00	165.00	71.50
J-112		6.96	564.01	399.00	165.01	71.50
J-113		6.96	565.81	405.00	160.81	69.69
J-114		6.96	565.79	412.00	153.79	66.64
J-115		6.96	565.78	412.00	153.78	66.64
J-116		6.96	565.74	404.00	161.74	70.09
J-117		6.96	565.72	405.00	160.72	69.65
J-118		6.96	565.92	403.00	162.92	70.60
J-119		6.96	565.94	403.00	162.94	70.61
J-120		6.96	565.94	403.00	162.94	70.61
J-121		6.96	564.00	399.00	165.00	71.50
J-122		2.39	415.00	397.50	17.50	7.58
J-123		2.39	564.04	397.50	166.54	72.17
J-127		2.39	571.87	396.00	175.87	76.21
J-128		2.39	572.02	396.00	176.02	76.28
J-129		2.39	566.10	395.00	171.10	74.14
J-130		2.39	564.94	403.00	161.94	70.17
J-131		2.39	566.01	399.00	167.01	72.37
I-Pump-1		0.00	415.00	397.50	17.50	7.58
I-Pump-2		0.00	415.00	397.50	17.50	7.58
I-Pump-3		0.00	415.00	397.50	17.50	7.58
R-1		----	415.00	397.50	17.50	7.58
O-RV-1		0.00	415.59	397.50	18.09	7.84
VP-1	WELL 1	----	572.98	398.00	174.98	75.82
VP-2	WELL 2	----	572.98	398.00	174.98	75.82
O-Pump-3		0.00	564.04	397.50	166.54	72.17

O-Pump-2	0.00	564.04	397.50	166.54	72.17
O-Pump-1	0.00	564.04	397.50	166.54	72.17
I-RV-1	----	563.65	397.50	166.15	72.00

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

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
J-2	77.94	J-122	7.58
J-4	77.11	I-Pump-1	7.58
J-1	76.84	I-Pump-2	7.58
J-7	76.68	I-Pump-3	7.58
J-6	76.68	R-1	7.58

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
P-100	6.30	P-10	0.01
P-165	6.30	P-95	0.01
P-54	4.93	P-98	0.01
P-53	4.11	P-125	0.01
P-132	2.86	P-21	0.01

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
P-100	21.75	P-125	0.00
P-165	21.75	P-10	0.00
P-54	15.85	P-95	0.00
P-53	9.88	P-98	0.00
P-52	3.04	P-21	0.00

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
P-100	21.75	P-125	0.00
P-165	21.75	P-10	0.00
P-54	15.85	P-95	0.00

P-53	9.88	P-98	0.00
P-52	3.04	P-21	0.00

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

VALVE LABEL	VALVE TYPE	VALVE SETTING psi or gpm	VALVE STATUS	UPSTREAM PRESSURE psi	DOWNSTREAM PRESSURE psi	THROUGH FLOW gpm
RV-1	PSV	72.00	ACTIVATED	72.00	7.84	555.28

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

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

NODE NAME	FLOWRATE gpm	NODE TITLE
R-1	-552.89	
VP-1	532.35	WELL 1
VP-2	479.03	WELL 2

NET SYSTEM INFLOW = 1011.38
NET SYSTEM OUTFLOW = -552.89
NET SYSTEM DEMAND = 458.49

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

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* * * * * * * * * * * *  K Y P I P E  * * * * * * * * * * * *
*                                                            *
*  Pipe Network Modeling Software                            *
*                                                            *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)                *
*  Version: 8.003 (vr8)  10/29/2015                          *
*  Company:  4BEngineer    Serial #:  591127                 *
*  Interface:  Classic                                       *
*  Licensed for Pipe2016                                     *
*                                                            *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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Date & Time: Wed Jun 22 09:29:54 2016

Master File : C:\Users\4B Engineering\Documents\CITY DOCUMENTS\COBURG\MODELING\2016 peak hour.KYP\2016 peak hour.P2K (2)

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********************************************
 S U M M A R Y   O F   O R I G I N A L   D A T A
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U N I T S   S P E C I F I E D

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

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

VALVE LABEL	VALVE TYPE	VALVE SETTING (ft or gpm)
RV-1	PSV	563.65

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

STATUS CODE: XX -CLOSED PIPE   CV -CHECK VALVE

P I P E N A M E	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-1	J-1	J-2	280.00	1.25	140.0000	0.00
P-2	J-2	J-3	606.60	3.00	140.0000	0.00
P-3	I-RV-1	J-75	16.20	6.00	140.0000	0.00

P-4	J-3	J-6	193.40	3.00	140.0000	0.00
P-5	J-6	J-4	600.30	3.00	140.0000	0.00
P-6	J-6	J-7	378.00	6.00	140.0000	0.00
P-7	J-7	J-9	1386.50	8.00	140.0000	0.00
P-8	J-9	J-8	2435.90	6.00	140.0000	0.00
P-9	J-9	J-13	3328.60	8.00	140.0000	0.00
P-10	J-10	J-109	76.70	12.00	120.0000	0.00
P-11	J-10	J-131	434.80	12.00	120.0000	0.00
P-12	J-13	J-10	565.60	8.00	120.0000	0.00
P-13	J-12	J-14	503.90	12.00	140.0000	0.00
P-14	J-12	J-16	176.50	4.00	100.0000	0.00
P-15	J-16	J-15	179.60	4.00	100.0000	0.00
P-17	J-15	J-18	130.00	4.00	100.0000	0.00
P-18	J-15	J-19	181.70	4.00	100.0000	0.00
P-19	J-20	J-12	181.70	12.00	120.0000	0.00
P-20	J-19	J-20	353.40	6.00	140.0000	0.00
P-21	J-21	J-22	373.10	12.00	120.0000	0.00
P-22	J-22	J-20	140.30	12.00	120.0000	0.00
P-23	J-22	J-25	224.90	8.00	140.0000	0.00
P-24	J-21	J-26	277.90	8.00	140.0000	0.00
P-25	J-25	J-24	278.00	8.00	140.0000	0.00
P-26	J-24	J-23	320.90	8.00	140.0000	0.00
P-27	J-23	J-12	425.10	12.00	120.0000	0.00
P-28	J-26	J-25	378.90	8.00	140.0000	0.00
P-29	J-26	J-28	423.90	8.00	140.0000	0.00
P-30	J-28	J-30	377.90	8.00	140.0000	0.00
P-31	J-28	J-29	689.00	8.00	140.0000	0.00
P-32	J-27	J-29	200.00	8.00	140.0000	0.00
P-33	J-30	J-27	418.10	6.00	140.0000	0.00
P-34	J-29	J-33	260.50	6.00	140.0000	0.00
P-35	J-31	J-32	334.50	6.00	140.0000	0.00
P-36	J-33	J-31	381.70	6.00	140.0000	0.00
P-37	J-33	J-129	287.60	6.00	140.0000	0.00
P-39	J-32	J-35	297.30	8.00	140.0000	0.00
P-40	J-35	J-24	320.70	8.00	140.0000	0.00
P-41	J-35	J-38	287.70	6.00	140.0000	0.00
P-42	J-36	J-23	30.00	8.00	140.0000	0.00
P-43	J-36	J-37	383.70	8.00	140.0000	0.00
P-44	J-38	J-36	277.70	12.00	140.0000	0.00
P-45	J-37	J-14	289.60	12.00	140.0000	0.00
P-46	J-37	J-39	308.50	12.00	140.0000	0.00
P-47	J-39	J-38	401.60	6.00	120.0000	0.00
P-48	J-38	J-34	299.60	12.00	120.0000	0.00
P-49	J-34	J-41	596.00	12.00	120.0000	0.00
P-51	J-41	J-42	56.70	12.00	120.0000	0.00
P-52	J-32	J-43	1029.30	6.00	130.0000	0.00
P-53	J-43	J-42	319.60	6.00	140.0000	0.00
P-54	J-43	J-47	172.10	6.00	130.0000	0.00
P-55	J-45	J-120	609.30	6.00	120.0000	0.00
P-56	J-46	J-45	326.60	6.00	120.0000	0.00
P-57	J-47	J-46	388.10	6.00	120.0000	0.00
P-58	J-42	J-48	189.00	12.00	120.0000	0.00
P-59	J-48	J-50	366.00	12.00	120.0000	0.00
P-60	J-48	J-47	322.80	8.00	140.0000	0.00

P-61	J-50	J-53	319.10	12.00	120.0000	0.00
P-62	J-46	J-50	319.80	6.00	140.0000	0.00
P-63	J-45	J-51	339.30	8.00	140.0000	0.00
P-64	J-51	J-118	576.50	12.00	120.0000	0.00
P-66	J-48	J-56	196.60	8.00	140.0000	0.00
P-67	J-53	J-51	31.90	12.00	120.0000	0.00
P-68	J-54	J-53	172.10	12.00	120.0000	0.00
P-69	J-54	J-57	316.80	12.00	120.0000	0.00
P-70	J-56	J-62	432.00	8.00	140.0000	0.00
P-71	J-55	J-56	268.20	8.00	140.0000	0.00
P-72	J-55	J-39	349.50	8.00	140.0000	0.00
P-73	J-57	J-61	312.10	8.00	140.0000	0.00
P-74	J-57	J-59	321.70	12.00	120.0000	0.00
P-75	J-59	J-130	561.90	12.00	120.0000	0.00
P-76	J-59	J-60	324.20	12.00	140.0000	0.00
P-77	J-60	J-64	216.10	12.00	140.0000	0.00
P-78	J-61	J-55	460.20	8.00	140.0000	0.00
P-79	J-60	J-61	318.60	6.00	140.0000	0.00
P-80	J-62	J-54	307.10	8.00	140.0000	0.00
P-81	J-62	J-61	323.30	6.00	140.0000	0.00
P-82	J-60	J-63	540.80	6.00	120.0000	0.00
P-83	J-64	J-39	278.70	12.00	140.0000	0.00
P-85	J-58	J-75	540.00	12.00	120.0000	0.00
P-86	J-75	J-66	71.90	12.00	120.0000	0.00
P-87	J-68	J-66	219.60	12.00	120.0000	0.00
P-88	J-68	J-69	649.80	6.00	140.0000	0.00
P-89	J-69	J-68	213.90	12.00	120.0000	0.00
P-90	J-58	J-71	329.80	12.00	120.0000	0.00
P-91	J-71	J-70	430.40	6.00	130.0000	0.00
P-92	J-71	J-112	318.00	12.00	120.0000	0.00
P-93	J-73	J-121	70.70	6.00	140.0000	0.00
P-94	J-73	J-111	298.20	12.00	120.0000	0.00
P-95	J-75	J-123	4.00	12.00	120.0000	0.00
P-96	J-123	O-Pump-3	6.30	12.00	120.0000	0.00
P-97	J-123	O-Pump-2	9.90	12.00	120.0000	0.00
P-98	R-1	J-122	12.50	12.00	120.0000	0.00
P-99	J-123	O-Pump-1	19.20	12.00	120.0000	0.00
P-100	R-1	O-RV-1	23.30	6.00	140.0000	0.00
P-101	I-Pump-1	J-122	11.90	12.00	120.0000	0.00
P-102	I-Pump-2	J-122	8.90	12.00	120.0000	0.00
P-103	J-74	J-67	171.50	12.00	120.0000	0.00
P-104	J-74	J-76	609.80	6.00	140.0000	0.00
P-105	J-77	J-49	383.00	12.00	120.0000	0.00
P-106	J-77	J-78	106.80	12.00	140.0000	0.00
P-107	J-49	J-80	226.20	12.00	120.0000	0.00
P-108	J-80	J-82	55.60	12.00	120.0000	0.00
P-109	J-80	J-113	1038.40	12.00	120.0000	0.00
P-110	J-82	J-79	182.50	6.00	140.0000	0.00
P-111	J-83	J-81	228.60	12.00	120.0000	0.00
P-112	J-83	J-116	295.10	8.00	120.0000	0.00
P-113	J-84	J-117	106.10	8.00	120.0000	0.00
P-114	J-84	J-87	253.10	6.00	140.0000	0.00
P-115	J-86	J-84	333.90	8.00	120.0000	0.00
P-116	J-86	J-89	388.40	8.00	140.0000	0.00

P-117	J-43	J-92	334.00	12.00	120.0000	0.00
P-118	VP-1	J-90	105.50	24.00	120.0000	0.00
P-119	J-91	J-97	168.70	12.00	140.0000	0.00
P-120	J-92	J-91	130.20	12.00	120.0000	0.00
P-122	J-93	J-47	326.60	8.00	140.0000	0.00
P-123	J-93	J-94	366.00	4.00	130.0000	0.00
P-124	J-93	J-96	576.50	8.00	140.0000	0.00
P-125	J-91	J-95	86.50	12.00	140.0000	0.00
P-126	J-97	J-102	631.00	12.00	140.0000	0.00
P-127	J-97	J-100	291.10	8.00	140.0000	0.00
P-128	J-98	J-99	107.60	8.00	140.0000	0.00
P-129	J-98	J-101	670.90	8.00	140.0000	0.00
P-130	J-100	J-98	429.00	8.00	140.0000	0.00
P-131	J-100	J-103	302.20	6.00	120.0000	0.00
P-132	J-102	J-88	308.70	12.00	140.0000	0.00
P-133	J-103	J-127	438.60	6.00	140.0000	0.00
P-134	J-90	J-88	1360.00	24.00	120.0000	0.00
P-135	VP-2	J-90	51.10	24.00	120.0000	0.00
P-136	J-46	J-104	332.30	6.00	120.0000	0.00
P-137	J-104	J-105	429.80	6.00	120.0000	0.00
P-138	J-104	J-96	316.00	6.00	120.0000	0.00
P-139	J-96	J-106	549.40	6.00	120.0000	0.00
P-140	J-96	J-107	464.20	6.00	120.0000	0.00
P-141	J-58	J-108	650.10	12.00	140.0000	0.00
P-143	I-Pump-3	J-122	12.80	12.00	120.0000	0.00
P-145	J-11	J-74	182.50	12.00	120.0000	0.00
P-146	J-110	J-11	324.00	12.00	120.0000	0.00
P-147	J-111	J-110	348.40	12.00	120.0000	0.00
P-148	J-112	J-73	378.60	12.00	120.0000	0.00
P-149	J-113	J-114	851.10	12.00	120.0000	0.00
P-150	J-114	J-115	451.70	12.00	120.0000	0.00
P-151	J-115	J-83	950.10	12.00	120.0000	0.00
P-152	J-116	J-86	247.50	8.00	120.0000	0.00
P-153	J-117	J-85	512.90	8.00	120.0000	0.00
P-154	J-118	J-77	693.90	12.00	120.0000	0.00
P-155	J-119	J-44	151.90	6.00	120.0000	0.00
P-156	J-120	J-119	139.90	6.00	120.0000	0.00
P-157	J-121	J-72	124.10	6.00	140.0000	0.00
P-160	J-127	J-128	143.40	6.00	140.0000	0.00
P-161	J-128	J-102	117.00	6.00	140.0000	0.00
P-162	J-129	J-31	763.20	6.00	140.0000	0.00
P-163	J-130	J-69	184.80	12.00	120.0000	0.00
P-164	J-131	J-21	294.10	12.00	120.0000	0.00

P U M P/L O S S   E L E M E N T   D A T A

THERE IS A DEVICE AT NODE Pump-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 3)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
210.00	0.00	80.00
185.00	800.00	80.00

160.00	1000.00	80.00
110.00	1400.00	80.00

THERE IS A DEVICE AT NODE Pump-2 ....> (ID= 3)

THERE IS A DEVICE AT NODE Pump-3 ....> (ID= 3)

THERE IS A DEVICE AT NODE VP-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
230.00	0.00	75.00
224.00	210.00	75.00
222.00	315.00	75.00
211.00	420.00	75.00
178.00	525.00	75.00
130.00	630.00	75.00

THERE IS A DEVICE AT NODE VP-2 DESCRIBED BY THE FOLLOWING DATA: (ID= 2)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
395.00	0.00	75.00
290.00	240.00	75.00
205.00	400.00	75.00
140.00	580.00	75.00
90.00	640.00	75.00

N O D E   D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
J-1		5.58	388.00	
J-2		5.58	386.00	
J-3		5.58	389.00	
J-4		5.58	388.00	
J-6		5.58	389.00	
J-7		5.58	389.00	
J-8		5.58	390.00	
J-9		5.58	391.00	
J-10		5.58	395.00	
J-11	FIRE	16.16	395.00	
J-12		5.58	399.00	
J-13		5.58	396.00	
J-14		5.58	400.00	
J-15		5.58	399.00	

J-16	5.58	399.00
J-18	5.58	402.00
J-19	5.58	399.00
J-20	5.58	397.00
J-21	5.58	399.00
J-22	5.58	397.00
J-23	5.58	400.00
J-24	5.58	401.00
J-25	5.58	399.00
J-26	5.58	398.00
J-27	5.58	392.00
J-28	5.58	391.00
J-29	5.58	392.00
J-30	5.58	390.00
J-31	5.58	399.00
J-32	5.58	402.00
J-33	5.58	393.00
J-34	5.58	403.00
J-35	5.58	403.00
J-36	5.58	400.00
J-37	5.58	405.00
J-38	5.58	401.00
J-39	5.58	401.00
J-41	5.58	403.00
J-42	5.58	403.00
J-43	5.58	405.00
J-44	16.16	403.00
J-45	5.58	403.00
J-46	5.58	403.00
J-47	5.58	403.00
J-48	5.58	403.00
J-49	16.16	414.00
J-50	5.58	403.00
J-51	5.58	403.00
J-53	5.58	403.00
J-54	5.58	403.00
J-55	5.58	401.00
J-56	5.58	403.00
J-57	5.58	401.00
J-58	16.16	399.00
J-59	5.58	401.00
J-60	5.58	399.00
J-61	5.58	401.00
J-62	5.58	402.00
J-63	5.58	399.00
J-64	5.58	401.00
J-66	5.58	403.00
J-67	16.16	393.00
J-68	5.58	399.00
J-69	5.58	400.00
J-70	16.16	400.00
J-71	16.16	399.00
J-72	16.16	399.00
J-73	16.16	399.00

J-74	16.16	393.00
J-75	5.58	397.50
J-76	16.16	393.00
J-77	16.16	403.00
J-78	16.16	403.00
J-79	16.16	403.00
J-80	16.16	403.00
J-81	16.16	413.00
J-82	16.16	403.00
J-83	16.16	412.00
J-84	16.16	404.00
J-85	16.16	408.00
J-86	16.16	404.00
J-87	16.16	404.00
J-88	5.58	399.00
J-89	16.16	404.00
J-90	5.58	398.00
J-91	5.58	401.00
J-92	5.58	401.00
J-93	5.58	404.00
J-94	5.58	403.00
J-95	5.58	401.00
J-96	5.58	403.00
J-97	5.58	401.00
J-98	5.58	399.00
J-99	5.58	399.00
J-100	5.58	399.00
J-101	5.58	397.00
J-102	5.58	396.00
J-103	5.58	399.00
J-104	5.58	403.00
J-105	5.58	403.00
J-106	5.58	405.00
J-107	5.58	405.00
J-108	16.16	403.00
J-109	5.58	396.00
J-110	16.16	397.00
J-111	16.16	399.00
J-112	16.16	399.00
J-113	16.16	405.00
J-114	16.16	412.00
J-115	16.16	412.00
J-116	16.16	404.00
J-117	16.16	405.00
J-118	16.16	403.00
J-119	16.16	403.00
J-120	16.16	403.00
J-121	16.16	399.00
J-122	5.58	397.50
J-123	5.58	397.50
J-127	5.58	396.00
J-128	5.58	396.00
J-129	5.58	395.00
J-130	5.58	403.00

J-131		5.58	399.00	
I-Pump-1		0.00	397.50	
I-Pump-2		0.00	397.50	
I-Pump-3		0.00	397.50	
R-1		----	397.50	415.00
O-RV-1		0.00	397.50	
VP-1	WELL 1	----	398.00	398.00
VP-2	WELL 2	----	398.00	398.00
I-RV-1		----	397.50	563.65
O-Pump-3		0.00	397.50	
O-Pump-2		0.00	397.50	
O-Pump-1		0.00	397.50	

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

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

MAXIMUM AND MINIMUM PRESSURES = 5

MAXIMUM AND MINIMUM VELOCITIES = 5

MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

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

NUMBER OF PIPES ....(P) = 154

NUMBER OF END NODES ....(J) = 127

NUMBER OF PRIMARY LOOPS ....(L) = 25

NUMBER OF SUPPLY NODES ....(F) = 3

NUMBER OF SUPPLY ZONES ....(Z) = 1

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Case: 0

RESULTS OBTAINED AFTER 14 TRIALS: ACCURACY = 0.21268E-06

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

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

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f

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P-1	J-1	J-2	-5.58	2.52	0.00	1.46	9.01	9.01
P-2	J-2	J-3	-11.16	0.28	0.00	0.51	0.46	0.46
P-3	I-RV-1	J-75	-1037.71	1.12	0.00	11.77	69.23	69.23
P-4	J-3	J-6	-16.74	0.19	0.00	0.76	0.97	0.97
P-5	J-6	J-4	5.58	0.08	0.00	0.25	0.13	0.13
P-6	J-6	J-7	-27.90	0.03	0.00	0.32	0.09	0.09
P-7	J-7	J-9	-33.48	0.04	0.00	0.21	0.03	0.03
P-8	J-9	J-8	5.58	0.01	0.00	0.06	0.00	0.00
P-9	J-9	J-13	-44.64	0.17	0.00	0.28	0.05	0.05
P-10	J-10	J-109	5.58	0.00	0.00	0.02	0.00	0.00
P-11	J-10	J-131	-61.38	0.01	0.00	0.17	0.02	0.02
P-12	J-13	J-10	-50.22	0.05	0.00	0.32	0.08	0.08
P-13	J-12	J-14	48.80	0.00	0.00	0.14	0.01	0.01
P-14	J-12	J-16	8.96	0.02	0.00	0.23	0.14	0.14
P-15	J-16	J-15	3.38	0.00	0.00	0.09	0.02	0.02
P-17	J-15	J-18	5.58	0.01	0.00	0.14	0.06	0.06
P-18	J-15	J-19	-7.78	0.02	0.00	0.20	0.11	0.11
P-19	J-20	J-12	-42.45	0.00	0.00	0.12	0.01	0.01
P-20	J-19	J-20	-13.36	0.01	0.00	0.15	0.02	0.02
P-21	J-21	J-22	-47.13	0.00	0.00	0.13	0.01	0.01
P-22	J-22	J-20	-23.51	0.00	0.00	0.07	0.00	0.00
P-23	J-22	J-25	-29.20	0.01	0.00	0.19	0.02	0.02
P-24	J-21	J-26	-25.41	0.00	0.00	0.16	0.02	0.02
P-25	J-25	J-24	-54.17	0.02	0.00	0.35	0.07	0.07
P-26	J-24	J-23	20.17	0.00	0.00	0.13	0.01	0.01
P-27	J-23	J-12	105.80	0.02	0.00	0.30	0.05	0.05
P-28	J-26	J-25	-19.39	0.00	0.00	0.12	0.01	0.01
P-29	J-26	J-28	-11.60	0.00	0.00	0.07	0.00	0.00
P-30	J-28	J-30	-2.25	0.00	0.00	0.01	0.00	0.00
P-31	J-28	J-29	-14.93	0.00	0.00	0.10	0.01	0.01
P-32	J-27	J-29	-13.41	0.00	0.00	0.09	0.01	0.01
P-33	J-30	J-27	-7.83	0.00	0.00	0.09	0.01	0.01
P-34	J-29	J-33	-33.92	0.03	0.00	0.38	0.12	0.12
P-35	J-31	J-32	-50.66	0.09	0.00	0.57	0.26	0.26
P-36	J-33	J-31	-27.69	0.03	0.00	0.31	0.08	0.08
P-37	J-33	J-129	-11.81	0.01	0.00	0.13	0.02	0.02
P-39	J-32	J-35	114.31	0.09	0.00	0.73	0.29	0.29
P-40	J-35	J-24	79.92	0.05	0.00	0.51	0.15	0.15
P-41	J-35	J-38	28.81	0.03	0.00	0.33	0.09	0.09
P-42	J-36	J-23	91.20	0.01	0.00	0.58	0.19	0.19
P-43	J-36	J-37	57.90	0.03	0.00	0.37	0.08	0.08
P-44	J-38	J-36	154.68	0.02	0.00	0.44	0.07	0.07
P-45	J-37	J-14	-43.22	0.00	0.00	0.12	0.01	0.01
P-46	J-37	J-39	95.55	0.01	0.00	0.27	0.03	0.03
P-47	J-39	J-38	-32.16	0.06	0.00	0.36	0.15	0.15
P-48	J-38	J-34	-163.61	0.03	0.00	0.46	0.10	0.10
P-49	J-34	J-41	-169.19	0.07	0.00	0.48	0.11	0.11
P-51	J-41	J-42	-174.77	0.01	0.00	0.50	0.12	0.12
P-52	J-32	J-43	-170.55	2.88	0.00	1.94	2.80	2.80
P-53	J-43	J-42	345.94	2.89	0.00	3.93	9.05	9.05
P-54	J-43	J-47	418.33	2.54	0.00	4.75	14.76	14.76
P-55	J-45	J-120	48.48	0.19	0.00	0.55	0.32	0.32

P-56	J-46	J-45	70.06	0.20	0.00	0.79	0.63	0.63
P-57	J-47	J-46	85.85	0.35	0.00	0.97	0.91	0.91
P-58	J-42	J-48	165.59	0.02	0.00	0.47	0.11	0.11
P-59	J-48	J-50	245.86	0.08	0.00	0.70	0.22	0.22
P-60	J-48	J-47	-242.30	0.37	0.00	1.55	1.15	1.15
P-61	J-50	J-53	296.03	0.10	0.00	0.84	0.31	0.31
P-62	J-46	J-50	55.75	0.10	0.00	0.63	0.31	0.31
P-63	J-45	J-51	16.00	0.00	0.00	0.10	0.01	0.01
P-64	J-51	J-118	307.04	0.19	0.00	0.87	0.33	0.33
P-66	J-48	J-56	156.44	0.10	0.00	1.00	0.51	0.51
P-67	J-53	J-51	296.62	0.01	0.00	0.84	0.31	0.31
P-68	J-54	J-53	6.17	0.00	0.00	0.02	0.00	0.00
P-69	J-54	J-57	42.22	0.00	0.00	0.12	0.01	0.01
P-70	J-56	J-62	74.26	0.06	0.00	0.47	0.13	0.13
P-71	J-55	J-56	-76.60	0.04	0.00	0.49	0.14	0.14
P-72	J-55	J-39	21.97	0.00	0.00	0.14	0.01	0.01
P-73	J-57	J-61	-45.32	0.02	0.00	0.29	0.05	0.05
P-74	J-57	J-59	81.96	0.01	0.00	0.23	0.03	0.03
P-75	J-59	J-130	216.60	0.10	0.00	0.61	0.17	0.17
P-76	J-59	J-60	-140.22	0.02	0.00	0.40	0.06	0.06
P-77	J-60	J-64	-138.51	0.01	0.00	0.39	0.06	0.06
P-78	J-61	J-55	-49.05	0.03	0.00	0.31	0.06	0.06
P-79	J-60	J-61	-12.87	0.01	0.00	0.15	0.02	0.02
P-80	J-62	J-54	53.96	0.02	0.00	0.34	0.07	0.07
P-81	J-62	J-61	14.72	0.01	0.00	0.17	0.03	0.03
P-82	J-60	J-63	5.58	0.00	0.00	0.06	0.01	0.01
P-83	J-64	J-39	-144.09	0.02	0.00	0.41	0.06	0.06
P-85	J-58	J-75	-226.24	0.10	0.00	0.64	0.19	0.19
P-86	J-75	J-66	-194.28	0.01	0.00	0.55	0.14	0.14
P-87	J-68	J-66	199.86	0.03	0.00	0.57	0.15	0.15
P-88	J-68	J-69	-19.26	0.03	0.00	0.22	0.04	0.04
P-89	J-69	J-68	186.18	0.03	0.00	0.53	0.13	0.13
P-90	J-58	J-71	193.92	0.05	0.00	0.55	0.14	0.14
P-91	J-71	J-70	16.16	0.02	0.00	0.18	0.04	0.04
P-92	J-71	J-112	161.60	0.03	0.00	0.46	0.10	0.10
P-93	J-73	J-121	32.32	0.01	0.00	0.37	0.11	0.11
P-94	J-73	J-111	96.96	0.01	0.00	0.28	0.04	0.04
P-95	J-75	J-123	-1075.25	0.01	0.00	3.05	3.36	3.36
P-96	J-123	O-Pump-3	-1080.83	0.02	0.00	3.07	3.40	3.40
P-97	J-123	O-Pump-2	0.00	0.00	0.00	0.00	0.00	0.00
P-98	R-1	J-122	1086.41	0.04	0.00	3.08	3.43	3.43
P-99	J-123	O-Pump-1	0.00	0.00	0.00	0.00	0.00	0.00
P-100	R-1	O-RV-1	-1037.71	1.61	0.00	11.77	69.23	69.23
P-101	I-Pump-1	J-122	0.00	0.00	0.00	0.00	0.00	0.00
P-102	I-Pump-2	J-122	0.00	0.00	0.00	0.00	0.00	0.00
P-103	J-74	J-67	16.16	0.00	0.00	0.05	0.00	0.00
P-104	J-74	J-76	16.16	0.02	0.00	0.18	0.03	0.03
P-105	J-77	J-49	258.56	0.09	0.00	0.73	0.24	0.24
P-106	J-77	J-78	16.16	0.00	0.00	0.05	0.00	0.00
P-107	J-49	J-80	242.40	0.05	0.00	0.69	0.21	0.21
P-108	J-80	J-82	32.32	0.00	0.00	0.09	0.01	0.01
P-109	J-80	J-113	193.92	0.15	0.00	0.55	0.14	0.14
P-110	J-82	J-79	16.16	0.01	0.00	0.18	0.03	0.03
P-111	J-83	J-81	16.16	0.00	0.00	0.05	0.00	0.00

P-112	J-83	J-116	113.12	0.11	0.00	0.72	0.37	0.37
P-113	J-84	J-117	32.32	0.00	0.00	0.21	0.04	0.04
P-114	J-84	J-87	16.16	0.01	0.00	0.18	0.03	0.03
P-115	J-86	J-84	64.64	0.04	0.00	0.41	0.13	0.13
P-116	J-86	J-89	16.16	0.00	0.00	0.10	0.01	0.01
P-117	J-43	J-92	-940.40	0.88	0.00	2.67	2.62	2.62
P-118	VP-1	J-90	535.66	0.00	0.00	0.38	0.03	0.03
P-119	J-91	J-97	-957.14	0.34	0.00	2.72	2.04	2.04
P-120	J-92	J-91	-945.98	0.35	0.00	2.68	2.65	2.65
P-122	J-93	J-47	-84.60	0.05	0.00	0.54	0.16	0.16
P-123	J-93	J-94	5.58	0.01	0.00	0.14	0.04	0.04
P-124	J-93	J-96	73.44	0.07	0.00	0.47	0.13	0.13
P-125	J-91	J-95	5.58	0.00	0.00	0.02	0.00	0.00
P-126	J-97	J-102	-886.58	1.12	0.00	2.51	1.77	1.77
P-127	J-97	J-100	-76.14	0.04	0.00	0.49	0.14	0.14
P-128	J-98	J-99	5.58	0.00	0.00	0.04	0.00	0.00
P-129	J-98	J-101	5.58	0.00	0.00	0.04	0.00	0.00
P-130	J-100	J-98	16.74	0.00	0.00	0.11	0.01	0.01
P-131	J-100	J-103	-98.46	0.36	0.00	1.12	1.18	1.18
P-132	J-102	J-88	-1007.36	0.69	0.00	2.86	2.24	2.24
P-133	J-103	J-127	-104.04	0.43	0.00	1.18	0.98	0.98
P-134	J-90	J-88	1012.94	0.14	0.00	0.72	0.10	0.10
P-135	VP-2	J-90	482.86	0.00	0.00	0.34	0.03	0.03
P-136	J-46	J-104	-45.54	0.09	0.00	0.52	0.28	0.28
P-137	J-104	J-105	5.58	0.00	0.00	0.06	0.01	0.01
P-138	J-104	J-96	-56.70	0.13	0.00	0.64	0.42	0.42
P-139	J-96	J-106	5.58	0.00	0.00	0.06	0.01	0.01
P-140	J-96	J-107	5.58	0.00	0.00	0.06	0.01	0.01
P-141	J-58	J-108	16.16	0.00	0.00	0.05	0.00	0.00
P-143	I-Pump-3	J-122	-1080.83	0.04	0.00	3.07	3.40	3.40
P-145	J-11	J-74	48.48	0.00	0.00	0.14	0.01	0.01
P-146	J-110	J-11	64.64	0.01	0.00	0.18	0.02	0.02
P-147	J-111	J-110	80.80	0.01	0.00	0.23	0.03	0.03
P-148	J-112	J-73	145.44	0.03	0.00	0.41	0.08	0.08
P-149	J-113	J-114	177.76	0.10	0.00	0.50	0.12	0.12
P-150	J-114	J-115	161.60	0.05	0.00	0.46	0.10	0.10
P-151	J-115	J-83	145.44	0.08	0.00	0.41	0.08	0.08
P-152	J-116	J-86	96.96	0.07	0.00	0.62	0.28	0.28
P-153	J-117	J-85	16.16	0.01	0.00	0.10	0.01	0.01
P-154	J-118	J-77	290.88	0.21	0.00	0.83	0.30	0.30
P-155	J-119	J-44	16.16	0.01	0.00	0.18	0.04	0.04
P-156	J-120	J-119	32.32	0.02	0.00	0.37	0.15	0.15
P-157	J-121	J-72	16.16	0.00	0.00	0.18	0.03	0.03
P-160	J-127	J-128	-109.62	0.15	0.00	1.24	1.08	1.08
P-161	J-128	J-102	-115.20	0.14	0.00	1.31	1.18	1.18
P-162	J-129	J-31	-17.39	0.03	0.00	0.20	0.04	0.04
P-163	J-130	J-69	211.02	0.03	0.00	0.60	0.16	0.16
P-164	J-131	J-21	-66.96	0.01	0.00	0.19	0.02	0.02

P U M P/L O S S   E L E M E N T   R E S U L T S

NAME	FLOWRATE gpm	INLET HEAD ft	OUTLET HEAD ft	PUMP HEAD ft	EFFIC-ENCY %	USEFUL POWER Hp	INCREMTL COST $	TOTAL COST $	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. ft
Device "Pump-1" is closed											
Pump-1	0.00	17.46	167.29	0.0	75.00	0.	0.0	0.0	**	**	50.7
Device "Pump-2" is closed											
Pump-2	0.00	17.46	167.29	0.0	75.00	0.	0.0	0.0	**	**	50.7
Pump-3	1080.83	17.41	167.31	149.9	75.00	0.	0.0	0.0	**	**	50.5
VP-1	535.66	0.00	173.59	173.6	75.00	0.	0.0	0.0	**	**	33.2
VP-2	482.86	0.00	173.59	173.6	75.00	0.	0.0	0.0	**	**	33.2

N O D E   R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		5.58	561.74	388.00	173.74	75.29
J-2		5.58	564.27	386.00	178.27	77.25
J-3		5.58	564.54	389.00	175.54	76.07
J-4		5.58	564.65	388.00	176.65	76.55
J-6		5.58	564.73	389.00	175.73	76.15
J-7		5.58	564.76	389.00	175.76	76.16
J-8		5.58	564.79	390.00	174.79	75.74
J-9		5.58	564.80	391.00	173.80	75.31
J-10		5.58	565.02	395.00	170.02	73.67
J-11	FIRE	16.16	564.54	395.00	169.54	73.47
J-12		5.58	565.04	399.00	166.04	71.95
J-13		5.58	564.97	396.00	168.97	73.22
J-14		5.58	565.03	400.00	165.03	71.51
J-15		5.58	565.01	399.00	166.01	71.94
J-16		5.58	565.01	399.00	166.01	71.94
J-18		5.58	565.00	402.00	163.00	70.63
J-19		5.58	565.03	399.00	166.03	71.95
J-20		5.58	565.04	397.00	168.04	72.82
J-21		5.58	565.03	399.00	166.03	71.95
J-22		5.58	565.04	397.00	168.04	72.82
J-23		5.58	565.06	400.00	165.06	71.52
J-24		5.58	565.06	401.00	164.06	71.09
J-25		5.58	565.04	399.00	166.04	71.95
J-26		5.58	565.04	398.00	167.04	72.38

J-27	5.58	565.04	392.00	173.04	74.98
J-28	5.58	565.04	391.00	174.04	75.42
J-29	5.58	565.04	392.00	173.04	74.99
J-30	5.58	565.04	390.00	175.04	75.85
J-31	5.58	565.11	399.00	166.11	71.98
J-32	5.58	565.19	402.00	163.19	70.72
J-33	5.58	565.07	393.00	172.07	74.57
J-34	5.58	565.11	403.00	162.11	70.25
J-35	5.58	565.11	403.00	162.11	70.25
J-36	5.58	565.06	400.00	165.06	71.53
J-37	5.58	565.03	405.00	160.03	69.35
J-38	5.58	565.08	401.00	164.08	71.10
J-39	5.58	565.02	401.00	164.02	71.08
J-41	5.58	565.18	403.00	162.18	70.28
J-42	5.58	565.18	403.00	162.18	70.28
J-43	5.58	568.08	405.00	163.08	70.67
J-44	16.16	564.76	403.00	161.76	70.10
J-45	5.58	564.98	403.00	161.98	70.19
J-46	5.58	565.18	403.00	162.18	70.28
J-47	5.58	565.54	403.00	162.54	70.43
J-48	5.58	565.16	403.00	162.16	70.27
J-49	16.16	564.49	414.00	150.49	65.21
J-50	5.58	565.08	403.00	162.08	70.24
J-51	5.58	564.98	403.00	161.98	70.19
J-53	5.58	564.99	403.00	161.99	70.19
J-54	5.58	564.99	403.00	161.99	70.19
J-55	5.58	565.03	401.00	164.03	71.08
J-56	5.58	565.06	403.00	162.06	70.23
J-57	5.58	564.98	401.00	163.98	71.06
J-58	16.16	564.67	399.00	165.67	71.79
J-59	5.58	564.97	401.00	163.97	71.06
J-60	5.58	564.99	399.00	165.99	71.93
J-61	5.58	565.00	401.00	164.00	71.07
J-62	5.58	565.01	402.00	163.01	70.64
J-63	5.58	564.99	399.00	165.99	71.93
J-64	5.58	565.01	401.00	164.01	71.07
J-66	5.58	564.79	403.00	161.79	70.11
J-67	16.16	564.53	393.00	171.53	74.33
J-68	5.58	564.82	399.00	165.82	71.85
J-69	5.58	564.85	400.00	164.85	71.43
J-70	16.16	564.61	400.00	164.61	71.33
J-71	16.16	564.63	399.00	165.63	71.77
J-72	16.16	564.55	399.00	165.55	71.74
J-73	16.16	564.56	399.00	165.56	71.74
J-74	16.16	564.54	393.00	171.54	74.33
J-75	5.58	564.78	397.50	167.28	72.49
J-76	16.16	564.52	393.00	171.52	74.32
J-77	16.16	564.58	403.00	161.58	70.02
J-78	16.16	564.58	403.00	161.58	70.02
J-79	16.16	564.43	403.00	161.43	69.95
J-80	16.16	564.44	403.00	161.44	69.96
J-81	16.16	564.07	413.00	151.07	65.46
J-82	16.16	564.44	403.00	161.44	69.96
J-83	16.16	564.07	412.00	152.07	65.90

J-84		16.16	563.84	404.00	159.84	69.26
J-85		16.16	563.83	408.00	155.83	67.53
J-86		16.16	563.89	404.00	159.89	69.28
J-87		16.16	563.83	404.00	159.83	69.26
J-88		5.58	571.45	399.00	172.45	74.73
J-89		16.16	563.88	404.00	159.88	69.28
J-90		5.58	571.59	398.00	173.59	75.22
J-91		5.58	569.30	401.00	168.30	72.93
J-92		5.58	568.95	401.00	167.95	72.78
J-93		5.58	565.48	404.00	161.48	69.98
J-94		5.58	565.47	403.00	162.47	70.40
J-95		5.58	569.30	401.00	168.30	72.93
J-96		5.58	565.41	403.00	162.41	70.38
J-97		5.58	569.64	401.00	168.64	73.08
J-98		5.58	569.68	399.00	170.68	73.96
J-99		5.58	569.68	399.00	170.68	73.96
J-100		5.58	569.68	399.00	170.68	73.96
J-101		5.58	569.68	397.00	172.68	74.83
J-102		5.58	570.76	396.00	174.76	75.73
J-103		5.58	570.04	399.00	171.04	74.12
J-104		5.58	565.28	403.00	162.28	70.32
J-105		5.58	565.27	403.00	162.27	70.32
J-106		5.58	565.41	405.00	160.41	69.51
J-107		5.58	565.41	405.00	160.41	69.51
J-108		16.16	564.67	403.00	161.67	70.06
J-109		5.58	565.02	396.00	169.02	73.24
J-110		16.16	564.54	397.00	167.54	72.60
J-111		16.16	564.55	399.00	165.55	71.74
J-112		16.16	564.60	399.00	165.60	71.76
J-113		16.16	564.29	405.00	159.29	69.03
J-114		16.16	564.19	412.00	152.19	65.95
J-115		16.16	564.14	412.00	152.14	65.93
J-116		16.16	563.96	404.00	159.96	69.31
J-117		16.16	563.84	405.00	158.84	68.83
J-118		16.16	564.79	403.00	161.79	70.11
J-119		16.16	564.76	403.00	161.76	70.10
J-120		16.16	564.79	403.00	161.79	70.11
J-121		16.16	564.56	399.00	165.56	71.74
J-122		5.58	414.96	397.50	17.46	7.56
J-123		5.58	564.79	397.50	167.29	72.49
J-127		5.58	570.47	396.00	174.47	75.60
J-128		5.58	570.62	396.00	174.62	75.67
J-129		5.58	565.08	395.00	170.08	73.70
J-130		5.58	564.88	403.00	161.88	70.15
J-131		5.58	565.03	399.00	166.03	71.94
I-Pump-1		0.00	414.96	397.50	17.46	7.56
I-Pump-2		0.00	414.96	397.50	17.46	7.56
I-Pump-3		0.00	414.91	397.50	17.41	7.55
R-1		----	415.00	397.50	17.50	7.58
O-RV-1		0.00	416.61	397.50	19.11	8.28
VP-1	WELL 1	----	571.59	398.00	173.59	75.22
VP-2	WELL 2	----	571.59	398.00	173.59	75.22
I-RV-1		----	563.65	397.50	166.15	72.00
O-Pump-3		0.00	564.81	397.50	167.31	72.50

O-Pump-2	0.00	564.79	397.50	167.29	72.49
O-Pump-1	0.00	564.79	397.50	167.29	72.49

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

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
J-2	77.25	I-Pump-3	7.55
J-4	76.55	J-122	7.56
J-7	76.16	I-Pump-1	7.56
J-6	76.15	I-Pump-2	7.56
J-3	76.07	R-1	7.58

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
P-3	11.77	P-30	0.01
P-100	11.77	P-10	0.02
P-54	4.75	P-125	0.02
P-53	3.93	P-68	0.02
P-98	3.08	P-128	0.04

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
P-3	69.23	P-125	0.00
P-100	69.23	P-10	0.00
P-54	14.76	P-30	0.00
P-53	9.05	P-68	0.00
P-1	9.01	P-106	0.00

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
P-3	69.23	P-125	0.00
P-100	69.23	P-10	0.00
P-54	14.76	P-30	0.00
P-53	9.05	P-68	0.00

P-1	9.01	P-106	0.00

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

VALVE LABEL	VALVE TYPE	VALVE SETTING psi or gpm	VALVE STATUS	UPSTREAM PRESSURE psi	DOWNSTREAM PRESSURE psi	THROUGH FLOW gpm
RV-1	PSV	72.00	ACTIVATED	72.00	8.28	1037.71

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

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

NODE NAME	FLOWRATE gpm	NODE TITLE
R-1	48.70	
VP-1	535.66	WELL 1
VP-2	482.86	WELL 2

NET SYSTEM INFLOW = 1067.22
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 1067.22

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

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* * * * * * * * * * * * *  K Y P I P E  * * * * * * * * * * * *
*                                                              *
*  Pipe Network Modeling Software                              *
*                                                              *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)                  *
*  Version: 8.003 (vr8)  10/29/2015                            *
*  Company:  4BEngineer    Serial #:  591127                   *
*  Interface:  Classic                                         *
*  Licensed for Pipe2016                                       *
*                                                              *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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Date & Time: Mon Jun 20 11:19:20 2016

Master File : C:\Users\4B Engineering\Documents\CITY DOCUMENTS\COBURG\MODELING\2016 average day, filling reservoir.KYP\2016 average day, filling reservoir.P2K (3)

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

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

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

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

VALVE LABEL	VALVE TYPE	VALVE SETTING (ft or gpm)
RV-1	PSV	563.65

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

STATUS CODE: XX -CLOSED PIPE   CV -CHECK VALVE

P I P E N A M E	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-1	J-1	J-2	280.00	1.25	140.0000	0.00
P-2	J-2	J-3	606.60	3.00	140.0000	0.00
P-4	J-3	J-6	193.40	3.00	140.0000	0.00

P-5	J-6	J-4	600.30	3.00	140.0000	0.00
P-6	J-6	J-7	378.00	6.00	140.0000	0.00
P-7	J-7	J-9	1386.50	8.00	140.0000	0.00
P-8	J-9	J-8	2435.90	6.00	140.0000	0.00
P-9	J-9	J-13	3328.60	8.00	140.0000	0.00
P-10	J-10	J-109	76.70	12.00	120.0000	0.00
P-11	J-10	J-131	434.80	12.00	120.0000	0.00
P-12	J-13	J-10	565.60	8.00	120.0000	0.00
P-13	J-12	J-14	503.90	12.00	140.0000	0.00
P-14	J-12	J-16	176.50	4.00	100.0000	0.00
P-15	J-16	J-15	179.60	4.00	100.0000	0.00
P-17	J-15	J-18	130.00	4.00	100.0000	0.00
P-18	J-15	J-19	181.70	4.00	100.0000	0.00
P-19	J-20	J-12	181.70	12.00	120.0000	0.00
P-20	J-19	J-20	353.40	6.00	140.0000	0.00
P-21	J-21	J-22	373.10	12.00	120.0000	0.00
P-22	J-22	J-20	140.30	12.00	120.0000	0.00
P-23	J-22	J-25	224.90	8.00	140.0000	0.00
P-24	J-21	J-26	277.90	8.00	140.0000	0.00
P-25	J-25	J-24	278.00	8.00	140.0000	0.00
P-26	J-24	J-23	320.90	8.00	140.0000	0.00
P-27	J-23	J-12	425.10	12.00	120.0000	0.00
P-28	J-26	J-25	378.90	8.00	140.0000	0.00
P-29	J-26	J-28	423.90	8.00	140.0000	0.00
P-30	J-28	J-30	377.90	8.00	140.0000	0.00
P-31	J-28	J-29	689.00	8.00	140.0000	0.00
P-32	J-27	J-29	200.00	8.00	140.0000	0.00
P-33	J-30	J-27	418.10	6.00	140.0000	0.00
P-34	J-29	J-33	260.50	6.00	140.0000	0.00
P-35	J-31	J-32	334.50	6.00	140.0000	0.00
P-36	J-33	J-31	381.70	6.00	140.0000	0.00
P-37	J-33	J-129	287.60	6.00	140.0000	0.00
P-39	J-32	J-35	297.30	8.00	140.0000	0.00
P-40	J-35	J-24	320.70	8.00	140.0000	0.00
P-41	J-35	J-38	287.70	6.00	140.0000	0.00
P-42	J-36	J-23	30.00	8.00	140.0000	0.00
P-43	J-36	J-37	383.70	8.00	140.0000	0.00
P-44	J-38	J-36	277.70	12.00	140.0000	0.00
P-45	J-37	J-14	289.60	12.00	140.0000	0.00
P-46	J-37	J-39	308.50	12.00	140.0000	0.00
P-47	J-39	J-38	401.60	6.00	120.0000	0.00
P-48	J-38	J-34	299.60	12.00	120.0000	0.00
P-49	J-34	J-41	596.00	12.00	120.0000	0.00
P-51	J-41	J-42	56.70	12.00	120.0000	0.00
P-52	J-32	J-43	1029.30	6.00	130.0000	0.00
P-53	J-43	J-42	319.60	6.00	140.0000	0.00
P-54	J-43	J-47	172.10	6.00	130.0000	0.00
P-55	J-45	J-120	609.30	6.00	120.0000	0.00
P-56	J-46	J-45	326.60	6.00	120.0000	0.00
P-57	J-47	J-46	388.10	6.00	120.0000	0.00
P-58	J-42	J-48	189.00	12.00	120.0000	0.00
P-59	J-48	J-50	366.00	12.00	120.0000	0.00
P-60	J-48	J-47	322.80	8.00	140.0000	0.00
P-61	J-50	J-53	319.10	12.00	120.0000	0.00

P-62	J-46	J-50	319.80	6.00	140.0000	0.00
P-63	J-45	J-51	339.30	8.00	140.0000	0.00
P-64	J-51	J-118	576.50	12.00	120.0000	0.00
P-66	J-48	J-56	196.60	8.00	140.0000	0.00
P-67	J-53	J-51	31.90	12.00	120.0000	0.00
P-68	J-54	J-53	172.10	12.00	120.0000	0.00
P-69	J-54	J-57	316.80	12.00	120.0000	0.00
P-70	J-56	J-62	432.00	8.00	140.0000	0.00
P-71	J-55	J-56	268.20	8.00	140.0000	0.00
P-72	J-55	J-39	349.50	8.00	140.0000	0.00
P-73	J-57	J-61	312.10	8.00	140.0000	0.00
P-74	J-57	J-59	321.70	12.00	120.0000	0.00
P-75	J-59	J-130	561.90	12.00	120.0000	0.00
P-76	J-59	J-60	324.20	12.00	140.0000	0.00
P-77	J-60	J-64	216.10	12.00	140.0000	0.00
P-78	J-61	J-55	460.20	8.00	140.0000	0.00
P-79	J-60	J-61	318.60	6.00	140.0000	0.00
P-80	J-62	J-54	307.10	8.00	140.0000	0.00
P-81	J-62	J-61	323.30	6.00	140.0000	0.00
P-82	J-60	J-63	540.80	6.00	120.0000	0.00
P-83	J-64	J-39	278.70	12.00	140.0000	0.00
P-85	J-58	J-75	540.00	12.00	120.0000	0.00
P-86	J-75	J-66	71.90	12.00	120.0000	0.00
P-87	J-68	J-66	219.60	12.00	120.0000	0.00
P-88	J-68	J-69	649.80	6.00	140.0000	0.00
P-89	J-69	J-68	213.90	12.00	120.0000	0.00
P-90	J-58	J-71	329.80	12.00	120.0000	0.00
P-91	J-71	J-70	430.40	6.00	130.0000	0.00
P-92	J-71	J-112	318.00	12.00	120.0000	0.00
P-93	J-73	J-121	70.70	6.00	140.0000	0.00
P-94	J-73	J-111	298.20	12.00	120.0000	0.00
P-95	J-75	J-123	4.00	12.00	120.0000	0.00
P-96	J-123	O-Pump-3	6.30	12.00	120.0000	0.00
P-97	J-123	O-Pump-2	9.90	12.00	120.0000	0.00
P-98	R-1	J-122	12.50	12.00	120.0000	0.00
P-99	J-123	O-Pump-1	19.20	12.00	120.0000	0.00
P-100	O-RV-1	R-1	27.10	6.00	140.0000	0.00
P-101	I-Pump-1	J-122	11.90	12.00	120.0000	0.00
P-102	I-Pump-2	J-122	8.90	12.00	120.0000	0.00
P-103	J-74	J-67	171.50	12.00	120.0000	0.00
P-104	J-74	J-76	609.80	6.00	140.0000	0.00
P-105	J-77	J-49	383.00	12.00	120.0000	0.00
P-106	J-77	J-78	106.80	12.00	140.0000	0.00
P-107	J-49	J-80	226.20	12.00	120.0000	0.00
P-108	J-80	J-82	55.60	12.00	120.0000	0.00
P-109	J-80	J-113	1038.40	12.00	120.0000	0.00
P-110	J-82	J-79	182.50	6.00	140.0000	0.00
P-111	J-83	J-81	228.60	12.00	120.0000	0.00
P-112	J-83	J-116	295.10	8.00	120.0000	0.00
P-113	J-84	J-117	106.10	8.00	120.0000	0.00
P-114	J-84	J-87	253.10	6.00	140.0000	0.00
P-115	J-86	J-84	333.90	8.00	120.0000	0.00
P-116	J-86	J-89	388.40	8.00	140.0000	0.00
P-117	J-43	J-92	334.00	12.00	120.0000	0.00

P-118	VP-1	J-90	103.70	24.00	120.0000	0.00
P-119	J-91	J-97	168.70	12.00	140.0000	0.00
P-120	J-92	J-91	130.20	12.00	120.0000	0.00
P-122	J-93	J-47	326.60	8.00	140.0000	0.00
P-123	J-93	J-94	366.00	4.00	130.0000	0.00
P-124	J-93	J-96	576.50	8.00	140.0000	0.00
P-125	J-91	J-95	86.50	12.00	140.0000	0.00
P-126	J-97	J-102	631.00	12.00	140.0000	0.00
P-127	J-97	J-100	291.10	8.00	140.0000	0.00
P-128	J-98	J-99	107.60	8.00	140.0000	0.00
P-129	J-98	J-101	670.90	8.00	140.0000	0.00
P-130	J-100	J-98	429.00	8.00	140.0000	0.00
P-131	J-100	J-103	302.20	6.00	120.0000	0.00
P-132	J-102	J-88	308.70	12.00	140.0000	0.00
P-133	J-103	J-127	438.60	6.00	140.0000	0.00
P-134	J-90	J-88	1360.00	24.00	120.0000	0.00
P-135	VP-2	J-90	53.70	24.00	120.0000	0.00
P-136	J-46	J-104	332.30	6.00	120.0000	0.00
P-137	J-104	J-105	429.80	6.00	120.0000	0.00
P-138	J-104	J-96	316.00	6.00	120.0000	0.00
P-139	J-96	J-106	549.40	6.00	120.0000	0.00
P-140	J-96	J-107	464.20	6.00	120.0000	0.00
P-141	J-58	J-108	650.10	12.00	140.0000	0.00
P-143	I-Pump-3	J-122	12.80	12.00	120.0000	0.00
P-145	J-11	J-74	182.50	12.00	120.0000	0.00
P-146	J-110	J-11	324.00	12.00	120.0000	0.00
P-147	J-111	J-110	348.40	12.00	120.0000	0.00
P-148	J-112	J-73	378.60	12.00	120.0000	0.00
P-149	J-113	J-114	851.10	12.00	120.0000	0.00
P-150	J-114	J-115	451.70	12.00	120.0000	0.00
P-151	J-115	J-83	950.10	12.00	120.0000	0.00
P-152	J-116	J-86	247.50	8.00	120.0000	0.00
P-153	J-117	J-85	512.90	8.00	120.0000	0.00
P-154	J-118	J-77	693.90	12.00	120.0000	0.00
P-155	J-119	J-44	151.90	6.00	120.0000	0.00
P-156	J-120	J-119	139.90	6.00	120.0000	0.00
P-157	J-121	J-72	124.10	6.00	140.0000	0.00
P-160	J-127	J-128	143.40	6.00	140.0000	0.00
P-161	J-128	J-102	117.00	6.00	140.0000	0.00
P-162	J-129	J-31	763.20	6.00	140.0000	0.00
P-163	J-130	J-69	184.80	12.00	120.0000	0.00
P-164	J-131	J-21	294.10	12.00	120.0000	0.00
P-165	J-75	I-RV-1	17.90	6.00	140.0000	0.00

P U M P/L O S S E L E M E N T D A T A

THERE IS A DEVICE AT NODE Pump-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 3)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
210.00	0.00	80.00
185.00	800.00	80.00

160.00	1000.00	80.00
110.00	1400.00	80.00

THERE IS A DEVICE AT NODE Pump-2 ....> (ID= 3)

THERE IS A DEVICE AT NODE Pump-3 ....> (ID= 3)

THERE IS A DEVICE AT NODE VP-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
230.00	0.00	75.00
224.00	210.00	75.00
222.00	315.00	75.00
211.00	420.00	75.00
178.00	525.00	75.00
130.00	630.00	75.00

THERE IS A DEVICE AT NODE VP-2 DESCRIBED BY THE FOLLOWING DATA: (ID= 2)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
395.00	0.00	75.00
290.00	240.00	75.00
205.00	400.00	75.00
140.00	580.00	75.00
90.00	640.00	75.00

N O D E   D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
J-1		0.86	388.00	
J-2		0.86	386.00	
J-3		0.86	389.00	
J-4		0.86	388.00	
J-6		0.86	389.00	
J-7		0.86	389.00	
J-8		0.86	390.00	
J-9		0.86	391.00	
J-10		0.86	395.00	
J-11	FIRE	2.50	395.00	
J-12		0.86	399.00	
J-13		0.86	396.00	
J-14		0.86	400.00	
J-15		0.86	399.00	

J-16	0.86	399.00
J-18	0.86	402.00
J-19	0.86	399.00
J-20	0.86	397.00
J-21	0.86	399.00
J-22	0.86	397.00
J-23	0.86	400.00
J-24	0.86	401.00
J-25	0.86	399.00
J-26	0.86	398.00
J-27	0.86	392.00
J-28	0.86	391.00
J-29	0.86	392.00
J-30	0.86	390.00
J-31	0.86	399.00
J-32	0.86	402.00
J-33	0.86	393.00
J-34	0.86	403.00
J-35	0.86	403.00
J-36	0.86	400.00
J-37	0.86	405.00
J-38	0.86	401.00
J-39	0.86	401.00
J-41	0.86	403.00
J-42	0.86	403.00
J-43	0.86	405.00
J-44	2.50	403.00
J-45	0.86	403.00
J-46	0.86	403.00
J-47	0.86	403.00
J-48	0.86	403.00
J-49	2.50	414.00
J-50	0.86	403.00
J-51	0.86	403.00
J-53	0.86	403.00
J-54	0.86	403.00
J-55	0.86	401.00
J-56	0.86	403.00
J-57	0.86	401.00
J-58	2.50	399.00
J-59	0.86	401.00
J-60	0.86	399.00
J-61	0.86	401.00
J-62	0.86	402.00
J-63	0.86	399.00
J-64	0.86	401.00
J-66	0.86	403.00
J-67	2.50	393.00
J-68	0.86	399.00
J-69	0.86	400.00
J-70	2.50	400.00
J-71	2.50	399.00
J-72	2.50	399.00
J-73	2.50	399.00

J-74	2.50	393.00
J-75	0.86	397.50
J-76	2.50	393.00
J-77	2.50	403.00
J-78	2.50	403.00
J-79	2.50	403.00
J-80	2.50	403.00
J-81	2.50	413.00
J-82	2.50	403.00
J-83	2.50	412.00
J-84	2.50	404.00
J-85	2.50	408.00
J-86	2.50	404.00
J-87	2.50	404.00
J-88	0.86	399.00
J-89	2.50	404.00
J-90	0.86	398.00
J-91	0.86	401.00
J-92	0.86	401.00
J-93	0.86	404.00
J-94	0.86	403.00
J-95	0.86	401.00
J-96	0.86	403.00
J-97	0.86	401.00
J-98	0.86	399.00
J-99	0.86	399.00
J-100	0.86	399.00
J-101	0.86	397.00
J-102	0.86	396.00
J-103	0.86	399.00
J-104	0.86	403.00
J-105	0.86	403.00
J-106	0.86	405.00
J-107	0.86	405.00
J-108	2.50	403.00
J-109	0.86	396.00
J-110	2.50	397.00
J-111	2.50	399.00
J-112	2.50	399.00
J-113	2.50	405.00
J-114	2.50	412.00
J-115	2.50	412.00
J-116	2.50	404.00
J-117	2.50	405.00
J-118	2.50	403.00
J-119	2.50	403.00
J-120	2.50	403.00
J-121	2.50	399.00
J-122	0.86	397.50
J-123	0.86	397.50
J-127	0.86	396.00
J-128	0.86	396.00
J-129	0.86	395.00
J-130	0.86	403.00

J-131		0.86	399.00	
I-Pump-1		0.00	397.50	
I-Pump-2		0.00	397.50	
I-Pump-3		0.00	397.50	
R-1		----	397.50	415.00
O-RV-1		0.00	397.50	
VP-1	WELL 1	----	398.00	398.00
VP-2	WELL 2	----	398.00	398.00
O-Pump-3		0.00	397.50	
O-Pump-2		0.00	397.50	
O-Pump-1		0.00	397.50	
I-RV-1		----	397.50	563.65

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

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

MAXIMUM AND MINIMUM PRESSURES = 5
MAXIMUM AND MINIMUM VELOCITIES = 5
MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

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

NUMBER OF PIPES ....(P) = 154
NUMBER OF END NODES ....(J) = 127
NUMBER OF PRIMARY LOOPS ....(L) = 25
NUMBER OF SUPPLY NODES ....(F) = 3
NUMBER OF SUPPLY ZONES ....(Z) = 1

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Case: 0

RESULTS OBTAINED AFTER 15 TRIALS: ACCURACY = 0.92151E-04

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

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

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f

P-1	J-1	J-2	-0.86	0.08	0.00	0.22	0.28	0.28
P-2	J-2	J-3	-1.72	0.01	0.00	0.08	0.01	0.01
P-4	J-3	J-6	-2.58	0.01	0.00	0.12	0.03	0.03
P-5	J-6	J-4	0.86	0.00	0.00	0.04	0.00	0.00
P-6	J-6	J-7	-4.30	0.00	0.00	0.05	0.00	0.00
P-7	J-7	J-9	-5.16	0.00	0.00	0.03	0.00	0.00
P-8	J-9	J-8	0.86	0.00	0.00	0.01	0.00	0.00
P-9	J-9	J-13	-6.88	0.01	0.00	0.04	0.00	0.00
P-10	J-10	J-109	0.86	0.00	0.00	0.00	0.00	0.00
P-11	J-10	J-131	-9.46	0.00	0.00	0.03	0.00	0.00
P-12	J-13	J-10	-7.74	0.00	0.00	0.05	0.00	0.00
P-13	J-12	J-14	176.13	0.04	0.00	0.50	0.09	0.09
P-14	J-12	J-16	-0.12	0.00	0.00	0.00	0.00	0.00
P-15	J-16	J-15	-0.98	0.00	0.00	0.02	0.00	0.00
P-17	J-15	J-18	0.86	0.00	0.00	0.02	0.00	0.00
P-18	J-15	J-19	-2.70	0.00	0.00	0.07	0.02	0.02
P-19	J-20	J-12	69.66	0.00	0.00	0.20	0.02	0.02
P-20	J-19	J-20	-3.56	0.00	0.00	0.04	0.00	0.00
P-21	J-21	J-22	27.98	0.00	0.00	0.08	0.00	0.00
P-22	J-22	J-20	74.08	0.00	0.00	0.21	0.02	0.02
P-23	J-22	J-25	-46.96	0.01	0.00	0.30	0.06	0.06
P-24	J-21	J-26	-39.16	0.01	0.00	0.25	0.04	0.04
P-25	J-25	J-24	-47.49	0.02	0.00	0.30	0.06	0.06
P-26	J-24	J-23	43.33	0.02	0.00	0.28	0.05	0.05
P-27	J-23	J-12	107.22	0.02	0.00	0.30	0.05	0.05
P-28	J-26	J-25	0.32	0.00	0.00	0.00	0.00	0.00
P-29	J-26	J-28	-40.34	0.02	0.00	0.26	0.04	0.04
P-30	J-28	J-30	-13.66	0.00	0.00	0.09	0.01	0.01
P-31	J-28	J-29	-27.55	0.01	0.00	0.18	0.02	0.02
P-32	J-27	J-29	-15.38	0.00	0.00	0.10	0.01	0.01
P-33	J-30	J-27	-14.52	0.01	0.00	0.16	0.03	0.03
P-34	J-29	J-33	-43.78	0.05	0.00	0.50	0.20	0.20
P-35	J-31	J-32	-46.36	0.07	0.00	0.53	0.22	0.22
P-36	J-33	J-31	-28.68	0.03	0.00	0.33	0.09	0.09
P-37	J-33	J-129	-15.97	0.01	0.00	0.18	0.03	0.03
P-39	J-32	J-35	133.62	0.11	0.00	0.85	0.38	0.38
P-40	J-35	J-24	91.68	0.06	0.00	0.59	0.19	0.19
P-41	J-35	J-38	41.08	0.05	0.00	0.47	0.17	0.17
P-42	J-36	J-23	64.75	0.00	0.00	0.41	0.10	0.10
P-43	J-36	J-37	104.45	0.09	0.00	0.67	0.24	0.24
P-44	J-38	J-36	170.06	0.02	0.00	0.48	0.08	0.08
P-45	J-37	J-14	-175.27	0.03	0.00	0.50	0.09	0.09
P-46	J-37	J-39	278.87	0.06	0.00	0.79	0.21	0.21
P-47	J-39	J-38	-58.56	0.18	0.00	0.66	0.45	0.45
P-48	J-38	J-34	-188.41	0.04	0.00	0.53	0.13	0.13
P-49	J-34	J-41	-189.27	0.08	0.00	0.54	0.13	0.13
P-51	J-41	J-42	-190.13	0.01	0.00	0.54	0.14	0.14
P-52	J-32	J-43	-180.85	3.22	0.00	2.05	3.12	3.12
P-53	J-43	J-42	368.45	3.25	0.00	4.18	10.17	10.17
P-54	J-43	J-47	439.53	2.78	0.00	4.99	16.18	16.18
P-55	J-45	J-120	7.50	0.01	0.00	0.09	0.01	0.01
P-56	J-46	J-45	76.71	0.24	0.00	0.87	0.74	0.74

P-57	J-47	J-46	91.90	0.40	0.00	1.04	1.03	1.03
P-58	J-42	J-48	177.46	0.02	0.00	0.50	0.12	0.12
P-59	J-48	J-50	244.16	0.08	0.00	0.69	0.22	0.22
P-60	J-48	J-47	-280.91	0.49	0.00	1.79	1.52	1.52
P-61	J-50	J-53	317.49	0.11	0.00	0.90	0.35	0.35
P-62	J-46	J-50	74.18	0.17	0.00	0.84	0.52	0.52
P-63	J-45	J-51	68.35	0.04	0.00	0.44	0.11	0.11
P-64	J-51	J-118	47.50	0.01	0.00	0.13	0.01	0.01
P-66	J-48	J-56	213.34	0.18	0.00	1.36	0.91	0.91
P-67	J-53	J-51	-19.99	0.00	0.00	0.06	0.00	0.00
P-68	J-54	J-53	-336.61	0.07	0.00	0.95	0.39	0.39
P-69	J-54	J-57	364.43	0.14	0.00	1.03	0.45	0.45
P-70	J-56	J-62	85.67	0.07	0.00	0.55	0.17	0.17
P-71	J-55	J-56	-126.81	0.09	0.00	0.81	0.35	0.35
P-72	J-55	J-39	38.58	0.01	0.00	0.25	0.04	0.04
P-73	J-57	J-61	-83.12	0.05	0.00	0.53	0.16	0.16
P-74	J-57	J-59	446.69	0.21	0.00	1.27	0.66	0.66
P-75	J-59	J-130	877.93	1.30	0.00	2.49	2.31	2.31
P-76	J-59	J-60	-432.10	0.15	0.00	1.23	0.47	0.47
P-77	J-60	J-64	-374.29	0.08	0.00	1.06	0.36	0.36
P-78	J-61	J-55	-87.37	0.08	0.00	0.56	0.17	0.17
P-79	J-60	J-61	-59.53	0.11	0.00	0.68	0.35	0.35
P-80	J-62	J-54	28.67	0.01	0.00	0.18	0.02	0.02
P-81	J-62	J-61	56.13	0.10	0.00	0.64	0.31	0.31
P-82	J-60	J-63	0.86	0.00	0.00	0.01	0.00	0.00
P-83	J-64	J-39	-375.15	0.10	0.00	1.06	0.36	0.36
P-85	J-58	J-75	-35.00	0.00	0.00	0.10	0.01	0.01
P-86	J-75	J-66	-874.49	0.16	0.00	2.48	2.29	2.29
P-87	J-68	J-66	875.35	0.50	0.00	2.48	2.30	2.30
P-88	J-68	J-69	-82.16	0.41	0.00	0.93	0.63	0.63
P-89	J-69	J-68	794.05	0.41	0.00	2.25	1.92	1.92
P-90	J-58	J-71	30.00	0.00	0.00	0.09	0.00	0.00
P-91	J-71	J-70	2.50	0.00	0.00	0.03	0.00	0.00
P-92	J-71	J-112	25.00	0.00	0.00	0.07	0.00	0.00
P-93	J-73	J-121	5.00	0.00	0.00	0.06	0.00	0.00
P-94	J-73	J-111	15.00	0.00	0.00	0.04	0.00	0.00
P-95	J-75	J-123	0.86	0.00	0.00	0.00	0.00	0.00
P-96	J-123	O-Pump-3	0.00	0.00	0.00	0.00	0.00	0.00
P-97	J-123	O-Pump-2	0.00	0.00	0.00	0.00	0.00	0.00
P-98	R-1	J-122	0.86	0.00	0.00	0.00	0.00	0.00
P-99	J-123	O-Pump-1	0.00	0.00	0.00	0.00	0.00	0.00
P-100	O-RV-1	R-1	837.77	1.26	0.00	9.51	46.58	46.58
P-101	I-Pump-1	J-122	0.00	0.00	0.00	0.00	0.00	0.00
P-102	I-Pump-2	J-122	0.00	0.00	0.00	0.00	0.00	0.00
P-103	J-74	J-67	2.50	0.00	0.00	0.01	0.00	0.00
P-104	J-74	J-76	2.50	0.00	0.00	0.03	0.00	0.00
P-105	J-77	J-49	40.00	0.00	0.00	0.11	0.01	0.01
P-106	J-77	J-78	2.50	0.00	0.00	0.01	0.00	0.00
P-107	J-49	J-80	37.50	0.00	0.00	0.11	0.01	0.01
P-108	J-80	J-82	5.00	0.00	0.00	0.01	0.00	0.00
P-109	J-80	J-113	30.00	0.00	0.00	0.09	0.00	0.00
P-110	J-82	J-79	2.50	0.00	0.00	0.03	0.00	0.00
P-111	J-83	J-81	2.50	0.00	0.00	0.01	0.00	0.00
P-112	J-83	J-116	17.50	0.00	0.00	0.11	0.01	0.01

P-113	J-84	J-117	5.00	0.00	0.00	0.03	0.00	0.00
P-114	J-84	J-87	2.50	0.00	0.00	0.03	0.00	0.00
P-115	J-86	J-84	10.00	0.00	0.00	0.06	0.00	0.00
P-116	J-86	J-89	2.50	0.00	0.00	0.02	0.00	0.00
P-117	J-43	J-92	-989.69	0.96	0.00	2.81	2.89	2.89
P-118	VP-1	J-90	527.83	0.00	0.00	0.37	0.03	0.03
P-119	J-91	J-97	-992.27	0.37	0.00	2.81	2.18	2.18
P-120	J-92	J-91	-990.55	0.38	0.00	2.81	2.89	2.89
P-122	J-93	J-47	-65.87	0.03	0.00	0.42	0.10	0.10
P-123	J-93	J-94	0.86	0.00	0.00	0.02	0.00	0.00
P-124	J-93	J-96	64.15	0.06	0.00	0.41	0.10	0.10
P-125	J-91	J-95	0.86	0.00	0.00	0.00	0.00	0.00
P-126	J-97	J-102	-893.80	1.13	0.00	2.54	1.80	1.80
P-127	J-97	J-100	-99.32	0.06	0.00	0.63	0.22	0.22
P-128	J-98	J-99	0.86	0.00	0.00	0.01	0.00	0.00
P-129	J-98	J-101	0.86	0.00	0.00	0.01	0.00	0.00
P-130	J-100	J-98	2.58	0.00	0.00	0.02	0.00	0.00
P-131	J-100	J-103	-102.76	0.38	0.00	1.17	1.27	1.27
P-132	J-102	J-88	-1000.01	0.68	0.00	2.84	2.21	2.21
P-133	J-103	J-127	-103.62	0.43	0.00	1.18	0.97	0.97
P-134	J-90	J-88	1000.87	0.14	0.00	0.71	0.10	0.10
P-135	VP-2	J-90	473.90	0.00	0.00	0.34	0.03	0.03
P-136	J-46	J-104	-59.85	0.16	0.00	0.68	0.47	0.47
P-137	J-104	J-105	0.86	0.00	0.00	0.01	0.00	0.00
P-138	J-104	J-96	-61.57	0.16	0.00	0.70	0.49	0.49
P-139	J-96	J-106	0.86	0.00	0.00	0.01	0.00	0.00
P-140	J-96	J-107	0.86	0.00	0.00	0.01	0.00	0.00
P-141	J-58	J-108	2.50	0.00	0.00	0.01	0.00	0.00
P-143	I-Pump-3	J-122	0.00	0.00	0.00	0.00	0.00	0.00
P-145	J-11	J-74	7.50	0.00	0.00	0.02	0.00	0.00
P-146	J-110	J-11	10.00	0.00	0.00	0.03	0.00	0.00
P-147	J-111	J-110	12.50	0.00	0.00	0.04	0.00	0.00
P-148	J-112	J-73	22.50	0.00	0.00	0.06	0.00	0.00
P-149	J-113	J-114	27.50	0.00	0.00	0.08	0.00	0.00
P-150	J-114	J-115	25.00	0.00	0.00	0.07	0.00	0.00
P-151	J-115	J-83	22.50	0.00	0.00	0.06	0.00	0.00
P-152	J-116	J-86	15.00	0.00	0.00	0.10	0.01	0.01
P-153	J-117	J-85	2.50	0.00	0.00	0.02	0.00	0.00
P-154	J-118	J-77	45.00	0.01	0.00	0.13	0.01	0.01
P-155	J-119	J-44	2.50	0.00	0.00	0.03	0.00	0.00
P-156	J-120	J-119	5.00	0.00	0.00	0.06	0.00	0.00
P-157	J-121	J-72	2.50	0.00	0.00	0.03	0.00	0.00
P-160	J-127	J-128	-104.48	0.14	0.00	1.19	0.99	0.99
P-161	J-128	J-102	-105.34	0.12	0.00	1.20	1.00	1.00
P-162	J-129	J-31	-16.83	0.03	0.00	0.19	0.03	0.03
P-163	J-130	J-69	877.07	0.43	0.00	2.49	2.31	2.31
P-164	J-131	J-21	-10.32	0.00	0.00	0.03	0.00	0.00
P-165	J-75	I-RV-1	837.77	0.83	0.00	9.51	46.58	46.58

P U M P/L O S S   E L E M E N T   R E S U L T S

NAME	FLOWRATE gpm	INLET HEAD ft	OUTLET HEAD ft	PUMP HEAD ft	EFFIC-ENCY %	USEFUL POWER Hp	INCREMTL COST $	TOTAL COST $	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. ft
Device "Pump-1" is closed											
Pump-1	0.00	17.50	166.99	0.0	75.00	0.	0.0	0.0	**	**	50.7
Device "Pump-2" is closed											
Pump-2	0.00	17.50	166.99	0.0	75.00	0.	0.0	0.0	**	**	50.7
Device "Pump-3" is closed											
Pump-3	0.00	17.50	166.99	0.0	75.00	0.	0.0	0.0	**	**	50.7
VP-1	527.83	0.00	176.84	176.8	75.00	0.	0.0	0.0	**	**	33.2
VP-2	473.90	0.00	176.84	176.8	75.00	0.	0.0	0.0	**	**	33.2

N O D E   R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		0.86	567.66	388.00	179.66	77.85
J-2		0.86	567.74	386.00	181.74	78.75
J-3		0.86	567.75	389.00	178.75	77.46
J-4		0.86	567.75	388.00	179.75	77.89
J-6		0.86	567.76	389.00	178.76	77.46
J-7		0.86	567.76	389.00	178.76	77.46
J-8		0.86	567.76	390.00	177.76	77.03
J-9		0.86	567.76	391.00	176.76	76.59
J-10		0.86	567.76	395.00	172.76	74.86
J-11	FIRE	2.50	564.48	395.00	169.48	73.44
J-12		0.86	567.76	399.00	168.76	73.13
J-13		0.86	567.76	396.00	171.76	74.43
J-14		0.86	567.71	400.00	167.71	72.67
J-15		0.86	567.76	399.00	168.76	73.13
J-16		0.86	567.76	399.00	168.76	73.13
J-18		0.86	567.76	402.00	165.76	71.83
J-19		0.86	567.76	399.00	168.76	73.13
J-20		0.86	567.76	397.00	170.76	74.00
J-21		0.86	567.76	399.00	168.76	73.13
J-22		0.86	567.76	397.00	170.76	74.00
J-23		0.86	567.78	400.00	167.78	72.70
J-24		0.86	567.79	401.00	166.79	72.28
J-25		0.86	567.78	399.00	168.78	73.14

J-26	0.86	567.78	398.00	169.78	73.57
J-27	0.86	567.81	392.00	175.81	76.18
J-28	0.86	567.79	391.00	176.79	76.61
J-29	0.86	567.81	392.00	175.81	76.18
J-30	0.86	567.80	390.00	177.80	77.04
J-31	0.86	567.89	399.00	168.89	73.19
J-32	0.86	567.97	402.00	165.97	71.92
J-33	0.86	567.86	393.00	174.86	75.77
J-34	0.86	567.84	403.00	164.84	71.43
J-35	0.86	567.85	403.00	164.85	71.44
J-36	0.86	567.78	400.00	167.78	72.70
J-37	0.86	567.69	405.00	162.69	70.50
J-38	0.86	567.80	401.00	166.80	72.28
J-39	0.86	567.62	401.00	166.62	72.20
J-41	0.86	567.92	403.00	164.92	71.47
J-42	0.86	567.93	403.00	164.93	71.47
J-43	0.86	571.18	405.00	166.18	72.01
J-44	2.50	567.75	403.00	164.75	71.39
J-45	0.86	567.75	403.00	164.75	71.39
J-46	0.86	568.00	403.00	165.00	71.50
J-47	0.86	568.40	403.00	165.40	71.67
J-48	0.86	567.91	403.00	164.91	71.46
J-49	2.50	567.70	414.00	153.70	66.60
J-50	0.86	567.83	403.00	164.83	71.43
J-51	0.86	567.72	403.00	164.72	71.38
J-53	0.86	567.72	403.00	164.72	71.38
J-54	0.86	567.65	403.00	164.65	71.35
J-55	0.86	567.64	401.00	166.64	72.21
J-56	0.86	567.73	403.00	164.73	71.38
J-57	0.86	567.51	401.00	166.51	72.15
J-58	2.50	564.48	399.00	165.48	71.71
J-59	0.86	567.29	401.00	166.29	72.06
J-60	0.86	567.44	399.00	168.44	72.99
J-61	0.86	567.55	401.00	166.55	72.17
J-62	0.86	567.66	402.00	165.66	71.78
J-63	0.86	567.44	399.00	168.44	72.99
J-64	0.86	567.52	401.00	166.52	72.16
J-66	0.86	564.65	403.00	161.65	70.05
J-67	2.50	564.48	393.00	171.48	74.31
J-68	0.86	565.16	399.00	166.16	72.00
J-69	0.86	565.57	400.00	165.57	71.75
J-70	2.50	564.48	400.00	164.48	71.28
J-71	2.50	564.48	399.00	165.48	71.71
J-72	2.50	564.48	399.00	165.48	71.71
J-73	2.50	564.48	399.00	165.48	71.71
J-74	2.50	564.48	393.00	171.48	74.31
J-75	0.86	564.49	397.50	166.99	72.36
J-76	2.50	564.48	393.00	171.48	74.31
J-77	2.50	567.70	403.00	164.70	71.37
J-78	2.50	567.70	403.00	164.70	71.37
J-79	2.50	567.70	403.00	164.70	71.37
J-80	2.50	567.70	403.00	164.70	71.37
J-81	2.50	567.69	413.00	154.69	67.03
J-82	2.50	567.70	403.00	164.70	71.37

J-83		2.50	567.69	412.00	155.69	67.46
J-84		2.50	567.68	404.00	163.68	70.93
J-85		2.50	567.68	408.00	159.68	69.19
J-86		2.50	567.68	404.00	163.68	70.93
J-87		2.50	567.68	404.00	163.68	70.93
J-88		0.86	574.70	399.00	175.70	76.14
J-89		2.50	567.68	404.00	163.68	70.93
J-90		0.86	574.84	398.00	176.84	76.63
J-91		0.86	572.52	401.00	171.52	74.33
J-92		0.86	572.15	401.00	171.15	74.16
J-93		0.86	568.36	404.00	164.36	71.22
J-94		0.86	568.36	403.00	165.36	71.66
J-95		0.86	572.52	401.00	171.52	74.33
J-96		0.86	568.31	403.00	165.31	71.63
J-97		0.86	572.89	401.00	171.89	74.49
J-98		0.86	572.95	399.00	173.95	75.38
J-99		0.86	572.95	399.00	173.95	75.38
J-100		0.86	572.95	399.00	173.95	75.38
J-101		0.86	572.95	397.00	175.95	76.25
J-102		0.86	574.02	396.00	178.02	77.14
J-103		0.86	573.34	399.00	174.34	75.55
J-104		0.86	568.15	403.00	165.15	71.57
J-105		0.86	568.15	403.00	165.15	71.57
J-106		0.86	568.31	405.00	163.31	70.77
J-107		0.86	568.31	405.00	163.31	70.77
J-108		2.50	564.48	403.00	161.48	69.98
J-109		0.86	567.76	396.00	171.76	74.43
J-110		2.50	564.48	397.00	167.48	72.57
J-111		2.50	564.48	399.00	165.48	71.71
J-112		2.50	564.48	399.00	165.48	71.71
J-113		2.50	567.69	405.00	162.69	70.50
J-114		2.50	567.69	412.00	155.69	67.47
J-115		2.50	567.69	412.00	155.69	67.47
J-116		2.50	567.68	404.00	163.68	70.93
J-117		2.50	567.68	405.00	162.68	70.49
J-118		2.50	567.71	403.00	164.71	71.37
J-119		2.50	567.75	403.00	164.75	71.39
J-120		2.50	567.75	403.00	164.75	71.39
J-121		2.50	564.48	399.00	165.48	71.71
J-122		0.86	415.00	397.50	17.50	7.58
J-123		0.86	564.49	397.50	166.99	72.36
J-127		0.86	573.76	396.00	177.76	77.03
J-128		0.86	573.90	396.00	177.90	77.09
J-129		0.86	567.87	395.00	172.87	74.91
J-130		0.86	565.99	403.00	162.99	70.63
J-131		0.86	567.76	399.00	168.76	73.13
I-Pump-1		0.00	415.00	397.50	17.50	7.58
I-Pump-2		0.00	415.00	397.50	17.50	7.58
I-Pump-3		0.00	415.00	397.50	17.50	7.58
R-1		----	415.00	397.50	17.50	7.58
O-RV-1		0.00	416.26	397.50	18.76	8.13
VP-1	WELL 1	----	574.84	398.00	176.84	76.63
VP-2	WELL 2	----	574.84	398.00	176.84	76.63
O-Pump-3		0.00	564.49	397.50	166.99	72.36

O-Pump-2	0.00	564.49	397.50	166.99	72.36
O-Pump-1	0.00	564.49	397.50	166.99	72.36
I-RV-1	----	563.65	397.50	166.15	72.00

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

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
J-2	78.75	J-122	7.58
J-4	77.89	I-Pump-1	7.58
J-1	77.85	I-Pump-2	7.58
J-7	77.46	I-Pump-3	7.58
J-6	77.46	R-1	7.58

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
P-100	9.51	P-28	0.00
P-165	9.51	P-10	0.00
P-54	4.99	P-95	0.00
P-53	4.18	P-98	0.00
P-132	2.84	P-125	0.00

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
P-165	46.58	P-125	0.00
P-100	46.58	P-28	0.00
P-54	16.18	P-10	0.00
P-53	10.17	P-98	0.00
P-52	3.12	P-95	0.00

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
P-165	46.58	P-125	0.00
P-100	46.58	P-28	0.00
P-54	16.18	P-10	0.00

P-53	10.17	P-98	0.00
P-52	3.12	P-95	0.00

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

VALVE LABEL	VALVE TYPE	VALVE SETTING psi or gpm	VALVE STATUS	UPSTREAM PRESSURE psi	DOWNSTREAM PRESSURE psi	THROUGH FLOW gpm
RV-1	PSV	72.00	ACTIVATED	72.00	8.13	837.77

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

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

NODE NAME	FLOWRATE gpm	NODE TITLE
R-1	-836.91	
VP-1	527.83	WELL 1
VP-2	473.90	WELL 2

NET SYSTEM INFLOW = 1001.73
NET SYSTEM OUTFLOW = -836.91
NET SYSTEM DEMAND = 164.82

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

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* * * * * * * * * * * * K Y P I P E * * * * * * * * * * * *
*                                                          *
*  Pipe Network Modeling Software                          *
*                                                          *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)              *
*  Version: 8.003 (vr8)  10/29/2015                        *
*  Company:  4BEngineer    Serial #:  591127               *
*  Interface:  Classic                                     *
*  Licensed for Pipe2016                                   *
*                                                          *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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Date & Time: Wed Jun 22 09:21:16 2016

Master File : C:\Users\4B Engineering\Documents\CITY DOCUMENTS\COBURG\MODELING\2016 max day with 3500 gpm fire flow.KYP\2016 max day with 3500 gpm fire flow.P2K (4)

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

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

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

VALVE LABEL	VALVE TYPE	VALVE SETTING (ft or gpm)
RV-1	PSV	563.65

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

STATUS CODE: XX -CLOSED PIPE   CV -CHECK VALVE

P I P E N A M E	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-1	J-1	J-2	280.00	1.25	140.0000	0.00
P-2	J-2	J-3	606.60	3.00	140.0000	0.00
P-4	J-3	J-6	193.40	3.00	140.0000	0.00

P-5	J-6	J-4	600.30	3.00	140.0000	0.00
P-6	J-6	J-7	378.00	6.00	140.0000	0.00
P-7	J-7	J-9	1386.50	8.00	140.0000	0.00
P-8	J-9	J-8	2435.90	6.00	140.0000	0.00
P-9	J-9	J-13	3328.60	8.00	140.0000	0.00
P-10	J-10	J-109	76.70	12.00	120.0000	0.00
P-11	J-10	J-131	434.80	12.00	120.0000	0.00
P-12	J-13	J-10	565.60	8.00	120.0000	0.00
P-13	J-12	J-14	503.90	12.00	140.0000	0.00
P-14	J-12	J-16	176.50	4.00	100.0000	0.00
P-15	J-16	J-15	179.60	4.00	100.0000	0.00
P-17	J-15	J-18	130.00	4.00	100.0000	0.00
P-18	J-15	J-19	181.70	4.00	100.0000	0.00
P-19	J-20	J-12	181.70	12.00	120.0000	0.00
P-20	J-19	J-20	353.40	6.00	140.0000	0.00
P-21	J-21	J-22	373.10	12.00	120.0000	0.00
P-22	J-22	J-20	140.30	12.00	120.0000	0.00
P-23	J-22	J-25	224.90	8.00	140.0000	0.00
P-24	J-21	J-26	277.90	8.00	140.0000	0.00
P-25	J-25	J-24	278.00	8.00	140.0000	0.00
P-26	J-24	J-23	320.90	8.00	140.0000	0.00
P-27	J-23	J-12	425.10	12.00	120.0000	0.00
P-28	J-26	J-25	378.90	8.00	140.0000	0.00
P-29	J-26	J-28	423.90	8.00	140.0000	0.00
P-30	J-28	J-30	377.90	8.00	140.0000	0.00
P-31	J-28	J-29	689.00	8.00	140.0000	0.00
P-32	J-27	J-29	200.00	8.00	140.0000	0.00
P-33	J-30	J-27	418.10	6.00	140.0000	0.00
P-34	J-29	J-33	260.50	6.00	140.0000	0.00
P-35	J-31	J-32	334.50	6.00	140.0000	0.00
P-36	J-33	J-31	381.70	6.00	140.0000	0.00
P-37	J-33	J-129	287.60	6.00	140.0000	0.00
P-39	J-32	J-35	297.30	8.00	140.0000	0.00
P-40	J-35	J-24	320.70	8.00	140.0000	0.00
P-41	J-35	J-38	287.70	6.00	140.0000	0.00
P-42	J-36	J-23	30.00	8.00	140.0000	0.00
P-43	J-36	J-37	383.70	8.00	140.0000	0.00
P-44	J-38	J-36	277.70	12.00	140.0000	0.00
P-45	J-37	J-14	289.60	12.00	140.0000	0.00
P-46	J-37	J-39	308.50	12.00	140.0000	0.00
P-47	J-39	J-38	401.60	6.00	120.0000	0.00
P-48	J-38	J-34	299.60	12.00	120.0000	0.00
P-49	J-34	J-41	596.00	12.00	120.0000	0.00
P-51	J-41	J-42	56.70	12.00	120.0000	0.00
P-52	J-32	J-43	1029.30	6.00	130.0000	0.00
P-53	J-43	J-42	319.60	6.00	140.0000	0.00
P-54	J-43	J-47	172.10	6.00	130.0000	0.00
P-55	J-45	J-120	609.30	6.00	120.0000	0.00
P-56	J-46	J-45	326.60	6.00	120.0000	0.00
P-57	J-47	J-46	388.10	6.00	120.0000	0.00
P-58	J-42	J-48	189.00	12.00	120.0000	0.00
P-59	J-48	J-50	366.00	12.00	120.0000	0.00
P-60	J-48	J-47	322.80	8.00	140.0000	0.00
P-61	J-50	J-53	319.10	12.00	120.0000	0.00

P-62	J-46	J-50	319.80	6.00	140.0000	0.00
P-63	J-45	J-51	339.30	8.00	140.0000	0.00
P-64	J-51	J-118	576.50	12.00	120.0000	0.00
P-66	J-48	J-56	196.60	8.00	140.0000	0.00
P-67	J-53	J-51	31.90	12.00	120.0000	0.00
P-68	J-54	J-53	172.10	12.00	120.0000	0.00
P-69	J-54	J-57	316.80	12.00	120.0000	0.00
P-70	J-56	J-62	432.00	8.00	140.0000	0.00
P-71	J-55	J-56	268.20	8.00	140.0000	0.00
P-72	J-55	J-39	349.50	8.00	140.0000	0.00
P-73	J-57	J-61	312.10	8.00	140.0000	0.00
P-74	J-57	J-59	321.70	12.00	120.0000	0.00
P-75	J-59	J-130	561.90	12.00	120.0000	0.00
P-76	J-59	J-60	324.20	12.00	140.0000	0.00
P-77	J-60	J-64	216.10	12.00	140.0000	0.00
P-78	J-61	J-55	460.20	8.00	140.0000	0.00
P-79	J-60	J-61	318.60	6.00	140.0000	0.00
P-80	J-62	J-54	307.10	8.00	140.0000	0.00
P-81	J-62	J-61	323.30	6.00	140.0000	0.00
P-82	J-60	J-63	540.80	6.00	120.0000	0.00
P-83	J-64	J-39	278.70	12.00	140.0000	0.00
P-85	J-58	J-75	540.00	12.00	120.0000	0.00
P-86	J-75	J-66	71.90	12.00	120.0000	0.00
P-87	J-68	J-66	219.60	12.00	120.0000	0.00
P-88	J-68	J-69	649.80	6.00	140.0000	0.00
P-89	J-69	J-68	213.90	12.00	120.0000	0.00
P-90	J-58	J-71	329.80	12.00	120.0000	0.00
P-91	J-71	J-70	430.40	6.00	130.0000	0.00
P-92	J-71	J-112	318.00	12.00	120.0000	0.00
P-93	J-73	J-121	70.70	6.00	140.0000	0.00
P-94	J-73	J-111	298.20	12.00	120.0000	0.00
P-95	J-75	J-123	4.00	12.00	120.0000	0.00
P-96	J-123	O-Pump-3	6.30	12.00	120.0000	0.00
P-97	J-123	O-Pump-2	9.90	12.00	120.0000	0.00
P-98	R-1	J-122	12.50	12.00	120.0000	0.00
P-99	J-123	O-Pump-1	19.20	12.00	120.0000	0.00
P-100	O-RV-1	R-1	27.10	6.00	140.0000	0.00
P-101	I-Pump-1	J-122	11.90	12.00	120.0000	0.00
P-102	I-Pump-2	J-122	8.90	12.00	120.0000	0.00
P-103	J-74	J-67	171.50	12.00	120.0000	0.00
P-104	J-74	J-76	609.80	6.00	140.0000	0.00
P-105	J-77	J-49	383.00	12.00	120.0000	0.00
P-106	J-77	J-78	106.80	12.00	140.0000	0.00
P-107	J-49	J-80	226.20	12.00	120.0000	0.00
P-108	J-80	J-82	55.60	12.00	120.0000	0.00
P-109	J-80	J-113	1038.40	12.00	120.0000	0.00
P-110	J-82	J-79	182.50	6.00	140.0000	0.00
P-111	J-83	J-81	228.60	12.00	120.0000	0.00
P-112	J-83	J-116	295.10	8.00	120.0000	0.00
P-113	J-84	J-117	106.10	8.00	120.0000	0.00
P-114	J-84	J-87	253.10	6.00	140.0000	0.00
P-115	J-86	J-84	333.90	8.00	120.0000	0.00
P-116	J-86	J-89	388.40	8.00	140.0000	0.00
P-117	J-43	J-92	334.00	12.00	120.0000	0.00

P-118	VP-1	J-90	103.70	24.00	120.0000	0.00
P-119	J-91	J-97	168.70	12.00	140.0000	0.00
P-120	J-92	J-91	130.20	12.00	120.0000	0.00
P-122	J-93	J-47	326.60	8.00	140.0000	0.00
P-123	J-93	J-94	366.00	4.00	130.0000	0.00
P-124	J-93	J-96	576.50	8.00	140.0000	0.00
P-125	J-91	J-95	86.50	12.00	140.0000	0.00
P-126	J-97	J-102	631.00	12.00	140.0000	0.00
P-127	J-97	J-100	291.10	8.00	140.0000	0.00
P-128	J-98	J-99	107.60	8.00	140.0000	0.00
P-129	J-98	J-101	670.90	8.00	140.0000	0.00
P-130	J-100	J-98	429.00	8.00	140.0000	0.00
P-131	J-100	J-103	302.20	6.00	120.0000	0.00
P-132	J-102	J-88	308.70	12.00	140.0000	0.00
P-133	J-103	J-127	438.60	6.00	140.0000	0.00
P-134	J-90	J-88	1360.00	24.00	120.0000	0.00
P-135	VP-2	J-90	53.70	24.00	120.0000	0.00
P-136	J-46	J-104	332.30	6.00	120.0000	0.00
P-137	J-104	J-105	429.80	6.00	120.0000	0.00
P-138	J-104	J-96	316.00	6.00	120.0000	0.00
P-139	J-96	J-106	549.40	6.00	120.0000	0.00
P-140	J-96	J-107	464.20	6.00	120.0000	0.00
P-141	J-58	J-108	650.10	12.00	140.0000	0.00
P-143	I-Pump-3	J-122	12.80	12.00	120.0000	0.00
P-145	J-11	J-74	182.50	12.00	120.0000	0.00
P-146	J-110	J-11	324.00	12.00	120.0000	0.00
P-147	J-111	J-110	348.40	12.00	120.0000	0.00
P-148	J-112	J-73	378.60	12.00	120.0000	0.00
P-149	J-113	J-114	851.10	12.00	120.0000	0.00
P-150	J-114	J-115	451.70	12.00	120.0000	0.00
P-151	J-115	J-83	950.10	12.00	120.0000	0.00
P-152	J-116	J-86	247.50	8.00	120.0000	0.00
P-153	J-117	J-85	512.90	8.00	120.0000	0.00
P-154	J-118	J-77	693.90	12.00	120.0000	0.00
P-155	J-119	J-44	151.90	6.00	120.0000	0.00
P-156	J-120	J-119	139.90	6.00	120.0000	0.00
P-157	J-121	J-72	124.10	6.00	140.0000	0.00
P-160	J-127	J-128	143.40	6.00	140.0000	0.00
P-161	J-128	J-102	117.00	6.00	140.0000	0.00
P-162	J-129	J-31	763.20	6.00	140.0000	0.00
P-163	J-130	J-69	184.80	12.00	120.0000	0.00
P-164	J-131	J-21	294.10	12.00	120.0000	0.00
P-165	J-75	I-RV-1	17.90	6.00	140.0000	0.00

P U M P/L O S S   E L E M E N T   D A T A

THERE IS A DEVICE AT NODE Pump-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 3)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
210.00	0.00	80.00
185.00	800.00	80.00

160.00	1000.00	80.00
110.00	1400.00	80.00

THERE IS A DEVICE AT NODE Pump-2 ....> (ID= 3)

THERE IS A DEVICE AT NODE Pump-3 ....> (ID= 3)

THERE IS A DEVICE AT NODE VP-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
230.00	0.00	75.00
224.00	210.00	75.00
222.00	315.00	75.00
211.00	420.00	75.00
178.00	525.00	75.00
130.00	630.00	75.00

THERE IS A DEVICE AT NODE VP-2 DESCRIBED BY THE FOLLOWING DATA: (ID= 2)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
395.00	0.00	75.00
290.00	240.00	75.00
205.00	400.00	75.00
140.00	580.00	75.00
90.00	640.00	75.00

N O D E   D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
J-1		2.39	388.00	
J-2		2.39	386.00	
J-3		2.39	389.00	
J-4		2.39	388.00	
J-6		2.39	389.00	
J-7		2.39	389.00	
J-8		2.39	390.00	
J-9		2.39	391.00	
J-10		2.39	395.00	
J-11	FIRE	3500.00	395.00	
J-12		2.39	399.00	
J-13		2.39	396.00	
J-14		2.39	400.00	
J-15		2.39	399.00	

J-16	2.39	399.00
J-18	2.39	402.00
J-19	2.39	399.00
J-20	2.39	397.00
J-21	2.39	399.00
J-22	2.39	397.00
J-23	2.39	400.00
J-24	2.39	401.00
J-25	2.39	399.00
J-26	2.39	398.00
J-27	2.39	392.00
J-28	2.39	391.00
J-29	2.39	392.00
J-30	2.39	390.00
J-31	2.39	399.00
J-32	2.39	402.00
J-33	2.39	393.00
J-34	2.39	403.00
J-35	2.39	403.00
J-36	2.39	400.00
J-37	2.39	405.00
J-38	2.39	401.00
J-39	2.39	401.00
J-41	2.39	403.00
J-42	2.39	403.00
J-43	2.39	405.00
J-44	6.96	403.00
J-45	2.39	403.00
J-46	2.39	403.00
J-47	2.39	403.00
J-48	2.39	403.00
J-49	6.96	414.00
J-50	2.39	403.00
J-51	2.39	403.00
J-53	2.39	403.00
J-54	2.39	403.00
J-55	2.39	401.00
J-56	2.39	403.00
J-57	2.39	401.00
J-58	6.96	399.00
J-59	2.39	401.00
J-60	2.39	399.00
J-61	2.39	401.00
J-62	2.39	402.00
J-63	2.39	399.00
J-64	2.39	401.00
J-66	2.39	403.00
J-67	6.96	393.00
J-68	2.39	399.00
J-69	2.39	400.00
J-70	6.96	400.00
J-71	6.96	399.00
J-72	6.96	399.00
J-73	6.96	399.00

J-74	6.96	393.00
J-75	2.39	397.50
J-76	6.96	393.00
J-77	6.96	403.00
J-78	6.96	403.00
J-79	6.96	403.00
J-80	6.96	403.00
J-81	6.96	413.00
J-82	6.96	403.00
J-83	6.96	412.00
J-84	6.96	404.00
J-85	6.96	408.00
J-86	6.96	404.00
J-87	6.96	404.00
J-88	2.39	399.00
J-89	6.96	404.00
J-90	2.39	398.00
J-91	2.39	401.00
J-92	2.39	401.00
J-93	2.39	404.00
J-94	2.39	403.00
J-95	2.39	401.00
J-96	2.39	403.00
J-97	2.39	401.00
J-98	2.39	399.00
J-99	2.39	399.00
J-100	2.39	399.00
J-101	2.39	397.00
J-102	2.39	396.00
J-103	2.39	399.00
J-104	2.39	403.00
J-105	2.39	403.00
J-106	2.39	405.00
J-107	2.39	405.00
J-108	6.96	403.00
J-109	2.39	396.00
J-110	6.96	397.00
J-111	6.96	399.00
J-112	6.96	399.00
J-113	6.96	405.00
J-114	6.96	412.00
J-115	6.96	412.00
J-116	6.96	404.00
J-117	6.96	405.00
J-118	6.96	403.00
J-119	6.96	403.00
J-120	6.96	403.00
J-121	6.96	399.00
J-122	2.39	397.50
J-123	2.39	397.50
J-127	2.39	396.00
J-128	2.39	396.00
J-129	2.39	395.00
J-130	2.39	403.00

J-131		2.39	399.00	
I-Pump-1		0.00	397.50	
I-Pump-2		0.00	397.50	
I-Pump-3		0.00	397.50	
R-1		----	397.50	415.00
O-RV-1		0.00	397.50	
VP-1	WELL 1	----	398.00	398.00
VP-2	WELL 2	----	398.00	398.00
O-Pump-3		0.00	397.50	
O-Pump-2		0.00	397.50	
O-Pump-1		0.00	397.50	
I-RV-1		----	397.50	563.65

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

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

- MAXIMUM AND MINIMUM PRESSURES = 5
- MAXIMUM AND MINIMUM VELOCITIES = 5
- MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

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

- NUMBER OF PIPES ....(P) = 154
- NUMBER OF END NODES ....(J) = 127
- NUMBER OF PRIMARY LOOPS ....(L) = 25
- NUMBER OF SUPPLY NODES ....(F) = 3
- NUMBER OF SUPPLY ZONES ....(Z) = 1

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Case: 0

RESULTS OBTAINED AFTER 19 TRIALS: ACCURACY = 0.22742E-04

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

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

STATUS CODE: XX -CLOSED PIPE   CV -CHECK VALVE

P I P E N A M E	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f

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P-1	J-1	J-2	-2.39	0.52	0.00	0.62	1.87	1.87
P-2	J-2	J-3	-4.78	0.06	0.00	0.22	0.10	0.10
P-4	J-3	J-6	-7.17	0.04	0.00	0.33	0.20	0.20
P-5	J-6	J-4	2.39	0.02	0.00	0.11	0.03	0.03
P-6	J-6	J-7	-11.95	0.01	0.00	0.14	0.02	0.02
P-7	J-7	J-9	-14.34	0.01	0.00	0.09	0.01	0.01
P-8	J-9	J-8	2.39	0.00	0.00	0.03	0.00	0.00
P-9	J-9	J-13	-19.12	0.03	0.00	0.12	0.01	0.01
P-10	J-10	J-109	2.39	0.00	0.00	0.01	0.00	0.00
P-11	J-10	J-131	-26.29	0.00	0.00	0.07	0.00	0.00
P-12	J-13	J-10	-21.51	0.01	0.00	0.14	0.02	0.02
P-13	J-12	J-14	171.40	0.04	0.00	0.49	0.08	0.08
P-14	J-12	J-16	3.43	0.00	0.00	0.09	0.02	0.02
P-15	J-16	J-15	1.04	0.00	0.00	0.03	0.00	0.00
P-17	J-15	J-18	2.39	0.00	0.00	0.06	0.01	0.01
P-18	J-15	J-19	-3.74	0.01	0.00	0.10	0.03	0.03
P-19	J-20	J-12	51.62	0.00	0.00	0.15	0.01	0.01
P-20	J-19	J-20	-6.13	0.00	0.00	0.07	0.01	0.01
P-21	J-21	J-22	12.29	0.00	0.00	0.03	0.00	0.00
P-22	J-22	J-20	60.14	0.00	0.00	0.17	0.02	0.02
P-23	J-22	J-25	-50.24	0.01	0.00	0.32	0.06	0.06
P-24	J-21	J-26	-43.36	0.01	0.00	0.28	0.05	0.05
P-25	J-25	J-24	-59.01	0.02	0.00	0.38	0.08	0.08
P-26	J-24	J-23	43.17	0.02	0.00	0.28	0.05	0.05
P-27	J-23	J-12	125.60	0.03	0.00	0.36	0.06	0.06
P-28	J-26	J-25	-6.37	0.00	0.00	0.04	0.00	0.00
P-29	J-26	J-28	-39.38	0.02	0.00	0.25	0.04	0.04
P-30	J-28	J-30	-12.90	0.00	0.00	0.08	0.01	0.01
P-31	J-28	J-29	-28.86	0.02	0.00	0.18	0.02	0.02
P-32	J-27	J-29	-17.68	0.00	0.00	0.11	0.01	0.01
P-33	J-30	J-27	-15.29	0.01	0.00	0.17	0.03	0.03
P-34	J-29	J-33	-48.94	0.06	0.00	0.56	0.24	0.24
P-35	J-31	J-32	-56.11	0.10	0.00	0.64	0.31	0.31
P-36	J-33	J-31	-33.62	0.05	0.00	0.38	0.12	0.12
P-37	J-33	J-129	-17.70	0.01	0.00	0.20	0.04	0.04
P-39	J-32	J-35	151.55	0.14	0.00	0.97	0.48	0.48
P-40	J-35	J-24	104.57	0.08	0.00	0.67	0.24	0.24
P-41	J-35	J-38	44.59	0.06	0.00	0.51	0.20	0.20
P-42	J-36	J-23	84.82	0.00	0.00	0.54	0.17	0.17
P-43	J-36	J-37	107.39	0.10	0.00	0.69	0.26	0.26
P-44	J-38	J-36	194.60	0.03	0.00	0.55	0.11	0.11
P-45	J-37	J-14	-169.01	0.02	0.00	0.48	0.08	0.08
P-46	J-37	J-39	274.01	0.06	0.00	0.78	0.20	0.20
P-47	J-39	J-38	-60.19	0.19	0.00	0.68	0.47	0.47
P-48	J-38	J-34	-212.60	0.05	0.00	0.60	0.17	0.17
P-49	J-34	J-41	-214.99	0.10	0.00	0.61	0.17	0.17
P-51	J-41	J-42	-217.38	0.01	0.00	0.62	0.17	0.17
P-52	J-32	J-43	-210.04	4.24	0.00	2.38	4.12	4.12
P-53	J-43	J-42	427.55	4.28	0.00	4.85	13.40	13.40
P-54	J-43	J-47	511.89	3.69	0.00	5.81	21.46	21.46
P-55	J-45	J-120	20.88	0.04	0.00	0.24	0.07	0.07
P-56	J-46	J-45	88.99	0.32	0.00	1.01	0.97	0.97

P-57	J-47	J-46	106.77	0.53	0.00	1.21	1.37	1.37
P-58	J-42	J-48	207.79	0.03	0.00	0.59	0.16	0.16
P-59	J-48	J-50	293.01	0.11	0.00	0.83	0.30	0.30
P-60	J-48	J-47	-319.32	0.62	0.00	2.04	1.92	1.92
P-61	J-50	J-53	372.70	0.15	0.00	1.06	0.47	0.47
P-62	J-46	J-50	82.07	0.20	0.00	0.93	0.63	0.63
P-63	J-45	J-51	65.72	0.03	0.00	0.42	0.10	0.10
P-64	J-51	J-118	132.24	0.04	0.00	0.38	0.07	0.07
P-66	J-48	J-56	231.70	0.21	0.00	1.48	1.06	1.06
P-67	J-53	J-51	68.91	0.00	0.00	0.20	0.02	0.02
P-68	J-54	J-53	-301.40	0.05	0.00	0.85	0.32	0.32
P-69	J-54	J-57	341.83	0.13	0.00	0.97	0.40	0.40
P-70	J-56	J-62	98.25	0.09	0.00	0.63	0.22	0.22
P-71	J-55	J-56	-131.06	0.10	0.00	0.84	0.37	0.37
P-72	J-55	J-39	38.36	0.01	0.00	0.24	0.04	0.04
P-73	J-57	J-61	-84.44	0.05	0.00	0.54	0.16	0.16
P-74	J-57	J-59	423.88	0.19	0.00	1.20	0.60	0.60
P-75	J-59	J-130	841.02	1.20	0.00	2.39	2.13	2.13
P-76	J-59	J-60	-419.53	0.14	0.00	1.19	0.44	0.44
P-77	J-60	J-64	-367.78	0.07	0.00	1.04	0.35	0.35
P-78	J-61	J-55	-90.31	0.09	0.00	0.58	0.19	0.19
P-79	J-60	J-61	-56.52	0.10	0.00	0.64	0.32	0.32
P-80	J-62	J-54	42.82	0.01	0.00	0.27	0.05	0.05
P-81	J-62	J-61	53.04	0.09	0.00	0.60	0.28	0.28
P-82	J-60	J-63	2.39	0.00	0.00	0.03	0.00	0.00
P-83	J-64	J-39	-370.17	0.10	0.00	1.05	0.35	0.35
P-85	J-58	J-75	-3590.48	16.95	0.00	10.18	31.38	31.38
P-86	J-75	J-66	-831.46	0.15	0.00	2.36	2.09	2.09
P-87	J-68	J-66	833.85	0.46	0.00	2.37	2.10	2.10
P-88	J-68	J-69	-78.41	0.38	0.00	0.89	0.58	0.58
P-89	J-69	J-68	757.83	0.38	0.00	2.15	1.76	1.76
P-90	J-58	J-71	3576.56	10.27	0.00	10.15	31.15	31.15
P-91	J-71	J-70	6.96	0.00	0.00	0.08	0.01	0.01
P-92	J-71	J-112	3562.64	9.84	0.00	10.11	30.93	30.93
P-93	J-73	J-121	13.92	0.00	0.00	0.16	0.02	0.02
P-94	J-73	J-111	3534.80	9.09	0.00	10.03	30.48	30.48
P-95	J-75	J-123	-2761.41	0.08	0.00	7.83	19.30	19.30
P-96	J-123	O-Pump-3	0.00	0.00	0.00	0.00	0.00	0.00
P-97	J-123	O-Pump-2	-1382.16	0.05	0.00	3.92	5.36	5.36
P-98	R-1	J-122	2766.19	0.24	0.00	7.85	19.36	19.36
P-99	J-123	O-Pump-1	-1381.64	0.10	0.00	3.92	5.35	5.35
P-100	O-RV-1	R-1	0.00	0.00	0.00	0.00	0.00	0.00
P-101	I-Pump-1	J-122	-1381.64	0.06	0.00	3.92	5.35	5.35
P-102	I-Pump-2	J-122	-1382.16	0.05	0.00	3.92	5.36	5.36
P-103	J-74	J-67	6.96	0.00	0.00	0.02	0.00	0.00
P-104	J-74	J-76	6.96	0.00	0.00	0.08	0.01	0.01
P-105	J-77	J-49	111.36	0.02	0.00	0.32	0.05	0.05
P-106	J-77	J-78	6.96	0.00	0.00	0.02	0.00	0.00
P-107	J-49	J-80	104.40	0.01	0.00	0.30	0.04	0.04
P-108	J-80	J-82	13.92	0.00	0.00	0.04	0.00	0.00
P-109	J-80	J-113	83.52	0.03	0.00	0.24	0.03	0.03
P-110	J-82	J-79	6.96	0.00	0.00	0.08	0.01	0.01
P-111	J-83	J-81	6.96	0.00	0.00	0.02	0.00	0.00
P-112	J-83	J-116	48.72	0.02	0.00	0.31	0.08	0.08

P-113	J-84	J-117	13.92	0.00	0.00	0.09	0.01	0.01
P-114	J-84	J-87	6.96	0.00	0.00	0.08	0.01	0.01
P-115	J-86	J-84	27.84	0.01	0.00	0.18	0.03	0.03
P-116	J-86	J-89	6.96	0.00	0.00	0.04	0.00	0.00
P-117	J-43	J-92	-1151.88	1.28	0.00	3.27	3.82	3.82
P-118	VP-1	J-90	607.10	0.00	0.00	0.43	0.04	0.04
P-119	J-91	J-97	-1159.05	0.49	0.00	3.29	2.91	2.91
P-120	J-92	J-91	-1154.27	0.50	0.00	3.27	3.84	3.84
P-122	J-93	J-47	-83.42	0.05	0.00	0.53	0.16	0.16
P-123	J-93	J-94	2.39	0.00	0.00	0.06	0.01	0.01
P-124	J-93	J-96	78.64	0.08	0.00	0.50	0.14	0.14
P-125	J-91	J-95	2.39	0.00	0.00	0.01	0.00	0.00
P-126	J-97	J-102	-1051.12	1.53	0.00	2.98	2.42	2.42
P-127	J-97	J-100	-110.33	0.08	0.00	0.70	0.27	0.27
P-128	J-98	J-99	2.39	0.00	0.00	0.02	0.00	0.00
P-129	J-98	J-101	2.39	0.00	0.00	0.02	0.00	0.00
P-130	J-100	J-98	7.17	0.00	0.00	0.05	0.00	0.00
P-131	J-100	J-103	-119.89	0.51	0.00	1.36	1.69	1.69
P-132	J-102	J-88	-1180.56	0.93	0.00	3.35	3.01	3.01
P-133	J-103	J-127	-122.28	0.58	0.00	1.39	1.32	1.32
P-134	J-90	J-88	1182.95	0.19	0.00	0.84	0.14	0.14
P-135	VP-2	J-90	578.24	0.00	0.00	0.41	0.04	0.04
P-136	J-46	J-104	-66.69	0.19	0.00	0.76	0.57	0.57
P-137	J-104	J-105	2.39	0.00	0.00	0.03	0.00	0.00
P-138	J-104	J-96	-71.47	0.21	0.00	0.81	0.65	0.65
P-139	J-96	J-106	2.39	0.00	0.00	0.03	0.00	0.00
P-140	J-96	J-107	2.39	0.00	0.00	0.03	0.00	0.00
P-141	J-58	J-108	6.96	0.00	0.00	0.02	0.00	0.00
P-143	I-Pump-3	J-122	0.00	0.00	0.00	0.00	0.00	0.00
P-145	J-11	J-74	20.88	0.00	0.00	0.06	0.00	0.00
P-146	J-110	J-11	3520.88	9.81	0.00	9.99	30.26	30.26
P-147	J-111	J-110	3527.84	10.58	0.00	10.01	30.37	30.37
P-148	J-112	J-73	3555.68	11.67	0.00	10.09	30.82	30.82
P-149	J-113	J-114	76.56	0.02	0.00	0.22	0.03	0.03
P-150	J-114	J-115	69.60	0.01	0.00	0.20	0.02	0.02
P-151	J-115	J-83	62.64	0.02	0.00	0.18	0.02	0.02
P-152	J-116	J-86	41.76	0.01	0.00	0.27	0.06	0.06
P-153	J-117	J-85	6.96	0.00	0.00	0.04	0.00	0.00
P-154	J-118	J-77	125.28	0.04	0.00	0.36	0.06	0.06
P-155	J-119	J-44	6.96	0.00	0.00	0.08	0.01	0.01
P-156	J-120	J-119	13.92	0.00	0.00	0.16	0.03	0.03
P-157	J-121	J-72	6.96	0.00	0.00	0.08	0.01	0.01
P-160	J-127	J-128	-124.67	0.20	0.00	1.41	1.37	1.37
P-161	J-128	J-102	-127.06	0.17	0.00	1.44	1.42	1.42
P-162	J-129	J-31	-20.09	0.04	0.00	0.23	0.05	0.05
P-163	J-130	J-69	838.63	0.39	0.00	2.38	2.12	2.12
P-164	J-131	J-21	-28.68	0.00	0.00	0.08	0.00	0.00
P-165	J-75	I-RV-1	0.00	0.00	0.00	0.00	0.00	0.00

P U M P/L O S S   E L E M E N T   R E S U L T S

NAME	FLOWRATE gpm	INLET HEAD ft	OUTLET HEAD ft	PUMP HEAD ft	EFFIC- ENCY %	USEFUL POWER Hp	INCREMTL COST $	TOTAL COST $	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. ft
Pump-1	1381.64	17.19	129.49	112.3	75.00	0.	0.0	0.0	**	**	50.2
Pump-2	1382.16	17.21	129.44	112.2	75.00	0.	0.0	0.0	**	**	50.2
Device "Pump-3" is closed											
Pump-3	0.00	17.26	129.39	0.0	75.00	0.	0.0	0.0	**	**	50.5
VP-1	607.10	0.00	141.25	141.3	75.00	0.	0.0	0.0	**	**	33.2
VP-2	578.24	0.00	141.25	141.3	75.00	0.	0.0	0.0	**	**	33.2

N O D E   R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		2.39	529.15	388.00	141.15	61.17
J-2		2.39	529.68	386.00	143.68	62.26
J-3		2.39	529.74	389.00	140.74	60.99
J-4		2.39	529.76	388.00	141.76	61.43
J-6		2.39	529.78	389.00	140.78	61.00
J-7		2.39	529.78	389.00	140.78	61.01
J-8		2.39	529.79	390.00	139.79	60.58
J-9		2.39	529.79	391.00	138.79	60.14
J-10		2.39	529.84	395.00	134.84	58.43
J-11	FIRE	3500.00	448.61	395.00	53.61	23.23
J-12		2.39	529.83	399.00	130.83	56.69
J-13		2.39	529.83	396.00	133.83	57.99
J-14		2.39	529.79	400.00	129.79	56.24
J-15		2.39	529.83	399.00	130.83	56.69
J-16		2.39	529.83	399.00	130.83	56.69
J-18		2.39	529.83	402.00	127.83	55.39
J-19		2.39	529.83	399.00	130.83	56.69
J-20		2.39	529.84	397.00	132.84	57.56
J-21		2.39	529.84	399.00	130.84	56.70
J-22		2.39	529.84	397.00	132.84	57.56
J-23		2.39	529.86	400.00	129.86	56.27
J-24		2.39	529.88	401.00	128.88	55.85
J-25		2.39	529.85	399.00	130.85	56.70
J-26		2.39	529.85	398.00	131.85	57.14
J-27		2.39	529.88	392.00	137.88	59.75

J-28	2.39	529.87	391.00	138.87	60.18
J-29	2.39	529.88	392.00	137.88	59.75
J-30	2.39	529.87	390.00	139.87	60.61
J-31	2.39	529.99	399.00	130.99	56.76
J-32	2.39	530.10	402.00	128.10	55.51
J-33	2.39	529.95	393.00	136.95	59.34
J-34	2.39	529.95	403.00	126.95	55.01
J-35	2.39	529.95	403.00	126.95	55.01
J-36	2.39	529.87	400.00	129.87	56.28
J-37	2.39	529.77	405.00	124.77	54.07
J-38	2.39	529.90	401.00	128.90	55.85
J-39	2.39	529.71	401.00	128.71	55.77
J-41	2.39	530.05	403.00	127.05	55.05
J-42	2.39	530.06	403.00	127.06	55.06
J-43	2.39	534.34	405.00	129.34	56.05
J-44	6.96	529.75	403.00	126.75	54.93
J-45	2.39	529.80	403.00	126.80	54.95
J-46	2.39	530.12	403.00	127.12	55.08
J-47	2.39	530.65	403.00	127.65	55.31
J-48	2.39	530.03	403.00	127.03	55.04
J-49	6.96	529.66	414.00	115.66	50.12
J-50	2.39	529.92	403.00	126.92	55.00
J-51	2.39	529.76	403.00	126.76	54.93
J-53	2.39	529.76	403.00	126.76	54.93
J-54	2.39	529.71	403.00	126.71	54.91
J-55	2.39	529.72	401.00	128.72	55.78
J-56	2.39	529.82	403.00	126.82	54.95
J-57	2.39	529.58	401.00	128.58	55.72
J-58	6.96	509.86	399.00	110.86	48.04
J-59	2.39	529.39	401.00	128.39	55.64
J-60	2.39	529.53	399.00	130.53	56.56
J-61	2.39	529.63	401.00	128.63	55.74
J-62	2.39	529.72	402.00	127.72	55.35
J-63	2.39	529.53	399.00	130.53	56.56
J-64	2.39	529.61	401.00	128.61	55.73
J-66	2.39	526.96	403.00	123.96	53.72
J-67	6.96	448.61	393.00	55.61	24.10
J-68	2.39	527.42	399.00	128.42	55.65
J-69	2.39	527.80	400.00	127.80	55.38
J-70	6.96	499.59	400.00	99.59	43.15
J-71	6.96	499.59	399.00	100.59	43.59
J-72	6.96	478.08	399.00	79.08	34.27
J-73	6.96	478.09	399.00	79.09	34.27
J-74	6.96	448.61	393.00	55.61	24.10
J-75	2.39	526.81	397.50	129.31	56.03
J-76	6.96	448.60	393.00	55.60	24.09
J-77	6.96	529.68	403.00	126.68	54.89
J-78	6.96	529.68	403.00	126.68	54.89
J-79	6.96	529.65	403.00	126.65	54.88
J-80	6.96	529.65	403.00	126.65	54.88
J-81	6.96	529.57	413.00	116.57	50.51
J-82	6.96	529.65	403.00	126.65	54.88
J-83	6.96	529.57	412.00	117.57	50.95
J-84	6.96	529.53	404.00	125.53	54.39

J-85		6.96	529.52	408.00	121.52	52.66
J-86		6.96	529.54	404.00	125.54	54.40
J-87		6.96	529.52	404.00	125.52	54.39
J-88		2.39	539.06	399.00	140.06	60.69
J-89		6.96	529.53	404.00	125.53	54.40
J-90		2.39	539.25	398.00	141.25	61.21
J-91		2.39	536.12	401.00	135.12	58.55
J-92		2.39	535.62	401.00	134.62	58.33
J-93		2.39	530.60	404.00	126.60	54.86
J-94		2.39	530.59	403.00	127.59	55.29
J-95		2.39	536.12	401.00	135.12	58.55
J-96		2.39	530.51	403.00	127.51	55.26
J-97		2.39	536.61	401.00	135.61	58.76
J-98		2.39	536.68	399.00	137.68	59.66
J-99		2.39	536.68	399.00	137.68	59.66
J-100		2.39	536.68	399.00	137.68	59.66
J-101		2.39	536.68	397.00	139.68	60.53
J-102		2.39	538.14	396.00	142.14	61.59
J-103		2.39	537.20	399.00	138.20	59.88
J-104		2.39	530.31	403.00	127.31	55.17
J-105		2.39	530.31	403.00	127.31	55.17
J-106		2.39	530.51	405.00	125.51	54.39
J-107		2.39	530.51	405.00	125.51	54.39
J-108		6.96	509.86	403.00	106.86	46.31
J-109		2.39	529.84	396.00	133.84	58.00
J-110		6.96	458.41	397.00	61.41	26.61
J-111		6.96	469.00	399.00	70.00	30.33
J-112		6.96	489.75	399.00	90.75	39.33
J-113		6.96	529.62	405.00	124.62	54.00
J-114		6.96	529.60	412.00	117.60	50.96
J-115		6.96	529.59	412.00	117.59	50.96
J-116		6.96	529.55	404.00	125.55	54.40
J-117		6.96	529.52	405.00	124.52	53.96
J-118		6.96	529.72	403.00	126.72	54.91
J-119		6.96	529.75	403.00	126.75	54.93
J-120		6.96	529.76	403.00	126.76	54.93
J-121		6.96	478.08	399.00	79.08	34.27
J-122		2.39	414.76	397.50	17.26	7.48
J-123		2.39	526.89	397.50	129.39	56.07
J-127		2.39	537.77	396.00	141.77	61.44
J-128		2.39	537.97	396.00	141.97	61.52
J-129		2.39	529.96	395.00	134.96	58.48
J-130		2.39	528.19	403.00	125.19	54.25
J-131		2.39	529.84	399.00	130.84	56.70
I-Pump-1		0.00	414.69	397.50	17.19	7.45
I-Pump-2		0.00	414.71	397.50	17.21	7.46
I-Pump-3		0.00	414.76	397.50	17.26	7.48
R-1		----	415.00	397.50	17.50	7.58
O-RV-1		0.00	415.00	397.50	17.50	7.58
VP-1	WELL 1	----	539.25	398.00	141.25	61.21
VP-2	WELL 2	----	539.25	398.00	141.25	61.21
O-Pump-3		0.00	526.89	397.50	129.39	56.07
O-Pump-2		0.00	526.94	397.50	129.44	56.09
O-Pump-1		0.00	526.99	397.50	129.49	56.11

I-RV--1	----	526.81	397.50	129.31	56.03

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

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
J-2	62.26	I-Pump-1	7.45
J-102	61.59	I-Pump-2	7.46
J-128	61.52	J-122	7.48
J-127	61.44	I-Pump-3	7.48
J-4	61.43	R-1	7.58

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
P-85	10.18	P-10	0.01
P-90	10.15	P-125	0.01
P-92	10.11	P-128	0.02
P-148	10.09	P-129	0.02
P-94	10.03	P-103	0.02

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
P-85	31.38	P-125	0.00
P-90	31.15	P-10	0.00
P-92	30.93	P-129	0.00
P-148	30.82	P-128	0.00
P-94	30.48	P-141	0.00

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
P-85	31.38	P-125	0.00
P-90	31.15	P-10	0.00
P-92	30.93	P-129	0.00
P-148	30.82	P-128	0.00
P-94	30.48	P-141	0.00

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

VALVE LABEL	VALVE TYPE	VALVE SETTING psi or gpm	VALVE STATUS	UPSTREAM PRESSURE psi	DOWNSTREAM PRESSURE psi	THROUGH FLOW gpm
RV-1	PSV	72.00	CLOSED	56.03	7.58	0.00

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

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

NODE NAME	FLOWRATE gpm	NODE TITLE
R-1	2766.19	
VP-1	607.10	WELL 1
VP-2	578.24	WELL 2

NET SYSTEM INFLOW = 3951.53
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 3951.52

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

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* * * * * * * * * * * * K Y P I P E * * * * * * * * * * * *
*                                                          *
*  Pipe Network Modeling Software                          *
*                                                          *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)              *
*  Version: 8.003 (vr8)  10/29/2015                        *
*  Company:  4BEngineer    Serial #:  591127               *
*  Interface:  Classic                                     *
*  Licensed for Pipe2016                                   *
*                                                          *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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Date & Time: Wed Jun 22 09:18:59 2016

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

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

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

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

VALVE LABEL	VALVE TYPE	VALVE SETTING (ft or gpm)
RV-1	PSV	563.65

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

STATUS CODE: XX -CLOSED PIPE   CV -CHECK VALVE

P I P E N A M E	NODE NAMES #1	NODE NAMES #2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-1	J-1	J-2	280.00	1.25	140.0000	0.00
P-2	J-2	J-3	606.60	3.00	140.0000	0.00
P-4	J-3	J-6	193.40	3.00	140.0000	0.00

P-5	J-6	J-4	600.30	3.00	140.0000	0.00
P-6	J-6	J-7	378.00	6.00	140.0000	0.00
P-7	J-7	J-9	1386.50	8.00	140.0000	0.00
P-8	J-9	J-8	2435.90	6.00	140.0000	0.00
P-9	J-9	J-13	3328.60	8.00	140.0000	0.00
P-10	J-10	J-109	76.70	12.00	120.0000	0.00
P-11	J-10	J-131	434.80	12.00	120.0000	0.00
P-12	J-13	J-10	565.60	8.00	120.0000	0.00
P-13	J-12	J-14	503.90	12.00	140.0000	0.00
P-14	J-12	J-16	176.50	4.00	100.0000	0.00
P-15	J-16	J-15	179.60	4.00	100.0000	0.00
P-17	J-15	J-18	130.00	4.00	100.0000	0.00
P-18	J-15	J-19	181.70	4.00	100.0000	0.00
P-19	J-20	J-12	181.70	12.00	120.0000	0.00
P-20	J-19	J-20	353.40	6.00	140.0000	0.00
P-21	J-21	J-22	373.10	12.00	120.0000	0.00
P-22	J-22	J-20	140.30	12.00	120.0000	0.00
P-23	J-22	J-25	224.90	8.00	140.0000	0.00
P-24	J-21	J-26	277.90	8.00	140.0000	0.00
P-25	J-25	J-24	278.00	8.00	140.0000	0.00
P-26	J-24	J-23	320.90	8.00	140.0000	0.00
P-27	J-23	J-12	425.10	12.00	120.0000	0.00
P-28	J-26	J-25	378.90	8.00	140.0000	0.00
P-29	J-26	J-28	423.90	8.00	140.0000	0.00
P-30	J-28	J-30	377.90	8.00	140.0000	0.00
P-31	J-28	J-29	689.00	8.00	140.0000	0.00
P-32	J-27	J-29	200.00	8.00	140.0000	0.00
P-33	J-30	J-27	418.10	6.00	140.0000	0.00
P-34	J-29	J-33	260.50	6.00	140.0000	0.00
P-35	J-31	J-32	334.50	6.00	140.0000	0.00
P-36	J-33	J-31	381.70	6.00	140.0000	0.00
P-37	J-33	J-129	287.60	6.00	140.0000	0.00
P-39	J-32	J-35	297.30	8.00	140.0000	0.00
P-40	J-35	J-24	320.70	8.00	140.0000	0.00
P-41	J-35	J-38	287.70	6.00	140.0000	0.00
P-42	J-36	J-23	30.00	8.00	140.0000	0.00
P-43	J-36	J-37	383.70	8.00	140.0000	0.00
P-44	J-38	J-36	277.70	12.00	140.0000	0.00
P-45	J-37	J-14	289.60	12.00	140.0000	0.00
P-46	J-37	J-39	308.50	12.00	140.0000	0.00
P-47	J-39	J-38	401.60	6.00	120.0000	0.00
P-48	J-38	J-34	299.60	12.00	120.0000	0.00
P-49	J-34	J-41	596.00	12.00	120.0000	0.00
P-51	J-41	J-42	56.70	12.00	120.0000	0.00
P-52	J-32	J-43	1029.30	6.00	130.0000	0.00
P-53	J-43	J-42	319.60	6.00	140.0000	0.00
P-54	J-43	J-47	172.10	6.00	130.0000	0.00
P-55	J-45	J-120	609.30	6.00	120.0000	0.00
P-56	J-46	J-45	326.60	6.00	120.0000	0.00
P-57	J-47	J-46	388.10	6.00	120.0000	0.00
P-58	J-42	J-48	189.00	12.00	120.0000	0.00
P-59	J-48	J-50	366.00	12.00	120.0000	0.00
P-60	J-48	J-47	322.80	8.00	140.0000	0.00
P-61	J-50	J-53	319.10	12.00	120.0000	0.00

P-62	J-46	J-50	319.80	6.00	140.0000	0.00
P-63	J-45	J-51	339.30	8.00	140.0000	0.00
P-64	J-51	J-118	576.50	12.00	120.0000	0.00
P-66	J-48	J-56	196.60	8.00	140.0000	0.00
P-67	J-53	J-51	31.90	12.00	120.0000	0.00
P-68	J-54	J-53	172.10	12.00	120.0000	0.00
P-69	J-54	J-57	316.80	12.00	120.0000	0.00
P-70	J-56	J-62	432.00	8.00	140.0000	0.00
P-71	J-55	J-56	268.20	8.00	140.0000	0.00
P-72	J-55	J-39	349.50	8.00	140.0000	0.00
P-73	J-57	J-61	312.10	8.00	140.0000	0.00
P-74	J-57	J-59	321.70	12.00	120.0000	0.00
P-75	J-59	J-130	561.90	12.00	120.0000	0.00
P-76	J-59	J-60	324.20	12.00	140.0000	0.00
P-77	J-60	J-64	216.10	12.00	140.0000	0.00
P-78	J-61	J-55	460.20	8.00	140.0000	0.00
P-79	J-60	J-61	318.60	6.00	140.0000	0.00
P-80	J-62	J-54	307.10	8.00	140.0000	0.00
P-81	J-62	J-61	323.30	6.00	140.0000	0.00
P-82	J-60	J-63	540.80	6.00	120.0000	0.00
P-83	J-64	J-39	278.70	12.00	140.0000	0.00
P-85	J-58	J-75	540.00	12.00	120.0000	0.00
P-86	J-75	J-66	71.90	12.00	120.0000	0.00
P-87	J-68	J-66	219.60	12.00	120.0000	0.00
P-88	J-68	J-69	649.80	6.00	140.0000	0.00
P-89	J-69	J-68	213.90	12.00	120.0000	0.00
P-90	J-58	J-71	329.80	12.00	120.0000	0.00
P-91	J-71	J-70	430.40	6.00	130.0000	0.00
P-92	J-71	J-112	318.00	12.00	120.0000	0.00
P-93	J-73	J-121	70.70	6.00	140.0000	0.00
P-94	J-73	J-111	298.20	12.00	120.0000	0.00
P-95	J-75	J-123	4.00	12.00	120.0000	0.00
P-96	J-123	O-Pump-3	6.30	12.00	120.0000	0.00
P-97	J-123	O-Pump-2	9.90	12.00	120.0000	0.00
P-98	R-1	J-122	12.50	12.00	120.0000	0.00
P-99	J-123	O-Pump-1	19.20	12.00	120.0000	0.00
P-100	O-RV-1	R-1	27.10	6.00	140.0000	0.00
P-101	I-Pump-1	J-122	11.90	12.00	120.0000	0.00
P-102	I-Pump-2	J-122	8.90	12.00	120.0000	0.00
P-103	J-74	J-67	171.50	12.00	120.0000	0.00
P-104	J-74	J-76	609.80	6.00	140.0000	0.00
P-105	J-77	J-49	383.00	12.00	120.0000	0.00
P-106	J-77	J-78	106.80	12.00	140.0000	0.00
P-107	J-49	J-80	226.20	12.00	120.0000	0.00
P-108	J-80	J-82	55.60	12.00	120.0000	0.00
P-109	J-80	J-113	1038.40	12.00	120.0000	0.00
P-110	J-82	J-79	182.50	6.00	140.0000	0.00
P-111	J-83	J-81	228.60	12.00	120.0000	0.00
P-112	J-83	J-116	295.10	8.00	120.0000	0.00
P-113	J-84	J-117	106.10	8.00	120.0000	0.00
P-114	J-84	J-87	253.10	6.00	140.0000	0.00
P-115	J-86	J-84	333.90	8.00	120.0000	0.00
P-116	J-86	J-89	388.40	8.00	140.0000	0.00
P-117	J-43	J-92	334.00	12.00	120.0000	0.00

P-118	VP-1	J-90	103.70	24.00	120.0000	0.00
P-119	J-91	J-97	168.70	12.00	140.0000	0.00
P-120	J-92	J-91	130.20	12.00	120.0000	0.00
P-122	J-93	J-47	326.60	8.00	140.0000	0.00
P-123	J-93	J-94	366.00	4.00	130.0000	0.00
P-124	J-93	J-96	576.50	8.00	140.0000	0.00
P-125	J-91	J-95	86.50	12.00	140.0000	0.00
P-126	J-97	J-102	631.00	12.00	140.0000	0.00
P-127	J-97	J-100	291.10	8.00	140.0000	0.00
P-128	J-98	J-99	107.60	8.00	140.0000	0.00
P-129	J-98	J-101	670.90	8.00	140.0000	0.00
P-130	J-100	J-98	429.00	8.00	140.0000	0.00
P-131	J-100	J-103	302.20	6.00	120.0000	0.00
P-132	J-102	J-88	308.70	12.00	140.0000	0.00
P-133	J-103	J-127	438.60	6.00	140.0000	0.00
P-134	J-90	J-88	1360.00	24.00	120.0000	0.00
P-135	VP-2	J-90	53.70	24.00	120.0000	0.00
P-136	J-46	J-104	332.30	6.00	120.0000	0.00
P-137	J-104	J-105	429.80	6.00	120.0000	0.00
P-138	J-104	J-96	316.00	6.00	120.0000	0.00
P-139	J-96	J-106	549.40	6.00	120.0000	0.00
P-140	J-96	J-107	464.20	6.00	120.0000	0.00
P-141	J-58	J-108	650.10	12.00	140.0000	0.00
P-143	I-Pump-3	J-122	12.80	12.00	120.0000	0.00
P-145	J-11	J-74	182.50	12.00	120.0000	0.00
P-146	J-110	J-11	324.00	12.00	120.0000	0.00
P-147	J-111	J-110	348.40	12.00	120.0000	0.00
P-148	J-112	J-73	378.60	12.00	120.0000	0.00
P-149	J-113	J-114	851.10	12.00	120.0000	0.00
P-150	J-114	J-115	451.70	12.00	120.0000	0.00
P-151	J-115	J-83	950.10	12.00	120.0000	0.00
P-152	J-116	J-86	247.50	8.00	120.0000	0.00
P-153	J-117	J-85	512.90	8.00	120.0000	0.00
P-154	J-118	J-77	693.90	12.00	120.0000	0.00
P-155	J-119	J-44	151.90	6.00	120.0000	0.00
P-156	J-120	J-119	139.90	6.00	120.0000	0.00
P-157	J-121	J-72	124.10	6.00	140.0000	0.00
P-160	J-127	J-128	143.40	6.00	140.0000	0.00
P-161	J-128	J-102	117.00	6.00	140.0000	0.00
P-162	J-129	J-31	763.20	6.00	140.0000	0.00
P-163	J-130	J-69	184.80	12.00	120.0000	0.00
P-164	J-131	J-21	294.10	12.00	120.0000	0.00
P-165	J-75	I-RV-1	17.90	6.00	140.0000	0.00

P U M P/L O S S   E L E M E N T   D A T A

THERE IS A DEVICE AT NODE   Pump-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 3)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
210.00	0.00	80.00
185.00	800.00	80.00

160.00	1000.00	80.00
110.00	1400.00	80.00

THERE IS A DEVICE AT NODE Pump-2 ....> (ID= 3)

THERE IS A DEVICE AT NODE Pump-3 ....> (ID= 3)

THERE IS A DEVICE AT NODE VP-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
230.00	0.00	75.00
224.00	210.00	75.00
222.00	315.00	75.00
211.00	420.00	75.00
178.00	525.00	75.00
130.00	630.00	75.00

THERE IS A DEVICE AT NODE VP-2 DESCRIBED BY THE FOLLOWING DATA: (ID= 2)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
395.00	0.00	75.00
290.00	240.00	75.00
205.00	400.00	75.00
140.00	580.00	75.00
80.00	640.00	75.00

N O D E   D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
J-1		2.39	388.00	
J-2		2.39	386.00	
J-3		2.39	389.00	
J-4		2.39	388.00	
J-6		2.39	389.00	
J-7		2.39	389.00	
J-8		2.39	390.00	
J-9		2.39	391.00	
J-10		2.39	395.00	
J-11	FIRE	6.96	395.00	
J-12		2.39	399.00	
J-13		2.39	396.00	
J-14		2.39	400.00	
J-15		2.39	399.00	

J-16		2.39	399.00
J-18		2.39	402.00
J-19		2.39	399.00
J-20		2.39	397.00
J-21		2.39	399.00
J-22		2.39	397.00
J-23		2.39	400.00
J-24		2.39	401.00
J-25		2.39	399.00
J-26		2.39	398.00
J-27		2.39	392.00
J-28		2.39	391.00
J-29		2.39	392.00
J-30		2.39	390.00
J-31		2.39	399.00
J-32		2.39	402.00
J-33		2.39	393.00
J-34		2.39	403.00
J-35		2.39	403.00
J-36		2.39	400.00
J-37		2.39	405.00
J-38		2.39	401.00
J-39		2.39	401.00
J-41		2.39	403.00
J-42		2.39	403.00
J-43		2.39	405.00
J-44		6.96	403.00
J-45		2.39	403.00
J-46		2.39	403.00
J-47		2.39	403.00
J-48		2.39	403.00
J-49		6.96	414.00
J-50		2.39	403.00
J-51		2.39	403.00
J-53		2.39	403.00
J-54		2.39	403.00
J-55		2.39	401.00
J-56		2.39	403.00
J-57		2.39	401.00
J-58		6.96	399.00
J-59		2.39	401.00
J-60		2.39	399.00
J-61	FIRE	3000.00	401.00
J-62		2.39	402.00
J-63		2.39	399.00
J-64		2.39	401.00
J-66		2.39	403.00
J-67		6.96	393.00
J-68		2.39	399.00
J-69		2.39	400.00
J-70		6.96	400.00
J-71		6.96	399.00
J-72		6.96	399.00
J-73		6.96	399.00

J-74	6.96	393.00
J-75	2.39	397.50
J-76	6.96	393.00
J-77	6.96	403.00
J-78	6.96	403.00
J-79	6.96	403.00
J-80	6.96	403.00
J-81	6.96	413.00
J-82	6.96	403.00
J-83	6.96	412.00
J-84	6.96	404.00
J-85	6.96	408.00
J-86	6.96	404.00
J-87	6.96	404.00
J-88	2.39	399.00
J-89	6.96	404.00
J-90	2.39	398.00
J-91	2.39	401.00
J-92	2.39	401.00
J-93	2.39	404.00
J-94	2.39	403.00
J-95	2.39	401.00
J-96	2.39	403.00
J-97	2.39	401.00
J-98	2.39	399.00
J-99	2.39	399.00
J-100	2.39	399.00
J-101	2.39	397.00
J-102	2.39	396.00
J-103	2.39	399.00
J-104	2.39	403.00
J-105	2.39	403.00
J-106	2.39	405.00
J-107	2.39	405.00
J-108	6.96	403.00
J-109	2.39	396.00
J-110	6.96	397.00
J-111	6.96	399.00
J-112	6.96	399.00
J-113	6.96	405.00
J-114	6.96	412.00
J-115	6.96	412.00
J-116	6.96	404.00
J-117	6.96	405.00
J-118	6.96	403.00
J-119	6.96	403.00
J-120	6.96	403.00
J-121	6.96	399.00
J-122	2.39	397.50
J-123	2.39	397.50
J-127	2.39	396.00
J-128	2.39	396.00
J-129	2.39	395.00
J-130	2.39	403.00

J-131		2.39	399.00	
I-Pump-1		0.00	397.50	
I-Pump-2		0.00	397.50	
I-Pump-3		0.00	397.50	
R-1		----	397.50	415.00
O-RV-1		0.00	397.50	
VP-1	WELL 1	----	398.00	398.00
VP-2	WELL 2	----	398.00	398.00
O-Pump-3		0.00	397.50	
O-Pump-2		0.00	397.50	
O-Pump-1		0.00	397.50	
I-RV-1		----	397.50	563.65

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

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT
MAXIMUM AND MINIMUM PRESSURES = 5
MAXIMUM AND MINIMUM VELOCITIES = 5
MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

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

NUMBER OF PIPES ....(P) = 154
NUMBER OF END NODES ....(J) = 127
NUMBER OF PRIMARY LOOPS ....(L) = 25
NUMBER OF SUPPLY NODES ....(F) = 3
NUMBER OF SUPPLY ZONES ....(Z) = 1

==
Case: 0

RESULTS OBTAINED AFTER 21 TRIALS: ACCURACY = 0.43318E-05

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

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

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f

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P-1	J-1	J-2	-2.39	0.52	0.00	0.62	1.87	1.87
P-2	J-2	J-3	-4.78	0.06	0.00	0.22	0.10	0.10
P-4	J-3	J-6	-7.17	0.04	0.00	0.33	0.20	0.20
P-5	J-6	J-4	2.39	0.02	0.00	0.11	0.03	0.03
P-6	J-6	J-7	-11.95	0.01	0.00	0.14	0.02	0.02
P-7	J-7	J-9	-14.34	0.01	0.00	0.09	0.01	0.01
P-8	J-9	J-8	2.39	0.00	0.00	0.03	0.00	0.00
P-9	J-9	J-13	-19.12	0.03	0.00	0.12	0.01	0.01
P-10	J-10	J-109	2.39	0.00	0.00	0.01	0.00	0.00
P-11	J-10	J-131	-26.29	0.00	0.00	0.07	0.00	0.00
P-12	J-13	J-10	-21.51	0.01	0.00	0.14	0.02	0.02
P-13	J-12	J-14	42.14	0.00	0.00	0.12	0.01	0.01
P-14	J-12	J-16	3.68	0.00	0.00	0.09	0.03	0.03
P-15	J-16	J-15	1.29	0.00	0.00	0.03	0.00	0.00
P-17	J-15	J-18	2.39	0.00	0.00	0.06	0.01	0.01
P-18	J-15	J-19	-3.49	0.00	0.00	0.09	0.02	0.02
P-19	J-20	J-12	27.09	0.00	0.00	0.08	0.00	0.00
P-20	J-19	J-20	-5.88	0.00	0.00	0.07	0.00	0.00
P-21	J-21	J-22	1.37	0.00	0.00	0.00	0.00	0.00
P-22	J-22	J-20	35.36	0.00	0.00	0.10	0.01	0.01
P-23	J-22	J-25	-36.38	0.01	0.00	0.23	0.03	0.03
P-24	J-21	J-26	-32.44	0.01	0.00	0.21	0.03	0.03
P-25	J-25	J-24	-39.11	0.01	0.00	0.25	0.04	0.04
P-26	J-24	J-23	49.05	0.02	0.00	0.31	0.06	0.06
P-27	J-23	J-12	21.12	0.00	0.00	0.06	0.00	0.00
P-28	J-26	J-25	-0.34	0.00	0.00	0.00	0.00	0.00
P-29	J-26	J-28	-34.48	0.01	0.00	0.22	0.03	0.03
P-30	J-28	J-30	-11.21	0.00	0.00	0.07	0.00	0.00
P-31	J-28	J-29	-25.66	0.01	0.00	0.16	0.02	0.02
P-32	J-27	J-29	-15.99	0.00	0.00	0.10	0.01	0.01
P-33	J-30	J-27	-13.60	0.01	0.00	0.15	0.02	0.02
P-34	J-29	J-33	-44.04	0.05	0.00	0.50	0.20	0.20
P-35	J-31	J-32	-51.21	0.09	0.00	0.58	0.26	0.26
P-36	J-33	J-31	-30.53	0.04	0.00	0.35	0.10	0.10
P-37	J-33	J-129	-15.91	0.01	0.00	0.18	0.03	0.03
P-39	J-32	J-35	145.53	0.13	0.00	0.93	0.45	0.45
P-40	J-35	J-24	90.56	0.06	0.00	0.58	0.19	0.19
P-41	J-35	J-38	52.58	0.08	0.00	0.60	0.28	0.28
P-42	J-36	J-23	-25.54	0.00	0.00	0.16	0.02	0.02
P-43	J-36	J-37	22.09	0.01	0.00	0.14	0.01	0.01
P-44	J-38	J-36	-1.06	0.00	0.00	0.00	0.00	0.00
P-45	J-37	J-14	-39.75	0.00	0.00	0.11	0.01	0.01
P-46	J-37	J-39	59.45	0.00	0.00	0.17	0.01	0.01
P-47	J-39	J-38	-11.54	0.01	0.00	0.13	0.02	0.02
P-48	J-38	J-34	39.72	0.00	0.00	0.11	0.01	0.01
P-49	J-34	J-41	37.33	0.00	0.00	0.11	0.01	0.01
P-51	J-41	J-42	34.94	0.00	0.00	0.10	0.01	0.01
P-52	J-32	J-43	-199.13	3.84	0.00	2.26	3.73	3.73
P-53	J-43	J-42	415.54	4.06	0.00	4.71	12.71	12.71
P-54	J-43	J-47	503.73	3.58	0.00	5.72	20.83	20.83
P-55	J-45	J-120	20.88	0.04	0.00	0.24	0.07	0.07
P-56	J-46	J-45	86.76	0.30	0.00	0.98	0.93	0.93

P-57	J-47	J-46	104.63	0.51	0.00	1.19	1.32	1.32
P-58	J-42	J-48	448.08	0.13	0.00	1.27	0.67	0.67
P-59	J-48	J-50	279.80	0.10	0.00	0.79	0.28	0.28
P-60	J-48	J-47	-314.72	0.60	0.00	2.01	1.87	1.87
P-61	J-50	J-53	358.15	0.14	0.00	1.02	0.44	0.44
P-62	J-46	J-50	80.73	0.20	0.00	0.92	0.61	0.61
P-63	J-45	J-51	63.49	0.03	0.00	0.41	0.10	0.10
P-64	J-51	J-118	132.24	0.04	0.00	0.38	0.07	0.07
P-66	J-48	J-56	480.61	0.81	0.00	3.07	4.10	4.10
P-67	J-53	J-51	71.14	0.00	0.00	0.20	0.02	0.02
P-68	J-54	J-53	-284.62	0.05	0.00	0.81	0.29	0.29
P-69	J-54	J-57	-67.30	0.01	0.00	0.19	0.02	0.02
P-70	J-56	J-62	141.23	0.18	0.00	0.90	0.42	0.42
P-71	J-55	J-56	-336.99	0.57	0.00	2.15	2.12	2.12
P-72	J-55	J-39	-492.48	1.50	0.00	3.14	4.29	4.29
P-73	J-57	J-61	1131.39	6.25	0.00	7.22	20.02	20.02
P-74	J-57	J-59	-1201.08	1.33	0.00	3.41	4.13	4.13
P-75	J-59	J-130	-2187.69	7.04	0.00	6.21	12.54	12.54
P-76	J-59	J-60	984.22	0.70	0.00	2.79	2.15	2.15
P-77	J-60	J-64	426.27	0.10	0.00	1.21	0.46	0.46
P-78	J-61	J-55	-827.07	5.16	0.00	5.28	11.20	11.20
P-79	J-60	J-61	553.17	6.88	0.00	6.28	21.59	21.59
P-80	J-62	J-54	-349.53	0.70	0.00	2.23	2.27	2.27
P-81	J-62	J-61	488.37	5.54	0.00	5.54	17.14	17.14
P-82	J-60	J-63	2.39	0.00	0.00	0.03	0.00	0.00
P-83	J-64	J-39	423.88	0.13	0.00	1.20	0.45	0.45
P-85	J-58	J-75	-97.44	0.02	0.00	0.28	0.04	0.04
P-86	J-75	J-66	2197.24	0.91	0.00	6.23	12.64	12.64
P-87	J-68	J-66	-2194.85	2.77	0.00	6.23	12.61	12.61
P-88	J-68	J-69	205.57	2.24	0.00	2.33	3.45	3.45
P-89	J-69	J-68	-1986.89	2.24	0.00	5.64	10.49	10.49
P-90	J-58	J-71	83.52	0.01	0.00	0.24	0.03	0.03
P-91	J-71	J-70	6.96	0.00	0.00	0.08	0.01	0.01
P-92	J-71	J-112	69.60	0.01	0.00	0.20	0.02	0.02
P-93	J-73	J-121	13.92	0.00	0.00	0.16	0.02	0.02
P-94	J-73	J-111	41.76	0.00	0.00	0.12	0.01	0.01
P-95	J-75	J-123	-2297.08	0.05	0.00	6.52	13.72	13.72
P-96	J-123	O-Pump-3	0.00	0.00	0.00	0.00	0.00	0.00
P-97	J-123	O-Pump-2	-1149.92	0.04	0.00	3.26	3.81	3.81
P-98	R-1	J-122	2301.86	0.17	0.00	6.53	13.77	13.77
P-99	J-123	O-Pump-1	-1149.55	0.07	0.00	3.26	3.81	3.81
P-100	O-RV-1	R-1	0.00	0.00	0.00	0.00	0.00	0.00
P-101	I-Pump-1	J-122	-1149.55	0.05	0.00	3.26	3.81	3.81
P-102	I-Pump-2	J-122	-1149.92	0.03	0.00	3.26	3.81	3.81
P-103	J-74	J-67	6.96	0.00	0.00	0.02	0.00	0.00
P-104	J-74	J-76	6.96	0.00	0.00	0.08	0.01	0.01
P-105	J-77	J-49	111.36	0.02	0.00	0.32	0.05	0.05
P-106	J-77	J-78	6.96	0.00	0.00	0.02	0.00	0.00
P-107	J-49	J-80	104.40	0.01	0.00	0.30	0.04	0.04
P-108	J-80	J-82	13.92	0.00	0.00	0.04	0.00	0.00
P-109	J-80	J-113	83.52	0.03	0.00	0.24	0.03	0.03
P-110	J-82	J-79	6.96	0.00	0.00	0.08	0.01	0.01
P-111	J-83	J-81	6.96	0.00	0.00	0.02	0.00	0.00
P-112	J-83	J-116	48.72	0.02	0.00	0.31	0.08	0.08

P-113	J-84	J-117	13.92	0.00	0.00	0.09	0.01	0.01
P-114	J-84	J-87	6.96	0.00	0.00	0.08	0.01	0.01
P-115	J-86	J-84	27.84	0.01	0.00	0.18	0.03	0.03
P-116	J-86	J-89	6.96	0.00	0.00	0.04	0.00	0.00
P-117	J-43	J-92	-1120.79	1.21	0.00	3.18	3.63	3.63
P-118	VP-1	J-90	587.66	0.00	0.00	0.42	0.04	0.04
P-119	J-91	J-97	-1127.96	0.47	0.00	3.20	2.76	2.76
P-120	J-92	J-91	-1123.18	0.47	0.00	3.19	3.65	3.65
P-122	J-93	J-47	-81.98	0.05	0.00	0.52	0.15	0.15
P-123	J-93	J-94	2.39	0.00	0.00	0.06	0.01	0.01
P-124	J-93	J-96	77.20	0.08	0.00	0.49	0.14	0.14
P-125	J-91	J-95	2.39	0.00	0.00	0.01	0.00	0.00
P-126	J-97	J-102	-1023.24	1.46	0.00	2.90	2.31	2.31
P-127	J-97	J-100	-107.10	0.07	0.00	0.68	0.25	0.25
P-128	J-98	J-99	2.39	0.00	0.00	0.02	0.00	0.00
P-129	J-98	J-101	2.39	0.00	0.00	0.02	0.00	0.00
P-130	J-100	J-98	7.17	0.00	0.00	0.05	0.00	0.00
P-131	J-100	J-103	-116.66	0.49	0.00	1.32	1.61	1.61
P-132	J-102	J-88	-1149.47	0.88	0.00	3.26	2.86	2.86
P-133	J-103	J-127	-119.05	0.55	0.00	1.35	1.26	1.26
P-134	J-90	J-88	1151.86	0.18	0.00	0.82	0.13	0.13
P-135	VP-2	J-90	566.59	0.00	0.00	0.40	0.04	0.04
P-136	J-46	J-104	-65.25	0.18	0.00	0.74	0.55	0.55
P-137	J-104	J-105	2.39	0.00	0.00	0.03	0.00	0.00
P-138	J-104	J-96	-70.03	0.20	0.00	0.79	0.63	0.63
P-139	J-96	J-106	2.39	0.00	0.00	0.03	0.00	0.00
P-140	J-96	J-107	2.39	0.00	0.00	0.03	0.00	0.00
P-141	J-58	J-108	6.96	0.00	0.00	0.02	0.00	0.00
P-143	I-Pump-3	J-122	0.00	0.00	0.00	0.00	0.00	0.00
P-145	J-11	J-74	20.88	0.00	0.00	0.06	0.00	0.00
P-146	J-110	J-11	27.84	0.00	0.00	0.08	0.00	0.00
P-147	J-111	J-110	34.80	0.00	0.00	0.10	0.01	0.01
P-148	J-112	J-73	62.64	0.01	0.00	0.18	0.02	0.02
P-149	J-113	J-114	76.56	0.02	0.00	0.22	0.03	0.03
P-150	J-114	J-115	69.60	0.01	0.00	0.20	0.02	0.02
P-151	J-115	J-83	62.64	0.02	0.00	0.18	0.02	0.02
P-152	J-116	J-86	41.76	0.01	0.00	0.27	0.06	0.06
P-153	J-117	J-85	6.96	0.00	0.00	0.04	0.00	0.00
P-154	J-118	J-77	125.28	0.04	0.00	0.36	0.06	0.06
P-155	J-119	J-44	6.96	0.00	0.00	0.08	0.01	0.01
P-156	J-120	J-119	13.92	0.00	0.00	0.16	0.03	0.03
P-157	J-121	J-72	6.96	0.00	0.00	0.08	0.01	0.01
P-160	J-127	J-128	-121.44	0.19	0.00	1.38	1.30	1.30
P-161	J-128	J-102	-123.83	0.16	0.00	1.41	1.35	1.35
P-162	J-129	J-31	-18.30	0.03	0.00	0.21	0.04	0.04
P-163	J-130	J-69	-2190.07	2.32	0.00	6.21	12.56	12.56
P-164	J-131	J-21	-28.68	0.00	0.00	0.08	0.00	0.00
P-165	J-75	I-RV-1	0.00	0.00	0.00	0.00	0.00	0.00

P U M P/L O S S   E L E M E N T   R E S U L T S

NAME	FLOWRATE gpm	INLET HEAD ft	OUTLET HEAD ft	PUMP HEAD ft	EFFIC-ENCY %	USEFUL POWER Hp	INCREMTL COST $	TOTAL COST $	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. ft
Pump-1	1149.55	17.28	158.59	141.3	75.00	0.	0.0	0.0	**	**	50.3
Pump-2	1149.92	17.29	158.55	141.3	75.00	0.	0.0	0.0	**	**	50.3
Device "Pump-3" is closed											
Pump-3	0.00	17.33	158.52	0.0	75.00	0.	0.0	0.0	**	**	50.5
VP-1	587.66	0.00	150.49	150.5	75.00	0.	0.0	0.0	**	**	33.2
VP-2	566.59	0.00	150.49	150.5	75.00	0.	0.0	0.0	**	**	33.2

N O D E   R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		2.39	539.08	388.00	151.08	65.47
J-2		2.39	539.60	386.00	153.60	66.56
J-3		2.39	539.66	389.00	150.66	65.29
J-4		2.39	539.69	388.00	151.69	65.73
J-6		2.39	539.70	389.00	150.70	65.30
J-7		2.39	539.71	389.00	150.71	65.31
J-8		2.39	539.71	390.00	149.71	64.88
J-9		2.39	539.72	391.00	148.72	64.44
J-10		2.39	539.76	395.00	144.76	62.73
J-11	FIRE	6.96	555.91	395.00	160.91	69.73
J-12		2.39	539.76	399.00	140.76	61.00
J-13		2.39	539.75	396.00	143.75	62.29
J-14		2.39	539.76	400.00	139.76	60.56
J-15		2.39	539.76	399.00	140.76	60.99
J-16		2.39	539.76	399.00	140.76	61.00
J-18		2.39	539.76	402.00	137.76	59.69
J-19		2.39	539.76	399.00	140.76	61.00
J-20		2.39	539.76	397.00	142.76	61.86
J-21		2.39	539.76	399.00	140.76	61.00
J-22		2.39	539.76	397.00	142.76	61.86
J-23		2.39	539.76	400.00	139.76	60.56
J-24		2.39	539.78	401.00	138.78	60.14
J-25		2.39	539.77	399.00	140.77	61.00
J-26		2.39	539.77	398.00	141.77	61.43
J-27		2.39	539.80	392.00	147.80	64.04

J-28		2.39	539.78	391.00	148.78	64.47
J-29		2.39	539.80	392.00	147.80	64.05
J-30		2.39	539.79	390.00	149.79	64.91
J-31		2.39	539.89	399.00	140.89	61.05
J-32		2.39	539.98	402.00	137.98	59.79
J-33		2.39	539.85	393.00	146.85	63.63
J-34		2.39	539.76	403.00	136.76	59.26
J-35		2.39	539.84	403.00	136.84	59.30
J-36		2.39	539.76	400.00	139.76	60.56
J-37		2.39	539.76	405.00	134.76	58.40
J-38		2.39	539.76	401.00	138.76	60.13
J-39		2.39	539.75	401.00	138.75	60.13
J-41		2.39	539.76	403.00	136.76	59.26
J-42		2.39	539.76	403.00	136.76	59.26
J-43		2.39	543.82	405.00	138.82	60.15
J-44		6.96	539.37	403.00	136.37	59.10
J-45		2.39	539.42	403.00	136.42	59.12
J-46		2.39	539.72	403.00	136.72	59.25
J-47		2.39	540.23	403.00	137.23	59.47
J-48		2.39	539.63	403.00	136.63	59.21
J-49		6.96	539.29	414.00	125.29	54.29
J-50		2.39	539.53	403.00	136.53	59.16
J-51		2.39	539.39	403.00	136.39	59.10
J-53		2.39	539.39	403.00	136.39	59.10
J-54		2.39	539.34	403.00	136.34	59.08
J-55		2.39	538.26	401.00	137.26	59.48
J-56		2.39	538.82	403.00	135.82	58.86
J-57		2.39	539.35	401.00	138.35	59.95
J-58		6.96	555.94	399.00	156.94	68.01
J-59		2.39	540.67	401.00	139.67	60.53
J-60		2.39	539.98	399.00	140.98	61.09
J-61	FIRE	3000.00	533.10	401.00	132.10	57.24
J-62		2.39	538.64	402.00	136.64	59.21
J-63		2.39	539.98	399.00	140.98	61.09
J-64		2.39	539.88	401.00	138.88	60.18
J-66		2.39	555.05	403.00	152.05	65.89
J-67		6.96	555.91	393.00	162.91	70.59
J-68		2.39	552.28	399.00	153.28	66.42
J-69		2.39	550.04	400.00	150.04	65.02
J-70		6.96	555.93	400.00	155.93	67.57
J-71		6.96	555.93	399.00	156.93	68.00
J-72		6.96	555.91	399.00	156.91	68.00
J-73		6.96	555.92	399.00	156.92	68.00
J-74		6.96	555.91	393.00	162.91	70.59
J-75		2.39	555.96	397.50	158.46	68.67
J-76		6.96	555.91	393.00	162.91	70.59
J-77		6.96	539.30	403.00	136.30	59.07
J-78		6.96	539.30	403.00	136.30	59.07
J-79		6.96	539.27	403.00	136.27	59.05
J-80		6.96	539.28	403.00	136.28	59.05
J-81		6.96	539.20	413.00	126.20	54.69
J-82		6.96	539.28	403.00	136.28	59.05
J-83		6.96	539.20	412.00	127.20	55.12
J-84		6.96	539.15	404.00	135.15	58.56

J-85		6.96	539.15	408.00	131.15	56.83
J-86		6.96	539.16	404.00	135.16	58.57
J-87		6.96	539.15	404.00	135.15	58.56
J-88		2.39	548.31	399.00	149.31	64.70
J-89		6.96	539.16	404.00	135.16	58.57
J-90		2.39	548.49	398.00	150.49	65.21
J-91		2.39	545.51	401.00	144.51	62.62
J-92		2.39	545.03	401.00	144.03	62.41
J-93		2.39	540.18	404.00	136.18	59.01
J-94		2.39	540.18	403.00	137.18	59.45
J-95		2.39	545.51	401.00	144.51	62.62
J-96		2.39	540.10	403.00	137.10	59.41
J-97		2.39	545.97	401.00	144.97	62.82
J-98		2.39	546.05	399.00	147.05	63.72
J-99		2.39	546.05	399.00	147.05	63.72
J-100		2.39	546.05	399.00	147.05	63.72
J-101		2.39	546.05	397.00	149.05	64.59
J-102		2.39	547.43	396.00	151.43	65.62
J-103		2.39	546.53	399.00	147.53	63.93
J-104		2.39	539.91	403.00	136.91	59.33
J-105		2.39	539.91	403.00	136.91	59.33
J-106		2.39	540.10	405.00	135.10	58.54
J-107		2.39	540.10	405.00	135.10	58.54
J-108		6.96	555.94	403.00	152.94	66.27
J-109		2.39	539.76	396.00	143.76	62.30
J-110		6.96	555.91	397.00	158.91	68.86
J-111		6.96	555.91	399.00	156.91	68.00
J-112		6.96	555.92	399.00	156.92	68.00
J-113		6.96	539.24	405.00	134.24	58.17
J-114		6.96	539.22	412.00	127.22	55.13
J-115		6.96	539.21	412.00	127.21	55.13
J-116		6.96	539.17	404.00	135.17	58.58
J-117		6.96	539.15	405.00	134.15	58.13
J-118		6.96	539.35	403.00	136.35	59.08
J-119		6.96	539.38	403.00	136.38	59.10
J-120		6.96	539.38	403.00	136.38	59.10
J-121		6.96	555.92	399.00	156.92	68.00
J-122		2.39	414.83	397.50	17.33	7.51
J-123		2.39	556.02	397.50	158.52	68.69
J-127		2.39	547.08	396.00	151.08	65.47
J-128		2.39	547.27	396.00	151.27	65.55
J-129		2.39	539.86	395.00	144.86	62.77
J-130		2.39	547.72	403.00	144.72	62.71
J-131		2.39	539.76	399.00	140.76	61.00
I-Pump-1		0.00	414.78	397.50	17.28	7.49
I-Pump-2		0.00	414.79	397.50	17.29	7.49
I-Pump-3		0.00	414.83	397.50	17.33	7.51
R-1		----	415.00	397.50	17.50	7.58
O-RV-1		0.00	415.00	397.50	17.50	7.58
VP-1	WELL 1	----	548.49	398.00	150.49	65.21
VP-2	WELL 2	----	548.49	398.00	150.49	65.21
O-Pump-3		0.00	556.02	397.50	158.52	68.69
O-Pump-2		0.00	556.05	397.50	158.55	68.71
O-Pump-1		0.00	556.09	397.50	158.59	68.72

I-RV-1	----	555.96	397.50	158.46	68.67

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

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
J-74	70.59	I-Pump-1	7.49
J-67	70.59	I-Pump-2	7.49
J-76	70.59	J-122	7.51
J-11	69.73	I-Pump-3	7.51
J-110	68.86	R-1	7.58

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
P-73	7.22	P-28	0.00
P-98	6.53	P-44	0.00
P-95	6.52	P-21	0.00
P-79	6.28	P-10	0.01
P-86	6.23	P-125	0.01

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
P-79	21.59	P-28	0.00
P-54	20.83	P-44	0.00
P-73	20.02	P-21	0.00
P-81	17.14	P-125	0.00
P-98	13.77	P-10	0.00

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
P-79	21.59	P-28	0.00
P-54	20.83	P-44	0.00
P-73	20.02	P-21	0.00
P-81	17.14	P-125	0.00
P-98	13.77	P-10	0.00

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

VALVE LABEL	VALVE TYPE	VALVE SETTING psi or gpm	VALVE STATUS	UPSTREAM PRESSURE psi	DOWNSTREAM PRESSURE psi	THROUGH FLOW gpm
RV-1	PSV	72.00	CLOSED	68.67	7.58	0.00

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

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

NODE NAME	FLOWRATE gpm	NODE TITLE
R-1	2301.86	
VP-1	587.66	WELL 1
VP-2	566.59	WELL 2

NET SYSTEM INFLOW = 3456.10
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 3456.09

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

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* * * * * * * * * * * * *  K Y P I P E  * * * * * * * * * * * * *
*                                                               *
*  Pipe Network Modeling Software                               *
*                                                               *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)                   *
*  Version: 8.003 (vr8)  10/29/2015                             *
*  Company:  4BEngineer    Serial #:  591127                    *
*  Interface:  Classic                                          *
*  Licensed for Pipe2016                                        *
*                                                               *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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Date & Time: Wed Jun 22 09:31:51 2016

Master File : C:\Users\4B Engineering\Documents\CITY DOCUMENTS\COBURG\MODELING\max day-year 2020.KYP\max day-year 2020.P2K (6)

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**********************************************
 S U M M A R Y   O F   O R I G I N A L   D A T A
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U N I T S   S P E C I F I E D

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

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

VALVE LABEL	VALVE TYPE	VALVE SETTING (ft or gpm)
RV-1	PSV	563.15

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

STATUS CODE: XX -CLOSED PIPE   CV -CHECK VALVE

P I P E N A M E	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-1	J-1	J-2	280.00	1.25	140.0000	0.00
P-2	J-2	J-3	606.60	3.00	140.0000	0.00
P-4	J-3	J-6	193.40	3.00	140.0000	0.00

P-5	J-6	J-4	600.30	3.00	140.0000	0.00
P-6	J-6	J-7	378.00	6.00	140.0000	0.00
P-7	J-7	J-9	1386.50	8.00	140.0000	0.00
P-8	J-9	J-8	2435.90	6.00	140.0000	0.00
P-9	J-9	J-13	3328.60	8.00	140.0000	0.00
P-10	J-10	J-109	76.70	12.00	120.0000	0.00
P-11	J-10	J-131	434.80	12.00	120.0000	0.00
P-12	J-13	J-10	565.60	8.00	120.0000	0.00
P-13	J-12	J-14	503.90	12.00	140.0000	0.00
P-14	J-12	J-16	176.50	4.00	100.0000	0.00
P-15	J-16	J-15	179.60	4.00	100.0000	0.00
P-17	J-15	J-18	130.00	4.00	100.0000	0.00
P-18	J-15	J-19	181.70	4.00	100.0000	0.00
P-19	J-20	J-12	181.70	12.00	120.0000	0.00
P-20	J-19	J-20	353.40	6.00	140.0000	0.00
P-21	J-21	J-22	373.10	12.00	120.0000	0.00
P-22	J-22	J-20	140.30	12.00	120.0000	0.00
P-23	J-22	J-25	224.90	8.00	140.0000	0.00
P-24	J-21	J-26	277.90	8.00	140.0000	0.00
P-25	J-25	J-24	278.00	8.00	140.0000	0.00
P-26	J-24	J-23	320.90	8.00	140.0000	0.00
P-27	J-23	J-12	425.10	12.00	120.0000	0.00
P-28	J-26	J-25	378.90	8.00	140.0000	0.00
P-29	J-26	J-28	423.90	8.00	140.0000	0.00
P-30	J-28	J-30	377.90	8.00	140.0000	0.00
P-31	J-28	J-29	689.00	8.00	140.0000	0.00
P-32	J-27	J-29	200.00	8.00	140.0000	0.00
P-33	J-30	J-27	418.10	6.00	140.0000	0.00
P-34	J-29	J-33	260.50	6.00	140.0000	0.00
P-35	J-31	J-32	334.50	6.00	140.0000	0.00
P-36	J-33	J-31	381.70	6.00	140.0000	0.00
P-37	J-33	J-129	287.60	6.00	140.0000	0.00
P-39	J-32	J-35	297.30	8.00	140.0000	0.00
P-40	J-35	J-24	320.70	8.00	140.0000	0.00
P-41	J-35	J-38	287.70	6.00	140.0000	0.00
P-42	J-36	J-23	30.00	8.00	140.0000	0.00
P-43	J-36	J-37	383.70	8.00	140.0000	0.00
P-44	J-38	J-36	277.70	12.00	140.0000	0.00
P-45	J-37	J-14	289.60	12.00	140.0000	0.00
P-46	J-37	J-39	308.50	12.00	140.0000	0.00
P-47	J-39	J-38	401.60	6.00	120.0000	0.00
P-48	J-38	J-34	299.60	12.00	120.0000	0.00
P-49	J-34	J-41	596.00	12.00	120.0000	0.00
P-51	J-41	J-42	56.70	12.00	120.0000	0.00
P-52	J-32	J-43	1029.30	6.00	130.0000	0.00
P-53	J-43	J-42	319.60	6.00	140.0000	0.00
P-54	J-43	J-47	172.10	6.00	130.0000	0.00
P-55	J-45	J-120	646.60	6.00	120.0000	0.00
P-56	J-46	J-45	326.60	6.00	120.0000	0.00
P-57	J-47	J-46	388.10	6.00	120.0000	0.00
P-58	J-42	J-48	189.00	12.00	120.0000	0.00
P-59	J-48	J-50	366.00	12.00	120.0000	0.00
P-60	J-48	J-47	322.80	8.00	140.0000	0.00
P-61	J-50	J-53	319.10	12.00	120.0000	0.00

P-62	J-46	J-50	319.80	6.00	140.0000	0.00
P-63	J-45	J-51	339.30	8.00	140.0000	0.00
P-64	J-51	J-118	614.60	12.00	120.0000	0.00
P-66	J-48	J-56	196.60	8.00	140.0000	0.00
P-67	J-53	J-51	31.90	12.00	120.0000	0.00
P-68	J-54	J-53	172.10	12.00	120.0000	0.00
P-69	J-54	J-57	316.80	12.00	120.0000	0.00
P-70	J-56	J-62	432.00	8.00	140.0000	0.00
P-71	J-55	J-56	268.20	8.00	140.0000	0.00
P-72	J-55	J-39	349.50	8.00	140.0000	0.00
P-73	J-57	J-61	312.10	8.00	140.0000	0.00
P-74	J-57	J-59	321.70	12.00	120.0000	0.00
P-75	J-59	J-130	561.90	12.00	120.0000	0.00
P-76	J-59	J-60	324.20	12.00	140.0000	0.00
P-77	J-60	J-64	216.10	12.00	140.0000	0.00
P-78	J-61	J-55	460.20	8.00	140.0000	0.00
P-79	J-60	J-61	318.60	6.00	140.0000	0.00
P-80	J-62	J-54	307.10	8.00	140.0000	0.00
P-81	J-62	J-61	323.30	6.00	140.0000	0.00
P-82	J-60	J-63	540.80	6.00	120.0000	0.00
P-83	J-64	J-39	278.70	12.00	140.0000	0.00
P-85	J-58	J-75	577.60	12.00	120.0000	0.00
P-86	J-75	J-66	71.90	12.00	120.0000	0.00
P-87	J-68	J-66	219.60	12.00	120.0000	0.00
P-88	J-68	J-69	649.80	6.00	140.0000	0.00
P-89	J-69	J-68	213.90	12.00	120.0000	0.00
P-90	J-58	J-71	329.80	12.00	120.0000	0.00
P-91	J-71	J-70	384.90	6.00	130.0000	0.00
P-92	J-71	J-112	318.00	12.00	120.0000	0.00
P-93	J-73	J-121	70.70	6.00	140.0000	0.00
P-94	J-73	J-111	298.20	12.00	120.0000	0.00
P-95	J-75	J-123	4.00	12.00	120.0000	0.00
P-96	J-123	O-Pump-3	6.30	12.00	120.0000	0.00
P-97	J-123	O-Pump-2	6.80	12.00	120.0000	0.00
P-98	R-1	J-122	2.30	12.00	120.0000	0.00
P-99	J-123	O-Pump-1	8.40	12.00	120.0000	0.00
P-100	O-RV-1	R-1	4.80	6.00	140.0000	0.00
P-101	I-Pump-1	J-122	2.10	12.00	120.0000	0.00
P-102	I-Pump-2	J-122	2.80	12.00	120.0000	0.00
P-103	J-74	J-67	171.50	12.00	120.0000	0.00
P-104	J-74	J-76	609.80	6.00	140.0000	0.00
P-105	J-77	J-49	383.00	12.00	120.0000	0.00
P-106	J-77	J-78	106.80	12.00	140.0000	0.00
P-107	J-49	J-80	226.20	12.00	120.0000	0.00
P-108	J-80	J-82	55.60	12.00	120.0000	0.00
P-109	J-80	J-113	1038.40	12.00	120.0000	0.00
P-110	J-82	J-79	182.50	6.00	140.0000	0.00
P-111	J-83	J-81	228.60	12.00	120.0000	0.00
P-112	J-83	J-116	295.10	8.00	120.0000	0.00
P-113	J-84	J-117	106.10	8.00	120.0000	0.00
P-114	J-84	J-87	234.20	6.00	140.0000	0.00
P-115	J-86	J-84	333.90	8.00	120.0000	0.00
P-116	J-86	J-89	364.30	8.00	140.0000	0.00
P-117	J-43	J-92	334.00	12.00	120.0000	0.00

P-118	VP-1	J-90	98.30	24.00	120.0000	0.00
P-119	J-91	J-97	168.70	12.00	140.0000	0.00
P-120	J-92	J-91	130.20	12.00	120.0000	0.00
P-122	J-93	J-47	326.60	8.00	140.0000	0.00
P-123	J-93	J-94	366.00	4.00	130.0000	0.00
P-124	J-93	J-96	576.50	8.00	140.0000	0.00
P-125	J-91	J-95	86.50	12.00	140.0000	0.00
P-126	J-97	J-102	631.00	12.00	140.0000	0.00
P-127	J-97	J-100	291.10	8.00	140.0000	0.00
P-128	J-98	J-99	107.60	8.00	140.0000	0.00
P-129	J-98	J-101	670.90	8.00	140.0000	0.00
P-130	J-100	J-98	429.00	8.00	140.0000	0.00
P-131	J-100	J-103	302.20	6.00	120.0000	0.00
P-132	J-102	J-88	308.70	12.00	140.0000	0.00
P-133	J-103	J-127	438.60	6.00	140.0000	0.00
P-134	J-90	J-88	1360.00	24.00	120.0000	0.00
P-135	VP-2	J-90	53.70	24.00	120.0000	0.00
P-136	J-46	J-104	332.30	6.00	120.0000	0.00
P-137	J-104	J-105	429.80	6.00	120.0000	0.00
P-138	J-104	J-96	316.00	6.00	120.0000	0.00
P-139	J-96	J-106	549.40	6.00	120.0000	0.00
P-140	J-96	J-107	464.20	6.00	120.0000	0.00
P-141	J-58	J-108	633.20	12.00	140.0000	0.00
P-142	VP-3	J-81	453.20	12.00	140.0000	0.00
P-143	I-Pump-3	J-122	4.00	12.00	120.0000	0.00
P-144	J-83	J-124	676.20	12.00	140.0000	0.00
P-145	J-11	J-74	194.50	12.00	120.0000	0.00
P-146	J-110	J-11	311.90	12.00	120.0000	0.00
P-147	J-111	J-110	348.40	12.00	120.0000	0.00
P-148	J-112	J-73	378.60	12.00	120.0000	0.00
P-149	J-113	J-114	851.10	12.00	120.0000	0.00
P-150	J-114	J-115	451.70	12.00	120.0000	0.00
P-151	J-115	J-83	950.10	12.00	120.0000	0.00
P-152	J-116	J-86	247.50	8.00	120.0000	0.00
P-153	J-117	J-85	500.80	8.00	120.0000	0.00
P-154	J-118	J-77	693.90	12.00	120.0000	0.00
P-155	J-119	J-44	151.90	6.00	120.0000	0.00
P-156	J-120	J-119	139.90	6.00	120.0000	0.00
P-157	J-121	J-72	124.10	6.00	140.0000	0.00
P-158	J-124	J-126	1398.50	12.00	140.0000	0.00
P-159	J-126	J-125	1042.90	12.00	140.0000	0.00
P-160	J-127	J-128	143.40	6.00	140.0000	0.00
P-161	J-128	J-102	117.00	6.00	140.0000	0.00
P-162	J-129	J-31	763.20	6.00	140.0000	0.00
P-163	J-130	J-69	184.80	12.00	120.0000	0.00
P-164	J-131	J-21	294.10	12.00	120.0000	0.00
P-165	J-75	I-RV-1	8.30	6.00	140.0000	0.00

P U M P/L O S S   E L E M E N T   D A T A

THERE IS A DEVICE AT NODE   Pump-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 3)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
210.00	0.00	80.00
185.00	800.00	80.00
160.00	1000.00	80.00
110.00	1400.00	80.00

THERE IS A DEVICE AT NODE Pump-2 ....> (ID= 3)

THERE IS A DEVICE AT NODE Pump-3 ....> (ID= 3)

THERE IS A DEVICE AT NODE VP-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
230.00	0.00	75.00
224.00	210.00	75.00
222.00	315.00	75.00
211.00	420.00	75.00
178.00	525.00	75.00
130.00	630.00	75.00

THERE IS A DEVICE AT NODE VP-2 DESCRIBED BY THE FOLLOWING DATA: (ID= 2)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
395.00	0.00	75.00
290.00	240.00	75.00
205.00	400.00	75.00
140.00	580.00	75.00
90.00	640.00	75.00

THERE IS A DEVICE AT NODE VP-3 DESCRIBED BY THE FOLLOWING DATA: (ID= 4)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
300.00	0.00	75.00
275.00	200.00	75.00
250.00	300.00	75.00
200.00	400.00	75.00
100.00	500.00	75.00

N O D E   D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)

J-1	3.18	388.00
J-2	3.18	386.00
J-3	3.18	389.00
J-4	3.18	388.00
J-6	3.18	389.00
J-7	3.18	389.00
J-8	3.18	390.00
J-9	3.18	391.00
J-10	3.18	395.00
J-11	9.19	395.00
J-12	3.18	399.00
J-13	3.18	396.00
J-14	3.18	400.00
J-15	3.18	399.00
J-16	3.18	399.00
J-18	3.18	402.00
J-19	3.18	399.00
J-20	3.18	397.00
J-21	3.18	399.00
J-22	3.18	397.00
J-23	3.18	400.00
J-24	3.18	401.00
J-25	3.18	399.00
J-26	3.18	398.00
J-27	3.18	392.00
J-28	3.18	391.00
J-29	3.18	392.00
J-30	3.18	390.00
J-31	3.18	399.00
J-32	3.18	402.00
J-33	3.18	393.00
J-34	3.18	403.00
J-35	3.18	403.00
J-36	3.18	400.00
J-37	3.18	405.00
J-38	3.18	401.00
J-39	3.18	401.00
J-41	3.18	403.00
J-42	3.18	403.00
J-43	3.18	405.00
J-44	9.19	403.00
J-45	3.18	403.00
J-46	3.18	403.00
J-47	3.18	403.00
J-48	3.18	403.00
J-49	9.19	414.00
J-50	3.18	403.00
J-51	3.18	403.00
J-53	3.18	403.00
J-54	3.18	403.00
J-55	3.18	401.00
J-56	3.18	403.00
J-57	3.18	401.00

J-58	9.19	399.00
J-59	3.18	401.00
J-60	3.18	399.00
J-61	3.18	401.00
J-62	3.18	402.00
J-63	3.18	399.00
J-64	3.18	401.00
J-66	3.18	403.00
J-67	9.19	393.00
J-68	3.18	399.00
J-69	3.18	400.00
J-70	9.19	400.00
J-71	9.19	399.00
J-72	9.19	399.00
J-73	9.19	399.00
J-74	9.19	393.00
J-75	3.18	397.50
J-76	9.19	393.00
J-77	9.19	403.00
J-78	9.19	403.00
J-79	9.19	403.00
J-80	9.19	403.00
J-81	9.19	413.00
J-82	9.19	403.00
J-83	9.19	412.00
J-84	9.19	404.00
J-85	9.19	408.00
J-86	9.19	404.00
J-87	9.19	404.00
J-88	3.18	399.00
J-89	9.19	404.00
J-90	3.18	398.00
J-91	3.18	401.00
J-92	3.18	401.00
J-93	3.18	404.00
J-94	3.18	403.00
J-95	3.18	401.00
J-96	3.18	403.00
J-97	3.18	401.00
J-98	3.18	399.00
J-99	3.18	399.00
J-100	3.18	399.00
J-101	3.18	397.00
J-102	3.18	396.00
J-103	3.18	399.00
J-104	3.18	403.00
J-105	3.18	403.00
J-106	3.18	405.00
J-107	3.18	405.00
J-108	9.19	403.00
J-109	3.18	396.00
J-110	9.19	397.00
J-111	9.19	399.00
J-112	9.19	399.00

J-113		9.19	405.00	
J-114		9.19	412.00	
J-115		9.19	412.00	
J-116		9.19	404.00	
J-117		9.19	405.00	
J-118		9.19	403.00	
J-119		9.19	403.00	
J-120		9.19	403.00	
J-121		9.19	399.00	
J-122		3.18	397.50	
J-123		3.18	397.50	
J-124		3.18	424.00	
J-125		3.18	407.00	
J-126		3.18	415.00	
J-127		3.18	396.00	
J-128		3.18	396.00	
J-129		3.18	395.00	
J-130		3.18	403.00	
J-131		3.18	399.00	
I-Pump-1		0.00	397.50	
I-Pump-2		0.00	397.50	
I-Pump-3		0.00	397.50	
R-1		----	397.50	415.00
O-RV-1		0.00	397.00	
VP-1	WELL 1	----	398.00	398.00
VP-2	WELL 2	----	398.00	398.00
VP-3	WELL 3	----	414.00	414.00
O-Pump-3		0.00	397.50	
O-Pump-2		0.00	397.50	
O-Pump-1		0.00	397.50	
I-RV-1		----	397.00	563.15

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

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

MAXIMUM AND MINIMUM PRESSURES = 5
MAXIMUM AND MINIMUM VELOCITIES = 5
MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

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

NUMBER OF PIPES ....(P) = 158
NUMBER OF END NODES ....(J) = 130
NUMBER OF PRIMARY LOOPS ....(L) = 25
NUMBER OF SUPPLY NODES ....(F) = 4
NUMBER OF SUPPLY ZONES ....(Z) = 1

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Case: 0

RESULTS OBTAINED AFTER 13 TRIALS: ACCURACY = 0.79278E-04

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

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

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
P-1	J-1	J-2	-3.18	0.89	0.00	0.83	3.18	3.18
P-2	J-2	J-3	-6.36	0.10	0.00	0.29	0.16	0.16
P-4	J-3	J-6	-9.54	0.07	0.00	0.43	0.34	0.34
P-5	J-6	J-4	3.18	0.03	0.00	0.14	0.04	0.04
P-6	J-6	J-7	-15.90	0.01	0.00	0.18	0.03	0.03
P-7	J-7	J-9	-19.08	0.01	0.00	0.12	0.01	0.01
P-8	J-9	J-8	3.18	0.00	0.00	0.04	0.00	0.00
P-9	J-9	J-13	-25.44	0.06	0.00	0.16	0.02	0.02
P-10	J-10	J-109	3.18	0.00	0.00	0.01	0.00	0.00
P-11	J-10	J-131	-34.98	0.00	0.00	0.10	0.01	0.01
P-12	J-13	J-10	-28.62	0.02	0.00	0.18	0.03	0.03
P-13	J-12	J-14	153.01	0.03	0.00	0.43	0.07	0.07
P-14	J-12	J-16	4.96	0.01	0.00	0.13	0.05	0.05
P-15	J-16	J-15	1.78	0.00	0.00	0.05	0.01	0.01
P-17	J-15	J-18	3.18	0.00	0.00	0.08	0.02	0.02
P-18	J-15	J-19	-4.58	0.01	0.00	0.12	0.04	0.04
P-19	J-20	J-12	26.89	0.00	0.00	0.08	0.00	0.00
P-20	J-19	J-20	-7.76	0.00	0.00	0.09	0.01	0.01
P-21	J-21	J-22	-4.17	0.00	0.00	0.01	0.00	0.00
P-22	J-22	J-20	37.83	0.00	0.00	0.11	0.01	0.01
P-23	J-22	J-25	-45.18	0.01	0.00	0.29	0.05	0.05
P-24	J-21	J-26	-37.17	0.01	0.00	0.24	0.04	0.04
P-25	J-25	J-24	-60.29	0.02	0.00	0.38	0.09	0.09
P-26	J-24	J-23	28.95	0.01	0.00	0.18	0.02	0.02
P-27	J-23	J-12	134.26	0.03	0.00	0.38	0.07	0.07
P-28	J-26	J-25	-11.93	0.00	0.00	0.08	0.00	0.00
P-29	J-26	J-28	-28.43	0.01	0.00	0.18	0.02	0.02
P-30	J-28	J-30	-8.89	0.00	0.00	0.06	0.00	0.00
P-31	J-28	J-29	-22.71	0.01	0.00	0.14	0.01	0.01
P-32	J-27	J-29	-15.25	0.00	0.00	0.10	0.01	0.01
P-33	J-30	J-27	-12.07	0.01	0.00	0.14	0.02	0.02
P-34	J-29	J-33	-41.15	0.05	0.00	0.47	0.18	0.18
P-35	J-31	J-32	-50.69	0.09	0.00	0.58	0.26	0.26

P-36	J-33	J-31	-29.57	0.04	0.00	0.34	0.10	0.10
P-37	J-33	J-129	-14.76	0.01	0.00	0.17	0.03	0.03
P-39	J-32	J-35	124.22	0.10	0.00	0.79	0.33	0.33
P-40	J-35	J-24	92.42	0.06	0.00	0.59	0.19	0.19
P-41	J-35	J-38	28.63	0.03	0.00	0.32	0.09	0.09
P-42	J-36	J-23	108.49	0.01	0.00	0.69	0.26	0.26
P-43	J-36	J-37	103.53	0.09	0.00	0.66	0.24	0.24
P-44	J-38	J-36	215.20	0.04	0.00	0.61	0.13	0.13
P-45	J-37	J-14	-149.83	0.02	0.00	0.43	0.07	0.07
P-46	J-37	J-39	250.18	0.05	0.00	0.71	0.17	0.17
P-47	J-39	J-38	-58.46	0.18	0.00	0.66	0.45	0.45
P-48	J-38	J-34	-248.21	0.07	0.00	0.70	0.22	0.22
P-49	J-34	J-41	-251.39	0.14	0.00	0.71	0.23	0.23
P-51	J-41	J-42	-254.57	0.01	0.00	0.72	0.23	0.23
P-52	J-32	J-43	-178.09	3.13	0.00	2.02	3.04	3.04
P-53	J-43	J-42	354.96	3.03	0.00	4.03	9.49	9.49
P-54	J-43	J-47	423.57	2.60	0.00	4.81	15.11	15.11
P-55	J-45	J-120	27.57	0.07	0.00	0.31	0.11	0.11
P-56	J-46	J-45	62.75	0.17	0.00	0.71	0.51	0.51
P-57	J-47	J-46	83.20	0.33	0.00	0.94	0.86	0.86
P-58	J-42	J-48	97.21	0.01	0.00	0.28	0.04	0.04
P-59	J-48	J-50	140.32	0.03	0.00	0.40	0.08	0.08
P-60	J-48	J-47	-265.77	0.44	0.00	1.70	1.37	1.37
P-61	J-50	J-53	203.58	0.05	0.00	0.58	0.15	0.15
P-62	J-46	J-50	66.43	0.14	0.00	0.75	0.43	0.43
P-63	J-45	J-51	32.00	0.01	0.00	0.20	0.03	0.03
P-64	J-51	J-118	-264.86	0.15	0.00	0.75	0.25	0.25
P-66	J-48	J-56	219.47	0.19	0.00	1.40	0.96	0.96
P-67	J-53	J-51	-293.68	0.01	0.00	0.83	0.30	0.30
P-68	J-54	J-53	-494.08	0.14	0.00	1.40	0.80	0.80
P-69	J-54	J-57	465.51	0.23	0.00	1.32	0.71	0.71
P-70	J-56	J-62	54.46	0.03	0.00	0.35	0.07	0.07
P-71	J-55	J-56	-161.83	0.15	0.00	1.03	0.55	0.55
P-72	J-55	J-39	80.95	0.05	0.00	0.52	0.15	0.15
P-73	J-57	J-61	-74.99	0.04	0.00	0.48	0.13	0.13
P-74	J-57	J-59	537.32	0.30	0.00	1.52	0.93	0.93
P-75	J-59	J-130	987.21	1.61	0.00	2.80	2.87	2.87
P-76	J-59	J-60	-453.07	0.17	0.00	1.29	0.51	0.51
P-77	J-60	J-64	-383.22	0.08	0.00	1.09	0.37	0.37
P-78	J-61	J-55	-77.71	0.06	0.00	0.50	0.14	0.14
P-79	J-60	J-61	-76.20	0.18	0.00	0.86	0.55	0.55
P-80	J-62	J-54	-25.39	0.01	0.00	0.16	0.02	0.02
P-81	J-62	J-61	76.67	0.18	0.00	0.87	0.56	0.56
P-82	J-60	J-63	3.18	0.00	0.00	0.04	0.00	0.00
P-83	J-64	J-39	-386.40	0.11	0.00	1.10	0.38	0.38
P-85	J-58	J-75	-128.66	0.04	0.00	0.36	0.07	0.07
P-86	J-75	J-66	-974.49	0.20	0.00	2.76	2.80	2.80
P-87	J-68	J-66	977.67	0.62	0.00	2.77	2.82	2.82
P-88	J-68	J-69	-91.97	0.51	0.00	1.04	0.78	0.78
P-89	J-69	J-68	888.88	0.51	0.00	2.52	2.36	2.36
P-90	J-58	J-71	110.28	0.02	0.00	0.31	0.05	0.05
P-91	J-71	J-70	9.19	0.00	0.00	0.10	0.01	0.01
P-92	J-71	J-112	91.90	0.01	0.00	0.26	0.04	0.04
P-93	J-73	J-121	18.38	0.00	0.00	0.21	0.04	0.04

P-94	J-73	J-111	55.14	0.00	0.00	0.16	0.01	0.01
P-95	J-75	J-123	3.18	0.00	0.00	0.01	0.00	0.00
P-96	J-123	O-Pump-3	0.00	0.00	0.00	0.00	0.00	0.00
P-97	J-123	O-Pump-2	0.00	0.00	0.00	0.00	0.00	0.00
P-98	R-1	J-122	3.18	0.00	0.00	0.01	0.00	0.00
P-99	J-123	O-Pump-1	0.00	0.00	0.00	0.00	0.00	0.00
P-100	O-RV-1	R-1	839.47	0.22	0.00	9.52	46.75	46.75
P-101	I-Pump-1	J-122	0.00	0.00	0.00	0.00	0.00	0.00
P-102	I-Pump-2	J-122	0.00	0.00	0.00	0.00	0.00	0.00
P-103	J-74	J-67	9.19	0.00	0.00	0.03	0.00	0.00
P-104	J-74	J-76	9.19	0.01	0.00	0.10	0.01	0.01
P-105	J-77	J-49	-292.43	0.12	0.00	0.83	0.30	0.30
P-106	J-77	J-78	9.19	0.00	0.00	0.03	0.00	0.00
P-107	J-49	J-80	-301.62	0.07	0.00	0.86	0.32	0.32
P-108	J-80	J-82	18.38	0.00	0.00	0.05	0.00	0.00
P-109	J-80	J-113	-329.19	0.39	0.00	0.93	0.38	0.38
P-110	J-82	J-79	9.19	0.00	0.00	0.10	0.01	0.01
P-111	J-83	J-81	-439.82	0.15	0.00	1.25	0.64	0.64
P-112	J-83	J-116	64.33	0.04	0.00	0.41	0.13	0.13
P-113	J-84	J-117	18.38	0.00	0.00	0.12	0.01	0.01
P-114	J-84	J-87	9.19	0.00	0.00	0.10	0.01	0.01
P-115	J-86	J-84	36.76	0.02	0.00	0.23	0.05	0.05
P-116	J-86	J-89	9.19	0.00	0.00	0.06	0.00	0.00
P-117	J-43	J-92	-959.80	0.91	0.00	2.72	2.73	2.73
P-118	VP-1	J-90	529.04	0.00	0.00	0.38	0.03	0.03
P-119	J-91	J-97	-969.34	0.35	0.00	2.75	2.09	2.09
P-120	J-92	J-91	-962.98	0.36	0.00	2.73	2.74	2.74
P-122	J-93	J-47	-71.42	0.04	0.00	0.46	0.12	0.12
P-123	J-93	J-94	3.18	0.00	0.00	0.08	0.01	0.01
P-124	J-93	J-96	65.06	0.06	0.00	0.42	0.10	0.10
P-125	J-91	J-95	3.18	0.00	0.00	0.01	0.00	0.00
P-126	J-97	J-102	-885.13	1.11	0.00	2.51	1.76	1.76
P-127	J-97	J-100	-87.39	0.05	0.00	0.56	0.17	0.17
P-128	J-98	J-99	3.18	0.00	0.00	0.02	0.00	0.00
P-129	J-98	J-101	3.18	0.00	0.00	0.02	0.00	0.00
P-130	J-100	J-98	9.54	0.00	0.00	0.06	0.00	0.00
P-131	J-100	J-103	-100.11	0.37	0.00	1.14	1.21	1.21
P-132	J-102	J-88	-997.96	0.68	0.00	2.83	2.20	2.20
P-133	J-103	J-127	-103.29	0.42	0.00	1.17	0.97	0.97
P-134	J-90	J-88	1001.14	0.14	0.00	0.71	0.10	0.10
P-135	VP-2	J-90	475.27	0.00	0.00	0.34	0.03	0.03
P-136	J-46	J-104	-49.16	0.11	0.00	0.56	0.32	0.32
P-137	J-104	J-105	3.18	0.00	0.00	0.04	0.00	0.00
P-138	J-104	J-96	-55.52	0.13	0.00	0.63	0.41	0.41
P-139	J-96	J-106	3.18	0.00	0.00	0.04	0.00	0.00
P-140	J-96	J-107	3.18	0.00	0.00	0.04	0.00	0.00
P-141	J-58	J-108	9.19	0.00	0.00	0.03	0.00	0.00
P-142	VP-3	J-81	449.01	0.23	0.00	1.27	0.50	0.50
P-143	I-Pump-3	J-122	0.00	0.00	0.00	0.00	0.00	0.00
P-144	J-83	J-124	9.54	0.00	0.00	0.03	0.00	0.00
P-145	J-11	J-74	27.57	0.00	0.00	0.08	0.00	0.00
P-146	J-110	J-11	36.76	0.00	0.00	0.10	0.01	0.01
P-147	J-111	J-110	45.95	0.00	0.00	0.13	0.01	0.01
P-148	J-112	J-73	82.71	0.01	0.00	0.23	0.03	0.03

P-149	J-113	J-114	-338.38	0.34	0.00	0.96	0.40	0.40
P-150	J-114	J-115	-347.57	0.19	0.00	0.99	0.42	0.42
P-151	J-115	J-83	-356.76	0.41	0.00	1.01	0.44	0.44
P-152	J-116	J-86	55.14	0.02	0.00	0.35	0.10	0.10
P-153	J-117	J-85	9.19	0.00	0.00	0.06	0.00	0.00
P-154	J-118	J-77	-274.05	0.19	0.00	0.78	0.27	0.27
P-155	J-119	J-44	9.19	0.00	0.00	0.10	0.01	0.01
P-156	J-120	J-119	18.38	0.01	0.00	0.21	0.05	0.05
P-157	J-121	J-72	9.19	0.00	0.00	0.10	0.01	0.01
P-158	J-124	J-126	6.36	0.00	0.00	0.02	0.00	0.00
P-159	J-126	J-125	3.18	0.00	0.00	0.01	0.00	0.00
P-160	J-127	J-128	-106.47	0.15	0.00	1.21	1.02	1.02
P-161	J-128	J-102	-109.65	0.13	0.00	1.24	1.08	1.08
P-162	J-129	J-31	-17.94	0.03	0.00	0.20	0.04	0.04
P-163	J-130	J-69	984.03	0.53	0.00	2.79	2.85	2.85
P-164	J-131	J-21	-38.16	0.00	0.00	0.11	0.01	0.01
P-165	J-75	I-RV-1	839.47	0.39	0.00	9.52	46.75	46.75

P U M P/L O S S   E L E M E N T   R E S U L T S

NAME	FLOWRATE gpm	INLET HEAD ft	OUTLET HEAD ft	PUMP HEAD ft	EFFIC- ENCY %	USEFUL POWER Hp	INCREMTL COST $	TOTAL COST $	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. ft
Device "Pump-1" is closed											
Pump-1	0.00	17.50	166.04	0.0	75.00	0.	0.0	0.0	**	**	50.7
Device "Pump-2" is closed											
Pump-2	0.00	17.50	166.04	0.0	75.00	0.	0.0	0.0	**	**	50.7
Device "Pump-3" is closed											
Pump-3	0.00	17.50	166.04	0.0	75.00	0.	0.0	0.0	**	**	50.7
VP-1	529.04	0.00	176.34	176.3	75.00	0.	0.0	0.0	**	**	33.2
VP-2	475.27	0.00	176.34	176.3	75.00	0.	0.0	0.0	**	**	33.2
VP-3	449.01	0.00	155.91	155.9	75.00	0.	0.0	0.0	**	**	33.2

N O D E   R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND	HYDRAULIC GRADE	NODE ELEVATION	PRESSURE HEAD	NODE PRESSURE

	gpm	ft	ft	ft	psi
J-1	3.18	566.31	388.00	178.31	77.27
J-2	3.18	567.20	386.00	181.20	78.52
J-3	3.18	567.30	389.00	178.30	77.26
J-4	3.18	567.34	388.00	179.34	77.71
J-6	3.18	567.36	389.00	178.36	77.29
J-7	3.18	567.37	389.00	178.37	77.30
J-8	3.18	567.39	390.00	177.39	76.87
J-9	3.18	567.39	391.00	176.39	76.44
J-10	3.18	567.46	395.00	172.46	74.73
J-11	9.19	563.46	395.00	168.46	73.00
J-12	3.18	567.47	399.00	168.47	73.00
J-13	3.18	567.45	396.00	171.45	74.29
J-14	3.18	567.43	400.00	167.43	72.55
J-15	3.18	567.46	399.00	168.46	73.00
J-16	3.18	567.46	399.00	168.46	73.00
J-18	3.18	567.46	402.00	165.46	71.70
J-19	3.18	567.47	399.00	168.47	73.00
J-20	3.18	567.47	397.00	170.47	73.87
J-21	3.18	567.47	399.00	168.47	73.00
J-22	3.18	567.47	397.00	170.47	73.87
J-23	3.18	567.50	400.00	167.50	72.58
J-24	3.18	567.51	401.00	166.51	72.15
J-25	3.18	567.48	399.00	168.48	73.01
J-26	3.18	567.48	398.00	169.48	73.44
J-27	3.18	567.50	392.00	175.50	76.05
J-28	3.18	567.49	391.00	176.49	76.48
J-29	3.18	567.50	392.00	175.50	76.05
J-30	3.18	567.49	390.00	177.49	76.91
J-31	3.18	567.58	399.00	168.58	73.05
J-32	3.18	567.67	402.00	165.67	71.79
J-33	3.18	567.54	393.00	174.54	75.64
J-34	3.18	567.61	403.00	164.61	71.33
J-35	3.18	567.57	403.00	164.57	71.31
J-36	3.18	567.51	400.00	167.51	72.59
J-37	3.18	567.41	405.00	162.41	70.38
J-38	3.18	567.54	401.00	166.54	72.17
J-39	3.18	567.36	401.00	166.36	72.09
J-41	3.18	567.74	403.00	164.74	71.39
J-42	3.18	567.76	403.00	164.76	71.39
J-43	3.18	570.79	405.00	165.79	71.84
J-44	9.19	567.61	403.00	164.61	71.33
J-45	3.18	567.69	403.00	164.69	71.37
J-46	3.18	567.86	403.00	164.86	71.44
J-47	3.18	568.19	403.00	165.19	71.58
J-48	3.18	567.75	403.00	164.75	71.39
J-49	9.19	568.14	414.00	154.14	66.79
J-50	3.18	567.72	403.00	164.72	71.38
J-51	3.18	567.68	403.00	164.68	71.36
J-53	3.18	567.67	403.00	164.67	71.36
J-54	3.18	567.54	403.00	164.54	71.30
J-55	3.18	567.41	401.00	166.41	72.11
J-56	3.18	567.56	403.00	164.56	71.31

J-57	3.18	567.31	401.00	166.31	72.07
J-58	9.19	563.50	399.00	164.50	71.29
J-59	3.18	567.01	401.00	166.01	71.94
J-60	3.18	567.18	399.00	168.18	72.88
J-61	3.18	567.35	401.00	166.35	72.09
J-62	3.18	567.53	402.00	165.53	71.73
J-63	3.18	567.17	399.00	168.17	72.88
J-64	3.18	567.26	401.00	166.26	72.04
J-66	3.18	563.74	403.00	160.74	69.66
J-67	9.19	563.45	393.00	170.45	73.86
J-68	3.18	564.36	399.00	165.36	71.66
J-69	3.18	564.87	400.00	164.87	71.44
J-70	9.19	563.48	400.00	163.48	70.84
J-71	9.19	563.49	399.00	164.49	71.28
J-72	9.19	563.46	399.00	164.46	71.27
J-73	9.19	563.47	399.00	164.47	71.27
J-74	9.19	563.46	393.00	170.46	73.86
J-75	3.18	563.54	397.50	166.04	71.95
J-76	9.19	563.45	393.00	170.45	73.86
J-77	9.19	568.02	403.00	165.02	71.51
J-78	9.19	568.02	403.00	165.02	71.51
J-79	9.19	568.21	403.00	165.21	71.59
J-80	9.19	568.21	403.00	165.21	71.59
J-81	9.19	569.69	413.00	156.69	67.90
J-82	9.19	568.21	403.00	165.21	71.59
J-83	9.19	569.54	412.00	157.54	68.27
J-84	9.19	569.46	404.00	165.46	71.70
J-85	9.19	569.46	408.00	161.46	69.96
J-86	9.19	569.48	404.00	165.48	71.71
J-87	9.19	569.46	404.00	165.46	71.70
J-88	3.18	574.20	399.00	175.20	75.92
J-89	9.19	569.47	404.00	165.47	71.71
J-90	3.18	574.34	398.00	176.34	76.41
J-91	3.18	572.06	401.00	171.06	74.13
J-92	3.18	571.70	401.00	170.70	73.97
J-93	3.18	568.15	404.00	164.15	71.13
J-94	3.18	568.15	403.00	165.15	71.56
J-95	3.18	572.06	401.00	171.06	74.13
J-96	3.18	568.09	403.00	165.09	71.54
J-97	3.18	572.41	401.00	171.41	74.28
J-98	3.18	572.46	399.00	173.46	75.17
J-99	3.18	572.46	399.00	173.46	75.17
J-100	3.18	572.46	399.00	173.46	75.17
J-101	3.18	572.46	397.00	175.46	76.03
J-102	3.18	573.52	396.00	177.52	76.93
J-103	3.18	572.83	399.00	173.83	75.33
J-104	3.18	567.97	403.00	164.97	71.49
J-105	3.18	567.97	403.00	164.97	71.48
J-106	3.18	568.09	405.00	163.09	70.67
J-107	3.18	568.09	405.00	163.09	70.67
J-108	9.19	563.50	403.00	160.50	69.55
J-109	3.18	567.46	396.00	171.46	74.30
J-110	9.19	563.46	397.00	166.46	72.13
J-111	9.19	563.46	399.00	164.46	71.27

J-112		9.19	563.48	399.00	164.48	71.27
J-113		9.19	568.60	405.00	163.60	70.89
J-114		9.19	568.94	412.00	156.94	68.01
J-115		9.19	569.12	412.00	157.12	68.09
J-116		9.19	569.50	404.00	165.50	71.72
J-117		9.19	569.46	405.00	164.46	71.27
J-118		9.19	567.84	403.00	164.84	71.43
J-119		9.19	567.61	403.00	164.61	71.33
J-120		9.19	567.62	403.00	164.62	71.34
J-121		9.19	563.46	399.00	164.46	71.27
J-122		3.18	415.00	397.50	17.50	7.58
J-123		3.18	563.54	397.50	166.04	71.95
J-124		3.18	569.54	424.00	145.54	63.07
J-125		3.18	569.54	407.00	162.54	70.43
J-126		3.18	569.54	415.00	154.54	66.97
J-127		3.18	573.25	396.00	177.25	76.81
J-128		3.18	573.40	396.00	177.40	76.87
J-129		3.18	567.55	395.00	172.55	74.77
J-130		3.18	565.40	403.00	162.40	70.37
J-131		3.18	567.47	399.00	168.47	73.00
I-Pump-1		0.00	415.00	397.50	17.50	7.58
I-Pump-2		0.00	415.00	397.50	17.50	7.58
I-Pump-3		0.00	415.00	397.50	17.50	7.58
R-1		----	415.00	397.50	17.50	7.58
O-RV-1		0.00	415.22	397.00	18.22	7.90
VP-1	WELL 1	----	574.34	398.00	176.34	76.42
VP-2	WELL 2	----	574.34	398.00	176.34	76.42
VP-3	WELL 3	----	569.91	414.00	155.91	67.56
O-Pump-3		0.00	563.54	397.50	166.04	71.95
O-Pump-2		0.00	563.54	397.50	166.04	71.95
O-Pump-1		0.00	563.54	397.50	166.04	71.95
I-RV-1		----	563.15	397.00	166.15	72.00

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

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
J-2	78.52	J-122	7.58
J-4	77.71	I-Pump-1	7.58
J-7	77.30	I-Pump-2	7.58
J-6	77.29	I-Pump-3	7.58
J-1	77.27	R-1	7.58

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY	PIPE NUMBER	MINIMUM VELOCITY

	(ft/s)		(ft/s)
P-100	9.52	P-10	0.01
P-165	9.52	P-95	0.01
P-54	4.81	P-98	0.01
P-53	4.03	P-125	0.01
P-132	2.83	P-159	0.01

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
P-100	46.75	P-125	0.00
P-165	46.75	P-159	0.00
P-54	15.11	P-98	0.00
P-53	9.49	P-10	0.00
P-1	3.18	P-95	0.00

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
P-100	46.75	P-125	0.00
P-165	46.75	P-159	0.00
P-54	15.11	P-98	0.00
P-53	9.49	P-10	0.00
P-1	3.18	P-95	0.00

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

VALVE LABEL	VALVE TYPE	VALVE SETTING psi or gpm	VALVE STATUS	UPSTREAM PRESSURE psi	DOWNSTREAM PRESSURE psi	THROUGH FLOW gpm
RV-1	PSV	72.00	ACTIVATED	72.00	7.90	839.47

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

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

NODE NAME	FLOWRATE gpm	NODE TITLE
R-1	-836.29	
VP-1	529.04	WELL 1

VP-2	475.27	WELL 2
VP-3	449.01	WELL 3

NET SYSTEM INFLOW = 1453.33
NET SYSTEM OUTFLOW = -836.29
NET SYSTEM DEMAND = 617.04

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

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* * * * * * * * * * * * K Y P I P E * * * * * * * * * * * *
*                                                          *
*  Pipe Network Modeling Software                          *
*                                                          *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)              *
*  Version: 8.003 (vr8)  10/29/2015                        *
*  Company:  4BEngineer    Serial #:  591127               *
*  Interface:  Classic                                     *
*  Licensed for Pipe2016                                   *
*                                                          *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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Date & Time: Wed Jun 22 09:35:15 2016

Master File : C:\Users\4B Engineering\Documents\CITY DOCUMENTS\COBURG\MODELING\max day-year 2025.KYP\max day-year 2025.P2K w/3500 GPM Fire Flow (7)

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********************************************
S U M M A R Y   O F   O R I G I N A L   D A T A
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U N I T S   S P E C I F I E D

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

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

VALVE LABEL	VALVE TYPE	VALVE SETTING (ft or gpm)
RV-1	PSV	563.15

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

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	NODE NAMES #1	NODE NAMES #2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-1	J-1	J-2	280.00	1.25	135.0000	0.00
P-2	J-2	J-3	606.60	3.00	135.0000	0.00
P-3	J-5	J-125	468.00	12.00	140.0000	0.00

P-4	J-3	J-6	193.40	3.00	135.0000	0.00
P-5	J-6	J-4	600.30	3.00	135.0000	0.00
P-6	J-6	J-7	378.00	6.00	135.0000	0.00
P-7	J-7	J-9	1386.50	8.00	135.0000	0.00
P-8	J-9	J-8	2435.90	6.00	135.0000	0.00
P-9	J-9	J-13	3328.60	8.00	135.0000	0.00
P-10	J-10	J-109	76.70	12.00	120.0000	0.00
P-11	J-10	J-131	434.80	12.00	120.0000	0.00
P-12	J-13	J-10	565.60	8.00	120.0000	0.00
P-13	J-12	J-14	503.90	12.00	135.0000	0.00
P-14	J-12	J-16	176.50	4.00	100.0000	0.00
P-15	J-16	J-15	179.60	4.00	100.0000	0.00
P-16	J-17	J-126	459.90	12.00	140.0000	0.00
P-17	J-15	J-18	130.00	4.00	100.0000	0.00
P-18	J-15	J-19	181.70	4.00	100.0000	0.00
P-19	J-20	J-12	181.70	12.00	120.0000	0.00
P-20	J-19	J-20	353.40	6.00	135.0000	0.00
P-21	J-21	J-22	373.10	12.00	120.0000	0.00
P-22	J-22	J-20	140.30	12.00	120.0000	0.00
P-23	J-22	J-25	224.90	8.00	135.0000	0.00
P-24	J-21	J-26	277.90	8.00	135.0000	0.00
P-25	J-25	J-24	278.00	8.00	135.0000	0.00
P-26	J-24	J-23	320.90	8.00	135.0000	0.00
P-27	J-23	J-12	425.10	12.00	120.0000	0.00
P-28	J-26	J-25	378.90	8.00	135.0000	0.00
P-29	J-26	J-28	423.90	8.00	135.0000	0.00
P-30	J-28	J-30	377.90	8.00	135.0000	0.00
P-31	J-28	J-29	689.00	8.00	135.0000	0.00
P-32	J-27	J-29	200.00	8.00	135.0000	0.00
P-33	J-30	J-27	418.10	6.00	135.0000	0.00
P-34	J-29	J-33	260.50	6.00	135.0000	0.00
P-35	J-31	J-32	334.50	6.00	135.0000	0.00
P-36	J-33	J-31	381.70	6.00	135.0000	0.00
P-37	J-33	J-129	287.60	6.00	135.0000	0.00
P-38	J-40	J-17	642.70	12.00	140.0000	0.00
P-39	J-32	J-35	297.30	8.00	135.0000	0.00
P-40	J-35	J-24	320.70	8.00	135.0000	0.00
P-41	J-35	J-38	287.70	6.00	135.0000	0.00
P-42	J-36	J-23	30.00	8.00	135.0000	0.00
P-43	J-36	J-37	383.70	8.00	135.0000	0.00
P-44	J-38	J-36	277.70	12.00	135.0000	0.00
P-45	J-37	J-14	289.60	12.00	135.0000	0.00
P-46	J-37	J-39	308.50	12.00	135.0000	0.00
P-47	J-39	J-38	401.60	6.00	120.0000	0.00
P-48	J-38	J-34	299.60	12.00	120.0000	0.00
P-49	J-34	J-41	596.00	12.00	120.0000	0.00
P-51	J-41	J-42	56.70	12.00	120.0000	0.00
P-52	J-32	J-43	1029.30	6.00	130.0000	0.00
P-53	J-43	J-42	319.60	6.00	135.0000	0.00
P-54	J-43	J-47	172.10	6.00	130.0000	0.00
P-55	J-45	J-120	646.60	6.00	120.0000	0.00
P-56	J-46	J-45	326.60	6.00	120.0000	0.00
P-57	J-47	J-46	388.10	6.00	120.0000	0.00
P-58	J-42	J-48	189.00	12.00	120.0000	0.00

P-59	J-48	J-50	366.00	12.00	120.0000	0.00
P-60	J-48	J-47	322.80	8.00	135.0000	0.00
P-61	J-50	J-53	319.10	12.00	120.0000	0.00
P-62	J-46	J-50	319.80	6.00	135.0000	0.00
P-63	J-45	J-51	339.30	8.00	135.0000	0.00
P-64	J-51	J-118	614.60	12.00	120.0000	0.00
P-66	J-48	J-56	196.60	8.00	135.0000	0.00
P-67	J-53	J-51	31.90	12.00	120.0000	0.00
P-68	J-54	J-53	172.10	12.00	120.0000	0.00
P-69	J-54	J-57	316.80	12.00	120.0000	0.00
P-70	J-56	J-62	432.00	8.00	135.0000	0.00
P-71	J-55	J-56	268.20	8.00	135.0000	0.00
P-72	J-55	J-39	349.50	8.00	135.0000	0.00
P-73	J-57	J-61	312.10	8.00	135.0000	0.00
P-74	J-57	J-59	321.70	12.00	120.0000	0.00
P-75	J-59	J-130	561.90	12.00	120.0000	0.00
P-76	J-59	J-60	324.20	12.00	135.0000	0.00
P-77	J-60	J-64	216.10	12.00	135.0000	0.00
P-78	J-61	J-55	460.20	8.00	135.0000	0.00
P-79	J-60	J-61	318.60	6.00	135.0000	0.00
P-80	J-62	J-54	307.10	8.00	135.0000	0.00
P-81	J-62	J-61	323.30	6.00	135.0000	0.00
P-82	J-60	J-63	554.80	6.00	120.0000	0.00
P-83	J-64	J-39	278.70	12.00	135.0000	0.00
P-85	J-58	J-75	577.60	12.00	120.0000	0.00
P-86	J-75	J-66	71.90	12.00	120.0000	0.00
P-87	J-68	J-66	219.60	12.00	120.0000	0.00
P-88	J-68	J-69	649.80	6.00	135.0000	0.00
P-89	J-69	J-68	213.90	12.00	120.0000	0.00
P-90	J-58	J-71	329.80	12.00	120.0000	0.00
P-91	J-71	J-70	384.90	6.00	130.0000	0.00
P-92	J-71	J-112	318.00	12.00	120.0000	0.00
P-93	J-73	J-121	70.70	6.00	135.0000	0.00
P-94	J-73	J-111	298.20	12.00	120.0000	0.00
P-95	J-75	J-123	4.00	12.00	120.0000	0.00
P-96	J-123	O-Pump-3	6.30	12.00	120.0000	0.00
P-97	J-123	O-Pump-2	6.80	12.00	120.0000	0.00
P-98	R-1	J-122	2.30	12.00	120.0000	0.00
P-99	J-123	O-Pump-1	8.40	12.00	120.0000	0.00
P-100	O-RV-1	R-1	4.50	6.00	135.0000	0.00
P-101	I-Pump-1	J-122	2.10	12.00	120.0000	0.00
P-102	I-Pump-2	J-122	2.80	12.00	120.0000	0.00
P-103	J-74	J-67	171.50	12.00	120.0000	0.00
P-104	J-74	J-76	609.80	6.00	135.0000	0.00
P-105	J-77	J-49	383.00	12.00	120.0000	0.00
P-106	J-77	J-78	106.80	12.00	135.0000	0.00
P-107	J-49	J-80	226.20	12.00	120.0000	0.00
P-108	J-80	J-82	55.60	12.00	120.0000	0.00
P-109	J-80	J-113	1038.40	12.00	120.0000	0.00
P-110	J-82	J-79	182.50	6.00	135.0000	0.00
P-111	J-83	J-81	228.60	12.00	120.0000	0.00
P-112	J-83	J-116	295.10	8.00	120.0000	0.00
P-113	J-84	J-117	106.10	8.00	120.0000	0.00
P-114	J-84	J-87	234.20	6.00	135.0000	0.00

P-115	J-86	J-84	333.90	8.00	120.0000	0.00
P-116	J-86	J-89	364.30	8.00	135.0000	0.00
P-117	J-43	J-92	334.00	12.00	120.0000	0.00
P-118	VP-1	J-90	98.30	24.00	120.0000	0.00
P-119	J-91	J-97	168.70	12.00	135.0000	0.00
P-120	J-92	J-91	130.20	12.00	120.0000	0.00
P-122	J-93	J-47	326.60	8.00	135.0000	0.00
P-123	J-93	J-94	366.00	4.00	130.0000	0.00
P-124	J-93	J-96	576.50	8.00	135.0000	0.00
P-125	J-91	J-95	86.50	12.00	135.0000	0.00
P-126	J-97	J-102	631.00	12.00	135.0000	0.00
P-127	J-97	J-100	291.10	8.00	135.0000	0.00
P-128	J-98	J-99	107.60	8.00	135.0000	0.00
P-129	J-98	J-101	670.90	8.00	135.0000	0.00
P-130	J-100	J-98	429.00	8.00	135.0000	0.00
P-131	J-100	J-103	302.20	6.00	120.0000	0.00
P-132	J-102	J-88	308.70	12.00	135.0000	0.00
P-133	J-103	J-127	438.60	6.00	135.0000	0.00
P-134	J-90	J-88	1360.00	24.00	120.0000	0.00
P-135	VP-2	J-90	40.00	24.00	120.0000	0.00
P-136	J-46	J-104	332.30	6.00	120.0000	0.00
P-137	J-104	J-105	429.80	6.00	120.0000	0.00
P-138	J-104	J-96	316.00	6.00	120.0000	0.00
P-139	J-96	J-106	549.40	6.00	120.0000	0.00
P-140	J-96	J-107	464.20	6.00	120.0000	0.00
P-141	J-58	J-108	633.20	12.00	135.0000	0.00
P-142	VP-3	J-81	453.20	12.00	140.0000	0.00
P-143	I-Pump-3	J-122	4.00	12.00	120.0000	0.00
P-144	J-83	J-124	676.20	12.00	140.0000	0.00
P-145	J-11	J-74	194.50	12.00	120.0000	0.00
P-146	J-110	J-11	311.90	12.00	120.0000	0.00
P-147	J-111	J-110	348.40	12.00	120.0000	0.00
P-148	J-112	J-73	378.60	12.00	120.0000	0.00
P-149	J-113	J-114	851.10	12.00	120.0000	0.00
P-150	J-114	J-115	451.70	12.00	120.0000	0.00
P-151	J-115	J-83	950.10	12.00	120.0000	0.00
P-152	J-116	J-86	247.50	8.00	120.0000	0.00
P-153	J-117	J-85	500.80	8.00	120.0000	0.00
P-154	J-118	J-77	693.90	12.00	120.0000	0.00
P-155	J-119	J-44	151.90	6.00	120.0000	0.00
P-156	J-120	J-119	139.90	6.00	120.0000	0.00
P-157	J-121	J-72	124.10	6.00	135.0000	0.00
P-158	J-124	J-40	295.90	12.00	140.0000	0.00
P-159	J-126	J-5	574.90	12.00	140.0000	0.00
P-160	J-127	J-128	143.40	6.00	135.0000	0.00
P-161	J-128	J-102	117.00	6.00	135.0000	0.00
P-162	J-129	J-31	763.20	6.00	135.0000	0.00
P-163	J-130	J-69	184.80	12.00	120.0000	0.00
P-164	J-131	J-21	294.10	12.00	120.0000	0.00
P-165	J-75	I-RV-1	8.50	6.00	135.0000	0.00
P-166	J-14	J-63	564.60	12.00	140.0000	0.00
P-167	J-63	J-130	348.50	12.00	140.0000	0.00
P-168	J-101	J-90	1547.40	12.00	140.0000	0.00
P-169	J-108	J-78	727.40	12.00	140.0000	0.00

P-170	J-124	R-2	3068.20	12.00	140.0000	0.00

P U M P/L O S S   E L E M E N T   D A T A

THERE IS A DEVICE AT NODE Pump-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 3)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
210.00	0.00	80.00
185.00	800.00	80.00
160.00	1000.00	80.00
110.00	1400.00	80.00

THERE IS A DEVICE AT NODE Pump-2 ....> (ID= 3)

THERE IS A DEVICE AT NODE Pump-3 ....> (ID= 3)

THERE IS A DEVICE AT NODE VP-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
230.00	0.00	75.00
224.00	210.00	75.00
222.00	315.00	75.00
211.00	420.00	75.00
178.00	525.00	75.00
130.00	630.00	75.00

THERE IS A DEVICE AT NODE VP-2 DESCRIBED BY THE FOLLOWING DATA: (ID= 2)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
395.00	0.00	75.00
290.00	240.00	75.00
205.00	400.00	75.00
140.00	580.00	75.00
90.00	640.00	75.00

THERE IS A DEVICE AT NODE VP-3 DESCRIBED BY THE FOLLOWING DATA: (ID= 4)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
300.00	0.00	75.00
275.00	200.00	75.00
250.00	300.00	75.00
200.00	400.00	75.00
100.00	500.00	75.00

N O D E   D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
J-1		3.93	388.00	
J-2		3.93	386.00	
J-3		3.93	389.00	
J-4		3.93	388.00	
J-5		3.93	410.00	
J-6		3.93	389.00	
J-7		3.93	389.00	
J-8		3.93	390.00	
J-9		3.93	391.00	
J-10		3.93	395.00	
J-11	FIRE	3500.00	395.00	
J-12		3.93	399.00	
J-13		3.93	396.00	
J-14		3.93	400.00	
J-15		3.93	399.00	
J-16		3.93	399.00	
J-17		3.93	420.00	
J-18		3.93	402.00	
J-19		3.93	399.00	
J-20		3.93	397.00	
J-21		3.93	399.00	
J-22		3.93	397.00	
J-23		3.93	400.00	
J-24		3.93	401.00	
J-25		3.93	399.00	
J-26		3.93	398.00	
J-27		3.93	392.00	
J-28		3.93	391.00	
J-29		3.93	392.00	
J-30		3.93	390.00	
J-31		3.93	399.00	
J-32		3.93	402.00	
J-33		3.93	393.00	
J-34		3.93	403.00	
J-35		3.93	403.00	
J-36		3.93	400.00	
J-37		3.93	405.00	
J-38		3.93	401.00	
J-39		3.93	401.00	
J-40		3.93	422.00	
J-41		3.93	403.00	
J-42		3.93	403.00	
J-43		3.93	405.00	
J-44		11.36	403.00	
J-45		3.93	403.00	

J-46	3.93	403.00
J-47	3.93	403.00
J-48	3.93	403.00
J-49	11.36	414.00
J-50	3.93	403.00
J-51	3.93	403.00
J-53	3.93	403.00
J-54	3.93	403.00
J-55	3.93	401.00
J-56	3.93	403.00
J-57	3.93	401.00
J-58	11.36	399.00
J-59	3.93	401.00
J-60	3.93	399.00
J-61	3.93	401.00
J-62	3.93	402.00
J-63	3.93	399.00
J-64	3.93	401.00
J-66	3.93	403.00
J-67	11.36	393.00
J-68	3.93	399.00
J-69	3.93	400.00
J-70	11.36	400.00
J-71	11.36	399.00
J-72	11.36	399.00
J-73	11.36	399.00
J-74	11.36	393.00
J-75	3.93	397.50
J-76	11.36	393.00
J-77	11.36	403.00
J-78	11.36	403.00
J-79	11.36	403.00
J-80	11.36	403.00
J-81	11.36	413.00
J-82	11.36	403.00
J-83	11.36	412.00
J-84	11.36	404.00
J-85	11.36	408.00
J-86	11.36	404.00
J-87	11.36	404.00
J-88	3.93	399.00
J-89	11.36	404.00
J-90	3.93	398.00
J-91	3.93	401.00
J-92	3.93	401.00
J-93	3.93	404.00
J-94	3.93	403.00
J-95	3.93	401.00
J-96	3.93	403.00
J-97	3.93	401.00
J-98	3.93	399.00
J-99	3.93	399.00
J-100	3.93	399.00
J-101	3.93	397.00

J-102		3.93	396.00	
J-103		3.93	399.00	
J-104		3.93	403.00	
J-105		3.93	403.00	
J-106		3.93	405.00	
J-107		3.93	405.00	
J-108		11.36	403.00	
J-109		3.93	396.00	
J-110		11.36	397.00	
J-111		11.36	399.00	
J-112		11.36	399.00	
J-113		11.36	405.00	
J-114		11.36	412.00	
J-115		11.36	412.00	
J-116		11.36	404.00	
J-117		11.36	405.00	
J-118		11.36	403.00	
J-119		11.36	403.00	
J-120		11.36	403.00	
J-121		11.36	399.00	
J-122		3.93	397.50	
J-123		3.93	397.50	
J-124		3.93	424.00	
J-125		3.93	407.00	
J-126		3.93	415.00	
J-127		3.93	396.00	
J-128		3.93	396.00	
J-129		3.93	395.00	
J-130		3.93	403.00	
J-131		3.93	399.00	
I-Pump-1		0.00	397.50	
I-Pump-2		0.00	397.50	
I-Pump-3		0.00	397.50	
R-1		----	397.50	415.00
R-2	NEW 750,000	----	540.00	565.00
O-RV-1		0.00	397.00	
VP-1	WELL 1	----	398.00	398.00
VP-2	WELL 2	----	398.00	398.00
VP-3	WELL 3	----	414.00	414.00
O-Pump-3		0.00	397.50	
O-Pump-2		0.00	397.50	
O-Pump-1		0.00	397.50	
I-RV-1		----	397.00	563.15

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

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

MAXIMUM AND MINIMUM PRESSURES = 5
MAXIMUM AND MINIMUM VELOCITIES = 5
MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

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

NUMBER OF PIPES ....(P) = 166
NUMBER OF END NODES ....(J) = 133
NUMBER OF PRIMARY LOOPS ....(L) = 29
NUMBER OF SUPPLY NODES ....(F) = 5
NUMBER OF SUPPLY ZONES ....(Z) = 1

==
Case: 0

RESULTS OBTAINED AFTER 20 TRIALS: ACCURACY = 0.35071E-04

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

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

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
P-1	J-1	J-2	-3.93	1.41	0.00	1.03	5.04	5.04
P-2	J-2	J-3	-7.86	0.16	0.00	0.36	0.26	0.26
P-3	J-5	J-125	3.93	0.00	0.00	0.01	0.00	0.00
P-4	J-3	J-6	-11.79	0.10	0.00	0.54	0.54	0.54
P-5	J-6	J-4	3.93	0.04	0.00	0.18	0.07	0.07
P-6	J-6	J-7	-19.65	0.02	0.00	0.22	0.05	0.05
P-7	J-7	J-9	-23.58	0.02	0.00	0.15	0.02	0.02
P-8	J-9	J-8	3.93	0.01	0.00	0.04	0.00	0.00
P-9	J-9	J-13	-31.44	0.09	0.00	0.20	0.03	0.03
P-10	J-10	J-109	3.93	0.00	0.00	0.01	0.00	0.00
P-11	J-10	J-131	-43.23	0.00	0.00	0.12	0.01	0.01
P-12	J-13	J-10	-35.37	0.02	0.00	0.23	0.04	0.04
P-13	J-12	J-14	107.40	0.02	0.00	0.30	0.04	0.04
P-14	J-12	J-16	6.26	0.01	0.00	0.16	0.07	0.07
P-15	J-16	J-15	2.33	0.00	0.00	0.06	0.01	0.01
P-16	J-17	J-126	11.79	0.00	0.00	0.03	0.00	0.00
P-17	J-15	J-18	3.93	0.00	0.00	0.10	0.03	0.03
P-18	J-15	J-19	-5.53	0.01	0.00	0.14	0.06	0.06
P-19	J-20	J-12	3.83	0.00	0.00	0.01	0.00	0.00
P-20	J-19	J-20	-9.46	0.00	0.00	0.11	0.01	0.01
P-21	J-21	J-22	-18.12	0.00	0.00	0.05	0.00	0.00

P-22	J-22	J-20	17.22	0.00	0.00	0.05	0.00	0.00
P-23	J-22	J-25	-39.27	0.01	0.00	0.25	0.04	0.04
P-24	J-21	J-26	-32.97	0.01	0.00	0.21	0.03	0.03
P-25	J-25	J-24	-54.75	0.02	0.00	0.35	0.08	0.08
P-26	J-24	J-23	31.95	0.01	0.00	0.20	0.03	0.03
P-27	J-23	J-12	113.75	0.02	0.00	0.32	0.05	0.05
P-28	J-26	J-25	-11.55	0.00	0.00	0.07	0.00	0.00
P-29	J-26	J-28	-25.35	0.01	0.00	0.16	0.02	0.02
P-30	J-28	J-30	-7.60	0.00	0.00	0.05	0.00	0.00
P-31	J-28	J-29	-21.68	0.01	0.00	0.14	0.01	0.01
P-32	J-27	J-29	-15.46	0.00	0.00	0.10	0.01	0.01
P-33	J-30	J-27	-11.53	0.01	0.00	0.13	0.02	0.02
P-34	J-29	J-33	-41.07	0.05	0.00	0.47	0.19	0.19
P-35	J-31	J-32	-52.86	0.10	0.00	0.60	0.30	0.30
P-36	J-33	J-31	-30.36	0.04	0.00	0.34	0.11	0.11
P-37	J-33	J-129	-14.64	0.01	0.00	0.17	0.03	0.03
P-38	J-40	J-17	15.72	0.00	0.00	0.04	0.00	0.00
P-39	J-32	J-35	132.32	0.12	0.00	0.84	0.40	0.40
P-40	J-35	J-24	90.63	0.06	0.00	0.58	0.20	0.20
P-41	J-35	J-38	37.76	0.05	0.00	0.43	0.16	0.16
P-42	J-36	J-23	85.74	0.01	0.00	0.55	0.18	0.18
P-43	J-36	J-37	69.49	0.05	0.00	0.44	0.12	0.12
P-44	J-38	J-36	159.16	0.02	0.00	0.45	0.08	0.08
P-45	J-37	J-14	1.58	0.00	0.00	0.00	0.00	0.00
P-46	J-37	J-39	63.98	0.00	0.00	0.18	0.01	0.01
P-47	J-39	J-38	-35.99	0.07	0.00	0.41	0.18	0.18
P-48	J-38	J-34	-161.32	0.03	0.00	0.46	0.10	0.10
P-49	J-34	J-41	-165.25	0.06	0.00	0.47	0.10	0.10
P-51	J-41	J-42	-169.18	0.01	0.00	0.48	0.11	0.11
P-52	J-32	J-43	-189.11	3.49	0.00	2.15	3.39	3.39
P-53	J-43	J-42	373.10	3.56	0.00	4.23	11.14	11.14
P-54	J-43	J-47	464.86	3.09	0.00	5.27	17.95	17.95
P-55	J-45	J-120	34.08	0.11	0.00	0.39	0.16	0.16
P-56	J-46	J-45	89.03	0.32	0.00	1.01	0.98	0.98
P-57	J-47	J-46	100.96	0.48	0.00	1.15	1.23	1.23
P-58	J-42	J-48	199.99	0.03	0.00	0.57	0.15	0.15
P-59	J-48	J-50	313.77	0.13	0.00	0.89	0.34	0.34
P-60	J-48	J-47	-273.70	0.50	0.00	1.75	1.55	1.55
P-61	J-50	J-53	376.60	0.15	0.00	1.07	0.48	0.48
P-62	J-46	J-50	66.76	0.15	0.00	0.76	0.46	0.46
P-63	J-45	J-51	51.02	0.02	0.00	0.33	0.07	0.07
P-64	J-51	J-118	686.39	0.90	0.00	1.95	1.47	1.47
P-66	J-48	J-56	155.98	0.11	0.00	1.00	0.55	0.55
P-67	J-53	J-51	639.30	0.04	0.00	1.81	1.28	1.28
P-68	J-54	J-53	266.63	0.04	0.00	0.76	0.25	0.25
P-69	J-54	J-57	-182.67	0.04	0.00	0.52	0.13	0.13
P-70	J-56	J-62	81.38	0.07	0.00	0.52	0.16	0.16
P-71	J-55	J-56	-70.67	0.03	0.00	0.45	0.13	0.13
P-72	J-55	J-39	15.39	0.00	0.00	0.10	0.01	0.01
P-73	J-57	J-61	-52.58	0.02	0.00	0.34	0.07	0.07
P-74	J-57	J-59	-134.01	0.02	0.00	0.38	0.07	0.07
P-75	J-59	J-130	-43.05	0.00	0.00	0.12	0.01	0.01
P-76	J-59	J-60	-94.90	0.01	0.00	0.27	0.03	0.03
P-77	J-60	J-64	-107.49	0.01	0.00	0.30	0.04	0.04

P-78	J-61	J-55	-51.35	0.03	0.00	0.33	0.07	0.07
P-79	J-60	J-61	15.60	0.01	0.00	0.18	0.03	0.03
P-80	J-62	J-54	87.90	0.06	0.00	0.56	0.19	0.19
P-81	J-62	J-61	-10.45	0.00	0.00	0.12	0.01	0.01
P-82	J-60	J-63	-6.94	0.00	0.00	0.08	0.01	0.01
P-83	J-64	J-39	-111.42	0.01	0.00	0.32	0.04	0.04
P-85	J-58	J-75	-2292.39	7.90	0.00	6.50	13.67	13.67
P-86	J-75	J-66	-35.42	0.00	0.00	0.10	0.01	0.01
P-87	J-68	J-66	39.35	0.00	0.00	0.11	0.01	0.01
P-88	J-68	J-69	-3.93	0.00	0.00	0.04	0.00	0.00
P-89	J-69	J-68	39.35	0.00	0.00	0.11	0.01	0.01
P-90	J-58	J-71	3624.96	10.53	0.00	10.28	31.94	31.94
P-91	J-71	J-70	11.36	0.01	0.00	0.13	0.02	0.02
P-92	J-71	J-112	3602.24	10.04	0.00	10.22	31.57	31.57
P-93	J-73	J-121	22.72	0.00	0.00	0.26	0.06	0.06
P-94	J-73	J-111	3556.80	9.20	0.00	10.09	30.84	30.84
P-95	J-75	J-123	-2260.90	0.05	0.00	6.41	13.32	13.32
P-96	J-123	O-Pump-3	-1132.41	0.02	0.00	3.21	3.70	3.70
P-97	J-123	O-Pump-2	-1132.43	0.03	0.00	3.21	3.70	3.70
P-98	R-1	J-122	2268.76	0.03	0.00	6.44	13.41	13.41
P-99	J-123	O-Pump-1	0.00	0.00	0.00	0.00	0.00	0.00
P-100	O-RV-1	R-1	0.00	0.00	0.00	0.00	0.00	0.00
P-101	I-Pump-1	J-122	0.00	0.00	0.00	0.00	0.00	0.00
P-102	I-Pump-2	J-122	-1132.43	0.01	0.00	3.21	3.70	3.70
P-103	J-74	J-67	11.36	0.00	0.00	0.03	0.00	0.00
P-104	J-74	J-76	11.36	0.01	0.00	0.13	0.02	0.02
P-105	J-77	J-49	-702.97	0.59	0.00	1.99	1.53	1.53
P-106	J-77	J-78	1366.65	0.45	0.00	3.88	4.22	4.22
P-107	J-49	J-80	-714.33	0.36	0.00	2.03	1.58	1.58
P-108	J-80	J-82	22.72	0.00	0.00	0.06	0.00	0.00
P-109	J-80	J-113	-748.41	1.79	0.00	2.12	1.72	1.72
P-110	J-82	J-79	11.36	0.00	0.00	0.13	0.02	0.02
P-111	J-83	J-81	-443.98	0.15	0.00	1.26	0.65	0.65
P-112	J-83	J-116	79.52	0.06	0.00	0.51	0.19	0.19
P-113	J-84	J-117	22.72	0.00	0.00	0.15	0.02	0.02
P-114	J-84	J-87	11.36	0.00	0.00	0.13	0.02	0.02
P-115	J-86	J-84	45.44	0.02	0.00	0.29	0.07	0.07
P-116	J-86	J-89	11.36	0.00	0.00	0.07	0.00	0.00
P-117	J-43	J-92	-1030.99	1.04	0.00	2.92	3.11	3.11
P-118	VP-1	J-90	549.76	0.00	0.00	0.39	0.03	0.03
P-119	J-91	J-97	-1042.78	0.43	0.00	2.96	2.56	2.56
P-120	J-92	J-91	-1034.92	0.41	0.00	2.94	3.13	3.13
P-122	J-93	J-47	-86.27	0.06	0.00	0.55	0.18	0.18
P-123	J-93	J-94	3.93	0.01	0.00	0.10	0.02	0.02
P-124	J-93	J-96	78.41	0.09	0.00	0.50	0.15	0.15
P-125	J-91	J-95	3.93	0.00	0.00	0.01	0.00	0.00
P-126	J-97	J-102	-784.06	0.95	0.00	2.22	1.51	1.51
P-127	J-97	J-100	-262.65	0.42	0.00	1.68	1.43	1.43
P-128	J-98	J-99	3.93	0.00	0.00	0.03	0.00	0.00
P-129	J-98	J-101	-208.88	0.63	0.00	1.33	0.94	0.94
P-130	J-100	J-98	-201.02	0.37	0.00	1.28	0.87	0.87
P-131	J-100	J-103	-65.56	0.17	0.00	0.74	0.55	0.55
P-132	J-102	J-88	-865.34	0.56	0.00	2.45	1.81	1.81
P-133	J-103	J-127	-69.49	0.22	0.00	0.79	0.50	0.50

P-134	J-90	J-88	869.27	0.11	0.00	0.62	0.08	0.08
P-135	VP-2	J-90	536.25	0.00	0.00	0.38	0.03	0.03
P-136	J-46	J-104	-58.76	0.15	0.00	0.67	0.45	0.45
P-137	J-104	J-105	3.93	0.00	0.00	0.04	0.00	0.00
P-138	J-104	J-96	-66.62	0.18	0.00	0.76	0.57	0.57
P-139	J-96	J-106	3.93	0.00	0.00	0.04	0.00	0.00
P-140	J-96	J-107	3.93	0.00	0.00	0.04	0.00	0.00
P-141	J-58	J-108	-1343.93	2.59	0.00	3.81	4.09	4.09
P-142	VP-3	J-81	455.34	0.23	0.00	1.29	0.51	0.51
P-143	I-Pump-3	J-122	-1132.41	0.01	0.00	3.21	3.70	3.70
P-144	J-83	J-124	-429.40	0.31	0.00	1.22	0.46	0.46
P-145	J-11	J-74	34.08	0.00	0.00	0.10	0.01	0.01
P-146	J-110	J-11	3534.08	9.50	0.00	10.02	30.47	30.47
P-147	J-111	J-110	3545.44	10.68	0.00	10.06	30.65	30.65
P-148	J-112	J-73	3590.88	11.88	0.00	10.19	31.39	31.39
P-149	J-113	J-114	-759.77	1.50	0.00	2.16	1.77	1.77
P-150	J-114	J-115	-771.14	0.82	0.00	2.19	1.82	1.82
P-151	J-115	J-83	-782.50	1.77	0.00	2.22	1.87	1.87
P-152	J-116	J-86	68.16	0.04	0.00	0.44	0.15	0.15
P-153	J-117	J-85	11.36	0.00	0.00	0.07	0.01	0.01
P-154	J-118	J-77	675.03	0.99	0.00	1.91	1.42	1.42
P-155	J-119	J-44	11.36	0.00	0.00	0.13	0.02	0.02
P-156	J-120	J-119	22.72	0.01	0.00	0.26	0.08	0.08
P-157	J-121	J-72	11.36	0.00	0.00	0.13	0.02	0.02
P-158	J-124	J-40	19.65	0.00	0.00	0.06	0.00	0.00
P-159	J-126	J-5	7.86	0.00	0.00	0.02	0.00	0.00
P-160	J-127	J-128	-73.42	0.08	0.00	0.83	0.55	0.55
P-161	J-128	J-102	-77.35	0.07	0.00	0.88	0.60	0.60
P-162	J-129	J-31	-18.57	0.03	0.00	0.21	0.04	0.04
P-163	J-130	J-69	47.21	0.00	0.00	0.13	0.01	0.01
P-164	J-131	J-21	-47.16	0.00	0.00	0.13	0.01	0.01
P-165	J-75	I-RV-1	0.00	0.00	0.00	0.00	0.00	0.00
P-166	J-14	J-63	105.05	0.02	0.00	0.30	0.03	0.03
P-167	J-63	J-130	94.19	0.01	0.00	0.27	0.03	0.03
P-168	J-101	J-90	-212.81	0.19	0.00	0.60	0.13	0.13
P-169	J-108	J-78	-1355.29	2.82	0.00	3.84	3.88	3.88
P-170	J-124	R-2	-452.98	1.56	0.00	1.28	0.51	0.51

P U M P/L O S S   E L E M E N T   R E S U L T S

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                                INLET    OUTLET   PUMP   EFFIC-  USEFUL INCREMTL TOTAL
#PUMPS  #PUMPS  NPSH
    NAME    FLOWRATE            HEAD     HEAD     HEAD   ENCY    POWER   COST    COST
PARALLEL SERIES  Avail.
             gpm                 ft       ft       ft     %       Hp      $       $
ft
--------------------------------------------------------------------------------------
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  Device "Pump-1" is closed
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Pump-1	0.00	17.47	160.88	0.0	75.00	0.	0.0	0.0	**	**	50.7
Pump-2	1132.43	17.46	160.91	143.4	75.00	0.	0.0	0.0	**	**	50.5
Pump-3	1132.41	17.45	160.90	143.4	75.00	0.	0.0	0.0	**	**	50.5
VP-1	549.76	0.00	167.59	167.6	75.00	0.	0.0	0.0	**	**	33.2
VP-2	536.25	0.00	167.58	167.6	75.00	0.	0.0	0.0	**	**	33.2
VP-3	455.34	0.00	149.51	149.5	75.00	0.	0.0	0.0	**	**	33.2

N O D E R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		3.93	556.54	388.00	168.54	73.04
J-2		3.93	557.95	386.00	171.95	74.51
J-3		3.93	558.11	389.00	169.11	73.28
J-4		3.93	558.17	388.00	170.17	73.74
J-5		3.93	563.43	410.00	153.43	66.49
J-6		3.93	558.21	389.00	169.21	73.33
J-7		3.93	558.23	389.00	169.23	73.33
J-8		3.93	558.25	390.00	168.25	72.91
J-9		3.93	558.26	391.00	167.26	72.48
J-10		3.93	558.37	395.00	163.37	70.80
J-11	FIRE	3500.00	488.59	395.00	93.59	40.56
J-12		3.93	558.38	399.00	159.38	69.06
J-13		3.93	558.35	396.00	162.35	70.35
J-14		3.93	558.36	400.00	158.36	68.62
J-15		3.93	558.37	399.00	159.37	69.06
J-16		3.93	558.37	399.00	159.37	69.06
J-17		3.93	563.43	420.00	143.43	62.15
J-18		3.93	558.36	402.00	156.36	67.76
J-19		3.93	558.38	399.00	159.38	69.06
J-20		3.93	558.38	397.00	161.38	69.93
J-21		3.93	558.38	399.00	159.38	69.06
J-22		3.93	558.38	397.00	161.38	69.93
J-23		3.93	558.40	400.00	158.40	68.64
J-24		3.93	558.41	401.00	157.41	68.21
J-25		3.93	558.39	399.00	159.39	69.07
J-26		3.93	558.39	398.00	160.39	69.50
J-27		3.93	558.40	392.00	166.40	72.11
J-28		3.93	558.40	391.00	167.40	72.54
J-29		3.93	558.41	392.00	166.41	72.11
J-30		3.93	558.40	390.00	168.40	72.97
J-31		3.93	558.50	399.00	159.50	69.11
J-32		3.93	558.60	402.00	156.60	67.86
J-33		3.93	558.46	393.00	165.46	71.70

J-34	3.93	558.46	403.00	155.46	67.37
J-35	3.93	558.48	403.00	155.48	67.37
J-36	3.93	558.41	400.00	158.41	68.64
J-37	3.93	558.36	405.00	153.36	66.46
J-38	3.93	558.43	401.00	157.43	68.22
J-39	3.93	558.36	401.00	157.36	68.19
J-40	3.93	563.43	422.00	141.43	61.29
J-41	3.93	558.52	403.00	155.52	67.39
J-42	3.93	558.53	403.00	155.53	67.40
J-43	3.93	562.09	405.00	157.09	68.07
J-44	11.36	558.08	403.00	155.08	67.20
J-45	3.93	558.20	403.00	155.20	67.25
J-46	3.93	558.52	403.00	155.52	67.39
J-47	3.93	559.00	403.00	156.00	67.60
J-48	3.93	558.50	403.00	155.50	67.38
J-49	11.36	556.88	414.00	142.88	61.91
J-50	3.93	558.37	403.00	155.37	67.33
J-51	3.93	558.18	403.00	155.18	67.24
J-53	3.93	558.22	403.00	155.22	67.26
J-54	3.93	558.26	403.00	155.26	67.28
J-55	3.93	558.36	401.00	157.36	68.19
J-56	3.93	558.39	403.00	155.39	67.34
J-57	3.93	558.30	401.00	157.30	68.17
J-58	11.36	550.43	399.00	151.43	65.62
J-59	3.93	558.33	401.00	157.33	68.18
J-60	3.93	558.34	399.00	159.34	69.05
J-61	3.93	558.33	401.00	157.33	68.18
J-62	3.93	558.32	402.00	156.32	67.74
J-63	3.93	558.34	399.00	159.34	69.05
J-64	3.93	558.35	401.00	157.35	68.18
J-66	3.93	558.33	403.00	155.33	67.31
J-67	11.36	488.59	393.00	95.59	41.42
J-68	3.93	558.33	399.00	159.33	69.04
J-69	3.93	558.33	400.00	158.33	68.61
J-70	11.36	539.89	400.00	139.89	60.62
J-71	11.36	539.90	399.00	140.90	61.06
J-72	11.36	517.97	399.00	118.97	51.55
J-73	11.36	517.97	399.00	118.97	51.56
J-74	11.36	488.59	393.00	95.59	41.42
J-75	3.93	558.33	397.50	160.83	69.69
J-76	11.36	488.58	393.00	95.58	41.42
J-77	11.36	556.29	403.00	153.29	66.43
J-78	11.36	555.84	403.00	152.84	66.23
J-79	11.36	557.23	403.00	154.23	66.83
J-80	11.36	557.24	403.00	154.24	66.84
J-81	11.36	563.27	413.00	150.27	65.12
J-82	11.36	557.24	403.00	154.24	66.84
J-83	11.36	563.12	412.00	151.12	65.49
J-84	11.36	563.01	404.00	159.01	68.90
J-85	11.36	563.00	408.00	155.00	67.17
J-86	11.36	563.03	404.00	159.03	68.91
J-87	11.36	563.00	404.00	159.00	68.90
J-88	3.93	565.48	399.00	166.48	72.14
J-89	11.36	563.03	404.00	159.03	68.91

J-90		3.93	565.58	398.00	167.58	72.62
J-91		3.93	563.54	401.00	162.54	70.43
J-92		3.93	563.13	401.00	162.13	70.26
J-93		3.93	558.94	404.00	154.94	67.14
J-94		3.93	558.93	403.00	155.93	67.57
J-95		3.93	563.54	401.00	162.54	70.43
J-96		3.93	558.85	403.00	155.85	67.54
J-97		3.93	563.97	401.00	162.97	70.62
J-98		3.93	564.76	399.00	165.76	71.83
J-99		3.93	564.76	399.00	165.76	71.83
J-100		3.93	564.38	399.00	165.38	71.67
J-101		3.93	565.39	397.00	168.39	72.97
J-102		3.93	564.92	396.00	168.92	73.20
J-103		3.93	564.55	399.00	165.55	71.74
J-104		3.93	558.67	403.00	155.67	67.46
J-105		3.93	558.67	403.00	155.67	67.46
J-106		3.93	558.85	405.00	153.85	66.67
J-107		3.93	558.85	405.00	153.85	66.67
J-108		11.36	553.02	403.00	150.02	65.01
J-109		3.93	558.37	396.00	162.37	70.36
J-110		11.36	498.10	397.00	101.10	43.81
J-111		11.36	508.78	399.00	109.78	47.57
J-112		11.36	529.86	399.00	130.86	56.71
J-113		11.36	559.02	405.00	154.02	66.74
J-114		11.36	560.53	412.00	148.53	64.36
J-115		11.36	561.35	412.00	149.35	64.72
J-116		11.36	563.07	404.00	159.07	68.93
J-117		11.36	563.00	405.00	158.00	68.47
J-118		11.36	557.28	403.00	154.28	66.85
J-119		11.36	558.09	403.00	155.09	67.20
J-120		11.36	558.10	403.00	155.10	67.21
J-121		11.36	517.97	399.00	118.97	51.55
J-122		3.93	414.97	397.50	17.47	7.57
J-123		3.93	558.38	397.50	160.88	69.71
J-124		3.93	563.44	424.00	139.44	60.42
J-125		3.93	563.43	407.00	156.43	67.79
J-126		3.93	563.43	415.00	148.43	64.32
J-127		3.93	564.77	396.00	168.77	73.13
J-128		3.93	564.85	396.00	168.85	73.17
J-129		3.93	558.46	395.00	163.46	70.83
J-130		3.93	558.33	403.00	155.33	67.31
J-131		3.93	558.38	399.00	159.38	69.06
I-Pump-1		0.00	414.97	397.50	17.47	7.57
I-Pump-2		0.00	414.96	397.50	17.46	7.57
I-Pump-3		0.00	414.95	397.50	17.45	7.56
R-1		----	415.00	397.50	17.50	7.58
R-2	NEW 750,000	----	565.00	540.00	25.00	10.83
O-RV-1		0.00	415.00	397.00	18.00	7.80
VP-1	WELL 1	----	565.59	398.00	167.59	72.62
VP-2	WELL 2	----	565.58	398.00	167.58	72.62
VP-3	WELL 3	----	563.51	414.00	149.51	64.79
O-Pump-3		0.00	558.40	397.50	160.90	69.72
O-Pump-2		0.00	558.41	397.50	160.91	69.73
O-Pump-1		0.00	558.38	397.50	160.88	69.71

I-RV-1	----	558.33	397.00	161.33	69.91

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

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
J-2	74.51	I-Pump-3	7.56
J-4	73.74	I-Pump-2	7.57
J-7	73.33	J-122	7.57
J-6	73.33	I-Pump-1	7.57
J-3	73.28	R-1	7.58

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
P-90	10.28	P-45	0.00
P-92	10.22	P-19	0.01
P-148	10.19	P-3	0.01
P-94	10.09	P-10	0.01
P-147	10.06	P-125	0.01

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
P-90	31.94	P-45	0.00
P-92	31.57	P-3	0.00
P-148	31.39	P-125	0.00
P-94	30.84	P-19	0.00
P-147	30.65	P-10	0.00

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
P-90	31.94	P-45	0.00
P-92	31.57	P-3	0.00
P-148	31.39	P-125	0.00
P-94	30.84	P-19	0.00
P-147	30.65	P-10	0.00

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

VALVE LABEL	VALVE TYPE	VALVE SETTING psi or gpm	VALVE STATUS	UPSTREAM PRESSURE psi	DOWNSTREAM PRESSURE psi	THROUGH FLOW gpm
RV-1	PSV	72.00	CLOSED	69.91	7.80	0.00

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

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

NODE NAME	FLOWRATE gpm	NODE TITLE
R-1	2268.76	
R-2	452.98	NEW 750,000
VP-1	549.76	WELL 1
VP-2	536.25	WELL 2
VP-3	455.34	WELL 3

NET SYSTEM INFLOW = 4263.09
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 4263.09

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

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* * * * * * * * * * * * K Y P I P E * * * * * * * * * * * *
*                                                           *
*  Pipe Network Modeling Software                           *
*                                                           *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)               *
*  Version: 8.003 (vr8)  10/29/2015                         *
*  Company:  4BEngineer    Serial #:  591127                *
*  Interface:  Classic                                      *
*  Licensed for Pipe2016                                    *
*                                                           *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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Date & Time: Wed Jun 22 09:33:39 2016

Master File : C:\Users\4B Engineering\Documents\CITY DOCUMENTS\COBURG\MODELING\max day-year 2025 with 3000 gpm fire flow downtown .KYP\max day-year 2025 with 3000 gpm fire flow downtown .P2K (8)

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************************************************
 S U M M A R Y   O F   O R I G I N A L   D A T A
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U N I T S   S P E C I F I E D

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

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

VALVE LABEL	VALVE TYPE	VALVE SETTING (ft or gpm)
RV-1	PSV	563.15

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

STATUS CODE: XX -CLOSED PIPE   CV -CHECK VALVE

P I P E N A M E	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-1	J-1	J-2	280.00	1.25	135.0000	0.00
P-2	J-2	J-3	606.60	3.00	135.0000	0.00

P-3	J-5	J-125	468.00	12.00	140.0000	0.00
P-4	J-3	J-6	193.40	3.00	135.0000	0.00
P-5	J-6	J-4	600.30	3.00	135.0000	0.00
P-6	J-6	J-7	378.00	6.00	135.0000	0.00
P-7	J-7	J-9	1386.50	8.00	135.0000	0.00
P-8	J-9	J-8	2435.90	6.00	135.0000	0.00
P-9	J-9	J-13	3328.60	8.00	135.0000	0.00
P-10	J-10	J-109	76.70	12.00	120.0000	0.00
P-11	J-10	J-131	434.80	12.00	120.0000	0.00
P-12	J-13	J-10	565.60	8.00	120.0000	0.00
P-13	J-12	J-14	503.90	12.00	135.0000	0.00
P-14	J-12	J-16	176.50	4.00	100.0000	0.00
P-15	J-16	J-15	179.60	4.00	100.0000	0.00
P-16	J-17	J-126	459.90	12.00	140.0000	0.00
P-17	J-15	J-18	130.00	4.00	100.0000	0.00
P-18	J-15	J-19	181.70	4.00	100.0000	0.00
P-19	J-20	J-12	181.70	12.00	120.0000	0.00
P-20	J-19	J-20	353.40	6.00	135.0000	0.00
P-21	J-21	J-22	373.10	12.00	120.0000	0.00
P-22	J-22	J-20	140.30	12.00	120.0000	0.00
P-23	J-22	J-25	224.90	8.00	135.0000	0.00
P-24	J-21	J-26	277.90	8.00	135.0000	0.00
P-25	J-25	J-24	278.00	8.00	135.0000	0.00
P-26	J-24	J-23	320.90	8.00	135.0000	0.00
P-27	J-23	J-12	425.10	12.00	120.0000	0.00
P-28	J-26	J-25	378.90	8.00	135.0000	0.00
P-29	J-26	J-28	423.90	8.00	135.0000	0.00
P-30	J-28	J-30	377.90	8.00	135.0000	0.00
P-31	J-28	J-29	689.00	8.00	135.0000	0.00
P-32	J-27	J-29	200.00	8.00	135.0000	0.00
P-33	J-30	J-27	418.10	6.00	135.0000	0.00
P-34	J-29	J-33	260.50	6.00	135.0000	0.00
P-35	J-31	J-32	334.50	6.00	135.0000	0.00
P-36	J-33	J-31	381.70	6.00	135.0000	0.00
P-37	J-33	J-129	287.60	6.00	135.0000	0.00
P-38	J-40	J-17	642.70	12.00	140.0000	0.00
P-39	J-32	J-35	297.30	8.00	135.0000	0.00
P-40	J-35	J-24	320.70	8.00	135.0000	0.00
P-41	J-35	J-38	287.70	6.00	135.0000	0.00
P-42	J-36	J-23	30.00	8.00	135.0000	0.00
P-43	J-36	J-37	383.70	8.00	135.0000	0.00
P-44	J-38	J-36	277.70	12.00	135.0000	0.00
P-45	J-37	J-14	289.60	12.00	135.0000	0.00
P-46	J-37	J-39	308.50	12.00	135.0000	0.00
P-47	J-39	J-38	401.60	6.00	120.0000	0.00
P-48	J-38	J-34	299.60	12.00	120.0000	0.00
P-49	J-34	J-41	596.00	12.00	120.0000	0.00
P-51	J-41	J-42	56.70	12.00	120.0000	0.00
P-52	J-32	J-43	1029.30	6.00	130.0000	0.00
P-53	J-43	J-42	319.60	6.00	135.0000	0.00
P-54	J-43	J-47	172.10	6.00	130.0000	0.00
P-55	J-45	J-120	646.60	6.00	120.0000	0.00
P-56	J-46	J-45	326.60	6.00	120.0000	0.00
P-57	J-47	J-46	388.10	6.00	120.0000	0.00

P-58	J-42	J-48	189.00	12.00	120.0000	0.00
P-59	J-48	J-50	366.00	12.00	120.0000	0.00
P-60	J-48	J-47	322.80	8.00	135.0000	0.00
P-61	J-50	J-53	319.10	12.00	120.0000	0.00
P-62	J-46	J-50	319.80	6.00	135.0000	0.00
P-63	J-45	J-51	339.30	8.00	135.0000	0.00
P-64	J-51	J-118	614.60	12.00	120.0000	0.00
P-66	J-48	J-56	196.60	8.00	135.0000	0.00
P-67	J-53	J-51	31.90	12.00	120.0000	0.00
P-68	J-54	J-53	172.10	12.00	120.0000	0.00
P-69	J-54	J-57	316.80	12.00	120.0000	0.00
P-70	J-56	J-62	432.00	8.00	135.0000	0.00
P-71	J-55	J-56	268.20	8.00	135.0000	0.00
P-72	J-55	J-39	349.50	8.00	135.0000	0.00
P-73	J-57	J-61	312.10	8.00	135.0000	0.00
P-74	J-57	J-59	321.70	12.00	120.0000	0.00
P-75	J-59	J-130	561.90	12.00	120.0000	0.00
P-76	J-59	J-60	324.20	12.00	135.0000	0.00
P-77	J-60	J-64	216.10	12.00	135.0000	0.00
P-78	J-61	J-55	460.20	8.00	135.0000	0.00
P-79	J-60	J-61	318.60	6.00	135.0000	0.00
P-80	J-62	J-54	307.10	8.00	135.0000	0.00
P-81	J-62	J-61	323.30	6.00	135.0000	0.00
P-82	J-60	J-63	554.80	6.00	120.0000	0.00
P-83	J-64	J-39	278.70	12.00	135.0000	0.00
P-85	J-58	J-75	577.60	12.00	120.0000	0.00
P-86	J-75	J-66	71.90	12.00	120.0000	0.00
P-87	J-68	J-66	219.60	12.00	120.0000	0.00
P-88	J-68	J-69	649.80	6.00	135.0000	0.00
P-89	J-69	J-68	213.90	12.00	120.0000	0.00
P-90	J-58	J-71	329.80	12.00	120.0000	0.00
P-91	J-71	J-70	384.90	6.00	130.0000	0.00
P-92	J-71	J-112	318.00	12.00	120.0000	0.00
P-93	J-73	J-121	70.70	6.00	135.0000	0.00
P-94	J-73	J-111	298.20	12.00	120.0000	0.00
P-95	J-75	J-123	4.00	12.00	120.0000	0.00
P-96	J-123	O-Pump-3	6.30	12.00	120.0000	0.00
P-97	J-123	O-Pump-2	6.80	12.00	120.0000	0.00
P-98	R-1	J-122	2.30	12.00	120.0000	0.00
P-99	J-123	O-Pump-1	8.40	12.00	120.0000	0.00
P-100	O-RV-1	R-1	4.50	6.00	135.0000	0.00
P-101	I-Pump-1	J-122	2.10	12.00	120.0000	0.00
P-102	I-Pump-2	J-122	2.80	12.00	120.0000	0.00
P-103	J-74	J-67	171.50	12.00	120.0000	0.00
P-104	J-74	J-76	609.80	6.00	135.0000	0.00
P-105	J-77	J-49	383.00	12.00	120.0000	0.00
P-106	J-77	J-78	106.80	12.00	135.0000	0.00
P-107	J-49	J-80	226.20	12.00	120.0000	0.00
P-108	J-80	J-82	55.60	12.00	120.0000	0.00
P-109	J-80	J-113	1038.40	12.00	120.0000	0.00
P-110	J-82	J-79	182.50	6.00	135.0000	0.00
P-111	J-83	J-81	228.60	12.00	120.0000	0.00
P-112	J-83	J-116	295.10	8.00	120.0000	0.00
P-113	J-84	J-117	106.10	8.00	120.0000	0.00

P-114	J-84	J-87	234.20	6.00	135.0000	0.00
P-115	J-86	J-84	333.90	8.00	120.0000	0.00
P-116	J-86	J-89	364.30	8.00	135.0000	0.00
P-117	J-43	J-92	334.00	12.00	120.0000	0.00
P-118	VP-1	J-90	98.30	24.00	120.0000	0.00
P-119	J-91	J-97	168.70	12.00	135.0000	0.00
P-120	J-92	J-91	130.20	12.00	120.0000	0.00
P-122	J-93	J-47	326.60	8.00	135.0000	0.00
P-123	J-93	J-94	366.00	4.00	130.0000	0.00
P-124	J-93	J-96	576.50	8.00	135.0000	0.00
P-125	J-91	J-95	86.50	12.00	135.0000	0.00
P-126	J-97	J-102	631.00	12.00	135.0000	0.00
P-127	J-97	J-100	291.10	8.00	135.0000	0.00
P-128	J-98	J-99	107.60	8.00	135.0000	0.00
P-129	J-98	J-101	670.90	8.00	135.0000	0.00
P-130	J-100	J-98	429.00	8.00	135.0000	0.00
P-131	J-100	J-103	302.20	6.00	120.0000	0.00
P-132	J-102	J-88	308.70	12.00	135.0000	0.00
P-133	J-103	J-127	438.60	6.00	135.0000	0.00
P-134	J-90	J-88	1360.00	24.00	120.0000	0.00
P-135	VP-2	J-90	40.00	24.00	120.0000	0.00
P-136	J-46	J-104	332.30	6.00	120.0000	0.00
P-137	J-104	J-105	429.80	6.00	120.0000	0.00
P-138	J-104	J-96	316.00	6.00	120.0000	0.00
P-139	J-96	J-106	549.40	6.00	120.0000	0.00
P-140	J-96	J-107	464.20	6.00	120.0000	0.00
P-141	J-58	J-108	633.20	12.00	135.0000	0.00
P-142	VP-3	J-81	453.20	12.00	140.0000	0.00
P-143	I-Pump-3	J-122	4.00	12.00	120.0000	0.00
P-144	J-83	J-124	676.20	12.00	140.0000	0.00
P-145	J-11	J-74	194.30	12.00	120.0000	0.00
P-146	J-110	J-11	312.00	12.00	120.0000	0.00
P-147	J-111	J-110	348.40	12.00	120.0000	0.00
P-148	J-112	J-73	378.60	12.00	120.0000	0.00
P-149	J-113	J-114	851.10	12.00	120.0000	0.00
P-150	J-114	J-115	451.70	12.00	120.0000	0.00
P-151	J-115	J-83	950.10	12.00	120.0000	0.00
P-152	J-116	J-86	247.50	8.00	120.0000	0.00
P-153	J-117	J-85	500.80	8.00	120.0000	0.00
P-154	J-118	J-77	693.90	12.00	120.0000	0.00
P-155	J-119	J-44	151.90	6.00	120.0000	0.00
P-156	J-120	J-119	139.90	6.00	120.0000	0.00
P-157	J-121	J-72	124.10	6.00	135.0000	0.00
P-158	J-124	J-40	295.90	12.00	140.0000	0.00
P-159	J-126	J-5	574.90	12.00	140.0000	0.00
P-160	J-127	J-128	143.40	6.00	135.0000	0.00
P-161	J-128	J-102	117.00	6.00	135.0000	0.00
P-162	J-129	J-31	763.20	6.00	135.0000	0.00
P-163	J-130	J-69	184.80	12.00	120.0000	0.00
P-164	J-131	J-21	294.10	12.00	120.0000	0.00
P-165	J-75	I-RV-1	8.50	6.00	135.0000	0.00
P-166	J-14	J-63	564.60	12.00	140.0000	0.00
P-167	J-63	J-130	348.50	12.00	140.0000	0.00
P-168	J-101	J-90	1547.40	12.00	140.0000	0.00

P-169	J-108	J-78	727.40	12.00	140.0000	0.00
P-170	J-124	R-2	3068.20	12.00	140.0000	0.00

P U M P/L O S S   E L E M E N T   D A T A

THERE IS A DEVICE AT NODE   Pump-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 3)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
210.00	0.00	80.00
185.00	800.00	80.00
160.00	1000.00	80.00
110.00	1400.00	80.00

THERE IS A DEVICE AT NODE   Pump-2 ....> (ID= 3)

THERE IS A DEVICE AT NODE   Pump-3 ....> (ID= 3)

THERE IS A DEVICE AT NODE   VP-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
230.00	0.00	75.00
224.00	210.00	75.00
222.00	315.00	75.00
211.00	420.00	75.00
178.00	525.00	75.00
130.00	630.00	75.00

THERE IS A DEVICE AT NODE   VP-2 DESCRIBED BY THE FOLLOWING DATA: (ID= 2)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
395.00	0.00	75.00
290.00	240.00	75.00
205.00	400.00	75.00
140.00	580.00	75.00
90.00	640.00	75.00

THERE IS A DEVICE AT NODE   VP-3 DESCRIBED BY THE FOLLOWING DATA: (ID= 4)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
300.00	0.00	75.00
275.00	200.00	75.00
250.00	300.00	75.00
200.00	400.00	75.00
100.00	500.00	75.00

N O D E   D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
J-1		3.93	388.00	
J-2		3.93	386.00	
J-3		3.93	389.00	
J-4		3.93	388.00	
J-5		3.93	410.00	
J-6		3.93	389.00	
J-7		3.93	389.00	
J-8		3.93	390.00	
J-9		3.93	391.00	
J-10		3.93	395.00	
J-11		11.36	395.00	
J-12		3.93	399.00	
J-13		3.93	396.00	
J-14		3.93	400.00	
J-15		3.93	399.00	
J-16		3.93	399.00	
J-17		3.93	420.00	
J-18		3.93	402.00	
J-19		3.93	399.00	
J-20		3.93	397.00	
J-21		3.93	399.00	
J-22		3.93	397.00	
J-23		3.93	400.00	
J-24		3.93	401.00	
J-25		3.93	399.00	
J-26		3.93	398.00	
J-27		3.93	392.00	
J-28		3.93	391.00	
J-29		3.93	392.00	
J-30		3.93	390.00	
J-31		3.93	399.00	
J-32		3.93	402.00	
J-33		3.93	393.00	
J-34		3.93	403.00	
J-35		3.93	403.00	
J-36		3.93	400.00	
J-37		3.93	405.00	
J-38		3.93	401.00	
J-39		3.93	401.00	
J-40		3.93	422.00	
J-41		3.93	403.00	
J-42		3.93	403.00	
J-43		3.93	405.00	
J-44		11.36	403.00	

J-45		3.93	403.00
J-46		3.93	403.00
J-47		3.93	403.00
J-48		3.93	403.00
J-49		11.36	414.00
J-50		3.93	403.00
J-51		3.93	403.00
J-53		3.93	403.00
J-54		3.93	403.00
J-55		3.93	401.00
J-56		3.93	403.00
J-57		3.93	401.00
J-58		11.36	399.00
J-59		3.93	401.00
J-60	FIRE	3000.00	399.00
J-61		3.93	401.00
J-62		3.93	402.00
J-63		3.93	399.00
J-64		3.93	401.00
J-66		3.93	403.00
J-67		11.36	393.00
J-68		3.93	399.00
J-69		3.93	400.00
J-70		11.36	400.00
J-71		11.36	399.00
J-72		11.36	399.00
J-73		11.36	399.00
J-74		11.36	393.00
J-75		3.93	397.50
J-76		11.36	393.00
J-77		11.36	403.00
J-78		11.36	403.00
J-79		11.36	403.00
J-80		11.36	403.00
J-81		11.36	413.00
J-82		11.36	403.00
J-83		11.36	412.00
J-84		11.36	404.00
J-85		11.36	408.00
J-86		11.36	404.00
J-87		11.36	404.00
J-88		3.93	399.00
J-89		11.36	404.00
J-90		3.93	398.00
J-91		3.93	401.00
J-92		3.93	401.00
J-93		3.93	404.00
J-94		3.93	403.00
J-95		3.93	401.00
J-96		3.93	403.00
J-97		3.93	401.00
J-98		3.93	399.00
J-99		3.93	399.00
J-100		3.93	399.00

J-101		3.93	397.00	
J-102		3.93	396.00	
J-103		3.93	399.00	
J-104		3.93	403.00	
J-105		3.93	403.00	
J-106		3.93	405.00	
J-107		3.93	405.00	
J-108		11.36	403.00	
J-109		3.93	396.00	
J-110		11.36	397.00	
J-111		11.36	399.00	
J-112		11.36	399.00	
J-113		11.36	405.00	
J-114		11.36	412.00	
J-115		11.36	412.00	
J-116		11.36	404.00	
J-117		11.36	405.00	
J-118		11.36	403.00	
J-119		11.36	403.00	
J-120		11.36	403.00	
J-121		11.36	399.00	
J-122		3.93	397.50	
J-123		3.93	397.50	
J-124		3.93	424.00	
J-125		3.93	407.00	
J-126		3.93	415.00	
J-127		3.93	396.00	
J-128		3.93	396.00	
J-129		3.93	395.00	
J-130		3.93	403.00	
J-131		3.93	399.00	
I-Pump-1		0.00	397.50	
I-Pump-2		0.00	397.50	
I-Pump-3		0.00	397.50	
R-1		----	397.50	415.00
R-2	NEW 750,000	----	540.00	565.00
O-RV-1		0.00	397.00	
VP-1	WELL 1	----	398.00	398.00
VP-2	WELL 2	----	398.00	398.00
VP-3	WELL 3	----	414.00	414.00
O-Pump-3		0.00	397.50	
O-Pump-2		0.00	397.50	
O-Pump-1		0.00	397.50	
I-RV-1		----	397.00	563.15

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

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

MAXIMUM AND MINIMUM PRESSURES = 5
MAXIMUM AND MINIMUM VELOCITIES = 5
MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

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

NUMBER OF PIPES ....(P) = 166
NUMBER OF END NODES ....(J) = 133
NUMBER OF PRIMARY LOOPS ....(L) = 29
NUMBER OF SUPPLY NODES ....(F) = 5
NUMBER OF SUPPLY ZONES ....(Z) = 1

==
Case: 0

RESULTS OBTAINED AFTER 15 TRIALS: ACCURACY = 0.53089E-04

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

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

STATUS CODE: XX -CLOSED PIPE   CV -CHECK VALVE

P I P E N A M E	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
P-1	J-1	J-2	-3.93	1.41	0.00	1.03	5.04	5.04
P-2	J-2	J-3	-7.86	0.16	0.00	0.36	0.26	0.26
P-3	J-5	J-125	3.93	0.00	0.00	0.01	0.00	0.00
P-4	J-3	J-6	-11.79	0.10	0.00	0.54	0.54	0.54
P-5	J-6	J-4	3.93	0.04	0.00	0.18	0.07	0.07
P-6	J-6	J-7	-19.65	0.02	0.00	0.22	0.05	0.05
P-7	J-7	J-9	-23.58	0.02	0.00	0.15	0.02	0.02
P-8	J-9	J-8	3.93	0.01	0.00	0.04	0.00	0.00
P-9	J-9	J-13	-31.44	0.09	0.00	0.20	0.03	0.03
P-10	J-10	J-109	3.93	0.00	0.00	0.01	0.00	0.00
P-11	J-10	J-131	-43.23	0.00	0.00	0.12	0.01	0.01
P-12	J-13	J-10	-35.37	0.02	0.00	0.23	0.04	0.04
P-13	J-12	J-14	128.61	0.03	0.00	0.36	0.05	0.05
P-14	J-12	J-16	6.24	0.01	0.00	0.16	0.07	0.07
P-15	J-16	J-15	2.31	0.00	0.00	0.06	0.01	0.01
P-16	J-17	J-126	11.79	0.00	0.00	0.03	0.00	0.00
P-17	J-15	J-18	3.93	0.00	0.00	0.10	0.03	0.03
P-18	J-15	J-19	-5.55	0.01	0.00	0.14	0.06	0.06
P-19	J-20	J-12	14.33	0.00	0.00	0.04	0.00	0.00
P-20	J-19	J-20	-9.48	0.00	0.00	0.11	0.01	0.01

P-21	J-21	J-22	-13.49	0.00	0.00	0.04	0.00	0.00
P-22	J-22	J-20	27.74	0.00	0.00	0.08	0.00	0.00
P-23	J-22	J-25	-45.16	0.01	0.00	0.29	0.05	0.05
P-24	J-21	J-26	-37.60	0.01	0.00	0.24	0.04	0.04
P-25	J-25	J-24	-61.34	0.03	0.00	0.39	0.10	0.10
P-26	J-24	J-23	39.37	0.01	0.00	0.25	0.04	0.04
P-27	J-23	J-12	124.45	0.03	0.00	0.35	0.06	0.06
P-28	J-26	J-25	-12.25	0.00	0.00	0.08	0.00	0.00
P-29	J-26	J-28	-29.29	0.01	0.00	0.19	0.02	0.02
P-30	J-28	J-30	-8.97	0.00	0.00	0.06	0.00	0.00
P-31	J-28	J-29	-24.25	0.01	0.00	0.15	0.02	0.02
P-32	J-27	J-29	-16.83	0.00	0.00	0.11	0.01	0.01
P-33	J-30	J-27	-12.90	0.01	0.00	0.15	0.02	0.02
P-34	J-29	J-33	-45.01	0.06	0.00	0.51	0.22	0.22
P-35	J-31	J-32	-56.80	0.11	0.00	0.64	0.34	0.34
P-36	J-33	J-31	-32.85	0.05	0.00	0.37	0.12	0.12
P-37	J-33	J-129	-16.09	0.01	0.00	0.18	0.03	0.03
P-38	J-40	J-17	15.72	0.00	0.00	0.04	0.00	0.00
P-39	J-32	J-35	137.91	0.13	0.00	0.88	0.43	0.43
P-40	J-35	J-24	104.63	0.08	0.00	0.67	0.26	0.26
P-41	J-35	J-38	29.35	0.03	0.00	0.33	0.10	0.10
P-42	J-36	J-23	89.01	0.01	0.00	0.57	0.19	0.19
P-43	J-36	J-37	187.98	0.30	0.00	1.20	0.77	0.77
P-44	J-38	J-36	280.92	0.06	0.00	0.80	0.23	0.23
P-45	J-37	J-14	-563.79	0.24	0.00	1.60	0.82	0.82
P-46	J-37	J-39	747.84	0.43	0.00	2.12	1.38	1.38
P-47	J-39	J-38	-129.53	0.78	0.00	1.47	1.95	1.95
P-48	J-38	J-34	-385.04	0.15	0.00	1.09	0.50	0.50
P-49	J-34	J-41	-388.97	0.30	0.00	1.10	0.51	0.51
P-51	J-41	J-42	-392.90	0.03	0.00	1.11	0.52	0.52
P-52	J-32	J-43	-198.64	3.83	0.00	2.25	3.72	3.72
P-53	J-43	J-42	369.63	3.50	0.00	4.19	10.95	10.95
P-54	J-43	J-47	453.46	2.95	0.00	5.15	17.14	17.14
P-55	J-45	J-120	34.08	0.11	0.00	0.39	0.16	0.16
P-56	J-46	J-45	53.75	0.13	0.00	0.61	0.38	0.38
P-57	J-47	J-46	85.67	0.35	0.00	0.97	0.91	0.91
P-58	J-42	J-48	-27.20	0.00	0.00	0.08	0.00	0.00
P-59	J-48	J-50	-61.11	0.01	0.00	0.17	0.02	0.02
P-60	J-48	J-47	-287.85	0.55	0.00	1.84	1.70	1.70
P-61	J-50	J-53	11.46	0.00	0.00	0.03	0.00	0.00
P-62	J-46	J-50	76.50	0.19	0.00	0.87	0.59	0.59
P-63	J-45	J-51	15.74	0.00	0.00	0.10	0.01	0.01
P-64	J-51	J-118	-786.81	1.16	0.00	2.23	1.89	1.89
P-66	J-48	J-56	317.83	0.40	0.00	2.03	2.04	2.04
P-67	J-53	J-51	-798.61	0.06	0.00	2.27	1.94	1.94
P-68	J-54	J-53	-806.14	0.34	0.00	2.29	1.97	1.97
P-69	J-54	J-57	700.45	0.48	0.00	1.99	1.52	1.52
P-70	J-56	J-62	26.55	0.01	0.00	0.17	0.02	0.02
P-71	J-55	J-56	-287.35	0.45	0.00	1.83	1.69	1.69
P-72	J-55	J-39	237.48	0.42	0.00	1.52	1.19	1.19
P-73	J-57	J-61	92.75	0.07	0.00	0.59	0.21	0.21
P-74	J-57	J-59	603.76	0.37	0.00	1.71	1.16	1.16
P-75	J-59	J-130	-837.15	1.19	0.00	2.37	2.12	2.12
P-76	J-59	J-60	1436.98	1.50	0.00	4.08	4.63	4.63

P-77	J-60	J-64	-1106.99	0.62	0.00	3.14	2.85	2.85
P-78	J-61	J-55	-45.94	0.03	0.00	0.29	0.06	0.06
P-79	J-60	J-61	-259.15	1.81	0.00	2.94	5.67	5.67
P-80	J-62	J-54	-101.77	0.08	0.00	0.65	0.25	0.25
P-81	J-62	J-61	124.39	0.47	0.00	1.41	1.46	1.46
P-82	J-60	J-63	-196.87	2.35	0.00	2.23	4.24	4.24
P-83	J-64	J-39	-1110.92	0.80	0.00	3.15	2.87	2.87
P-85	J-58	J-75	-606.98	0.67	0.00	1.72	1.17	1.17
P-86	J-75	J-66	1492.77	0.44	0.00	4.23	6.18	6.18
P-87	J-68	J-66	-1488.84	1.35	0.00	4.22	6.15	6.15
P-88	J-68	J-69	134.71	1.10	0.00	1.53	1.69	1.69
P-89	J-69	J-68	-1350.20	1.10	0.00	3.83	5.13	5.13
P-90	J-58	J-71	136.32	0.02	0.00	0.39	0.07	0.07
P-91	J-71	J-70	11.36	0.01	0.00	0.13	0.02	0.02
P-92	J-71	J-112	113.60	0.02	0.00	0.32	0.05	0.05
P-93	J-73	J-121	22.72	0.00	0.00	0.26	0.06	0.06
P-94	J-73	J-111	68.16	0.01	0.00	0.19	0.02	0.02
P-95	J-75	J-123	-3257.20	0.10	0.00	9.24	26.20	26.20
P-96	J-123	O-Pump-3	-1087.04	0.02	0.00	3.08	3.43	3.43
P-97	J-123	O-Pump-2	-1087.06	0.02	0.00	3.08	3.43	3.43
P-98	R-1	J-122	3265.06	0.06	0.00	9.26	26.32	26.32
P-99	J-123	O-Pump-1	-1087.03	0.03	0.00	3.08	3.43	3.43
P-100	O-RV-1	R-1	1153.53	0.41	0.00	13.09	90.09	90.09
P-101	I-Pump-1	J-122	-1087.03	0.01	0.00	3.08	3.43	3.43
P-102	I-Pump-2	J-122	-1087.06	0.01	0.00	3.08	3.43	3.43
P-103	J-74	J-67	11.36	0.00	0.00	0.03	0.00	0.00
P-104	J-74	J-76	11.36	0.01	0.00	0.13	0.02	0.02
P-105	J-77	J-49	-372.95	0.18	0.00	1.06	0.47	0.47
P-106	J-77	J-78	-436.58	0.05	0.00	1.24	0.51	0.51
P-107	J-49	J-80	-384.31	0.11	0.00	1.09	0.50	0.50
P-108	J-80	J-82	22.72	0.00	0.00	0.06	0.00	0.00
P-109	J-80	J-113	-418.39	0.61	0.00	1.19	0.59	0.59
P-110	J-82	J-79	11.36	0.00	0.00	0.13	0.02	0.02
P-111	J-83	J-81	-442.32	0.15	0.00	1.25	0.65	0.65
P-112	J-83	J-116	79.52	0.06	0.00	0.51	0.19	0.19
P-113	J-84	J-117	22.72	0.00	0.00	0.15	0.02	0.02
P-114	J-84	J-87	11.36	0.00	0.00	0.13	0.02	0.02
P-115	J-86	J-84	45.44	0.02	0.00	0.29	0.07	0.07
P-116	J-86	J-89	11.36	0.00	0.00	0.07	0.00	0.00
P-117	J-43	J-92	-1025.66	1.03	0.00	2.91	3.08	3.08
P-118	VP-1	J-90	546.80	0.00	0.00	0.39	0.03	0.03
P-119	J-91	J-97	-1037.45	0.43	0.00	2.94	2.53	2.53
P-120	J-92	J-91	-1029.59	0.40	0.00	2.92	3.10	3.10
P-122	J-93	J-47	-76.02	0.05	0.00	0.49	0.14	0.14
P-123	J-93	J-94	3.93	0.01	0.00	0.10	0.02	0.02
P-124	J-93	J-96	68.16	0.07	0.00	0.44	0.12	0.12
P-125	J-91	J-95	3.93	0.00	0.00	0.01	0.00	0.00
P-126	J-97	J-102	-780.10	0.94	0.00	2.21	1.49	1.49
P-127	J-97	J-100	-261.29	0.41	0.00	1.67	1.42	1.42
P-128	J-98	J-99	3.93	0.00	0.00	0.03	0.00	0.00
P-129	J-98	J-101	-207.85	0.62	0.00	1.33	0.93	0.93
P-130	J-100	J-98	-199.99	0.37	0.00	1.28	0.86	0.86
P-131	J-100	J-103	-65.22	0.17	0.00	0.74	0.55	0.55
P-132	J-102	J-88	-861.04	0.55	0.00	2.44	1.79	1.79

P-133	J-103	J-127	-69.15	0.22	0.00	0.78	0.49	0.49
P-134	J-90	J-88	864.97	0.10	0.00	0.61	0.08	0.08
P-135	VP-2	J-90	533.88	0.00	0.00	0.38	0.03	0.03
P-136	J-46	J-104	-48.51	0.11	0.00	0.55	0.32	0.32
P-137	J-104	J-105	3.93	0.00	0.00	0.04	0.00	0.00
P-138	J-104	J-96	-56.37	0.13	0.00	0.64	0.42	0.42
P-139	J-96	J-106	3.93	0.00	0.00	0.04	0.00	0.00
P-140	J-96	J-107	3.93	0.00	0.00	0.04	0.00	0.00
P-141	J-58	J-108	459.30	0.35	0.00	1.30	0.56	0.56
P-142	VP-3	J-81	453.68	0.23	0.00	1.29	0.51	0.51
P-143	I-Pump-3	J-122	-1087.04	0.01	0.00	3.08	3.43	3.43
P-144	J-83	J-124	-101.04	0.02	0.00	0.29	0.03	0.03
P-145	J-11	J-74	34.08	0.00	0.00	0.10	0.01	0.01
P-146	J-110	J-11	45.44	0.00	0.00	0.13	0.01	0.01
P-147	J-111	J-110	56.80	0.01	0.00	0.16	0.01	0.01
P-148	J-112	J-73	102.24	0.02	0.00	0.29	0.04	0.04
P-149	J-113	J-114	-429.75	0.52	0.00	1.22	0.62	0.62
P-150	J-114	J-115	-441.11	0.29	0.00	1.25	0.65	0.65
P-151	J-115	J-83	-452.47	0.64	0.00	1.28	0.68	0.68
P-152	J-116	J-86	68.16	0.04	0.00	0.44	0.15	0.15
P-153	J-117	J-85	11.36	0.00	0.00	0.07	0.01	0.01
P-154	J-118	J-77	-798.17	1.34	0.00	2.26	1.94	1.94
P-155	J-119	J-44	11.36	0.00	0.00	0.13	0.02	0.02
P-156	J-120	J-119	22.72	0.01	0.00	0.26	0.08	0.08
P-157	J-121	J-72	11.36	0.00	0.00	0.13	0.02	0.02
P-158	J-124	J-40	19.65	0.00	0.00	0.06	0.00	0.00
P-159	J-126	J-5	7.86	0.00	0.00	0.02	0.00	0.00
P-160	J-127	J-128	-73.08	0.08	0.00	0.83	0.54	0.54
P-161	J-128	J-102	-77.01	0.07	0.00	0.87	0.60	0.60
P-162	J-129	J-31	-20.02	0.04	0.00	0.23	0.05	0.05
P-163	J-130	J-69	-1480.98	1.12	0.00	4.20	6.09	6.09
P-164	J-131	J-21	-47.16	0.00	0.00	0.13	0.01	0.01
P-165	J-75	I-RV-1	1153.53	0.77	0.00	13.09	90.09	90.09
P-166	J-14	J-63	-439.11	0.27	0.00	1.25	0.48	0.48
P-167	J-63	J-130	-639.91	0.34	0.00	1.82	0.97	0.97
P-168	J-101	J-90	-211.78	0.19	0.00	0.60	0.12	0.12
P-169	J-108	J-78	447.94	0.36	0.00	1.27	0.50	0.50
P-170	J-124	R-2	-124.62	0.14	0.00	0.35	0.05	0.05

P U M P/L O S S   E L E M E N T   R E S U L T S

NAME	FLOWRATE	INLET HEAD	OUTLET HEAD	PUMP HEAD	EFFIC-ENCY	USEFUL POWER	INCREMTL COST	TOTAL COST	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail.
	gpm	ft	ft	ft	%	Hp	$	$			ft

Pump-1	1087.03	17.43	166.55	149.1	75.00	0.	0.0	0.0	**	**	50.5
Pump-2	1087.06	17.43	166.55	149.1	75.00	0.	0.0	0.0	**	**	50.5
Pump-3	1087.04	17.43	166.55	149.1	75.00	0.	0.0	0.0	**	**	50.5
VP-1	546.80	0.00	168.86	168.9	75.00	0.	0.0	0.0	**	**	33.2
VP-2	533.88	0.00	168.86	168.9	75.00	0.	0.0	0.0	**	**	33.2
VP-3	453.67	0.00	151.22	151.2	75.00	0.	0.0	0.0	**	**	33.2

N O D E   R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		3.93	557.49	388.00	169.49	73.44
J-2		3.93	558.90	386.00	172.90	74.92
J-3		3.93	559.05	389.00	170.05	73.69
J-4		3.93	559.11	388.00	171.11	74.15
J-5		3.93	564.86	410.00	154.86	67.10
J-6		3.93	559.16	389.00	170.16	73.73
J-7		3.93	559.17	389.00	170.17	73.74
J-8		3.93	559.19	390.00	169.19	73.32
J-9		3.93	559.20	391.00	168.20	72.89
J-10		3.93	559.32	395.00	164.32	71.20
J-11		11.36	563.17	395.00	168.17	72.88
J-12		3.93	559.32	399.00	160.32	69.47
J-13		3.93	559.29	396.00	163.29	70.76
J-14		3.93	559.30	400.00	159.30	69.03
J-15		3.93	559.31	399.00	160.31	69.47
J-16		3.93	559.31	399.00	160.31	69.47
J-17		3.93	564.86	420.00	144.86	62.77
J-18		3.93	559.30	402.00	157.30	68.16
J-19		3.93	559.32	399.00	160.32	69.47
J-20		3.93	559.32	397.00	162.32	70.34
J-21		3.93	559.32	399.00	160.32	69.47
J-22		3.93	559.32	397.00	162.32	70.34
J-23		3.93	559.35	400.00	159.35	69.05
J-24		3.93	559.36	401.00	158.36	68.62
J-25		3.93	559.33	399.00	160.33	69.48
J-26		3.93	559.33	398.00	161.33	69.91
J-27		3.93	559.35	392.00	167.35	72.52
J-28		3.93	559.34	391.00	168.34	72.95
J-29		3.93	559.36	392.00	167.36	72.52
J-30		3.93	559.34	390.00	169.34	73.38
J-31		3.93	559.46	399.00	160.46	69.53
J-32		3.93	559.57	402.00	157.57	68.28
J-33		3.93	559.41	393.00	166.41	72.11

J-34		3.93	559.57	403.00	156.57	67.85
J-35		3.93	559.45	403.00	156.45	67.79
J-36		3.93	559.35	400.00	159.35	69.05
J-37		3.93	559.06	405.00	154.06	66.76
J-38		3.93	559.42	401.00	158.42	68.65
J-39		3.93	558.63	401.00	157.63	68.31
J-40		3.93	564.86	422.00	142.86	61.90
J-41		3.93	559.87	403.00	156.87	67.98
J-42		3.93	559.90	403.00	156.90	67.99
J-43		3.93	563.40	405.00	158.40	68.64
J-44		11.36	559.85	403.00	156.85	67.97
J-45		3.93	559.97	403.00	156.97	68.02
J-46		3.93	560.10	403.00	157.10	68.08
J-47		3.93	560.45	403.00	157.45	68.23
J-48		3.93	559.90	403.00	156.90	67.99
J-49		11.36	562.65	414.00	148.65	64.42
J-50		3.93	559.91	403.00	156.91	67.99
J-51		3.93	559.97	403.00	156.97	68.02
J-53		3.93	559.91	403.00	156.91	67.99
J-54		3.93	559.57	403.00	156.57	67.85
J-55		3.93	559.05	401.00	158.05	68.49
J-56		3.93	559.50	403.00	156.50	67.82
J-57		3.93	559.09	401.00	158.09	68.50
J-58		11.36	563.25	399.00	164.25	71.17
J-59		3.93	558.71	401.00	157.71	68.34
J-60	FIRE	3000.00	557.21	399.00	158.21	68.56
J-61		3.93	559.02	401.00	158.02	68.48
J-62		3.93	559.49	402.00	157.49	68.25
J-63		3.93	559.57	399.00	160.57	69.58
J-64		3.93	557.83	401.00	156.83	67.96
J-66		3.93	563.48	403.00	160.48	69.54
J-67		11.36	563.17	393.00	170.17	73.74
J-68		3.93	562.13	399.00	163.13	70.69
J-69		3.93	561.03	400.00	161.03	69.78
J-70		11.36	563.21	400.00	163.21	70.73
J-71		11.36	563.22	399.00	164.22	71.16
J-72		11.36	563.18	399.00	164.18	71.15
J-73		11.36	563.19	399.00	164.19	71.15
J-74		11.36	563.17	393.00	170.17	73.74
J-75		3.93	563.92	397.50	166.42	72.12
J-76		11.36	563.16	393.00	170.16	73.74
J-77		11.36	562.47	403.00	159.47	69.11
J-78		11.36	562.53	403.00	159.53	69.13
J-79		11.36	562.76	403.00	159.76	69.23
J-80		11.36	562.77	403.00	159.77	69.23
J-81		11.36	564.98	413.00	151.98	65.86
J-82		11.36	562.77	403.00	159.77	69.23
J-83		11.36	564.84	412.00	152.84	66.23
J-84		11.36	564.72	404.00	160.72	69.64
J-85		11.36	564.71	408.00	156.71	67.91
J-86		11.36	564.74	404.00	160.74	69.65
J-87		11.36	564.71	404.00	160.71	69.64
J-88		3.93	566.76	399.00	167.76	72.69
J-89		11.36	564.74	404.00	160.74	69.65

J-90		3.93	566.86	398.00	168.86	73.17
J-91		3.93	564.83	401.00	163.83	70.99
J-92		3.93	564.43	401.00	163.43	70.82
J-93		3.93	560.40	404.00	156.40	67.77
J-94		3.93	560.40	403.00	157.40	68.20
J-95		3.93	564.83	401.00	163.83	70.99
J-96		3.93	560.34	403.00	157.34	68.18
J-97		3.93	565.26	401.00	164.26	71.18
J-98		3.93	566.04	399.00	167.04	72.39
J-99		3.93	566.04	399.00	167.04	72.39
J-100		3.93	565.67	399.00	166.67	72.23
J-101		3.93	566.67	397.00	169.67	73.52
J-102		3.93	566.20	396.00	170.20	73.75
J-103		3.93	565.84	399.00	166.84	72.30
J-104		3.93	560.20	403.00	157.20	68.12
J-105		3.93	560.20	403.00	157.20	68.12
J-106		3.93	560.33	405.00	155.33	67.31
J-107		3.93	560.33	405.00	155.33	67.31
J-108		11.36	562.89	403.00	159.89	69.29
J-109		3.93	559.32	396.00	163.32	70.77
J-110		11.36	563.18	397.00	166.18	72.01
J-111		11.36	563.18	399.00	164.18	71.15
J-112		11.36	563.20	399.00	164.20	71.16
J-113		11.36	563.38	405.00	158.38	68.63
J-114		11.36	563.90	412.00	151.90	65.82
J-115		11.36	564.19	412.00	152.19	65.95
J-116		11.36	564.78	404.00	160.78	69.67
J-117		11.36	564.72	405.00	159.72	69.21
J-118		11.36	561.13	403.00	158.13	68.52
J-119		11.36	559.86	403.00	156.86	67.97
J-120		11.36	559.87	403.00	156.87	67.98
J-121		11.36	563.18	399.00	164.18	71.15
J-122		3.93	414.94	397.50	17.44	7.56
J-123		3.93	564.02	397.50	166.52	72.16
J-124		3.93	564.86	424.00	140.86	61.04
J-125		3.93	564.86	407.00	157.86	68.40
J-126		3.93	564.86	415.00	149.86	64.94
J-127		3.93	566.05	396.00	170.05	73.69
J-128		3.93	566.13	396.00	170.13	73.72
J-129		3.93	559.42	395.00	164.42	71.25
J-130		3.93	559.90	403.00	156.90	67.99
J-131		3.93	559.32	399.00	160.32	69.47
I-Pump-1		0.00	414.93	397.50	17.43	7.55
I-Pump-2		0.00	414.93	397.50	17.43	7.55
I-Pump-3		0.00	414.93	397.50	17.43	7.55
R-1		----	415.00	397.50	17.50	7.58
R-2	NEW 750,000	----	565.00	540.00	25.00	10.83
O-RV-1		0.00	415.41	397.00	18.41	7.98
VP-1	WELL 1	----	566.86	398.00	168.86	73.17
VP-2	WELL 2	----	566.86	398.00	168.86	73.17
VP-3	WELL 3	----	565.22	414.00	151.22	65.53
O-Pump-3		0.00	564.05	397.50	166.55	72.17
O-Pump-2		0.00	564.05	397.50	166.55	72.17
O-Pump-1		0.00	564.05	397.50	166.55	72.17

I-RV-1	----	563.15	397.00	166.15	72.00

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

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
J-2	74.92	I-Pump-3	7.55
J-4	74.15	I-Pump-2	7.55
J-102	73.75	I-Pump-1	7.55
J-7	73.74	J-122	7.56
J-74	73.74	R-1	7.58

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
P-100	13.09	P-3	0.01
P-165	13.09	P-10	0.01
P-98	9.26	P-125	0.01
P-95	9.24	P-159	0.02
P-54	5.15	P-128	0.03

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
P-100	90.09	P-3	0.00
P-165	90.09	P-125	0.00
P-98	26.32	P-10	0.00
P-95	26.20	P-159	0.00
P-54	17.14	P-16	0.00

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
P-100	90.09	P-3	0.00
P-165	90.09	P-125	0.00
P-98	26.32	P-10	0.00
P-95	26.20	P-159	0.00
P-54	17.14	P-16	0.00

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

VALVE LABEL	VALVE TYPE	VALVE SETTING psi or gpm	VALVE STATUS	UPSTREAM PRESSURE psi	DOWNSTREAM PRESSURE psi	THROUGH FLOW gpm
RV-1	PSV	72.00	ACTIVATED	72.00	7.98	1153.53

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

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

NODE NAME	FLOWRATE gpm	NODE TITLE
R-1	2111.53	
R-2	124.62	NEW 750,000
VP-1	546.80	WELL 1
VP-2	533.88	WELL 2
VP-3	453.67	WELL 3

NET SYSTEM INFLOW = 3770.50
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 3770.52

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

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* * * * * * * * * * * * *  K Y P I P E  * * * * * * * * * * * *
*                                                             *
*  Pipe Network Modeling Software                             *
*                                                             *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)                 *
*  Version: 8.003 (vr8)  10/29/2015                           *
*  Company:  4BEngineer    Serial #:  591127                  *
*  Interface:  Classic                                        *
*  Licensed for Pipe2016                                      *
*                                                             *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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Date & Time: Wed Jun 22 09:41:47 2016

Master File : C:\Users\4B Engineering\Documents\CITY DOCUMENTS\COBURG\MODELING\peak hour-year 2025 pumps filling upper reservoir.KYP\peak hour-year 2025 pumps filling upper reservoir.P2K (9)

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*********************************************
 S U M M A R Y   O F   O R I G I N A L   D A T A
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U N I T S   S P E C I F I E D

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

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

VALVE LABEL	VALVE TYPE	VALVE SETTING (ft or gpm)
RV-1	PSV	558.54

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

STATUS CODE: XX -CLOSED PIPE   CV -CHECK VALVE

P I P E N A M E	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-1	J-1	J-2	280.00	1.25	135.0000	0.00
P-2	J-2	J-3	606.60	3.00	135.0000	0.00

P-3	J-5	J-125	468.00	12.00	140.0000	0.00
P-4	J-3	J-6	193.40	3.00	135.0000	0.00
P-5	J-6	J-4	600.30	3.00	135.0000	0.00
P-6	J-6	J-7	378.00	6.00	135.0000	0.00
P-7	J-7	J-9	1386.50	8.00	135.0000	0.00
P-8	J-9	J-8	2435.90	6.00	135.0000	0.00
P-9	J-9	J-13	3328.60	8.00	135.0000	0.00
P-10	J-10	J-109	76.70	12.00	120.0000	0.00
P-11	J-10	J-131	434.80	12.00	120.0000	0.00
P-12	J-13	J-10	565.60	8.00	120.0000	0.00
P-13	J-12	J-14	503.90	12.00	135.0000	0.00
P-14	J-12	J-16	176.50	4.00	100.0000	0.00
P-15	J-16	J-15	179.60	4.00	100.0000	0.00
P-16	J-17	J-126	459.90	12.00	140.0000	0.00
P-17	J-15	J-18	130.00	4.00	100.0000	0.00
P-18	J-15	J-19	181.70	4.00	100.0000	0.00
P-19	J-20	J-12	181.70	12.00	120.0000	0.00
P-20	J-19	J-20	353.40	6.00	135.0000	0.00
P-21	J-21	J-22	373.10	12.00	120.0000	0.00
P-22	J-22	J-20	140.30	12.00	120.0000	0.00
P-23	J-22	J-25	224.90	8.00	135.0000	0.00
P-24	J-21	J-26	277.90	8.00	135.0000	0.00
P-25	J-25	J-24	278.00	8.00	135.0000	0.00
P-26	J-24	J-23	320.90	8.00	135.0000	0.00
P-27	J-23	J-12	425.10	12.00	120.0000	0.00
P-28	J-26	J-25	378.90	8.00	135.0000	0.00
P-29	J-26	J-28	423.90	8.00	135.0000	0.00
P-30	J-28	J-30	377.90	8.00	135.0000	0.00
P-31	J-28	J-29	689.00	8.00	135.0000	0.00
P-32	J-27	J-29	200.00	8.00	135.0000	0.00
P-33	J-30	J-27	418.10	6.00	135.0000	0.00
P-34	J-29	J-33	260.50	6.00	135.0000	0.00
P-35	J-31	J-32	334.50	6.00	135.0000	0.00
P-36	J-33	J-31	381.70	6.00	135.0000	0.00
P-37	J-33	J-129	287.60	6.00	135.0000	0.00
P-38	J-40	J-17	642.70	12.00	140.0000	0.00
P-39	J-32	J-35	297.30	8.00	135.0000	0.00
P-40	J-35	J-24	320.70	8.00	135.0000	0.00
P-41	J-35	J-38	287.70	6.00	135.0000	0.00
P-42	J-36	J-23	30.00	8.00	135.0000	0.00
P-43	J-36	J-37	383.70	8.00	135.0000	0.00
P-44	J-38	J-36	277.70	12.00	135.0000	0.00
P-45	J-37	J-14	289.60	12.00	135.0000	0.00
P-46	J-37	J-39	308.50	12.00	135.0000	0.00
P-47	J-39	J-38	401.60	6.00	120.0000	0.00
P-48	J-38	J-34	299.60	12.00	120.0000	0.00
P-49	J-34	J-41	596.00	12.00	120.0000	0.00
P-51	J-41	J-42	56.70	12.00	120.0000	0.00
P-52	J-32	J-43	1029.30	6.00	130.0000	0.00
P-53	J-43	J-42	319.60	6.00	135.0000	0.00
P-54	J-43	J-47	172.10	6.00	130.0000	0.00
P-55	J-45	J-120	646.60	6.00	120.0000	0.00
P-56	J-46	J-45	326.60	6.00	120.0000	0.00
P-57	J-47	J-46	388.10	6.00	120.0000	0.00

P-58	J-42	J-48	189.00	12.00	120.0000	0.00
P-59	J-48	J-50	366.00	12.00	120.0000	0.00
P-60	J-48	J-47	322.80	8.00	135.0000	0.00
P-61	J-50	J-53	319.10	12.00	120.0000	0.00
P-62	J-46	J-50	319.80	6.00	135.0000	0.00
P-63	J-45	J-51	339.30	8.00	135.0000	0.00
P-64	J-51	J-118	614.60	12.00	120.0000	0.00
P-66	J-48	J-56	196.60	8.00	135.0000	0.00
P-67	J-53	J-51	31.90	12.00	120.0000	0.00
P-68	J-54	J-53	172.10	12.00	120.0000	0.00
P-69	J-54	J-57	316.80	12.00	120.0000	0.00
P-70	J-56	J-62	432.00	8.00	135.0000	0.00
P-71	J-55	J-56	268.20	8.00	135.0000	0.00
P-72	J-55	J-39	349.50	8.00	135.0000	0.00
P-73	J-57	J-61	312.10	8.00	135.0000	0.00
P-74	J-57	J-59	321.70	12.00	120.0000	0.00
P-75	J-59	J-130	561.90	12.00	120.0000	0.00
P-76	J-59	J-60	324.20	12.00	135.0000	0.00
P-77	J-60	J-64	216.10	12.00	135.0000	0.00
P-78	J-61	J-55	460.20	8.00	135.0000	0.00
P-79	J-60	J-61	318.60	6.00	135.0000	0.00
P-80	J-62	J-54	307.10	8.00	135.0000	0.00
P-81	J-62	J-61	323.30	6.00	135.0000	0.00
P-82	J-60	J-63	554.80	6.00	120.0000	0.00
P-83	J-64	J-39	278.70	12.00	135.0000	0.00
P-85	J-58	J-75	577.60	12.00	120.0000	0.00
P-86	J-75	J-66	71.90	12.00	120.0000	0.00
P-87	J-68	J-66	219.60	12.00	120.0000	0.00
P-88	J-68	J-69	649.80	6.00	135.0000	0.00
P-89	J-69	J-68	213.90	12.00	120.0000	0.00
P-90	J-58	J-71	329.80	12.00	120.0000	0.00
P-91	J-71	J-70	384.90	6.00	130.0000	0.00
P-92	J-71	J-112	318.00	12.00	120.0000	0.00
P-93	J-73	J-121	70.70	6.00	135.0000	0.00
P-94	J-73	J-111	298.20	12.00	120.0000	0.00
P-95	J-75	J-123	4.00	12.00	120.0000	0.00
P-96	J-123	O-Pump-3	6.30	12.00	120.0000	0.00
P-97	J-123	O-Pump-2	6.80	12.00	120.0000	0.00
P-98	R-1	J-122	2.40	12.00	120.0000	0.00
P-99	J-123	O-Pump-1	8.40	12.00	120.0000	0.00
P-100	O-RV-1	R-1	4.30	6.00	135.0000	0.00
P-101	I-Pump-1	J-122	2.10	12.00	120.0000	0.00
P-102	I-Pump-2	J-122	2.80	12.00	120.0000	0.00
P-103	J-74	J-67	171.50	12.00	120.0000	0.00
P-104	J-74	J-76	609.80	6.00	135.0000	0.00
P-105	J-77	J-49	383.00	12.00	120.0000	0.00
P-106	J-77	J-78	106.80	12.00	135.0000	0.00
P-107	J-49	J-80	226.20	12.00	120.0000	0.00
P-108	J-80	J-82	55.60	12.00	120.0000	0.00
P-109	J-80	J-113	1038.40	12.00	120.0000	0.00
P-110	J-82	J-79	182.50	6.00	135.0000	0.00
P-111	J-83	J-81	228.60	12.00	120.0000	0.00
P-112	J-83	J-116	295.10	8.00	120.0000	0.00
P-113	J-84	J-117	106.10	8.00	120.0000	0.00

P-114	J-84	J-87	234.20	6.00	135.0000	0.00
P-115	J-86	J-84	333.90	8.00	120.0000	0.00
P-116	J-86	J-89	364.30	8.00	135.0000	0.00
P-117	J-43	J-92	334.00	12.00	120.0000	0.00
P-118	VP-1	J-90	98.30	24.00	120.0000	0.00
P-119	J-91	J-97	168.70	12.00	135.0000	0.00
P-120	J-92	J-91	130.20	12.00	120.0000	0.00
P-122	J-93	J-47	326.60	8.00	135.0000	0.00
P-123	J-93	J-94	366.00	4.00	130.0000	0.00
P-124	J-93	J-96	576.50	8.00	135.0000	0.00
P-125	J-91	J-95	86.50	12.00	135.0000	0.00
P-126	J-97	J-102	631.00	12.00	135.0000	0.00
P-127	J-97	J-100	291.10	8.00	135.0000	0.00
P-128	J-98	J-99	107.60	8.00	135.0000	0.00
P-129	J-98	J-101	670.90	8.00	135.0000	0.00
P-130	J-100	J-98	429.00	8.00	135.0000	0.00
P-131	J-100	J-103	302.20	6.00	120.0000	0.00
P-132	J-102	J-88	308.70	12.00	135.0000	0.00
P-133	J-103	J-127	438.60	6.00	135.0000	0.00
P-134	J-90	J-88	1360.00	24.00	120.0000	0.00
P-135	VP-2	J-90	41.60	24.00	120.0000	0.00
P-136	J-46	J-104	332.30	6.00	120.0000	0.00
P-137	J-104	J-105	429.80	6.00	120.0000	0.00
P-138	J-104	J-96	316.00	6.00	120.0000	0.00
P-139	J-96	J-106	549.40	6.00	120.0000	0.00
P-140	J-96	J-107	464.20	6.00	120.0000	0.00
P-141	J-58	J-108	633.20	12.00	135.0000	0.00
P-142	VP-3	J-81	453.20	12.00	140.0000	0.00
P-143	I-Pump-3	J-122	4.00	12.00	120.0000	0.00
P-144	J-83	J-124	676.20	12.00	140.0000	0.00
P-145	J-11	J-74	194.50	12.00	120.0000	0.00
P-146	J-110	J-11	311.90	12.00	120.0000	0.00
P-147	J-111	J-110	348.40	12.00	120.0000	0.00
P-148	J-112	J-73	378.60	12.00	120.0000	0.00
P-149	J-113	J-114	851.10	12.00	120.0000	0.00
P-150	J-114	J-115	451.70	12.00	120.0000	0.00
P-151	J-115	J-83	950.10	12.00	120.0000	0.00
P-152	J-116	J-86	247.50	8.00	120.0000	0.00
P-153	J-117	J-85	500.80	8.00	120.0000	0.00
P-154	J-118	J-77	693.90	12.00	120.0000	0.00
P-155	J-119	J-44	151.90	6.00	120.0000	0.00
P-156	J-120	J-119	139.90	6.00	120.0000	0.00
P-157	J-121	J-72	124.10	6.00	135.0000	0.00
P-158	J-124	J-40	295.90	12.00	140.0000	0.00
P-159	J-126	J-5	574.90	12.00	140.0000	0.00
P-160	J-127	J-128	143.40	6.00	135.0000	0.00
P-161	J-128	J-102	117.00	6.00	135.0000	0.00
P-162	J-129	J-31	763.20	6.00	135.0000	0.00
P-163	J-130	J-69	184.80	12.00	120.0000	0.00
P-164	J-131	J-21	294.10	12.00	120.0000	0.00
P-165	J-75	I-RV-1	8.50	6.00	135.0000	0.00
P-166	J-14	J-63	564.60	12.00	140.0000	0.00
P-167	J-63	J-130	348.50	12.00	140.0000	0.00
P-168	J-101	J-90	1547.40	12.00	140.0000	0.00

P-169	J-108	J-78	727.40	12.00	140.0000	0.00
P-170	J-124	R-2	3068.20	12.00	140.0000	0.00

P U M P/L O S S   E L E M E N T   D A T A

THERE IS A DEVICE AT NODE Pump-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 3)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
210.00	0.00	80.00
185.00	800.00	80.00
160.00	1000.00	80.00
110.00	1400.00	80.00

THERE IS A DEVICE AT NODE Pump-2 ....> (ID= 3)

THERE IS A DEVICE AT NODE Pump-3 ....> (ID= 3)

THERE IS A DEVICE AT NODE VP-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
230.00	0.00	75.00
224.00	210.00	75.00
222.00	315.00	75.00
211.00	420.00	75.00
178.00	525.00	75.00
130.00	630.00	75.00

THERE IS A DEVICE AT NODE VP-2 DESCRIBED BY THE FOLLOWING DATA: (ID= 2)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
395.00	0.00	75.00
290.00	240.00	75.00
205.00	400.00	75.00
140.00	580.00	75.00
90.00	640.00	75.00

THERE IS A DEVICE AT NODE VP-3 DESCRIBED BY THE FOLLOWING DATA: (ID= 4)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
300.00	0.00	75.00
275.00	200.00	75.00
250.00	300.00	75.00
200.00	400.00	75.00
100.00	500.00	75.00

N O D E   D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
J-1		1.51	388.00	
J-2		1.51	386.00	
J-3		1.51	389.00	
J-4		1.51	388.00	
J-5		1.51	410.00	
J-6		1.51	389.00	
J-7		1.51	389.00	
J-8		1.51	390.00	
J-9		1.51	391.00	
J-10		1.51	395.00	
J-11	FIRE	4.37	395.00	
J-12		1.51	399.00	
J-13		1.51	396.00	
J-14		1.51	400.00	
J-15		1.51	399.00	
J-16		1.51	399.00	
J-17		1.51	420.00	
J-18		1.51	402.00	
J-19		1.51	399.00	
J-20		1.51	397.00	
J-21		1.51	399.00	
J-22		1.51	397.00	
J-23		1.51	400.00	
J-24		1.51	401.00	
J-25		1.51	399.00	
J-26		1.51	398.00	
J-27		1.51	392.00	
J-28		1.51	391.00	
J-29		1.51	392.00	
J-30		1.51	390.00	
J-31		1.51	399.00	
J-32		1.51	402.00	
J-33		1.51	393.00	
J-34		1.51	403.00	
J-35		1.51	403.00	
J-36		1.51	400.00	
J-37		1.51	405.00	
J-38		1.51	401.00	
J-39		1.51	401.00	
J-40		1.51	422.00	
J-41		1.51	403.00	
J-42		1.51	403.00	
J-43		1.51	405.00	
J-44		4.37	403.00	

J-45	1.51	403.00
J-46	1.51	403.00
J-47	1.51	403.00
J-48	1.51	403.00
J-49	4.37	414.00
J-50	1.51	403.00
J-51	1.51	403.00
J-53	1.51	403.00
J-54	1.51	403.00
J-55	1.51	401.00
J-56	1.51	403.00
J-57	1.51	401.00
J-58	4.37	399.00
J-59	1.51	401.00
J-60	1.51	399.00
J-61	1.51	401.00
J-62	1.51	402.00
J-63	1.51	399.00
J-64	1.51	401.00
J-66	1.51	403.00
J-67	4.37	393.00
J-68	1.51	399.00
J-69	1.51	400.00
J-70	4.37	400.00
J-71	4.37	399.00
J-72	4.37	399.00
J-73	4.37	399.00
J-74	4.37	393.00
J-75	1.51	397.50
J-76	4.37	393.00
J-77	4.37	403.00
J-78	4.37	403.00
J-79	4.37	403.00
J-80	4.37	403.00
J-81	4.37	413.00
J-82	4.37	403.00
J-83	4.37	412.00
J-84	4.37	404.00
J-85	4.37	408.00
J-86	4.37	404.00
J-87	4.37	404.00
J-88	1.51	399.00
J-89	4.37	404.00
J-90	1.51	398.00
J-91	1.51	401.00
J-92	1.51	401.00
J-93	1.51	404.00
J-94	1.51	403.00
J-95	1.51	401.00
J-96	1.51	403.00
J-97	1.51	401.00
J-98	1.51	399.00
J-99	1.51	399.00
J-100	1.51	399.00

J-101		1.51	397.00	
J-102		1.51	396.00	
J-103		1.51	399.00	
J-104		1.51	403.00	
J-105		1.51	403.00	
J-106		1.51	405.00	
J-107		1.51	405.00	
J-108		4.37	403.00	
J-109		1.51	396.00	
J-110		4.37	397.00	
J-111		4.37	399.00	
J-112		4.37	399.00	
J-113		4.37	405.00	
J-114		4.37	412.00	
J-115		4.37	412.00	
J-116		4.37	404.00	
J-117		4.37	405.00	
J-118		4.37	403.00	
J-119		4.37	403.00	
J-120		4.37	403.00	
J-121		4.37	399.00	
J-122		1.51	397.50	
J-123		1.51	397.50	
J-124		1.51	424.00	
J-125		1.51	407.00	
J-126		1.51	415.00	
J-127		1.51	396.00	
J-128		1.51	396.00	
J-129		1.51	395.00	
J-130		1.51	403.00	
J-131		1.51	399.00	
I-Pump-1		0.00	397.50	
I-Pump-2		0.00	397.50	
I-Pump-3		0.00	397.50	
R-1		----	397.50	415.00
R-2	NEW 750,000	----	540.00	565.00
O-RV-1		0.00	397.00	
VP-1	WELL 1	----	398.00	398.00
VP-2	WELL 2	----	398.00	398.00
VP-3	WELL 3	----	414.00	414.00
O-Pump-3		0.00	397.50	
O-Pump-2		0.00	397.50	
O-Pump-1		0.00	397.50	
I-RV-1		----	397.00	558.54

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

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

MAXIMUM AND MINIMUM PRESSURES = 5
MAXIMUM AND MINIMUM VELOCITIES = 5
MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

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

NUMBER OF PIPES ....(P) = 166
NUMBER OF END NODES ....(J) = 133
NUMBER OF PRIMARY LOOPS ....(L) = 29
NUMBER OF SUPPLY NODES ....(F) = 5
NUMBER OF SUPPLY ZONES ....(Z) = 1

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Case: 0

RESULTS OBTAINED AFTER 9 TRIALS: ACCURACY = 0.42669E-04

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

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

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
P-1	J-1	J-2	-1.51	0.24	0.00	0.39	0.86	0.86
P-2	J-2	J-3	-3.02	0.03	0.00	0.14	0.04	0.04
P-3	J-5	J-125	1.51	0.00	0.00	0.00	0.00	0.00
P-4	J-3	J-6	-4.53	0.02	0.00	0.21	0.09	0.09
P-5	J-6	J-4	1.51	0.01	0.00	0.07	0.01	0.01
P-6	J-6	J-7	-7.55	0.00	0.00	0.09	0.01	0.01
P-7	J-7	J-9	-9.06	0.00	0.00	0.06	0.00	0.00
P-8	J-9	J-8	1.51	0.00	0.00	0.02	0.00	0.00
P-9	J-9	J-13	-12.08	0.02	0.00	0.08	0.00	0.00
P-10	J-10	J-109	1.51	0.00	0.00	0.00	0.00	0.00
P-11	J-10	J-131	-16.61	0.00	0.00	0.05	0.00	0.00
P-12	J-13	J-10	-13.59	0.00	0.00	0.09	0.01	0.01
P-13	J-12	J-14	157.65	0.04	0.00	0.45	0.08	0.08
P-14	J-12	J-16	1.87	0.00	0.00	0.05	0.01	0.01
P-15	J-16	J-15	0.36	0.00	0.00	0.01	0.00	0.00
P-16	J-17	J-126	4.53	0.00	0.00	0.01	0.00	0.00
P-17	J-15	J-18	1.51	0.00	0.00	0.04	0.01	0.01
P-18	J-15	J-19	-2.66	0.00	0.00	0.07	0.01	0.01
P-19	J-20	J-12	51.89	0.00	0.00	0.15	0.01	0.01
P-20	J-19	J-20	-4.17	0.00	0.00	0.05	0.00	0.00

P-21	J-21	J-22	16.71	0.00	0.00	0.05	0.00	0.00
P-22	J-22	J-20	57.57	0.00	0.00	0.16	0.01	0.01
P-23	J-22	J-25	-42.37	0.01	0.00	0.27	0.05	0.05
P-24	J-21	J-26	-36.34	0.01	0.00	0.23	0.04	0.04
P-25	J-25	J-24	-47.68	0.02	0.00	0.30	0.06	0.06
P-26	J-24	J-23	35.88	0.01	0.00	0.23	0.04	0.04
P-27	J-23	J-12	109.14	0.02	0.00	0.31	0.05	0.05
P-28	J-26	J-25	-3.80	0.00	0.00	0.02	0.00	0.00
P-29	J-26	J-28	-34.05	0.01	0.00	0.22	0.03	0.03
P-30	J-28	J-30	-11.31	0.00	0.00	0.07	0.00	0.00
P-31	J-28	J-29	-24.25	0.01	0.00	0.15	0.02	0.02
P-32	J-27	J-29	-14.33	0.00	0.00	0.09	0.01	0.01
P-33	J-30	J-27	-12.82	0.01	0.00	0.15	0.02	0.02
P-34	J-29	J-33	-40.09	0.05	0.00	0.45	0.18	0.18
P-35	J-31	J-32	-44.62	0.07	0.00	0.51	0.22	0.22
P-36	J-33	J-31	-27.05	0.03	0.00	0.31	0.09	0.09
P-37	J-33	J-129	-14.55	0.01	0.00	0.17	0.03	0.03
P-38	J-40	J-17	6.04	0.00	0.00	0.02	0.00	0.00
P-39	J-32	J-35	122.86	0.10	0.00	0.78	0.35	0.35
P-40	J-35	J-24	85.07	0.06	0.00	0.54	0.18	0.18
P-41	J-35	J-38	36.28	0.04	0.00	0.41	0.15	0.15
P-42	J-36	J-23	74.77	0.00	0.00	0.48	0.14	0.14
P-43	J-36	J-37	81.52	0.06	0.00	0.52	0.16	0.16
P-44	J-38	J-36	157.80	0.02	0.00	0.45	0.08	0.08
P-45	J-37	J-14	26.81	0.00	0.00	0.08	0.00	0.00
P-46	J-37	J-39	53.20	0.00	0.00	0.15	0.01	0.01
P-47	J-39	J-38	-39.67	0.09	0.00	0.45	0.22	0.22
P-48	J-38	J-34	-162.70	0.03	0.00	0.46	0.10	0.10
P-49	J-34	J-41	-164.21	0.06	0.00	0.47	0.10	0.10
P-51	J-41	J-42	-165.72	0.01	0.00	0.47	0.11	0.11
P-52	J-32	J-43	-168.99	2.84	0.00	1.92	2.76	2.76
P-53	J-43	J-42	333.06	2.88	0.00	3.78	9.03	9.03
P-54	J-43	J-47	411.85	2.47	0.00	4.67	14.34	14.34
P-55	J-45	J-120	13.11	0.02	0.00	0.15	0.03	0.03
P-56	J-46	J-45	77.25	0.24	0.00	0.88	0.75	0.75
P-57	J-47	J-46	89.10	0.38	0.00	1.01	0.98	0.98
P-58	J-42	J-48	165.83	0.02	0.00	0.47	0.11	0.11
P-59	J-48	J-50	259.68	0.09	0.00	0.74	0.24	0.24
P-60	J-48	J-47	-254.55	0.44	0.00	1.62	1.35	1.35
P-61	J-50	J-53	324.63	0.12	0.00	0.92	0.37	0.37
P-62	J-46	J-50	66.46	0.15	0.00	0.75	0.46	0.46
P-63	J-45	J-51	62.63	0.03	0.00	0.40	0.10	0.10
P-64	J-51	J-118	449.59	0.41	0.00	1.28	0.67	0.67
P-66	J-48	J-56	159.19	0.11	0.00	1.02	0.57	0.57
P-67	J-53	J-51	388.47	0.02	0.00	1.10	0.51	0.51
P-68	J-54	J-53	65.36	0.00	0.00	0.19	0.02	0.02
P-69	J-54	J-57	-7.11	0.00	0.00	0.02	0.00	0.00
P-70	J-56	J-62	76.14	0.06	0.00	0.49	0.14	0.14
P-71	J-55	J-56	-81.54	0.04	0.00	0.52	0.16	0.16
P-72	J-55	J-39	32.62	0.01	0.00	0.21	0.03	0.03
P-73	J-57	J-61	-47.76	0.02	0.00	0.30	0.06	0.06
P-74	J-57	J-59	39.13	0.00	0.00	0.11	0.01	0.01
P-75	J-59	J-130	153.92	0.05	0.00	0.44	0.09	0.09
P-76	J-59	J-60	-116.30	0.01	0.00	0.33	0.04	0.04

P-77	J-60	J-64	-122.47	0.01	0.00	0.35	0.05	0.05
P-78	J-61	J-55	-47.41	0.03	0.00	0.30	0.06	0.06
P-79	J-60	J-61	-13.02	0.01	0.00	0.15	0.02	0.02
P-80	J-62	J-54	59.75	0.03	0.00	0.38	0.09	0.09
P-81	J-62	J-61	14.88	0.01	0.00	0.17	0.03	0.03
P-82	J-60	J-63	17.68	0.03	0.00	0.20	0.05	0.05
P-83	J-64	J-39	-123.98	0.01	0.00	0.35	0.05	0.05
P-85	J-58	J-75	-342.48	0.23	0.00	0.97	0.40	0.40
P-86	J-75	J-66	-347.01	0.03	0.00	0.98	0.41	0.41
P-87	J-68	J-66	348.52	0.09	0.00	0.99	0.42	0.42
P-88	J-68	J-69	-31.75	0.08	0.00	0.36	0.12	0.12
P-89	J-69	J-68	318.27	0.08	0.00	0.90	0.35	0.35
P-90	J-58	J-71	52.44	0.00	0.00	0.15	0.01	0.01
P-91	J-71	J-70	4.37	0.00	0.00	0.05	0.00	0.00
P-92	J-71	J-112	43.70	0.00	0.00	0.12	0.01	0.01
P-93	J-73	J-121	8.74	0.00	0.00	0.10	0.01	0.01
P-94	J-73	J-111	26.22	0.00	0.00	0.07	0.00	0.00
P-95	J-75	J-123	1.51	0.00	0.00	0.00	0.00	0.00
P-96	J-123	O-Pump-3	0.00	0.00	0.00	0.00	0.00	0.00
P-97	J-123	O-Pump-2	0.00	0.00	0.00	0.00	0.00	0.00
P-98	R-1	J-122	1.51	0.00	0.00	0.00	0.00	0.00
P-99	J-123	O-Pump-1	0.00	0.00	0.00	0.00	0.00	0.00
P-100	O-RV-1	R-1	1.51	0.00	0.00	0.02	0.00	0.00
P-101	I-Pump-1	J-122	0.00	0.00	0.00	0.00	0.00	0.00
P-102	I-Pump-2	J-122	0.00	0.00	0.00	0.00	0.00	0.00
P-103	J-74	J-67	4.37	0.00	0.00	0.01	0.00	0.00
P-104	J-74	J-76	4.37	0.00	0.00	0.05	0.00	0.00
P-105	J-77	J-49	717.78	0.61	0.00	2.04	1.59	1.59
P-106	J-77	J-78	-276.93	0.02	0.00	0.79	0.22	0.22
P-107	J-49	J-80	713.41	0.36	0.00	2.02	1.57	1.57
P-108	J-80	J-82	8.74	0.00	0.00	0.02	0.00	0.00
P-109	J-80	J-113	700.30	1.58	0.00	1.99	1.52	1.52
P-110	J-82	J-79	4.37	0.00	0.00	0.05	0.00	0.00
P-111	J-83	J-81	-439.52	0.15	0.00	1.25	0.64	0.64
P-112	J-83	J-116	30.59	0.01	0.00	0.20	0.03	0.03
P-113	J-84	J-117	8.74	0.00	0.00	0.06	0.00	0.00
P-114	J-84	J-87	4.37	0.00	0.00	0.05	0.00	0.00
P-115	J-86	J-84	17.48	0.00	0.00	0.11	0.01	0.01
P-116	J-86	J-89	4.37	0.00	0.00	0.03	0.00	0.00
P-117	J-43	J-92	-915.41	0.83	0.00	2.60	2.50	2.50
P-118	VP-1	J-90	496.08	0.00	0.00	0.35	0.03	0.03
P-119	J-91	J-97	-919.94	0.34	0.00	2.61	2.03	2.03
P-120	J-92	J-91	-916.92	0.33	0.00	2.60	2.50	2.50
P-122	J-93	J-47	-66.68	0.04	0.00	0.43	0.11	0.11
P-123	J-93	J-94	1.51	0.00	0.00	0.04	0.00	0.00
P-124	J-93	J-96	63.66	0.06	0.00	0.41	0.10	0.10
P-125	J-91	J-95	1.51	0.00	0.00	0.00	0.00	0.00
P-126	J-97	J-102	-687.23	0.74	0.00	1.95	1.18	1.18
P-127	J-97	J-100	-234.21	0.34	0.00	1.49	1.16	1.16
P-128	J-98	J-99	1.51	0.00	0.00	0.01	0.00	0.00
P-129	J-98	J-101	-180.11	0.48	0.00	1.15	0.71	0.71
P-130	J-100	J-98	-177.09	0.30	0.00	1.13	0.69	0.69
P-131	J-100	J-103	-58.63	0.14	0.00	0.67	0.45	0.45
P-132	J-102	J-88	-751.90	0.43	0.00	2.13	1.39	1.39

P-133	J-103	J-127	-60.14	0.17	0.00	0.68	0.38	0.38
P-134	J-90	J-88	753.41	0.08	0.00	0.53	0.06	0.06
P-135	VP-2	J-90	440.47	0.00	0.00	0.31	0.02	0.02
P-136	J-46	J-104	-56.11	0.14	0.00	0.64	0.41	0.41
P-137	J-104	J-105	1.51	0.00	0.00	0.02	0.00	0.00
P-138	J-104	J-96	-59.13	0.14	0.00	0.67	0.46	0.46
P-139	J-96	J-106	1.51	0.00	0.00	0.02	0.00	0.00
P-140	J-96	J-107	1.51	0.00	0.00	0.02	0.00	0.00
P-141	J-58	J-108	285.67	0.15	0.00	0.81	0.23	0.23
P-142	VP-3	J-81	443.89	0.22	0.00	1.26	0.49	0.49
P-143	I-Pump-3	J-122	0.00	0.00	0.00	0.00	0.00	0.00
P-144	J-83	J-124	1091.75	1.76	0.00	3.10	2.60	2.60
P-145	J-11	J-74	13.11	0.00	0.00	0.04	0.00	0.00
P-146	J-110	J-11	17.48	0.00	0.00	0.05	0.00	0.00
P-147	J-111	J-110	21.85	0.00	0.00	0.06	0.00	0.00
P-148	J-112	J-73	39.33	0.00	0.00	0.11	0.01	0.01
P-149	J-113	J-114	695.93	1.28	0.00	1.97	1.50	1.50
P-150	J-114	J-115	691.56	0.67	0.00	1.96	1.49	1.49
P-151	J-115	J-83	687.19	1.39	0.00	1.95	1.47	1.47
P-152	J-116	J-86	26.22	0.01	0.00	0.17	0.02	0.02
P-153	J-117	J-85	4.37	0.00	0.00	0.03	0.00	0.00
P-154	J-118	J-77	445.22	0.46	0.00	1.26	0.66	0.66
P-155	J-119	J-44	4.37	0.00	0.00	0.05	0.00	0.00
P-156	J-120	J-119	8.74	0.00	0.00	0.10	0.01	0.01
P-157	J-121	J-72	4.37	0.00	0.00	0.05	0.00	0.00
P-158	J-124	J-40	7.55	0.00	0.00	0.02	0.00	0.00
P-159	J-126	J-5	3.02	0.00	0.00	0.01	0.00	0.00
P-160	J-127	J-128	-61.65	0.06	0.00	0.70	0.40	0.40
P-161	J-128	J-102	-63.16	0.05	0.00	0.72	0.42	0.42
P-162	J-129	J-31	-16.06	0.03	0.00	0.18	0.03	0.03
P-163	J-130	J-69	351.54	0.08	0.00	1.00	0.42	0.42
P-164	J-131	J-21	-18.12	0.00	0.00	0.05	0.00	0.00
P-165	J-75	I-RV-1	1.51	0.00	0.00	0.02	0.00	0.00
P-166	J-14	J-63	182.95	0.05	0.00	0.52	0.10	0.10
P-167	J-63	J-130	199.13	0.04	0.00	0.56	0.11	0.11
P-168	J-101	J-90	-181.62	0.15	0.00	0.52	0.09	0.09
P-169	J-108	J-78	281.30	0.15	0.00	0.80	0.21	0.21
P-170	J-124	R-2	1082.69	7.86	0.00	3.07	2.56	2.56

P U M P/L O S S   E L E M E N T   R E S U L T S

INLET OUTLET PUMP EFFIC- USEFUL INCREMTL TOTAL
#PUMPS #PUMPS NPSH
NAME FLOWRATE HEAD HEAD HEAD ENCY POWER COST COST
PARALLEL SERIES Avail.
gpm ft ft ft % Hp $ $
ft

Device "Pump-1" is closed

Pump-1	0.00	183.56	183.56	0.0	75.00	0.	0.0	0.0	**	** 216.8
Device "Pump-2" is closed										
Pump-2	0.00	183.56	183.56	0.0	75.00	0.	0.0	0.0	**	** 216.8
Device "Pump-3" is closed										
Pump-3	0.00	183.56	183.56	0.0	75.00	0.	0.0	0.0	**	** 216.8
VP-1	496.08	0.00	189.26	189.3	75.00	0.	0.0	0.0	**	** 33.2
VP-2	440.47	0.00	189.26	189.3	75.00	0.	0.0	0.0	**	** 33.2
VP-3	443.89	0.00	160.99	161.0	75.00	0.	0.0	0.0	**	** 33.2

N O D E   R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		1.51	581.16	388.00	193.16	83.70
J-2		1.51	581.40	386.00	195.40	84.67
J-3		1.51	581.43	389.00	192.43	83.39
J-4		1.51	581.44	388.00	193.44	83.82
J-5		1.51	572.86	410.00	162.86	70.57
J-6		1.51	581.45	389.00	192.45	83.39
J-7		1.51	581.45	389.00	192.45	83.40
J-8		1.51	581.45	390.00	191.45	82.96
J-9		1.51	581.45	391.00	190.45	82.53
J-10		1.51	581.47	395.00	186.47	80.81
J-11	FIRE	4.37	580.82	395.00	185.82	80.52
J-12		1.51	581.47	399.00	182.47	79.07
J-13		1.51	581.47	396.00	185.47	80.37
J-14		1.51	581.43	400.00	181.43	78.62
J-15		1.51	581.47	399.00	182.47	79.07
J-16		1.51	581.47	399.00	182.47	79.07
J-17		1.51	572.86	420.00	152.86	66.24
J-18		1.51	581.47	402.00	179.47	77.77
J-19		1.51	581.47	399.00	182.47	79.07
J-20		1.51	581.47	397.00	184.47	79.94
J-21		1.51	581.48	399.00	182.48	79.07
J-22		1.51	581.47	397.00	184.47	79.94
J-23		1.51	581.49	400.00	181.49	78.65
J-24		1.51	581.50	401.00	180.50	78.22
J-25		1.51	581.49	399.00	182.49	79.08
J-26		1.51	581.49	398.00	183.49	79.51
J-27		1.51	581.51	392.00	189.51	82.12
J-28		1.51	581.50	391.00	190.50	82.55
J-29		1.51	581.51	392.00	189.51	82.12
J-30		1.51	581.50	390.00	191.50	82.98
J-31		1.51	581.59	399.00	182.59	79.12

J-32	1.51	581.66	402.00	179.66	77.85
J-33	1.51	581.56	393.00	188.56	81.71
J-34	1.51	581.55	403.00	178.55	77.37
J-35	1.51	581.56	403.00	178.56	77.38
J-36	1.51	581.50	400.00	181.50	78.65
J-37	1.51	581.43	405.00	176.43	76.45
J-38	1.51	581.52	401.00	180.52	78.22
J-39	1.51	581.43	401.00	180.43	78.19
J-40	1.51	572.86	422.00	150.86	65.37
J-41	1.51	581.61	403.00	178.61	77.40
J-42	1.51	581.61	403.00	178.61	77.40
J-43	1.51	584.50	405.00	179.50	77.78
J-44	4.37	581.39	403.00	178.39	77.30
J-45	1.51	581.41	403.00	178.41	77.31
J-46	1.51	581.65	403.00	178.65	77.42
J-47	1.51	582.03	403.00	179.03	77.58
J-48	1.51	581.59	403.00	178.59	77.39
J-49	4.37	579.90	414.00	165.90	71.89
J-50	1.51	581.51	403.00	178.51	77.35
J-51	1.51	581.37	403.00	178.37	77.30
J-53	1.51	581.39	403.00	178.39	77.30
J-54	1.51	581.39	403.00	178.39	77.30
J-55	1.51	581.44	401.00	180.44	78.19
J-56	1.51	581.48	403.00	178.48	77.34
J-57	1.51	581.39	401.00	180.39	78.17
J-58	4.37	580.83	399.00	181.83	78.79
J-59	1.51	581.39	401.00	180.39	78.17
J-60	1.51	581.40	399.00	182.40	79.04
J-61	1.51	581.41	401.00	180.41	78.18
J-62	1.51	581.42	402.00	179.42	77.75
J-63	1.51	581.38	399.00	182.38	79.03
J-64	1.51	581.42	401.00	180.42	78.18
J-66	1.51	581.09	403.00	178.09	77.17
J-67	4.37	580.82	393.00	187.82	81.39
J-68	1.51	581.18	399.00	182.18	78.95
J-69	1.51	581.26	400.00	181.26	78.55
J-70	4.37	580.82	400.00	180.82	78.36
J-71	4.37	580.83	399.00	181.83	78.79
J-72	4.37	580.82	399.00	181.82	78.79
J-73	4.37	580.82	399.00	181.82	78.79
J-74	4.37	580.82	393.00	187.82	81.39
J-75	1.51	581.06	397.50	183.56	79.54
J-76	4.37	580.82	393.00	187.82	81.39
J-77	4.37	580.51	403.00	177.51	76.92
J-78	4.37	580.53	403.00	177.53	76.93
J-79	4.37	579.54	403.00	176.54	76.50
J-80	4.37	579.54	403.00	176.54	76.50
J-81	4.37	574.76	413.00	161.76	70.10
J-82	4.37	579.54	403.00	176.54	76.50
J-83	4.37	574.62	412.00	162.62	70.47
J-84	4.37	574.60	404.00	170.60	73.93
J-85	4.37	574.60	408.00	166.60	72.19
J-86	4.37	574.60	404.00	170.60	73.93
J-87	4.37	574.60	404.00	170.60	73.92

J-88		1.51	587.18	399.00	188.18	81.54
J-89		4.37	574.60	404.00	170.60	73.93
J-90		1.51	587.26	398.00	189.26	82.01
J-91		1.51	585.66	401.00	184.66	80.02
J-92		1.51	585.33	401.00	184.33	79.88
J-93		1.51	581.99	404.00	177.99	77.13
J-94		1.51	581.99	403.00	178.99	77.56
J-95		1.51	585.66	401.00	184.66	80.02
J-96		1.51	581.93	403.00	178.93	77.54
J-97		1.51	586.00	401.00	185.00	80.17
J-98		1.51	586.63	399.00	187.63	81.31
J-99		1.51	586.63	399.00	187.63	81.31
J-100		1.51	586.34	399.00	187.34	81.18
J-101		1.51	587.11	397.00	190.11	82.38
J-102		1.51	586.75	396.00	190.75	82.66
J-103		1.51	586.47	399.00	187.47	81.24
J-104		1.51	581.79	403.00	178.79	77.48
J-105		1.51	581.79	403.00	178.79	77.48
J-106		1.51	581.93	405.00	176.93	76.67
J-107		1.51	581.93	405.00	176.93	76.67
J-108		4.37	580.68	403.00	177.68	77.00
J-109		1.51	581.47	396.00	185.47	80.37
J-110		4.37	580.82	397.00	183.82	79.65
J-111		4.37	580.82	399.00	181.82	78.79
J-112		4.37	580.82	399.00	181.82	78.79
J-113		4.37	577.96	405.00	172.96	74.95
J-114		4.37	576.68	412.00	164.68	71.36
J-115		4.37	576.01	412.00	164.01	71.07
J-116		4.37	574.61	404.00	170.61	73.93
J-117		4.37	574.60	405.00	169.60	73.49
J-118		4.37	580.96	403.00	177.96	77.12
J-119		4.37	581.39	403.00	178.39	77.30
J-120		4.37	581.39	403.00	178.39	77.30
J-121		4.37	580.82	399.00	181.82	78.79
J-122		1.51	581.06	397.50	183.56	79.54
J-123		1.51	581.06	397.50	183.56	79.54
J-124		1.51	572.86	424.00	148.86	64.51
J-125		1.51	572.86	407.00	165.86	71.87
J-126		1.51	572.86	415.00	157.86	68.41
J-127		1.51	586.64	396.00	190.64	82.61
J-128		1.51	586.70	396.00	190.70	82.64
J-129		1.51	581.57	395.00	186.57	80.85
J-130		1.51	581.34	403.00	178.34	77.28
J-131		1.51	581.47	399.00	182.47	79.07
I-Pump-1		0.00	581.06	397.50	183.56	79.54
I-Pump-2		0.00	581.06	397.50	183.56	79.54
I-Pump-3		0.00	581.06	397.50	183.56	79.54
R-1		----	581.06	397.50	183.56	79.54
R-2	NEW 750,000	----	565.00	540.00	25.00	10.83
O-RV-1		0.00	581.06	397.00	184.06	79.76
VP-1	WELL 1	----	587.26	398.00	189.26	82.01
VP-2	WELL 2	----	587.26	398.00	189.26	82.01
VP-3	WELL 3	----	574.99	414.00	160.99	69.76
O-Pump-3		0.00	581.06	397.50	183.56	79.54

O-Pump-2	0.00	581.06	397.50	183.56	79.54
O-Pump-1	0.00	581.06	397.50	183.56	79.54
I-RV-1	----	581.06	397.00	184.06	79.76

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

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
J-2	84.67	R-2	10.83
J-4	83.82	J-124	64.51
J-1	83.70	J-40	65.37
J-7	83.40	J-17	66.24
J-6	83.39	J-126	68.41

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
P-54	4.67	P-3	0.00
P-53	3.78	P-10	0.00
P-144	3.10	P-95	0.00
P-170	3.07	P-98	0.00
P-119	2.61	P-125	0.00

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
P-54	14.34	P-3	0.00
P-53	9.03	P-125	0.00
P-52	2.76	P-10	0.00
P-144	2.60	P-95	0.00
P-170	2.56	P-98	0.00

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
P-54	14.34	P-3	0.00
P-53	9.03	P-125	0.00
P-52	2.76	P-10	0.00

P-144	2.60	P-95	0.00
P-170	2.56	P-98	0.00

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

VALVE LABEL	VALVE TYPE	VALVE SETTING psi or gpm	VALVE STATUS	UPSTREAM PRESSURE psi	DOWNSTREAM PRESSURE psi	THROUGH FLOW gpm
RV-1	PSV	70.00	WIDE OPEN	79.76	79.76	1.51

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

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

NODE NAME	FLOWRATE gpm	NODE TITLE
R-2	-1082.69	NEW 750,000
VP-1	496.08	WELL 1
VP-2	440.47	WELL 2
VP-3	443.89	WELL 3

NET SYSTEM INFLOW = 1380.44
NET SYSTEM OUTFLOW = -1082.69
NET SYSTEM DEMAND = 297.75

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

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* * * * * * * * * * * * K Y P I P E * * * * * * * * * * * *
*                                                          *
*  Pipe Network Modeling Software                          *
*                                                          *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)              *
*  Version: 8.003 (vr8)  10/29/2015                        *
*  Company:  4BEngineer    Serial #:  591127               *
*  Interface:  Classic                                     *
*  Licensed for Pipe2016                                   *
*                                                          *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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Date & Time: Wed Jun 22 09:44:39 2016

Master File : C:\Users\4B Engineering\Documents\CITY DOCUMENTS\COBURG\MODELING\peak hour-year 2025 upper reservoir only.KYP\peak hour-year 2025 upper reservoir only.P2K (10)

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***********************************************
 S U M M A R Y   O F   O R I G I N A L   D A T A
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U N I T S   S P E C I F I E D

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

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

VALVE LABEL	VALVE TYPE	VALVE SETTING (ft or gpm)
RV-1	PSV	558.54

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

STATUS CODE: XX -CLOSED PIPE   CV -CHECK VALVE

P I P E N A M E	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-1	J-1	J-2	280.00	1.25	135.0000	0.00
P-2	J-2	J-3	606.60	3.00	135.0000	0.00
P-3	J-5	J-125	468.00	12.00	140.0000	0.00

P-4	J-3	J-6	193.40	3.00	135.0000	0.00
P-5	J-6	J-4	600.30	3.00	135.0000	0.00
P-6	J-6	J-7	378.00	6.00	135.0000	0.00
P-7	J-7	J-9	1386.50	8.00	135.0000	0.00
P-8	J-9	J-8	2435.90	6.00	135.0000	0.00
P-9	J-9	J-13	3328.60	8.00	135.0000	0.00
P-10	J-10	J-109	76.70	12.00	120.0000	0.00
P-11	J-10	J-131	434.80	12.00	120.0000	0.00
P-12	J-13	J-10	565.60	8.00	120.0000	0.00
P-13	J-12	J-14	503.90	12.00	135.0000	0.00
P-14	J-12	J-16	176.50	4.00	100.0000	0.00
P-15	J-16	J-15	179.60	4.00	100.0000	0.00
P-16	J-17	J-126	459.90	12.00	140.0000	0.00
P-17	J-15	J-18	130.00	4.00	100.0000	0.00
P-18	J-15	J-19	181.70	4.00	100.0000	0.00
P-19	J-20	J-12	181.70	12.00	120.0000	0.00
P-20	J-19	J-20	353.40	6.00	135.0000	0.00
P-21	J-21	J-22	373.10	12.00	120.0000	0.00
P-22	J-22	J-20	140.30	12.00	120.0000	0.00
P-23	J-22	J-25	224.90	8.00	135.0000	0.00
P-24	J-21	J-26	277.90	8.00	135.0000	0.00
P-25	J-25	J-24	278.00	8.00	135.0000	0.00
P-26	J-24	J-23	320.90	8.00	135.0000	0.00
P-27	J-23	J-12	425.10	12.00	120.0000	0.00
P-28	J-26	J-25	378.90	8.00	135.0000	0.00
P-29	J-26	J-28	423.90	8.00	135.0000	0.00
P-30	J-28	J-30	377.90	8.00	135.0000	0.00
P-31	J-28	J-29	689.00	8.00	135.0000	0.00
P-32	J-27	J-29	200.00	8.00	135.0000	0.00
P-33	J-30	J-27	418.10	6.00	135.0000	0.00
P-34	J-29	J-33	260.50	6.00	135.0000	0.00
P-35	J-31	J-32	334.50	6.00	135.0000	0.00
P-36	J-33	J-31	381.70	6.00	135.0000	0.00
P-37	J-33	J-129	287.60	6.00	135.0000	0.00
P-38	J-40	J-17	642.70	12.00	140.0000	0.00
P-39	J-32	J-35	297.30	8.00	135.0000	0.00
P-40	J-35	J-24	320.70	8.00	135.0000	0.00
P-41	J-35	J-38	287.70	6.00	135.0000	0.00
P-42	J-36	J-23	30.00	8.00	135.0000	0.00
P-43	J-36	J-37	383.70	8.00	135.0000	0.00
P-44	J-38	J-36	277.70	12.00	135.0000	0.00
P-45	J-37	J-14	289.60	12.00	135.0000	0.00
P-46	J-37	J-39	308.50	12.00	135.0000	0.00
P-47	J-39	J-38	401.60	6.00	120.0000	0.00
P-48	J-38	J-34	299.60	12.00	120.0000	0.00
P-49	J-34	J-41	596.00	12.00	120.0000	0.00
P-51	J-41	J-42	56.70	12.00	120.0000	0.00
P-52	J-32	J-43	1029.30	6.00	130.0000	0.00
P-53	J-43	J-42	319.60	6.00	135.0000	0.00
P-54	J-43	J-47	172.10	6.00	130.0000	0.00
P-55	J-45	J-120	646.60	6.00	120.0000	0.00
P-56	J-46	J-45	326.60	6.00	120.0000	0.00
P-57	J-47	J-46	388.10	6.00	120.0000	0.00
P-58	J-42	J-48	189.00	12.00	120.0000	0.00

P-59	J-48	J-50	366.00	12.00	120.0000	0.00
P-60	J-48	J-47	322.80	8.00	135.0000	0.00
P-61	J-50	J-53	319.10	12.00	120.0000	0.00
P-62	J-46	J-50	319.80	6.00	135.0000	0.00
P-63	J-45	J-51	339.30	8.00	135.0000	0.00
P-64	J-51	J-118	614.60	12.00	120.0000	0.00
P-66	J-48	J-56	196.60	8.00	135.0000	0.00
P-67	J-53	J-51	31.90	12.00	120.0000	0.00
P-68	J-54	J-53	172.10	12.00	120.0000	0.00
P-69	J-54	J-57	316.80	12.00	120.0000	0.00
P-70	J-56	J-62	432.00	8.00	135.0000	0.00
P-71	J-55	J-56	268.20	8.00	135.0000	0.00
P-72	J-55	J-39	349.50	8.00	135.0000	0.00
P-73	J-57	J-61	312.10	8.00	135.0000	0.00
P-74	J-57	J-59	321.70	12.00	120.0000	0.00
P-75	J-59	J-130	561.90	12.00	120.0000	0.00
P-76	J-59	J-60	324.20	12.00	135.0000	0.00
P-77	J-60	J-64	216.10	12.00	135.0000	0.00
P-78	J-61	J-55	460.20	8.00	135.0000	0.00
P-79	J-60	J-61	318.60	6.00	135.0000	0.00
P-80	J-62	J-54	307.10	8.00	135.0000	0.00
P-81	J-62	J-61	323.30	6.00	135.0000	0.00
P-82	J-60	J-63	554.80	6.00	120.0000	0.00
P-83	J-64	J-39	278.70	12.00	135.0000	0.00
P-85	J-58	J-75	577.60	12.00	120.0000	0.00
P-86	J-75	J-66	71.90	12.00	120.0000	0.00
P-87	J-68	J-66	219.60	12.00	120.0000	0.00
P-88	J-68	J-69	649.80	6.00	135.0000	0.00
P-89	J-69	J-68	213.90	12.00	120.0000	0.00
P-90	J-58	J-71	329.80	12.00	120.0000	0.00
P-91	J-71	J-70	384.90	6.00	130.0000	0.00
P-92	J-71	J-112	318.00	12.00	120.0000	0.00
P-93	J-73	J-121	70.70	6.00	135.0000	0.00
P-94	J-73	J-111	298.20	12.00	120.0000	0.00
P-95	J-75	J-123	4.00	12.00	120.0000	0.00
P-96	J-123	O-Pump-3	6.30	12.00	120.0000	0.00
P-97	J-123	O-Pump-2	6.80	12.00	120.0000	0.00
P-98	R-1	J-122	2.40	12.00	120.0000	0.00
P-99	J-123	O-Pump-1	8.40	12.00	120.0000	0.00
P-100	O-RV-1	R-1	4.30	6.00	135.0000	0.00
P-101	I-Pump-1	J-122	2.10	12.00	120.0000	0.00
P-102	I-Pump-2	J-122	2.80	12.00	120.0000	0.00
P-103	J-74	J-67	171.50	12.00	120.0000	0.00
P-104	J-74	J-76	609.80	6.00	135.0000	0.00
P-105	J-77	J-49	383.00	12.00	120.0000	0.00
P-106	J-77	J-78	106.80	12.00	135.0000	0.00
P-107	J-49	J-80	226.20	12.00	120.0000	0.00
P-108	J-80	J-82	55.60	12.00	120.0000	0.00
P-109	J-80	J-113	1038.40	12.00	120.0000	0.00
P-110	J-82	J-79	182.50	6.00	135.0000	0.00
P-111	J-83	J-81	228.60	12.00	120.0000	0.00
P-112	J-83	J-116	295.10	8.00	120.0000	0.00
P-113	J-84	J-117	106.10	8.00	120.0000	0.00
P-114	J-84	J-87	234.20	6.00	135.0000	0.00

P-115	J-86	J-84	333.90	8.00	120.0000	0.00
P-116	J-86	J-89	364.30	8.00	135.0000	0.00
P-117	J-43	J-92	334.00	12.00	120.0000	0.00
P-118	VP-1	J-90	92.90	24.00	120.0000	0.00
P-119	J-91	J-97	168.70	12.00	135.0000	0.00
P-120	J-92	J-91	130.20	12.00	120.0000	0.00
P-122	J-93	J-47	326.60	8.00	135.0000	0.00
P-123	J-93	J-94	366.00	4.00	130.0000	0.00
P-124	J-93	J-96	576.50	8.00	135.0000	0.00
P-125	J-91	J-95	86.50	12.00	135.0000	0.00
P-126	J-97	J-102	631.00	12.00	135.0000	0.00
P-127	J-97	J-100	291.10	8.00	135.0000	0.00
P-128	J-98	J-99	107.60	8.00	135.0000	0.00
P-129	J-98	J-101	670.90	8.00	135.0000	0.00
P-130	J-100	J-98	429.00	8.00	135.0000	0.00
P-131	J-100	J-103	302.20	6.00	120.0000	0.00
P-132	J-102	J-88	308.70	12.00	135.0000	0.00
P-133	J-103	J-127	438.60	6.00	135.0000	0.00
P-134	J-90	J-88	1360.00	24.00	120.0000	0.00
P-135	VP-2	J-90	36.10	24.00	120.0000	0.00
P-136	J-46	J-104	332.30	6.00	120.0000	0.00
P-137	J-104	J-105	429.80	6.00	120.0000	0.00
P-138	J-104	J-96	316.00	6.00	120.0000	0.00
P-139	J-96	J-106	549.40	6.00	120.0000	0.00
P-140	J-96	J-107	464.20	6.00	120.0000	0.00
P-141	J-58	J-108	633.20	12.00	135.0000	0.00
P-142	VP-3	J-81	453.20	12.00	140.0000	0.00
P-143	I-Pump-3	J-122	4.00	12.00	120.0000	0.00
P-144	J-83	J-124	676.20	12.00	140.0000	0.00
P-145	J-11	J-74	194.50	12.00	120.0000	0.00
P-146	J-110	J-11	311.90	12.00	120.0000	0.00
P-147	J-111	J-110	348.40	12.00	120.0000	0.00
P-148	J-112	J-73	378.60	12.00	120.0000	0.00
P-149	J-113	J-114	851.10	12.00	120.0000	0.00
P-150	J-114	J-115	451.70	12.00	120.0000	0.00
P-151	J-115	J-83	950.10	12.00	120.0000	0.00
P-152	J-116	J-86	247.50	8.00	120.0000	0.00
P-153	J-117	J-85	500.80	8.00	120.0000	0.00
P-154	J-118	J-77	693.90	12.00	120.0000	0.00
P-155	J-119	J-44	151.90	6.00	120.0000	0.00
P-156	J-120	J-119	139.90	6.00	120.0000	0.00
P-157	J-121	J-72	124.10	6.00	135.0000	0.00
P-158	J-124	J-40	295.90	12.00	140.0000	0.00
P-159	J-126	J-5	574.90	12.00	140.0000	0.00
P-160	J-127	J-128	143.40	6.00	135.0000	0.00
P-161	J-128	J-102	117.00	6.00	135.0000	0.00
P-162	J-129	J-31	763.20	6.00	135.0000	0.00
P-163	J-130	J-69	184.80	12.00	120.0000	0.00
P-164	J-131	J-21	294.10	12.00	120.0000	0.00
P-165	J-75	I-RV-1	8.50	6.00	135.0000	0.00
P-166	J-14	J-63	564.60	12.00	140.0000	0.00
P-167	J-63	J-130	348.50	12.00	140.0000	0.00
P-168	J-101	J-90	1552.60	12.00	140.0000	0.00
P-169	J-108	J-78	727.40	12.00	140.0000	0.00

P-170	J-124	R-2	3068.20	12.00	140.0000	0.00

P U M P/L O S S   E L E M E N T   D A T A

THERE IS A DEVICE AT NODE Pump-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 3)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
210.00	0.00	80.00
185.00	800.00	80.00
160.00	1000.00	80.00
110.00	1400.00	80.00

THERE IS A DEVICE AT NODE Pump-2 ....> (ID= 3)

THERE IS A DEVICE AT NODE Pump-3 ....> (ID= 3)

THERE IS A DEVICE AT NODE VP-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
230.00	0.00	75.00
224.00	210.00	75.00
222.00	315.00	75.00
211.00	420.00	75.00
178.00	525.00	75.00
130.00	630.00	75.00

THERE IS A DEVICE AT NODE VP-2 DESCRIBED BY THE FOLLOWING DATA: (ID= 2)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
395.00	0.00	75.00
290.00	240.00	75.00
205.00	400.00	75.00
140.00	580.00	75.00
90.00	640.00	75.00

THERE IS A DEVICE AT NODE VP-3 DESCRIBED BY THE FOLLOWING DATA: (ID= 4)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
300.00	0.00	75.00
275.00	200.00	75.00
250.00	300.00	75.00
200.00	400.00	75.00
100.00	500.00	75.00

N O D E   D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
J-1		9.80	388.00	
J-2		9.80	386.00	
J-3		9.80	389.00	
J-4		9.80	388.00	
J-5		9.80	410.00	
J-6		9.80	389.00	
J-7		9.80	389.00	
J-8		9.80	390.00	
J-9		9.80	391.00	
J-10		9.80	395.00	
J-11		28.42	395.00	
J-12		9.80	399.00	
J-13		9.80	396.00	
J-14		9.80	400.00	
J-15		9.80	399.00	
J-16		9.80	399.00	
J-17		9.80	420.00	
J-18		9.80	402.00	
J-19		9.80	399.00	
J-20		9.80	397.00	
J-21		9.80	399.00	
J-22		9.80	397.00	
J-23		9.80	400.00	
J-24		9.80	401.00	
J-25		9.80	399.00	
J-26		9.80	398.00	
J-27		9.80	392.00	
J-28		9.80	391.00	
J-29		9.80	392.00	
J-30		9.80	390.00	
J-31		9.80	399.00	
J-32		9.80	402.00	
J-33		9.80	393.00	
J-34		9.80	403.00	
J-35		9.80	403.00	
J-36		9.80	400.00	
J-37		9.80	405.00	
J-38		9.80	401.00	
J-39		9.80	401.00	
J-40		9.80	422.00	
J-41		9.80	403.00	
J-42		9.80	403.00	
J-43		9.80	405.00	
J-44		28.42	403.00	
J-45		9.80	403.00	

J-46	9.80	403.00
J-47	9.80	403.00
J-48	9.80	403.00
J-49	28.42	414.00
J-50	9.80	403.00
J-51	9.80	403.00
J-53	9.80	403.00
J-54	9.80	403.00
J-55	9.80	401.00
J-56	9.80	403.00
J-57	9.80	401.00
J-58	28.42	399.00
J-59	9.80	401.00
J-60	9.80	399.00
J-61	9.80	401.00
J-62	9.80	402.00
J-63	9.80	399.00
J-64	9.80	401.00
J-66	9.80	403.00
J-67	28.42	393.00
J-68	9.80	399.00
J-69	9.80	400.00
J-70	28.42	400.00
J-71	28.42	399.00
J-72	28.42	399.00
J-73	28.42	399.00
J-74	28.42	393.00
J-75	9.80	397.50
J-76	28.42	393.00
J-77	28.42	403.00
J-78	28.42	403.00
J-79	28.42	403.00
J-80	28.42	403.00
J-81	28.42	413.00
J-82	28.42	403.00
J-83	28.42	412.00
J-84	28.42	404.00
J-85	28.42	408.00
J-86	28.42	404.00
J-87	28.42	404.00
J-88	9.80	399.00
J-89	28.42	404.00
J-90	9.80	398.00
J-91	9.80	401.00
J-92	9.80	401.00
J-93	9.80	404.00
J-94	9.80	403.00
J-95	9.80	401.00
J-96	9.80	403.00
J-97	9.80	401.00
J-98	9.80	399.00
J-99	9.80	399.00
J-100	9.80	399.00
J-101	9.80	397.00

J-102		9.80	396.00	
J-103		9.80	399.00	
J-104		9.80	403.00	
J-105		9.80	403.00	
J-106		9.80	405.00	
J-107		9.80	405.00	
J-108		28.42	403.00	
J-109		9.80	396.00	
J-110		28.42	397.00	
J-111		28.42	399.00	
J-112		28.42	399.00	
J-113		28.42	405.00	
J-114		28.42	412.00	
J-115		28.42	412.00	
J-116		28.42	404.00	
J-117		28.42	405.00	
J-118		28.42	403.00	
J-119		28.42	403.00	
J-120		28.42	403.00	
J-121		28.42	399.00	
J-122		9.80	397.50	
J-123		9.80	397.50	
J-124		9.80	424.00	
J-125		9.80	407.00	
J-126		9.80	415.00	
J-127		9.80	396.00	
J-128		9.80	396.00	
J-129		9.80	395.00	
J-130		9.80	403.00	
J-131		9.80	399.00	
I-Pump-1		0.00	397.50	
I-Pump-2		0.00	397.50	
I-Pump-3		0.00	397.50	
R-1		----	397.50	415.00
R-2	NEW 750,000	----	540.00	565.00
O-RV-1		0.00	397.00	
VP-1	WELL 1	----	398.00	398.00
VP-2	WELL 2	----	398.00	398.00
VP-3	WELL 3	----	414.00	414.00
O-Pump-3		0.00	397.50	
O-Pump-2		0.00	397.50	
O-Pump-1		0.00	397.50	
I-RV-1		----	397.00	558.54

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

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

MAXIMUM AND MINIMUM PRESSURES = 5
MAXIMUM AND MINIMUM VELOCITIES = 5
MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

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

NUMBER OF PIPES ....(P) = 166
NUMBER OF END NODES ....(J) = 133
NUMBER OF PRIMARY LOOPS ....(L) = 29
NUMBER OF SUPPLY NODES ....(F) = 5
NUMBER OF SUPPLY ZONES ....(Z) = 1

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Case: 0

RESULTS OBTAINED AFTER 18 TRIALS: ACCURACY = 0.29416E-04

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

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

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
P-1	J-1	J-2	-9.80	7.66	0.00	2.56	27.36	27.36
P-2	J-2	J-3	-19.60	0.84	0.00	0.89	1.39	1.39
P-3	J-5	J-125	9.80	0.00	0.00	0.03	0.00	0.00
P-4	J-3	J-6	-29.40	0.57	0.00	1.33	2.95	2.95
P-5	J-6	J-4	9.80	0.23	0.00	0.44	0.39	0.39
P-6	J-6	J-7	-49.00	0.10	0.00	0.56	0.26	0.26
P-7	J-7	J-9	-58.80	0.12	0.00	0.38	0.09	0.09
P-8	J-9	J-8	9.80	0.03	0.00	0.11	0.01	0.01
P-9	J-9	J-13	-78.40	0.51	0.00	0.50	0.15	0.15
P-10	J-10	J-109	9.80	0.00	0.00	0.03	0.00	0.00
P-11	J-10	J-131	-107.80	0.02	0.00	0.31	0.05	0.05
P-12	J-13	J-10	-88.20	0.13	0.00	0.56	0.24	0.24
P-13	J-12	J-14	-187.07	0.05	0.00	0.53	0.11	0.11
P-14	J-12	J-16	16.81	0.08	0.00	0.43	0.45	0.45
P-15	J-16	J-15	7.01	0.02	0.00	0.18	0.09	0.09
P-16	J-17	J-126	29.40	0.00	0.00	0.08	0.00	0.00
P-17	J-15	J-18	9.80	0.02	0.00	0.25	0.17	0.17
P-18	J-15	J-19	-12.59	0.05	0.00	0.32	0.26	0.26
P-19	J-20	J-12	-195.11	0.03	0.00	0.55	0.14	0.14
P-20	J-19	J-20	-22.39	0.02	0.00	0.25	0.06	0.06
P-21	J-21	J-22	-131.63	0.03	0.00	0.37	0.07	0.07
P-22	J-22	J-20	-162.92	0.01	0.00	0.46	0.10	0.10

P-23	J-22	J-25	21.49	0.00	0.00	0.14	0.01	0.01
P-24	J-21	J-26	4.23	0.00	0.00	0.03	0.00	0.00
P-25	J-25	J-24	-35.66	0.01	0.00	0.23	0.04	0.04
P-26	J-24	J-23	-66.36	0.04	0.00	0.42	0.11	0.11
P-27	J-23	J-12	34.65	0.00	0.00	0.10	0.01	0.01
P-28	J-26	J-25	-47.36	0.02	0.00	0.30	0.06	0.06
P-29	J-26	J-28	41.78	0.02	0.00	0.27	0.05	0.05
P-30	J-28	J-30	16.13	0.00	0.00	0.10	0.01	0.01
P-31	J-28	J-29	15.85	0.01	0.00	0.10	0.01	0.01
P-32	J-27	J-29	-3.47	0.00	0.00	0.02	0.00	0.00
P-33	J-30	J-27	6.33	0.00	0.00	0.07	0.01	0.01
P-34	J-29	J-33	2.58	0.00	0.00	0.03	0.00	0.00
P-35	J-31	J-32	-26.82	0.03	0.00	0.30	0.08	0.08
P-36	J-33	J-31	-9.93	0.01	0.00	0.11	0.01	0.01
P-37	J-33	J-129	2.72	0.00	0.00	0.03	0.00	0.00
P-38	J-40	J-17	39.20	0.00	0.00	0.11	0.01	0.01
P-39	J-32	J-35	-51.32	0.02	0.00	0.33	0.07	0.07
P-40	J-35	J-24	-20.90	0.00	0.00	0.13	0.01	0.01
P-41	J-35	J-38	-40.22	0.05	0.00	0.46	0.18	0.18
P-42	J-36	J-23	110.82	0.01	0.00	0.71	0.29	0.29
P-43	J-36	J-37	-67.07	0.04	0.00	0.43	0.11	0.11
P-44	J-38	J-36	53.55	0.00	0.00	0.15	0.01	0.01
P-45	J-37	J-14	37.69	0.00	0.00	0.11	0.01	0.01
P-46	J-37	J-39	-114.56	0.01	0.00	0.32	0.04	0.04
P-47	J-39	J-38	30.59	0.05	0.00	0.35	0.13	0.13
P-48	J-38	J-34	-72.98	0.01	0.00	0.21	0.02	0.02
P-49	J-34	J-41	-82.78	0.02	0.00	0.23	0.03	0.03
P-51	J-41	J-42	-92.58	0.00	0.00	0.26	0.04	0.04
P-52	J-32	J-43	14.71	0.03	0.00	0.17	0.03	0.03
P-53	J-43	J-42	-62.38	0.13	0.00	0.71	0.41	0.41
P-54	J-43	J-47	-69.92	0.09	0.00	0.79	0.54	0.54
P-55	J-45	J-120	85.26	0.58	0.00	0.97	0.90	0.90
P-56	J-46	J-45	-30.58	0.04	0.00	0.35	0.13	0.13
P-57	J-47	J-46	-29.69	0.05	0.00	0.34	0.13	0.13
P-58	J-42	J-48	-164.76	0.02	0.00	0.47	0.10	0.10
P-59	J-48	J-50	-205.19	0.06	0.00	0.58	0.16	0.16
P-60	J-48	J-47	84.71	0.06	0.00	0.54	0.18	0.18
P-61	J-50	J-53	-257.82	0.08	0.00	0.73	0.24	0.24
P-62	J-46	J-50	-42.82	0.06	0.00	0.49	0.20	0.20
P-63	J-45	J-51	-125.64	0.12	0.00	0.80	0.37	0.37
P-64	J-51	J-118	-647.49	0.81	0.00	1.84	1.31	1.31
P-66	J-48	J-56	-54.07	0.02	0.00	0.35	0.08	0.08
P-67	J-53	J-51	-512.05	0.03	0.00	1.45	0.85	0.85
P-68	J-54	J-53	-244.43	0.04	0.00	0.69	0.22	0.22
P-69	J-54	J-57	156.29	0.03	0.00	0.44	0.09	0.09
P-70	J-56	J-62	-55.17	0.03	0.00	0.35	0.08	0.08
P-71	J-55	J-56	8.70	0.00	0.00	0.06	0.00	0.00
P-72	J-55	J-39	27.47	0.01	0.00	0.18	0.02	0.02
P-73	J-57	J-61	54.65	0.02	0.00	0.35	0.08	0.08
P-74	J-57	J-59	91.84	0.01	0.00	0.26	0.04	0.04
P-75	J-59	J-130	-55.27	0.01	0.00	0.16	0.01	0.01
P-76	J-59	J-60	137.31	0.02	0.00	0.39	0.06	0.06
P-77	J-60	J-64	137.28	0.01	0.00	0.39	0.06	0.06
P-78	J-61	J-55	45.97	0.03	0.00	0.29	0.06	0.06

P-79	J-60	J-61	-12.25	0.01	0.00	0.14	0.02	0.02
P-80	J-62	J-54	-78.34	0.05	0.00	0.50	0.15	0.15
P-81	J-62	J-61	13.37	0.01	0.00	0.15	0.02	0.02
P-82	J-60	J-63	2.48	0.00	0.00	0.03	0.00	0.00
P-83	J-64	J-39	127.48	0.01	0.00	0.36	0.05	0.05
P-85	J-58	J-75	280.57	0.16	0.00	0.80	0.28	0.28
P-86	J-75	J-66	260.97	0.02	0.00	0.74	0.24	0.24
P-87	J-68	J-66	-251.17	0.05	0.00	0.71	0.23	0.23
P-88	J-68	J-69	21.90	0.04	0.00	0.25	0.06	0.06
P-89	J-69	J-68	-219.47	0.04	0.00	0.62	0.18	0.18
P-90	J-58	J-71	341.04	0.13	0.00	0.97	0.40	0.40
P-91	J-71	J-70	28.42	0.04	0.00	0.32	0.10	0.10
P-92	J-71	J-112	284.20	0.09	0.00	0.81	0.29	0.29
P-93	J-73	J-121	56.84	0.02	0.00	0.64	0.34	0.34
P-94	J-73	J-111	170.52	0.03	0.00	0.48	0.11	0.11
P-95	J-75	J-123	9.80	0.00	0.00	0.03	0.00	0.00
P-96	J-123	O-Pump-3	0.00	0.00	0.00	0.00	0.00	0.00
P-97	J-123	O-Pump-2	0.00	0.00	0.00	0.00	0.00	0.00
P-98	R-1	J-122	9.80	0.00	0.00	0.03	0.00	0.00
P-99	J-123	O-Pump-1	0.00	0.00	0.00	0.00	0.00	0.00
P-100	O-RV-1	R-1	0.00	0.00	0.00	0.00	0.00	0.00
P-101	I-Pump-1	J-122	0.00	0.00	0.00	0.00	0.00	0.00
P-102	I-Pump-2	J-122	0.00	0.00	0.00	0.00	0.00	0.00
P-103	J-74	J-67	28.42	0.00	0.00	0.08	0.00	0.00
P-104	J-74	J-76	28.42	0.06	0.00	0.32	0.09	0.09
P-105	J-77	J-49	-1411.20	2.13	0.00	4.00	5.57	5.57
P-106	J-77	J-78	706.87	0.13	0.00	2.01	1.24	1.24
P-107	J-49	J-80	-1439.62	1.31	0.00	4.08	5.78	5.78
P-108	J-80	J-82	56.84	0.00	0.00	0.16	0.01	0.01
P-109	J-80	J-113	-1524.88	6.67	0.00	4.33	6.42	6.42
P-110	J-82	J-79	28.42	0.02	0.00	0.32	0.09	0.09
P-111	J-83	J-81	28.42	0.00	0.00	0.08	0.00	0.00
P-112	J-83	J-116	198.94	0.31	0.00	1.27	1.06	1.06
P-113	J-84	J-117	56.84	0.01	0.00	0.36	0.10	0.10
P-114	J-84	J-87	28.42	0.02	0.00	0.32	0.09	0.09
P-115	J-86	J-84	113.68	0.13	0.00	0.73	0.38	0.38
P-116	J-86	J-89	28.42	0.01	0.00	0.18	0.02	0.02
P-117	J-43	J-92	137.20	0.02	0.00	0.39	0.07	0.07
P-118	VP-1	J-90	0.00	0.00	0.00	0.00	0.00	0.00
P-119	J-91	J-97	107.80	0.01	0.00	0.31	0.04	0.04
P-120	J-92	J-91	127.40	0.01	0.00	0.36	0.06	0.06
P-122	J-93	J-47	-34.69	0.01	0.00	0.22	0.03	0.03
P-123	J-93	J-94	9.80	0.04	0.00	0.25	0.10	0.10
P-124	J-93	J-96	15.09	0.00	0.00	0.10	0.01	0.01
P-125	J-91	J-95	9.80	0.00	0.00	0.03	0.00	0.00
P-126	J-97	J-102	63.21	0.01	0.00	0.18	0.01	0.01
P-127	J-97	J-100	34.79	0.01	0.00	0.22	0.03	0.03
P-128	J-98	J-99	9.80	0.00	0.00	0.06	0.00	0.00
P-129	J-98	J-101	-5.25	0.00	0.00	0.03	0.00	0.00
P-130	J-100	J-98	14.35	0.00	0.00	0.09	0.01	0.01
P-131	J-100	J-103	10.64	0.01	0.00	0.12	0.02	0.02
P-132	J-102	J-88	34.65	0.00	0.00	0.10	0.00	0.00
P-133	J-103	J-127	0.84	0.00	0.00	0.01	0.00	0.00
P-134	J-90	J-88	-24.85	0.00	0.00	0.02	0.00	0.00

P-135	VP-2	J-90	0.00	0.00	0.00	0.00	0.00	0.00
P-136	J-46	J-104	33.91	0.05	0.00	0.38	0.16	0.16
P-137	J-104	J-105	9.80	0.01	0.00	0.11	0.02	0.02
P-138	J-104	J-96	14.31	0.01	0.00	0.16	0.03	0.03
P-139	J-96	J-106	9.80	0.01	0.00	0.11	0.02	0.02
P-140	J-96	J-107	9.80	0.01	0.00	0.11	0.02	0.02
P-141	J-58	J-108	-650.03	0.67	0.00	1.84	1.06	1.06
P-142	VP-3	J-81	0.00	0.00	0.00	0.00	0.00	0.00
P-143	I-Pump-3	J-122	0.00	0.00	0.00	0.00	0.00	0.00
P-144	J-83	J-124	-1865.92	4.75	0.00	5.29	7.02	7.02
P-145	J-11	J-74	85.26	0.01	0.00	0.24	0.03	0.03
P-146	J-110	J-11	113.68	0.02	0.00	0.32	0.05	0.05
P-147	J-111	J-110	142.10	0.03	0.00	0.40	0.08	0.08
P-148	J-112	J-73	255.78	0.09	0.00	0.73	0.24	0.24
P-149	J-113	J-114	-1553.30	5.66	0.00	4.41	6.65	6.65
P-150	J-114	J-115	-1581.72	3.11	0.00	4.49	6.88	6.88
P-151	J-115	J-83	-1610.14	6.75	0.00	4.57	7.11	7.11
P-152	J-116	J-86	170.52	0.20	0.00	1.09	0.80	0.80
P-153	J-117	J-85	28.42	0.01	0.00	0.18	0.03	0.03
P-154	J-118	J-77	-675.91	0.99	0.00	1.92	1.42	1.42
P-155	J-119	J-44	28.42	0.02	0.00	0.32	0.12	0.12
P-156	J-120	J-119	56.84	0.06	0.00	0.64	0.42	0.42
P-157	J-121	J-72	28.42	0.01	0.00	0.32	0.09	0.09
P-158	J-124	J-40	49.00	0.00	0.00	0.14	0.01	0.01
P-159	J-126	J-5	19.60	0.00	0.00	0.06	0.00	0.00
P-160	J-127	J-128	-8.96	0.00	0.00	0.10	0.01	0.01
P-161	J-128	J-102	-18.76	0.01	0.00	0.21	0.04	0.04
P-162	J-129	J-31	-7.08	0.01	0.00	0.08	0.01	0.01
P-163	J-130	J-69	-231.57	0.04	0.00	0.66	0.20	0.20
P-164	J-131	J-21	-117.60	0.02	0.00	0.33	0.06	0.06
P-165	J-75	I-RV-1	0.00	0.00	0.00	0.00	0.00	0.00
P-166	J-14	J-63	-159.18	0.04	0.00	0.45	0.07	0.07
P-167	J-63	J-130	-166.50	0.03	0.00	0.47	0.08	0.08
P-168	J-101	J-90	-15.05	0.00	0.00	0.04	0.00	0.00
P-169	J-108	J-78	-678.45	0.78	0.00	1.92	1.08	1.08
P-170	J-124	R-2	-1924.72	22.81	0.00	5.46	7.43	7.43

P U M P/L O S S E L E M E N T R E S U L T S

NAME	FLOWRATE gpm	INLET HEAD ft	OUTLET HEAD ft	PUMP HEAD ft	EFFICIENCY %	USEFUL POWER Hp	INCREMTL COST $	TOTAL COST $	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. ft
Device "Pump-1" is closed											
Pump-1	0.00	17.50	112.57	0.0	75.00	0.	0.0	0.0	**	**	50.7

Device "Pump-2" is closed											
Pump-2	0.00	17.50	112.57	0.0	75.00	0.	0.0	0.0	**	**	50.7
Device "Pump-3" is closed											
Pump-3	0.00	17.50	112.57	0.0	75.00	0.	0.0	0.0	**	**	50.7
Device "VP-1" is closed											
VP-1	0.00	0.00	111.67	0.0	75.00	0.	0.0	0.0	**	**	33.2
Device "VP-2" is closed											
VP-2	0.00	0.00	111.67	0.0	75.00	0.	0.0	0.0	**	**	33.2
Device "VP-3" is closed											
VP-3	0.00	0.00	123.45	0.0	75.00	0.	0.0	0.0	**	**	33.2

N O D E   R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		9.80	499.76	388.00	111.76	48.43
J-2		9.80	507.43	386.00	121.43	52.62
J-3		9.80	508.27	389.00	119.27	51.68
J-4		9.80	508.61	388.00	120.61	52.26
J-5		9.80	542.19	410.00	132.19	57.28
J-6		9.80	508.84	389.00	119.84	51.93
J-7		9.80	508.94	389.00	119.94	51.97
J-8		9.80	509.03	390.00	119.03	51.58
J-9		9.80	509.06	391.00	118.06	51.16
J-10		9.80	509.70	395.00	114.70	49.70
J-11		28.42	509.84	395.00	114.84	49.77
J-12		9.80	509.81	399.00	110.81	48.02
J-13		9.80	509.57	396.00	113.57	49.21
J-14		9.80	509.86	400.00	109.86	47.61
J-15		9.80	509.71	399.00	110.71	47.97
J-16		9.80	509.73	399.00	110.73	47.98
J-17		9.80	542.19	420.00	122.19	52.95
J-18		9.80	509.69	402.00	107.69	46.67
J-19		9.80	509.76	399.00	110.76	48.00
J-20		9.80	509.78	397.00	112.78	48.87
J-21		9.80	509.74	399.00	110.74	47.99
J-22		9.80	509.77	397.00	112.77	48.87
J-23		9.80	509.81	400.00	109.81	47.58
J-24		9.80	509.77	401.00	108.77	47.13
J-25		9.80	509.76	399.00	110.76	48.00
J-26		9.80	509.74	398.00	111.74	48.42
J-27		9.80	509.71	392.00	117.71	51.01
J-28		9.80	509.72	391.00	118.72	51.45
J-29		9.80	509.71	392.00	117.71	51.01
J-30		9.80	509.72	390.00	119.72	51.88

J-31	9.80	509.72	399.00	110.72	47.98
J-32	9.80	509.75	402.00	107.75	46.69
J-33	9.80	509.71	393.00	116.71	50.58
J-34	9.80	509.83	403.00	106.83	46.29
J-35	9.80	509.77	403.00	106.77	46.27
J-36	9.80	509.82	400.00	109.82	47.59
J-37	9.80	509.86	405.00	104.86	45.44
J-38	9.80	509.82	401.00	108.82	47.16
J-39	9.80	509.87	401.00	108.87	47.18
J-40	9.80	542.19	422.00	120.19	52.08
J-41	9.80	509.84	403.00	106.84	46.30
J-42	9.80	509.85	403.00	106.85	46.30
J-43	9.80	509.72	405.00	104.72	45.38
J-44	28.42	509.24	403.00	106.24	46.04
J-45	9.80	509.90	403.00	106.90	46.32
J-46	9.80	509.86	403.00	106.86	46.31
J-47	9.80	509.81	403.00	106.81	46.28
J-48	9.80	509.87	403.00	106.87	46.31
J-49	28.42	513.95	414.00	99.95	43.31
J-50	9.80	509.92	403.00	106.92	46.33
J-51	9.80	510.03	403.00	107.03	46.38
J-53	9.80	510.00	403.00	107.00	46.37
J-54	9.80	509.96	403.00	106.96	46.35
J-55	9.80	509.88	401.00	108.88	47.18
J-56	9.80	509.88	403.00	106.88	46.32
J-57	9.80	509.93	401.00	108.93	47.20
J-58	28.42	510.23	399.00	111.23	48.20
J-59	9.80	509.92	401.00	108.92	47.20
J-60	9.80	509.90	399.00	110.90	48.06
J-61	9.80	509.91	401.00	108.91	47.19
J-62	9.80	509.92	402.00	107.92	46.76
J-63	9.80	509.90	399.00	110.90	48.06
J-64	9.80	509.89	401.00	108.89	47.19
J-66	9.80	510.05	403.00	107.05	46.39
J-67	28.42	509.84	393.00	116.84	50.63
J-68	9.80	510.00	399.00	111.00	48.10
J-69	9.80	509.97	400.00	109.97	47.65
J-70	28.42	510.06	400.00	110.06	47.69
J-71	28.42	510.10	399.00	111.10	48.14
J-72	28.42	509.88	399.00	110.88	48.05
J-73	28.42	509.92	399.00	110.92	48.07
J-74	28.42	509.84	393.00	116.84	50.63
J-75	9.80	510.07	397.50	112.57	48.78
J-76	28.42	509.78	393.00	116.78	50.60
J-77	28.42	511.82	403.00	108.82	47.16
J-78	28.42	511.69	403.00	108.69	47.10
J-79	28.42	515.24	403.00	112.24	48.64
J-80	28.42	515.26	403.00	112.26	48.65
J-81	28.42	537.45	413.00	124.45	53.93
J-82	28.42	515.26	403.00	112.26	48.65
J-83	28.42	537.45	412.00	125.45	54.36
J-84	28.42	536.81	404.00	132.81	57.55
J-85	28.42	536.78	408.00	128.78	55.81
J-86	28.42	536.94	404.00	132.94	57.61

J-87		28.42	536.79	404.00	132.79	57.54
J-88		9.80	509.67	399.00	110.67	47.96
J-89		28.42	536.93	404.00	132.93	57.60
J-90		9.80	509.67	398.00	111.67	48.39
J-91		9.80	509.68	401.00	108.68	47.10
J-92		9.80	509.69	401.00	108.69	47.10
J-93		9.80	509.80	404.00	105.80	45.85
J-94		9.80	509.76	403.00	106.76	46.26
J-95		9.80	509.68	401.00	108.68	47.10
J-96		9.80	509.79	403.00	106.79	46.28
J-97		9.80	509.68	401.00	108.68	47.09
J-98		9.80	509.66	399.00	110.66	47.95
J-99		9.80	509.66	399.00	110.66	47.95
J-100		9.80	509.67	399.00	110.67	47.96
J-101		9.80	509.67	397.00	112.67	48.82
J-102		9.80	509.67	396.00	113.67	49.26
J-103		9.80	509.66	399.00	110.66	47.95
J-104		9.80	509.80	403.00	106.80	46.28
J-105		9.80	509.80	403.00	106.80	46.28
J-106		9.80	509.79	405.00	104.79	45.41
J-107		9.80	509.79	405.00	104.79	45.41
J-108		28.42	510.91	403.00	107.91	46.76
J-109		9.80	509.70	396.00	113.70	49.27
J-110		28.42	509.86	397.00	112.86	48.91
J-111		28.42	509.89	399.00	110.89	48.05
J-112		28.42	510.01	399.00	111.01	48.10
J-113		28.42	521.93	405.00	116.93	50.67
J-114		28.42	527.59	412.00	115.59	50.09
J-115		28.42	530.70	412.00	118.70	51.44
J-116		28.42	537.13	404.00	133.13	57.69
J-117		28.42	536.80	405.00	131.80	57.11
J-118		28.42	510.83	403.00	107.83	46.73
J-119		28.42	509.26	403.00	106.26	46.05
J-120		28.42	509.32	403.00	106.32	46.07
J-121		28.42	509.90	399.00	110.90	48.05
J-122		9.80	415.00	397.50	17.50	7.58
J-123		9.80	510.07	397.50	112.57	48.78
J-124		9.80	542.19	424.00	118.19	51.22
J-125		9.80	542.19	407.00	135.19	58.58
J-126		9.80	542.19	415.00	127.19	55.11
J-127		9.80	509.66	396.00	113.66	49.25
J-128		9.80	509.66	396.00	113.66	49.25
J-129		9.80	509.71	395.00	114.71	49.71
J-130		9.80	509.93	403.00	106.93	46.34
J-131		9.80	509.72	399.00	110.72	47.98
I-Pump-1		0.00	415.00	397.50	17.50	7.58
I-Pump-2		0.00	415.00	397.50	17.50	7.58
I-Pump-3		0.00	415.00	397.50	17.50	7.58
R-1		----	415.00	397.50	17.50	7.58
R-2	NEW 750,000	----	565.00	540.00	25.00	10.83
O-RV-1		0.00	415.00	397.00	18.00	7.80
VP-1	WELL 1	----	509.67	398.00	111.67	48.39
VP-2	WELL 2	----	509.67	398.00	111.67	48.39
VP-3	WELL 3	----	537.45	414.00	123.45	53.49

O-Pump-3	0.00	510.07	397.50	112.57	48.78
O-Pump-2	0.00	510.07	397.50	112.57	48.78
O-Pump-1	0.00	510.07	397.50	112.57	48.78
I-RV-1	----	510.07	397.00	113.07	49.00

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

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
J-125	58.58	J-122	7.58
J-116	57.69	I-Pump-1	7.58
J-86	57.61	I-Pump-2	7.58
J-89	57.60	I-Pump-3	7.58
J-84	57.55	R-1	7.58

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
P-170	5.46	P-133	0.01
P-144	5.29	P-134	0.02
P-151	4.57	P-32	0.02
P-150	4.49	P-24	0.03
P-149	4.41	P-3	0.03

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
P-1	27.36	P-134	0.00
P-170	7.43	P-133	0.00
P-151	7.11	P-3	0.00
P-144	7.02	P-125	0.00
P-150	6.88	P-32	0.00

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
P-1	27.36	P-134	0.00
P-170	7.43	P-133	0.00

P-151	7.11	P-3	0.00
P-144	7.02	P-125	0.00
P-150	6.88	P-32	0.00

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

VALVE LABEL	VALVE TYPE	VALVE SETTING psi or gpm	VALVE STATUS	UPSTREAM PRESSURE psi	DOWNSTREAM PRESSURE psi	THROUGH FLOW gpm
RV-1	PSV	70.00	CLOSED	49.00	7.80	0.00

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

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

NODE NAME	FLOWRATE gpm	NODE TITLE
R-1	9.80	
R-2	1924.72	NEW 750,000

NET SYSTEM INFLOW = 1934.52
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 1934.52

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

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* * * * * * * * * * * * *  K Y P I P E  * * * * * * * * * * * * *
*                                                                *
*  Pipe Network Modeling Software                                *
*                                                                *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)                    *
*  Version: 8.003 (vr8)  10/29/2015                              *
*  Company:  4BEngineer    Serial #:  591127                     *
*  Interface:  Classic                                           *
*  Licensed for Pipe2016                                         *
*                                                                *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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Date & Time: Wed Jun 22 09:39:28 2016

Master File : C:\Users\4B Engineering\Documents\CITY DOCUMENTS\COBURG\MODELING\max day-year 2036.KYP\max day-year 2036.P2K (11)

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

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

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

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

VALVE LABEL	VALVE TYPE	VALVE SETTING (ft or gpm)
RV-1	PSV	563.15

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

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	NODE NAMES #1	NODE NAMES #2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-1	J-1	J-2	280.00	1.25	130.0000	0.00
P-2	J-2	J-3	606.60	3.00	130.0000	0.00
P-3	J-5	J-125	468.00	12.00	140.0000	0.00

P-4	J-3	J-6	193.40	3.00	130.0000	0.00
P-5	J-6	J-4	600.30	3.00	130.0000	0.00
P-6	J-6	J-7	378.00	6.00	130.0000	0.00
P-7	J-7	J-9	1386.50	8.00	130.0000	0.00
P-8	J-9	J-8	2435.90	6.00	130.0000	0.00
P-9	J-9	J-13	3328.60	8.00	130.0000	0.00
P-10	J-10	J-109	76.70	12.00	110.0000	0.00
P-11	J-10	J-131	434.80	12.00	110.0000	0.00
P-12	J-13	J-10	565.60	8.00	110.0000	0.00
P-13	J-12	J-14	503.90	12.00	130.0000	0.00
P-14	J-12	J-16	176.50	4.00	100.0000	0.00
P-15	J-16	J-15	179.60	4.00	100.0000	0.00
P-16	J-17	J-126	459.90	12.00	140.0000	0.00
P-17	J-15	J-18	130.00	4.00	100.0000	0.00
P-18	J-15	J-19	181.70	4.00	100.0000	0.00
P-19	J-20	J-12	181.70	12.00	110.0000	0.00
P-20	J-19	J-20	353.40	6.00	130.0000	0.00
P-21	J-21	J-22	373.10	12.00	110.0000	0.00
P-22	J-22	J-20	140.30	12.00	110.0000	0.00
P-23	J-22	J-25	224.90	8.00	130.0000	0.00
P-24	J-21	J-26	277.90	8.00	130.0000	0.00
P-25	J-25	J-24	278.00	8.00	130.0000	0.00
P-26	J-24	J-23	320.90	8.00	130.0000	0.00
P-27	J-23	J-12	425.10	12.00	110.0000	0.00
P-28	J-26	J-25	378.90	8.00	130.0000	0.00
P-29	J-26	J-28	423.90	8.00	130.0000	0.00
P-30	J-28	J-30	377.90	8.00	130.0000	0.00
P-31	J-28	J-29	689.00	8.00	130.0000	0.00
P-32	J-27	J-29	200.00	8.00	130.0000	0.00
P-33	J-30	J-27	418.10	6.00	130.0000	0.00
P-34	J-29	J-33	260.50	6.00	130.0000	0.00
P-35	J-31	J-32	334.50	6.00	130.0000	0.00
P-36	J-33	J-31	381.70	6.00	130.0000	0.00
P-37	J-33	J-129	287.60	6.00	130.0000	0.00
P-38	J-40	J-17	642.70	12.00	140.0000	0.00
P-39	J-32	J-35	297.30	8.00	130.0000	0.00
P-40	J-35	J-24	320.70	8.00	130.0000	0.00
P-41	J-35	J-38	287.70	6.00	130.0000	0.00
P-42	J-36	J-23	30.00	8.00	130.0000	0.00
P-43	J-36	J-37	383.70	8.00	130.0000	0.00
P-44	J-38	J-36	277.70	12.00	130.0000	0.00
P-45	J-37	J-14	289.60	12.00	130.0000	0.00
P-46	J-37	J-39	308.50	12.00	130.0000	0.00
P-47	J-39	J-38	401.60	6.00	110.0000	0.00
P-48	J-38	J-34	299.60	12.00	110.0000	0.00
P-49	J-34	J-41	596.00	12.00	110.0000	0.00
P-50	J-94	J-104	175.30	6.00	140.0000	0.00
P-51	J-41	J-42	56.70	12.00	110.0000	0.00
P-52	J-32	J-52	713.80	6.00	130.0000	0.00
P-53	J-43	J-42	319.60	6.00	130.0000	0.00
P-54	J-43	J-47	172.10	6.00	140.0000	0.00
P-55	J-45	J-120	646.60	6.00	140.0000	0.00
P-56	J-46	J-45	326.60	6.00	140.0000	0.00
P-57	J-47	J-46	388.10	6.00	140.0000	0.00

P-58	J-42	J-48	189.00	12.00	110.0000	0.00
P-59	J-48	J-50	366.00	12.00	110.0000	0.00
P-60	J-48	J-47	322.80	8.00	130.0000	0.00
P-61	J-50	J-53	320.70	12.00	110.0000	0.00
P-62	J-46	J-50	319.80	6.00	130.0000	0.00
P-63	J-45	J-51	339.30	8.00	130.0000	0.00
P-64	J-51	J-118	614.60	12.00	110.0000	0.00
P-65	J-52	J-43	315.50	6.00	140.0000	0.00
P-66	J-48	J-56	196.60	8.00	130.0000	0.00
P-67	J-53	J-51	30.30	12.00	110.0000	0.00
P-68	J-54	J-53	172.10	12.00	110.0000	0.00
P-69	J-54	J-57	316.80	12.00	110.0000	0.00
P-70	J-56	J-62	432.00	8.00	130.0000	0.00
P-71	J-55	J-56	268.20	8.00	130.0000	0.00
P-72	J-55	J-39	349.50	8.00	130.0000	0.00
P-73	J-57	J-61	312.10	8.00	130.0000	0.00
P-74	J-57	J-59	321.70	12.00	110.0000	0.00
P-75	J-59	J-130	561.90	12.00	110.0000	0.00
P-76	J-59	J-60	324.20	12.00	130.0000	0.00
P-77	J-60	J-64	216.10	12.00	130.0000	0.00
P-78	J-61	J-55	460.20	8.00	130.0000	0.00
P-79	J-60	J-61	318.60	6.00	130.0000	0.00
P-80	J-62	J-54	307.10	8.00	130.0000	0.00
P-81	J-62	J-61	323.30	6.00	130.0000	0.00
P-82	J-60	J-63	554.80	6.00	140.0000	0.00
P-83	J-64	J-39	278.70	12.00	130.0000	0.00
P-84	J-50	J-62	178.40	6.00	140.0000	0.00
P-85	J-58	J-75	577.60	12.00	110.0000	0.00
P-86	J-75	J-66	71.90	12.00	110.0000	0.00
P-87	J-68	J-66	219.60	12.00	110.0000	0.00
P-88	J-68	J-69	649.80	6.00	130.0000	0.00
P-89	J-69	J-68	213.90	12.00	110.0000	0.00
P-90	J-58	J-71	329.80	12.00	110.0000	0.00
P-91	J-71	J-70	384.90	6.00	130.0000	0.00
P-92	J-71	J-112	318.00	12.00	110.0000	0.00
P-93	J-73	J-121	70.70	6.00	130.0000	0.00
P-94	J-73	J-111	298.20	12.00	110.0000	0.00
P-95	J-75	J-123	4.00	12.00	110.0000	0.00
P-96	J-123	O-Pump-3	6.30	12.00	110.0000	0.00
P-97	J-123	O-Pump-2	6.80	12.00	110.0000	0.00
P-98	R-1	J-122	2.30	12.00	110.0000	0.00
P-99	J-123	O-Pump-1	8.40	12.00	110.0000	0.00
P-100	O-RV-1	R-1	6.20	6.00	130.0000	0.00
P-101	I-Pump-1	J-122	2.10	12.00	110.0000	0.00
P-102	I-Pump-2	J-122	2.80	12.00	110.0000	0.00
P-103	J-74	J-67	171.50	12.00	110.0000	0.00
P-104	J-74	J-76	609.80	6.00	130.0000	0.00
P-105	J-77	J-49	383.00	12.00	110.0000	0.00
P-106	J-77	J-78	106.80	12.00	130.0000	0.00
P-107	J-49	J-80	226.20	12.00	110.0000	0.00
P-108	J-80	J-82	55.60	12.00	110.0000	0.00
P-109	J-80	J-113	1038.40	12.00	110.0000	0.00
P-110	J-82	J-79	182.50	6.00	130.0000	0.00
P-111	J-83	J-81	228.60	12.00	110.0000	0.00

P-112	J-83	J-116	295.10	8.00	110.0000	0.00
P-113	J-84	J-117	106.10	8.00	110.0000	0.00
P-114	J-84	J-87	234.20	6.00	130.0000	0.00
P-115	J-86	J-84	333.90	8.00	110.0000	0.00
P-116	J-86	J-89	364.30	8.00	130.0000	0.00
P-117	J-43	J-92	334.00	12.00	110.0000	0.00
P-118	VP-1	J-90	98.30	24.00	110.0000	0.00
P-119	J-91	J-97	168.70	12.00	130.0000	0.00
P-120	J-92	J-91	130.20	12.00	110.0000	0.00
P-121	J-58	J-65	1412.30	12.00	140.0000	0.00
P-122	J-93	J-47	326.60	8.00	130.0000	0.00
P-123	J-93	J-94	217.50	6.00	140.0000	0.00
P-124	J-93	J-96	576.50	8.00	130.0000	0.00
P-125	J-91	J-95	86.50	12.00	130.0000	0.00
P-126	J-97	J-102	631.00	12.00	130.0000	0.00
P-127	J-97	J-100	291.10	8.00	130.0000	0.00
P-128	J-98	J-99	107.60	8.00	130.0000	0.00
P-129	J-98	J-101	670.90	8.00	130.0000	0.00
P-130	J-100	J-98	429.00	8.00	130.0000	0.00
P-131	J-100	J-103	302.20	6.00	140.0000	0.00
P-132	J-102	J-88	308.70	12.00	130.0000	0.00
P-133	J-103	J-127	438.60	6.00	130.0000	0.00
P-134	J-90	J-88	1360.00	24.00	110.0000	0.00
P-135	VP-2	J-90	40.90	24.00	110.0000	0.00
P-136	J-46	J-104	332.30	6.00	140.0000	0.00
P-137	J-104	J-105	429.80	6.00	140.0000	0.00
P-138	J-104	J-96	316.00	6.00	140.0000	0.00
P-139	J-96	J-106	549.40	6.00	140.0000	0.00
P-140	J-96	J-107	464.20	6.00	140.0000	0.00
P-141	J-58	J-108	633.20	12.00	130.0000	0.00
P-142	VP-3	J-81	453.20	12.00	140.0000	0.00
P-143	I-Pump-3	J-122	4.00	12.00	110.0000	0.00
P-144	J-83	J-124	676.20	12.00	140.0000	0.00
P-145	J-11	J-74	194.50	12.00	110.0000	0.00
P-146	J-110	J-11	311.90	12.00	110.0000	0.00
P-147	J-111	J-110	348.40	12.00	110.0000	0.00
P-148	J-112	J-73	378.60	12.00	110.0000	0.00
P-149	J-113	J-114	851.10	12.00	110.0000	0.00
P-150	J-114	J-115	451.70	12.00	110.0000	0.00
P-151	J-115	J-83	950.10	12.00	110.0000	0.00
P-152	J-116	J-86	247.50	8.00	110.0000	0.00
P-153	J-117	J-85	500.80	8.00	110.0000	0.00
P-154	J-118	J-77	693.90	12.00	110.0000	0.00
P-155	J-119	J-44	151.90	6.00	140.0000	0.00
P-156	J-120	J-119	139.90	6.00	140.0000	0.00
P-157	J-121	J-72	124.10	6.00	130.0000	0.00
P-158	J-124	J-40	295.90	12.00	140.0000	0.00
P-159	J-126	J-5	574.90	12.00	140.0000	0.00
P-160	J-127	J-128	143.40	6.00	130.0000	0.00
P-161	J-128	J-102	117.00	6.00	130.0000	0.00
P-162	J-129	J-31	763.20	6.00	130.0000	0.00
P-163	J-130	J-69	184.80	12.00	110.0000	0.00
P-164	J-131	J-21	294.10	12.00	110.0000	0.00
P-165	J-75	I-RV-1	7.20	6.00	130.0000	0.00

P-166	J-14	J-63	564.60	12.00	140.0000	0.00
P-167	J-63	J-130	348.50	12.00	140.0000	0.00
P-168	J-101	J-90	1547.40	12.00	140.0000	0.00
P-169	J-108	J-78	727.40	12.00	140.0000	0.00
P-170	J-124	R-2	3068.20	12.00	140.0000	0.00
P-171	J-65	J-125	2167.00	12.00	140.0000	0.00

P U M P/L O S S   E L E M E N T   D A T A

THERE IS A DEVICE AT NODE Pump-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 3)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
210.00	0.00	80.00
185.00	800.00	80.00
160.00	1000.00	80.00
110.00	1400.00	80.00

THERE IS A DEVICE AT NODE Pump-2 ....> (ID= 3)

THERE IS A DEVICE AT NODE Pump-3 ....> (ID= 3)

THERE IS A DEVICE AT NODE VP-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
230.00	0.00	75.00
224.00	210.00	75.00
222.00	315.00	75.00
211.00	420.00	75.00
178.00	525.00	75.00
130.00	630.00	75.00

THERE IS A DEVICE AT NODE VP-2 DESCRIBED BY THE FOLLOWING DATA: (ID= 2)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
395.00	0.00	75.00
290.00	240.00	75.00
205.00	400.00	75.00
140.00	580.00	75.00
90.00	640.00	75.00

THERE IS A DEVICE AT NODE VP-3 DESCRIBED BY THE FOLLOWING DATA: (ID= 4)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
300.00	0.00	75.00
275.00	200.00	75.00

250.00	300.00	75.00
200.00	400.00	75.00
100.00	500.00	75.00

N O D E   D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
J-1		6.03	388.00	
J-2		6.03	386.00	
J-3		6.03	389.00	
J-4		6.03	388.00	
J-5		6.03	410.00	
J-6		6.03	389.00	
J-7		6.03	389.00	
J-8		6.03	390.00	
J-9		6.03	391.00	
J-10		6.03	395.00	
J-11	FIRE	17.46	395.00	
J-12		6.03	399.00	
J-13		6.03	396.00	
J-14		6.03	400.00	
J-15		6.03	399.00	
J-16		6.03	399.00	
J-17		6.03	420.00	
J-18		6.03	402.00	
J-19		6.03	399.00	
J-20		6.03	397.00	
J-21		6.03	399.00	
J-22		6.03	397.00	
J-23		6.03	400.00	
J-24		6.03	401.00	
J-25		6.03	399.00	
J-26		6.03	398.00	
J-27		6.03	392.00	
J-28		6.03	391.00	
J-29		6.03	392.00	
J-30		6.03	390.00	
J-31		6.03	399.00	
J-32		6.03	402.00	
J-33		6.03	393.00	
J-34		6.03	403.00	
J-35		6.03	403.00	
J-36		6.03	400.00	
J-37		6.03	405.00	
J-38		6.03	401.00	
J-39		6.03	401.00	
J-40		6.03	422.00	

J-41	6.03	403.00
J-42	6.03	403.00
J-43	6.03	405.00
J-44	17.46	403.00
J-45	6.03	403.00
J-46	6.03	403.00
J-47	6.03	403.00
J-48	6.03	403.00
J-49	17.46	414.00
J-50	6.03	403.00
J-51	6.03	403.00
J-52	6.03	403.00
J-53	6.03	403.00
J-54	6.03	403.00
J-55	6.03	401.00
J-56	6.03	403.00
J-57	6.03	401.00
J-58	17.46	399.00
J-59	6.03	401.00
J-60	6.03	399.00
J-61	6.03	401.00
J-62	6.03	402.00
J-63	6.03	399.00
J-64	6.03	401.00
J-65	6.03	403.00
J-66	6.03	403.00
J-67	17.46	393.00
J-68	6.03	399.00
J-69	6.03	400.00
J-70	17.46	400.00
J-71	17.46	399.00
J-72	17.46	399.00
J-73	17.46	399.00
J-74	17.46	393.00
J-75	6.03	397.50
J-76	17.46	393.00
J-77	17.46	403.00
J-78	17.46	403.00
J-79	17.46	403.00
J-80	17.46	403.00
J-81	17.46	413.00
J-82	17.46	403.00
J-83	17.46	412.00
J-84	17.46	404.00
J-85	17.46	408.00
J-86	17.46	404.00
J-87	17.46	404.00
J-88	6.03	399.00
J-89	17.46	404.00
J-90	6.03	398.00
J-91	6.03	401.00
J-92	6.03	401.00
J-93	6.03	404.00
J-94	6.03	403.00

J-95		6.03	401.00	
J-96		6.03	403.00	
J-97		6.03	401.00	
J-98		6.03	399.00	
J-99		6.03	399.00	
J-100		6.03	399.00	
J-101		6.03	397.00	
J-102		6.03	396.00	
J-103		6.03	399.00	
J-104		6.03	403.00	
J-105		6.03	403.00	
J-106		6.03	405.00	
J-107		6.03	405.00	
J-108		17.46	403.00	
J-109		6.03	396.00	
J-110		17.46	397.00	
J-111		17.46	399.00	
J-112		17.46	399.00	
J-113		17.46	405.00	
J-114		17.46	412.00	
J-115		17.46	412.00	
J-116		17.46	404.00	
J-117		17.46	405.00	
J-118		17.46	403.00	
J-119		17.46	403.00	
J-120		17.46	403.00	
J-121		17.46	399.00	
J-122		6.03	397.50	
J-123		6.03	397.50	
J-124		6.03	424.00	
J-125		6.03	407.00	
J-126		6.03	415.00	
J-127		6.03	396.00	
J-128		6.03	396.00	
J-129		6.03	395.00	
J-130		6.03	403.00	
J-131		6.03	399.00	
I-Pump-1		0.00	397.50	
I-Pump-2		0.00	397.50	
I-Pump-3		0.00	397.50	
R-1	NEW 1 MG RES	----	397.50	415.00
R-2	NEW 750,000	----	540.00	565.00
O-RV-1		0.00	397.00	
VP-1	WELL 1	----	398.00	398.00
VP-2	WELL 2	----	398.00	398.00
VP-3	WELL 3	----	414.00	414.00
O-Pump-3		0.00	397.50	
O-Pump-2		0.00	397.50	
O-Pump-1		0.00	397.50	
I-RV-1		----	397.00	563.15

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

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

MAXIMUM AND MINIMUM PRESSURES = 5
MAXIMUM AND MINIMUM VELOCITIES = 5
MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

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

NUMBER OF PIPES ....(P) = 171
NUMBER OF END NODES ....(J) = 135
NUMBER OF PRIMARY LOOPS ....(L) = 32
NUMBER OF SUPPLY NODES ....(F) = 5
NUMBER OF SUPPLY ZONES ....(Z) = 1

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Case: 0

RESULTS OBTAINED AFTER 15 TRIALS: ACCURACY = 0.11433E-04

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

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

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
P-1	J-1	J-2	-6.03	3.34	0.00	1.58	11.94	11.94
P-2	J-2	J-3	-12.06	0.37	0.00	0.55	0.61	0.61
P-3	J-5	J-125	253.02	0.08	0.00	0.72	0.17	0.17
P-4	J-3	J-6	-18.09	0.25	0.00	0.82	1.29	1.29
P-5	J-6	J-4	6.03	0.10	0.00	0.27	0.17	0.17
P-6	J-6	J-7	-30.15	0.04	0.00	0.34	0.11	0.11

P-7	J-7	J-9	-36.18	0.05	0.00	0.23	0.04	0.04
P-8	J-9	J-8	6.03	0.01	0.00	0.07	0.01	0.01
P-9	J-9	J-13	-48.24	0.22	0.00	0.31	0.07	0.07
P-10	J-10	J-109	6.03	0.00	0.00	0.02	0.00	0.00
P-11	J-10	J-131	-66.33	0.01	0.00	0.19	0.02	0.02
P-12	J-13	J-10	-54.27	0.06	0.00	0.35	0.11	0.11
P-13	J-12	J-14	57.50	0.01	0.00	0.16	0.01	0.01
P-14	J-12	J-16	9.80	0.03	0.00	0.25	0.17	0.17
P-15	J-16	J-15	3.77	0.01	0.00	0.10	0.03	0.03
P-16	J-17	J-126	265.08	0.09	0.00	0.75	0.19	0.19
P-17	J-15	J-18	6.03	0.01	0.00	0.15	0.07	0.07
P-18	J-15	J-19	-8.29	0.02	0.00	0.21	0.12	0.12
P-19	J-20	J-12	-46.77	0.00	0.00	0.13	0.01	0.01
P-20	J-19	J-20	-14.32	0.01	0.00	0.16	0.03	0.03
P-21	J-21	J-22	-51.92	0.01	0.00	0.15	0.01	0.01
P-22	J-22	J-20	-26.42	0.00	0.00	0.07	0.00	0.00
P-23	J-22	J-25	-31.53	0.01	0.00	0.20	0.03	0.03
P-24	J-21	J-26	-26.47	0.01	0.00	0.17	0.02	0.02
P-25	J-25	J-24	-59.98	0.03	0.00	0.38	0.10	0.10
P-26	J-24	J-23	16.08	0.00	0.00	0.10	0.01	0.01
P-27	J-23	J-12	120.10	0.03	0.00	0.34	0.07	0.07
P-28	J-26	J-25	-22.42	0.01	0.00	0.14	0.02	0.02
P-29	J-26	J-28	-10.08	0.00	0.00	0.06	0.00	0.00
P-30	J-28	J-30	-1.55	0.00	0.00	0.01	0.00	0.00
P-31	J-28	J-29	-14.56	0.00	0.00	0.09	0.01	0.01
P-32	J-27	J-29	-13.61	0.00	0.00	0.09	0.01	0.01
P-33	J-30	J-27	-7.58	0.00	0.00	0.09	0.01	0.01

P-34	J-29	J-33	-34.20	0.04	0.00	0.39	0.14	0.14
P-35	J-31	J-32	-52.29	0.10	0.00	0.59	0.31	0.31
P-36	J-33	J-31	-28.38	0.04	0.00	0.32	0.10	0.10
P-37	J-33	J-129	-11.85	0.01	0.00	0.13	0.02	0.02
P-38	J-40	J-17	271.11	0.13	0.00	0.77	0.20	0.20
P-39	J-32	J-35	113.39	0.10	0.00	0.72	0.32	0.32
P-40	J-35	J-24	82.09	0.06	0.00	0.52	0.18	0.18
P-41	J-35	J-38	25.27	0.02	0.00	0.29	0.08	0.08
P-42	J-36	J-23	110.05	0.01	0.00	0.70	0.31	0.31
P-43	J-36	J-37	56.71	0.03	0.00	0.36	0.09	0.09
P-44	J-38	J-36	172.79	0.03	0.00	0.49	0.10	0.10
P-45	J-37	J-14	99.17	0.01	0.00	0.28	0.04	0.04
P-46	J-37	J-39	-48.49	0.00	0.00	0.14	0.01	0.01
P-47	J-39	J-38	-29.33	0.06	0.00	0.33	0.15	0.15
P-48	J-38	J-34	-182.88	0.04	0.00	0.52	0.15	0.15
P-49	J-34	J-41	-188.91	0.09	0.00	0.54	0.16	0.16
P-50	J-94	J-104	42.23	0.03	0.00	0.48	0.18	0.18
P-51	J-41	J-42	-194.94	0.01	0.00	0.55	0.17	0.17
P-52	J-32	J-52	-171.71	2.03	0.00	1.95	2.84	2.84
P-53	J-43	J-42	317.39	2.83	0.00	3.60	8.85	8.85
P-54	J-43	J-47	440.67	2.44	0.00	5.00	14.17	14.17
P-55	J-45	J-120	52.38	0.18	0.00	0.59	0.27	0.27
P-56	J-46	J-45	84.62	0.22	0.00	0.96	0.67	0.67
P-57	J-47	J-46	93.42	0.31	0.00	1.06	0.80	0.80
P-58	J-42	J-48	116.42	0.01	0.00	0.33	0.06	0.06
P-59	J-48	J-50	205.29	0.07	0.00	0.58	0.18	0.18
P-60	J-48	J-47	-234.73	0.40	0.00	1.50	1.25	1.25

P-61	J-50	J-53	214.72	0.06	0.00	0.61	0.20	0.20
P-62	J-46	J-50	67.04	0.16	0.00	0.76	0.50	0.50
P-63	J-45	J-51	26.21	0.01	0.00	0.17	0.02	0.02
P-64	J-51	J-118	138.76	0.05	0.00	0.39	0.09	0.09
P-65	J-52	J-43	-177.74	0.83	0.00	2.02	2.64	2.64
P-66	J-48	J-56	139.84	0.09	0.00	0.89	0.48	0.48
P-67	J-53	J-51	118.58	0.00	0.00	0.34	0.07	0.07
P-68	J-54	J-53	-90.11	0.01	0.00	0.26	0.04	0.04
P-69	J-54	J-57	136.03	0.03	0.00	0.39	0.09	0.09
P-70	J-56	J-62	40.71	0.02	0.00	0.26	0.05	0.05
P-71	J-55	J-56	-93.10	0.06	0.00	0.59	0.22	0.22
P-72	J-55	J-39	65.01	0.04	0.00	0.41	0.12	0.12
P-73	J-57	J-61	-20.18	0.00	0.00	0.13	0.01	0.01
P-74	J-57	J-59	150.18	0.03	0.00	0.43	0.10	0.10
P-75	J-59	J-130	174.09	0.08	0.00	0.49	0.14	0.14
P-76	J-59	J-60	-29.94	0.00	0.00	0.08	0.00	0.00
P-77	J-60	J-64	-33.79	0.00	0.00	0.10	0.00	0.00
P-78	J-61	J-55	-22.05	0.01	0.00	0.14	0.02	0.02
P-79	J-60	J-61	-30.16	0.04	0.00	0.34	0.11	0.11
P-80	J-62	J-54	51.94	0.02	0.00	0.33	0.08	0.08
P-81	J-62	J-61	34.32	0.05	0.00	0.39	0.14	0.14
P-82	J-60	J-63	27.99	0.05	0.00	0.32	0.09	0.09
P-83	J-64	J-39	-39.82	0.00	0.00	0.11	0.01	0.01
P-84	J-50	J-62	51.59	0.05	0.00	0.59	0.27	0.27
P-85	J-58	J-75	222.48	0.12	0.00	0.63	0.21	0.21
P-86	J-75	J-66	-322.61	0.03	0.00	0.92	0.43	0.43
P-87	J-68	J-66	328.64	0.10	0.00	0.93	0.44	0.44

P-88	J-68	J-69	-31.75	0.08	0.00	0.36	0.12	0.12
P-89	J-69	J-68	302.92	0.08	0.00	0.86	0.38	0.38
P-90	J-58	J-71	209.52	0.06	0.00	0.59	0.19	0.19
P-91	J-71	J-70	17.46	0.02	0.00	0.20	0.04	0.04
P-92	J-71	J-112	174.60	0.04	0.00	0.50	0.14	0.14
P-93	J-73	J-121	34.92	0.01	0.00	0.40	0.15	0.15
P-94	J-73	J-111	104.76	0.02	0.00	0.30	0.05	0.05
P-95	J-75	J-123	6.03	0.00	0.00	0.02	0.00	0.00
P-96	J-123	O-Pump-3	0.00	0.00	0.00	0.00	0.00	0.00
P-97	J-123	O-Pump-2	0.00	0.00	0.00	0.00	0.00	0.00
P-98	R-1	J-122	6.03	0.00	0.00	0.02	0.00	0.00
P-99	J-123	O-Pump-1	0.00	0.00	0.00	0.00	0.00	0.00
P-100	O-RV-1	R-1	533.04	0.14	0.00	6.05	23.13	23.13
P-101	I-Pump-1	J-122	0.00	0.00	0.00	0.00	0.00	0.00
P-102	I-Pump-2	J-122	0.00	0.00	0.00	0.00	0.00	0.00
P-103	J-74	J-67	17.46	0.00	0.00	0.05	0.00	0.00
P-104	J-74	J-76	17.46	0.03	0.00	0.20	0.04	0.04
P-105	J-77	J-49	-139.57	0.03	0.00	0.40	0.09	0.09
P-106	J-77	J-78	243.42	0.02	0.00	0.69	0.19	0.19
P-107	J-49	J-80	-157.03	0.03	0.00	0.45	0.11	0.11
P-108	J-80	J-82	34.92	0.00	0.00	0.10	0.01	0.01
P-109	J-80	J-113	-209.41	0.20	0.00	0.59	0.19	0.19
P-110	J-82	J-79	17.46	0.01	0.00	0.20	0.04	0.04
P-111	J-83	J-81	-436.52	0.17	0.00	1.24	0.74	0.74
P-112	J-83	J-116	122.22	0.15	0.00	0.78	0.51	0.51
P-113	J-84	J-117	34.92	0.01	0.00	0.22	0.05	0.05
P-114	J-84	J-87	17.46	0.01	0.00	0.20	0.04	0.04

P-115	J-86	J-84	69.84	0.06	0.00	0.45	0.18	0.18
P-116	J-86	J-89	17.46	0.00	0.00	0.11	0.01	0.01
P-117	J-43	J-92	-941.83	1.03	0.00	2.67	3.09	3.09
P-118	VP-1	J-90	539.23	0.00	0.00	0.38	0.04	0.04
P-119	J-91	J-97	-959.92	0.40	0.00	2.72	2.35	2.35
P-120	J-92	J-91	-947.86	0.41	0.00	2.69	3.13	3.13
P-121	J-58	J-65	-240.96	0.22	0.00	0.68	0.16	0.16
P-122	J-93	J-47	-106.48	0.09	0.00	0.68	0.29	0.29
P-123	J-93	J-94	48.26	0.05	0.00	0.55	0.24	0.24
P-124	J-93	J-96	52.19	0.04	0.00	0.33	0.08	0.08
P-125	J-91	J-95	6.03	0.00	0.00	0.02	0.00	0.00
P-126	J-97	J-102	-724.46	0.88	0.00	2.06	1.40	1.40
P-127	J-97	J-100	-241.49	0.38	0.00	1.54	1.31	1.31
P-128	J-98	J-99	6.03	0.00	0.00	0.04	0.00	0.00
P-129	J-98	J-101	-198.02	0.61	0.00	1.26	0.91	0.91
P-130	J-100	J-98	-185.96	0.35	0.00	1.19	0.81	0.81
P-131	J-100	J-103	-61.57	0.11	0.00	0.70	0.37	0.37
P-132	J-102	J-88	-810.15	0.53	0.00	2.30	1.72	1.72
P-133	J-103	J-127	-67.60	0.22	0.00	0.77	0.50	0.50
P-134	J-90	J-88	816.18	0.11	0.00	0.58	0.08	0.08
P-135	VP-2	J-90	487.02	0.00	0.00	0.35	0.03	0.03
P-136	J-46	J-104	-64.27	0.13	0.00	0.73	0.40	0.40
P-137	J-104	J-105	6.03	0.00	0.00	0.07	0.01	0.01
P-138	J-104	J-96	-34.10	0.04	0.00	0.39	0.12	0.12
P-139	J-96	J-106	6.03	0.00	0.00	0.07	0.01	0.01
P-140	J-96	J-107	6.03	0.00	0.00	0.07	0.01	0.01
P-141	J-58	J-108	-208.50	0.09	0.00	0.59	0.14	0.14

P-142	VP-3	J-81	453.98	0.23	0.00	1.29	0.51	0.51
P-143	I-Pump-3	J-122	0.00	0.00	0.00	0.00	0.00	0.00
P-144	J-83	J-124	35.04	0.00	0.00	0.10	0.00	0.00
P-145	J-11	J-74	52.38	0.00	0.00	0.15	0.01	0.01
P-146	J-110	J-11	69.84	0.01	0.00	0.20	0.02	0.02
P-147	J-111	J-110	87.30	0.01	0.00	0.25	0.04	0.04
P-148	J-112	J-73	157.14	0.04	0.00	0.45	0.11	0.11
P-149	J-113	J-114	-226.87	0.19	0.00	0.64	0.22	0.22
P-150	J-114	J-115	-244.33	0.11	0.00	0.69	0.25	0.25
P-151	J-115	J-83	-261.79	0.27	0.00	0.74	0.29	0.29
P-152	J-116	J-86	104.76	0.09	0.00	0.67	0.38	0.38
P-153	J-117	J-85	17.46	0.01	0.00	0.11	0.01	0.01
P-154	J-118	J-77	121.30	0.05	0.00	0.34	0.07	0.07
P-155	J-119	J-44	17.46	0.01	0.00	0.20	0.04	0.04
P-156	J-120	J-119	34.92	0.02	0.00	0.40	0.13	0.13
P-157	J-121	J-72	17.46	0.01	0.00	0.20	0.04	0.04
P-158	J-124	J-40	277.14	0.06	0.00	0.79	0.21	0.21
P-159	J-126	J-5	259.05	0.10	0.00	0.73	0.18	0.18
P-160	J-127	J-128	-73.63	0.08	0.00	0.84	0.59	0.59
P-161	J-128	J-102	-79.66	0.08	0.00	0.90	0.68	0.68
P-162	J-129	J-31	-17.88	0.03	0.00	0.20	0.04	0.04
P-163	J-130	J-69	340.70	0.09	0.00	0.97	0.47	0.47
P-164	J-131	J-21	-72.36	0.01	0.00	0.21	0.03	0.03
P-165	J-75	I-RV-1	533.04	0.17	0.00	6.05	23.13	23.13
P-166	J-14	J-63	150.64	0.04	0.00	0.43	0.07	0.07
P-167	J-63	J-130	172.60	0.03	0.00	0.49	0.09	0.09
P-168	J-101	J-90	-204.05	0.18	0.00	0.58	0.12	0.12

P-169	J-108	J-78	-225.96	0.10	0.00	0.64	0.14	0.14
P-170	J-124	R-2	-248.13	0.51	0.00	0.70	0.17	0.17
P-171	J-65	J-125	-246.99	0.36	0.00	0.70	0.17	0.17

P U M P/L O S S   E L E M E N T   R E S U L T S

NAME	FLOWRATE gpm	INLET HEAD ft	OUTLET HEAD ft	PUMP HEAD ft	EFFIC-ENCY %	USEFUL POWER Hp	INCREMTL COST $	TOTAL COST $	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. ft
Device "Pump-1" is closed											
Pump-1	0.00	17.50	165.82	0.0	75.00	0.	0.0	0.0	**	**	50.7
Device "Pump-2" is closed											
Pump-2	0.00	17.50	165.82	0.0	75.00	0.	0.0	0.0	**	**	50.7
Device "Pump-3" is closed											
Pump-3	0.00	17.50	165.82	0.0	75.00	0.	0.0	0.0	**	**	50.7
VP-1	539.23	0.00	172.09	172.1	75.00	0.	0.0	0.0	**	**	33.2
VP-2	487.02	0.00	172.09	172.1	75.00	0.	0.0	0.0	**	**	33.2
VP-3	453.98	0.00	150.89	150.9	75.00	0.	0.0	0.0	**	**	33.2

N O D E   R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		6.03	559.32	388.00	171.32	74.24
J-2		6.03	562.66	386.00	176.66	76.55
J-3		6.03	563.03	389.00	174.03	75.41
J-4		6.03	563.18	388.00	175.18	75.91
J-5		6.03	564.11	410.00	154.11	66.78
J-6		6.03	563.28	389.00	174.28	75.52
J-7		6.03	563.32	389.00	174.32	75.54
J-8		6.03	563.36	390.00	173.36	75.12
J-9		6.03	563.38	391.00	172.38	74.70

J-10		6.03	563.66	395.00	168.66	73.09
J-11	FIRE	17.46	563.26	395.00	168.26	72.91
J-12		6.03	563.69	399.00	164.69	71.37
J-13		6.03	563.60	396.00	167.60	72.63
J-14		6.03	563.68	400.00	163.68	70.93
J-15		6.03	563.65	399.00	164.65	71.35
J-16		6.03	563.66	399.00	164.66	71.35
J-17		6.03	564.30	420.00	144.30	62.53
J-18		6.03	563.65	402.00	161.65	70.05
J-19		6.03	563.68	399.00	164.68	71.36
J-20		6.03	563.69	397.00	166.69	72.23
J-21		6.03	563.68	399.00	164.68	71.36
J-22		6.03	563.69	397.00	166.69	72.23
J-23		6.03	563.72	400.00	163.72	70.94
J-24		6.03	563.72	401.00	162.72	70.51
J-25		6.03	563.69	399.00	164.69	71.37
J-26		6.03	563.69	398.00	165.69	71.80
J-27		6.03	563.69	392.00	171.69	74.40
J-28		6.03	563.69	391.00	172.69	74.83
J-29		6.03	563.69	392.00	171.69	74.40
J-30		6.03	563.69	390.00	173.69	75.27
J-31		6.03	563.77	399.00	164.77	71.40
J-32		6.03	563.87	402.00	161.87	70.15
J-33		6.03	563.73	393.00	170.73	73.98
J-34		6.03	563.80	403.00	160.80	69.68
J-35		6.03	563.78	403.00	160.78	69.67
J-36		6.03	563.73	400.00	163.73	70.95
J-37		6.03	563.69	405.00	158.69	68.77
J-38		6.03	563.75	401.00	162.75	70.53
J-39		6.03	563.70	401.00	162.70	70.50
J-40		6.03	564.43	422.00	142.43	61.72
J-41		6.03	563.89	403.00	160.89	69.72
J-42		6.03	563.90	403.00	160.90	69.72
J-43		6.03	566.73	405.00	161.73	70.08
J-44		17.46	563.56	403.00	160.56	69.58
J-45		6.03	563.76	403.00	160.76	69.66
J-46		6.03	563.98	403.00	160.98	69.76
J-47		6.03	564.29	403.00	161.29	69.89
J-48		6.03	563.89	403.00	160.89	69.72
J-49		17.46	563.69	414.00	149.69	64.86
J-50		6.03	563.82	403.00	160.82	69.69
J-51		6.03	563.76	403.00	160.76	69.66
J-52		6.03	565.90	403.00	162.90	70.59
J-53		6.03	563.76	403.00	160.76	69.66
J-54		6.03	563.75	403.00	160.75	69.66
J-55		6.03	563.74	401.00	162.74	70.52
J-56		6.03	563.80	403.00	160.80	69.68
J-57		6.03	563.72	401.00	162.72	70.51
J-58		17.46	563.44	399.00	164.44	71.26
J-59		6.03	563.69	401.00	162.69	70.50
J-60		6.03	563.69	399.00	164.69	71.37
J-61		6.03	563.73	401.00	162.73	70.52
J-62		6.03	563.78	402.00	161.78	70.10
J-63		6.03	563.65	399.00	164.65	71.35

J-64	6.03	563.69	401.00	162.69	70.50
J-65	6.03	563.67	403.00	160.67	69.62
J-66	6.03	563.35	403.00	160.35	69.49
J-67	17.46	563.25	393.00	170.25	73.78
J-68	6.03	563.45	399.00	164.45	71.26
J-69	6.03	563.53	400.00	163.53	70.86
J-70	17.46	563.36	400.00	163.36	70.79
J-71	17.46	563.38	399.00	164.38	71.23
J-72	17.46	563.28	399.00	164.28	71.19
J-73	17.46	563.29	399.00	164.29	71.19
J-74	17.46	563.26	393.00	170.26	73.78
J-75	6.03	563.32	397.50	165.82	71.86
J-76	17.46	563.23	393.00	170.23	73.77
J-77	17.46	563.65	403.00	160.65	69.62
J-78	17.46	563.63	403.00	160.63	69.61
J-79	17.46	563.71	403.00	160.71	69.64
J-80	17.46	563.71	403.00	160.71	69.64
J-81	17.46	564.66	413.00	151.66	65.72
J-82	17.46	563.71	403.00	160.71	69.64
J-83	17.46	564.49	412.00	152.49	66.08
J-84	17.46	564.19	404.00	160.19	69.41
J-85	17.46	564.17	408.00	156.17	67.68
J-86	17.46	564.25	404.00	160.25	69.44
J-87	17.46	564.18	404.00	160.18	69.41
J-88	6.03	569.98	399.00	170.98	74.09
J-89	17.46	564.24	404.00	160.24	69.44
J-90	6.03	570.09	398.00	172.09	74.57
J-91	6.03	568.17	401.00	167.17	72.44
J-92	6.03	567.77	401.00	166.77	72.26
J-93	6.03	564.20	404.00	160.20	69.42
J-94	6.03	564.15	403.00	161.15	69.83
J-95	6.03	568.17	401.00	167.17	72.44
J-96	6.03	564.15	403.00	161.15	69.83
J-97	6.03	568.57	401.00	167.57	72.61
J-98	6.03	569.30	399.00	170.30	73.80
J-99	6.03	569.30	399.00	170.30	73.80
J-100	6.03	568.95	399.00	169.95	73.65
J-101	6.03	569.91	397.00	172.91	74.93
J-102	6.03	569.45	396.00	173.45	75.16
J-103	6.03	569.06	399.00	170.06	73.69
J-104	6.03	564.12	403.00	161.12	69.82
J-105	6.03	564.11	403.00	161.11	69.82
J-106	6.03	564.15	405.00	159.15	68.97
J-107	6.03	564.15	405.00	159.15	68.97
J-108	17.46	563.53	403.00	160.53	69.56
J-109	6.03	563.66	396.00	167.66	72.65
J-110	17.46	563.27	397.00	166.27	72.05
J-111	17.46	563.28	399.00	164.28	71.19
J-112	17.46	563.34	399.00	164.34	71.21
J-113	17.46	563.91	405.00	158.91	68.86
J-114	17.46	564.10	412.00	152.10	65.91
J-115	17.46	564.22	412.00	152.22	65.96
J-116	17.46	564.34	404.00	160.34	69.48
J-117	17.46	564.18	405.00	159.18	68.98

J-118		17.46	563.70	403.00	160.70	69.64
J-119		17.46	563.57	403.00	160.57	69.58
J-120		17.46	563.59	403.00	160.59	69.59
J-121		17.46	563.28	399.00	164.28	71.19
J-122		6.03	415.00	397.50	17.50	7.58
J-123		6.03	563.32	397.50	165.82	71.86
J-124		6.03	564.49	424.00	140.49	60.88
J-125		6.03	564.03	407.00	157.03	68.05
J-126		6.03	564.21	415.00	149.21	64.66
J-127		6.03	569.29	396.00	173.29	75.09
J-128		6.03	569.37	396.00	173.37	75.13
J-129		6.03	563.74	395.00	168.74	73.12
J-130		6.03	563.62	403.00	160.62	69.60
J-131		6.03	563.67	399.00	164.67	71.36
I-Pump-1		0.00	415.00	397.50	17.50	7.58
I-Pump-2		0.00	415.00	397.50	17.50	7.58
I-Pump-3		0.00	415.00	397.50	17.50	7.58
R-1	NEW 1 MG RES	----	415.00	397.50	17.50	7.58
R-2	NEW 750,000	----	565.00	540.00	25.00	10.83
O-RV-1		0.00	415.14	397.00	18.14	7.86
VP-1	WELL 1	----	570.09	398.00	172.09	74.57
VP-2	WELL 2	----	570.09	398.00	172.09	74.57
VP-3	WELL 3	----	564.89	414.00	150.89	65.39
O-Pump-3		0.00	563.32	397.50	165.82	71.86
O-Pump-2		0.00	563.32	397.50	165.82	71.86
O-Pump-1		0.00	563.32	397.50	165.82	71.86
I-RV-1		----	563.15	397.00	166.15	72.00

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

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
J-2	76.55	J-122	7.58
J-4	75.91	I-Pump-1	7.58
J-7	75.54	I-Pump-2	7.58
J-6	75.52	I-Pump-3	7.58
J-3	75.41	R-1	7.58

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
P-100	6.05	P-30	0.01
P-165	6.05	P-10	0.02
P-54	5.00	P-95	0.02

P-53	3.60	P-98	0.02
P-119	2.72	P-125	0.02

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
P-100	23.13	P-30	0.00
P-165	23.13	P-125	0.00
P-54	14.17	P-10	0.00
P-1	11.94	P-98	0.00
P-53	8.85	P-95	0.00

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
P-100	23.13	P-30	0.00
P-165	23.13	P-125	0.00
P-54	14.17	P-10	0.00
P-1	11.94	P-98	0.00
P-53	8.85	P-95	0.00

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

VALVE LABEL	VALVE TYPE	VALVE SETTING psi or gpm	VALVE STATUS	UPSTREAM PRESSURE psi	DOWNSTREAM PRESSURE psi	THROUGH FLOW gpm
RV-1	PSV	72.00	ACTIVATED	72.00	7.86	533.04

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

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

NODE NAME	FLOWRATE gpm	NODE TITLE
R-1	-527.01	NEW 1 MG RES
R-2	248.13	NEW 750,000
VP-1	539.23	WELL 1
VP-2	487.02	WELL 2
VP-3	453.98	WELL 3

NET SYSTEM INFLOW = 1728.36

NET SYSTEM OUTFLOW =   -527.01
NET SYSTEM DEMAND =   1201.41

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

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* * * * * * * * * * * *  K Y P I P E  * * * * * * * * * * * *
*                                                            *
*  Pipe Network Modeling Software                            *
*                                                            *
*  CopyRighted by KYPIPE LLC (www.kypipe.com)                *
*  Version: 8.003 (vr8)  10/29/2015                          *
*  Company:  4BEngineer    Serial #:  591127                 *
*  Interface:  Classic                                       *
*  Licensed for Pipe2016                                     *
*                                                            *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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Date & Time: Wed Jun 22 09:36:58 2016

Master File : C:\Users\4B Engineering\Documents\CITY DOCUMENTS\COBURG\MODELING\max day-year 2036 with fire flow.KYP\max day-year 2036 with fire flow.P2K (12)

****

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

****

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

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

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

VALVE LABEL	VALVE TYPE	VALVE SETTING (ft or gpm)
RV-1	PSV	563.15

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

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	NODE NAMES #1	#2	LENGTH (ft)	DIAMETER (in)	ROUGHNESS COEFF.	MINOR LOSS COEFF.
P-1	J-1	J-2	280.00	1.25	130.0000	0.00
P-2	J-2	J-3	606.60	3.00	130.0000	0.00
P-3	J-5	J-125	468.00	12.00	140.0000	0.00

P-4	J-3	J-6	193.40	3.00	130.0000	0.00
P-5	J-6	J-4	600.30	3.00	130.0000	0.00
P-6	J-6	J-7	378.00	6.00	130.0000	0.00
P-7	J-7	J-9	1386.50	8.00	130.0000	0.00
P-8	J-9	J-8	2435.90	6.00	130.0000	0.00
P-9	J-9	J-13	3328.60	8.00	130.0000	0.00
P-10	J-10	J-109	76.70	12.00	110.0000	0.00
P-11	J-10	J-131	434.80	12.00	110.0000	0.00
P-12	J-13	J-10	565.60	8.00	110.0000	0.00
P-13	J-12	J-14	503.90	12.00	130.0000	0.00
P-14	J-12	J-16	176.50	4.00	100.0000	0.00
P-15	J-16	J-15	179.60	4.00	100.0000	0.00
P-16	J-17	J-126	459.90	12.00	140.0000	0.00
P-17	J-15	J-18	130.00	4.00	100.0000	0.00
P-18	J-15	J-19	181.70	4.00	100.0000	0.00
P-19	J-20	J-12	181.70	12.00	110.0000	0.00
P-20	J-19	J-20	353.40	6.00	130.0000	0.00
P-21	J-21	J-22	373.10	12.00	110.0000	0.00
P-22	J-22	J-20	140.30	12.00	110.0000	0.00
P-23	J-22	J-25	224.90	8.00	130.0000	0.00
P-24	J-21	J-26	277.90	8.00	130.0000	0.00
P-25	J-25	J-24	278.00	8.00	130.0000	0.00
P-26	J-24	J-23	320.90	8.00	130.0000	0.00
P-27	J-23	J-12	425.10	12.00	110.0000	0.00
P-28	J-26	J-25	378.90	8.00	130.0000	0.00
P-29	J-26	J-28	423.90	8.00	130.0000	0.00
P-30	J-28	J-30	377.90	8.00	130.0000	0.00
P-31	J-28	J-29	689.00	8.00	130.0000	0.00
P-32	J-27	J-29	200.00	8.00	130.0000	0.00
P-33	J-30	J-27	418.10	6.00	130.0000	0.00
P-34	J-29	J-33	260.50	6.00	130.0000	0.00
P-35	J-31	J-32	334.50	6.00	130.0000	0.00
P-36	J-33	J-31	381.70	6.00	130.0000	0.00
P-37	J-33	J-129	287.60	6.00	130.0000	0.00
P-38	J-40	J-17	642.70	12.00	140.0000	0.00
P-39	J-32	J-35	297.30	8.00	130.0000	0.00
P-40	J-35	J-24	320.70	8.00	130.0000	0.00
P-41	J-35	J-38	287.70	6.00	130.0000	0.00
P-42	J-36	J-23	30.00	8.00	130.0000	0.00
P-43	J-36	J-37	383.70	8.00	130.0000	0.00
P-44	J-38	J-36	277.70	12.00	130.0000	0.00
P-45	J-37	J-14	289.60	12.00	130.0000	0.00
P-46	J-37	J-39	308.50	12.00	130.0000	0.00
P-47	J-39	J-38	401.60	6.00	110.0000	0.00
P-48	J-38	J-34	299.60	12.00	110.0000	0.00
P-49	J-34	J-41	596.00	12.00	110.0000	0.00
P-50	J-94	J-104	175.30	6.00	140.0000	0.00
P-51	J-41	J-42	56.70	12.00	110.0000	0.00
P-52	J-32	J-52	713.80	6.00	130.0000	0.00
P-53	J-43	J-42	319.60	6.00	130.0000	0.00
P-54	J-43	J-47	172.10	6.00	140.0000	0.00
P-55	J-45	J-120	646.60	6.00	140.0000	0.00
P-56	J-46	J-45	326.60	6.00	140.0000	0.00
P-57	J-47	J-46	388.10	6.00	140.0000	0.00

P-58	J-42	J-48	189.00	12.00	110.0000	0.00
P-59	J-48	J-50	366.00	12.00	110.0000	0.00
P-60	J-48	J-47	322.80	8.00	130.0000	0.00
P-61	J-50	J-53	320.70	12.00	110.0000	0.00
P-62	J-46	J-50	319.80	6.00	130.0000	0.00
P-63	J-45	J-51	339.30	8.00	130.0000	0.00
P-64	J-51	J-118	614.60	12.00	110.0000	0.00
P-65	J-52	J-43	315.50	6.00	140.0000	0.00
P-66	J-48	J-56	196.60	8.00	130.0000	0.00
P-67	J-53	J-51	30.30	12.00	110.0000	0.00
P-68	J-54	J-53	172.10	12.00	110.0000	0.00
P-69	J-54	J-57	316.80	12.00	110.0000	0.00
P-70	J-56	J-62	432.00	8.00	130.0000	0.00
P-71	J-55	J-56	268.20	8.00	130.0000	0.00
P-72	J-55	J-39	349.50	8.00	130.0000	0.00
P-73	J-57	J-61	312.10	8.00	130.0000	0.00
P-74	J-57	J-59	321.70	12.00	110.0000	0.00
P-75	J-59	J-130	561.90	12.00	110.0000	0.00
P-76	J-59	J-60	324.20	12.00	130.0000	0.00
P-77	J-60	J-64	216.10	12.00	130.0000	0.00
P-78	J-61	J-55	460.20	8.00	130.0000	0.00
P-79	J-60	J-61	318.60	6.00	130.0000	0.00
P-80	J-62	J-54	307.10	8.00	130.0000	0.00
P-81	J-62	J-61	323.30	6.00	130.0000	0.00
P-82	J-60	J-63	554.80	6.00	140.0000	0.00
P-83	J-64	J-39	278.70	12.00	130.0000	0.00
P-84	J-50	J-62	178.40	6.00	140.0000	0.00
P-85	J-58	J-75	577.60	12.00	110.0000	0.00
P-86	J-75	J-66	71.90	12.00	110.0000	0.00
P-87	J-68	J-66	219.60	12.00	110.0000	0.00
P-88	J-68	J-69	649.80	6.00	130.0000	0.00
P-89	J-69	J-68	213.90	12.00	110.0000	0.00
P-90	J-58	J-71	329.80	12.00	110.0000	0.00
P-91	J-71	J-70	384.90	6.00	130.0000	0.00
P-92	J-71	J-112	318.00	12.00	110.0000	0.00
P-93	J-73	J-121	70.70	6.00	130.0000	0.00
P-94	J-73	J-111	298.20	12.00	110.0000	0.00
P-95	J-75	J-123	4.00	12.00	110.0000	0.00
P-96	J-123	O-Pump-3	6.30	12.00	110.0000	0.00
P-97	J-123	O-Pump-2	6.80	12.00	110.0000	0.00
P-98	R-1	J-122	2.30	12.00	110.0000	0.00
P-99	J-123	O-Pump-1	8.40	12.00	110.0000	0.00
P-100	O-RV-1	R-1	4.50	6.00	130.0000	0.00
P-101	I-Pump-1	J-122	2.10	12.00	110.0000	0.00
P-102	I-Pump-2	J-122	2.80	12.00	110.0000	0.00
P-103	J-74	J-67	171.50	12.00	110.0000	0.00
P-104	J-74	J-76	609.80	6.00	130.0000	0.00
P-105	J-77	J-49	383.00	12.00	110.0000	0.00
P-106	J-77	J-78	106.80	12.00	130.0000	0.00
P-107	J-49	J-80	226.20	12.00	110.0000	0.00
P-108	J-80	J-82	55.60	12.00	110.0000	0.00
P-109	J-80	J-113	1038.40	12.00	110.0000	0.00
P-110	J-82	J-79	182.50	6.00	130.0000	0.00
P-111	J-83	J-81	228.60	12.00	110.0000	0.00

P-112	J-83	J-116	295.10	8.00	110.0000	0.00
P-113	J-84	J-117	106.10	8.00	110.0000	0.00
P-114	J-84	J-87	234.20	6.00	130.0000	0.00
P-115	J-86	J-84	333.90	8.00	110.0000	0.00
P-116	J-86	J-89	364.30	8.00	130.0000	0.00
P-117	J-43	J-92	334.00	12.00	110.0000	0.00
P-118	VP-1	J-90	98.30	24.00	110.0000	0.00
P-119	J-91	J-97	168.70	12.00	130.0000	0.00
P-120	J-92	J-91	130.20	12.00	110.0000	0.00
P-121	J-58	J-65	1412.30	12.00	140.0000	0.00
P-122	J-93	J-47	326.60	8.00	130.0000	0.00
P-123	J-93	J-94	217.50	6.00	140.0000	0.00
P-124	J-93	J-96	576.50	8.00	130.0000	0.00
P-125	J-91	J-95	86.50	12.00	130.0000	0.00
P-126	J-97	J-102	631.00	12.00	130.0000	0.00
P-127	J-97	J-100	291.10	8.00	130.0000	0.00
P-128	J-98	J-99	107.60	8.00	130.0000	0.00
P-129	J-98	J-101	670.90	8.00	130.0000	0.00
P-130	J-100	J-98	429.00	8.00	130.0000	0.00
P-131	J-100	J-103	302.20	6.00	140.0000	0.00
P-132	J-102	J-88	308.70	12.00	130.0000	0.00
P-133	J-103	J-127	438.60	6.00	130.0000	0.00
P-134	J-90	J-88	1360.00	24.00	110.0000	0.00
P-135	VP-2	J-90	42.70	24.00	110.0000	0.00
P-136	J-46	J-104	332.30	6.00	140.0000	0.00
P-137	J-104	J-105	429.80	6.00	140.0000	0.00
P-138	J-104	J-96	316.00	6.00	140.0000	0.00
P-139	J-96	J-106	549.40	6.00	140.0000	0.00
P-140	J-96	J-107	464.20	6.00	140.0000	0.00
P-141	J-58	J-108	633.20	12.00	130.0000	0.00
P-142	VP-3	J-81	453.20	12.00	140.0000	0.00
P-143	I-Pump-3	J-122	4.00	12.00	110.0000	0.00
P-144	J-83	J-124	676.20	12.00	140.0000	0.00
P-145	J-11	J-74	194.50	12.00	110.0000	0.00
P-146	J-110	J-11	311.90	12.00	110.0000	0.00
P-147	J-111	J-110	348.40	12.00	110.0000	0.00
P-148	J-112	J-73	378.60	12.00	110.0000	0.00
P-149	J-113	J-114	851.10	12.00	110.0000	0.00
P-150	J-114	J-115	451.70	12.00	110.0000	0.00
P-151	J-115	J-83	950.10	12.00	110.0000	0.00
P-152	J-116	J-86	247.50	8.00	110.0000	0.00
P-153	J-117	J-85	500.80	8.00	110.0000	0.00
P-154	J-118	J-77	693.90	12.00	110.0000	0.00
P-155	J-119	J-44	151.90	6.00	140.0000	0.00
P-156	J-120	J-119	139.90	6.00	140.0000	0.00
P-157	J-121	J-72	124.10	6.00	130.0000	0.00
P-158	J-124	J-40	295.90	12.00	140.0000	0.00
P-159	J-126	J-5	574.90	12.00	140.0000	0.00
P-160	J-127	J-128	143.40	6.00	130.0000	0.00
P-161	J-128	J-102	117.00	6.00	130.0000	0.00
P-162	J-129	J-31	763.20	6.00	130.0000	0.00
P-163	J-130	J-69	184.80	12.00	110.0000	0.00
P-164	J-131	J-21	294.10	12.00	110.0000	0.00
P-165	J-75	I-RV-1	8.50	6.00	130.0000	0.00

P-166	J-14	J-63	564.60	12.00	140.0000	0.00
P-167	J-63	J-130	348.50	12.00	140.0000	0.00
P-168	J-101	J-90	1547.40	12.00	140.0000	0.00
P-169	J-108	J-78	727.40	12.00	140.0000	0.00
P-170	J-124	R-2	3068.20	12.00	140.0000	0.00
P-171	J-65	J-125	2167.00	12.00	140.0000	0.00

P U M P/L O S S   E L E M E N T   D A T A

THERE IS A DEVICE AT NODE Pump-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 3)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
210.00	0.00	80.00
185.00	800.00	80.00
160.00	1000.00	80.00
110.00	1400.00	80.00

THERE IS A DEVICE AT NODE Pump-2 ....> (ID= 3)

THERE IS A DEVICE AT NODE Pump-3 ....> (ID= 3)

THERE IS A DEVICE AT NODE VP-1 DESCRIBED BY THE FOLLOWING DATA: (ID= 1)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
230.00	0.00	75.00
224.00	210.00	75.00
222.00	315.00	75.00
211.00	420.00	75.00
178.00	525.00	75.00
130.00	630.00	75.00

THERE IS A DEVICE AT NODE VP-2 DESCRIBED BY THE FOLLOWING DATA: (ID= 2)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
395.00	0.00	75.00
290.00	240.00	75.00
205.00	400.00	75.00
140.00	580.00	75.00
90.00	640.00	75.00

THERE IS A DEVICE AT NODE VP-3 DESCRIBED BY THE FOLLOWING DATA: (ID= 4)

HEAD (ft)	FLOWRATE (gpm)	EFFICIENCY (%)
300.00	0.00	75.00
275.00	200.00	75.00

250.00	300.00	75.00
200.00	400.00	75.00
100.00	500.00	75.00

N O D E   D A T A

NODE NAME	NODE TITLE	EXTERNAL DEMAND (gpm)	JUNCTION ELEVATION (ft)	EXTERNAL GRADE (ft)
J-1		6.03	388.00	
J-2		6.03	386.00	
J-3		6.03	389.00	
J-4		6.03	388.00	
J-5		6.03	410.00	
J-6		6.03	389.00	
J-7		6.03	389.00	
J-8		6.03	390.00	
J-9		6.03	391.00	
J-10		6.03	395.00	
J-11	FIRE	3500.00	395.00	
J-12		6.03	399.00	
J-13		6.03	396.00	
J-14		6.03	400.00	
J-15		6.03	399.00	
J-16		6.03	399.00	
J-17		6.03	420.00	
J-18		6.03	402.00	
J-19		6.03	399.00	
J-20		6.03	397.00	
J-21		6.03	399.00	
J-22		6.03	397.00	
J-23		6.03	400.00	
J-24		6.03	401.00	
J-25		6.03	399.00	
J-26		6.03	398.00	
J-27		6.03	392.00	
J-28		6.03	391.00	
J-29		6.03	392.00	
J-30		6.03	390.00	
J-31		6.03	399.00	
J-32		6.03	402.00	
J-33		6.03	393.00	
J-34		6.03	403.00	
J-35		6.03	403.00	
J-36		6.03	400.00	
J-37		6.03	405.00	
J-38		6.03	401.00	
J-39		6.03	401.00	
J-40		6.03	422.00	

J-41	6.03	403.00
J-42	6.03	403.00
J-43	6.03	405.00
J-44	17.46	403.00
J-45	6.03	403.00
J-46	6.03	403.00
J-47	6.03	403.00
J-48	6.03	403.00
J-49	17.46	414.00
J-50	6.03	403.00
J-51	6.03	403.00
J-52	6.03	403.00
J-53	6.03	403.00
J-54	6.03	403.00
J-55	6.03	401.00
J-56	6.03	403.00
J-57	6.03	401.00
J-58	17.46	399.00
J-59	6.03	401.00
J-60	6.03	399.00
J-61	6.03	401.00
J-62	6.03	402.00
J-63	6.03	399.00
J-64	6.03	401.00
J-65	6.03	403.00
J-66	6.03	403.00
J-67	17.46	393.00
J-68	6.03	399.00
J-69	6.03	400.00
J-70	17.46	400.00
J-71	17.46	399.00
J-72	17.46	399.00
J-73	17.46	399.00
J-74	17.46	393.00
J-75	6.03	397.50
J-76	17.46	393.00
J-77	17.46	403.00
J-78	17.46	403.00
J-79	17.46	403.00
J-80	17.46	403.00
J-81	17.46	413.00
J-82	17.46	403.00
J-83	17.46	412.00
J-84	17.46	404.00
J-85	17.46	408.00
J-86	17.46	404.00
J-87	17.46	404.00
J-88	6.03	399.00
J-89	17.46	404.00
J-90	6.03	398.00
J-91	6.03	401.00
J-92	6.03	401.00
J-93	6.03	404.00
J-94	6.03	403.00

J-95		6.03	401.00	
J-96		6.03	403.00	
J-97		6.03	401.00	
J-98		6.03	399.00	
J-99		6.03	399.00	
J-100		6.03	399.00	
J-101		6.03	397.00	
J-102		6.03	396.00	
J-103		6.03	399.00	
J-104		6.03	403.00	
J-105		6.03	403.00	
J-106		6.03	405.00	
J-107		6.03	405.00	
J-108		17.46	403.00	
J-109		6.03	396.00	
J-110		17.46	397.00	
J-111		17.46	399.00	
J-112		17.46	399.00	
J-113		17.46	405.00	
J-114		17.46	412.00	
J-115		17.46	412.00	
J-116		17.46	404.00	
J-117		17.46	405.00	
J-118		17.46	403.00	
J-119		17.46	403.00	
J-120		17.46	403.00	
J-121		17.46	399.00	
J-122		6.03	397.50	
J-123		6.03	397.50	
J-124		6.03	424.00	
J-125		6.03	407.00	
J-126		6.03	415.00	
J-127		6.03	396.00	
J-128		6.03	396.00	
J-129		6.03	395.00	
J-130		6.03	403.00	
J-131		6.03	399.00	
I-Pump-1		0.00	397.50	
I-Pump-2		0.00	397.50	
I-Pump-3		0.00	397.50	
R-1	NEW 1 MG RES	----	397.50	415.00
R-2	NEW 750,000	----	540.00	565.00
O-RV-1		0.00	397.00	
VP-1	WELL 1	----	398.00	398.00
VP-2	WELL 2	----	398.00	398.00
VP-3	WELL 3	----	414.00	414.00
O-Pump-3		0.00	397.50	
O-Pump-2		0.00	397.50	
O-Pump-1		0.00	397.50	
I-RV-1		----	397.00	563.15

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

OUTPUT SELECTION: ALL RESULTS ARE INCLUDED IN THE TABULATED OUTPUT

MAXIMUM AND MINIMUM PRESSURES = 5
MAXIMUM AND MINIMUM VELOCITIES = 5
MAXIMUM AND MINIMUM HEAD LOSS/1000 = 5

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

NUMBER OF PIPES ....(P) = 171
NUMBER OF END NODES ....(J) = 135
NUMBER OF PRIMARY LOOPS ....(L) = 32
NUMBER OF SUPPLY NODES ....(F) = 5
NUMBER OF SUPPLY ZONES ....(Z) = 1

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Case: 0

RESULTS OBTAINED AFTER 21 TRIALS: ACCURACY = 0.41732E-04

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

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

STATUS CODE: XX -CLOSED PIPE CV -CHECK VALVE

P I P E N A M E	NODE NUMBERS #1	#2	FLOWRATE gpm	HEAD LOSS ft	MINOR LOSS ft	LINE VELO. ft/s	HL+ML/ 1000 ft/f	HL/ 1000 ft/f
P-1	J-1	J-2	-6.03	3.34	0.00	1.58	11.94	11.94
P-2	J-2	J-3	-12.06	0.37	0.00	0.55	0.61	0.61
P-3	J-5	J-125	694.73	0.53	0.00	1.97	1.13	1.13
P-4	J-3	J-6	-18.09	0.25	0.00	0.82	1.29	1.29
P-5	J-6	J-4	6.03	0.10	0.00	0.27	0.17	0.17
P-6	J-6	J-7	-30.15	0.04	0.00	0.34	0.11	0.11
P-7	J-7	J-9	-36.18	0.05	0.00	0.23	0.04	0.04
P-8	J-9	J-8	6.03	0.01	0.00	0.07	0.01	0.01
P-9	J-9	J-13	-48.24	0.22	0.00	0.31	0.07	0.07
P-10	J-10	J-109	6.03	0.00	0.00	0.02	0.00	0.00
P-11	J-10	J-131	-66.33	0.01	0.00	0.19	0.02	0.02
P-12	J-13	J-10	-54.27	0.06	0.00	0.35	0.11	0.11
P-13	J-12	J-14	9.44	0.00	0.00	0.03	0.00	0.00
P-14	J-12	J-16	9.87	0.03	0.00	0.25	0.17	0.17

P-15	J-16	J-15	3.84	0.01	0.00	0.10	0.03	0.03
P-16	J-17	J-126	706.79	0.53	0.00	2.00	1.16	1.16
P-17	J-15	J-18	6.03	0.01	0.00	0.15	0.07	0.07
P-18	J-15	J-19	-8.22	0.02	0.00	0.21	0.12	0.12
P-19	J-20	J-12	-56.82	0.00	0.00	0.16	0.02	0.02
P-20	J-19	J-20	-14.25	0.01	0.00	0.16	0.03	0.03
P-21	J-21	J-22	-54.51	0.01	0.00	0.15	0.02	0.02
P-22	J-22	J-20	-36.54	0.00	0.00	0.10	0.01	0.01
P-23	J-22	J-25	-24.00	0.00	0.00	0.15	0.02	0.02
P-24	J-21	J-26	-23.88	0.01	0.00	0.15	0.02	0.02
P-25	J-25	J-24	-50.10	0.02	0.00	0.32	0.07	0.07
P-26	J-24	J-23	23.08	0.01	0.00	0.15	0.02	0.02
P-27	J-23	J-12	82.16	0.01	0.00	0.23	0.03	0.03
P-28	J-26	J-25	-20.07	0.00	0.00	0.13	0.01	0.01
P-29	J-26	J-28	-9.84	0.00	0.00	0.06	0.00	0.00
P-30	J-28	J-30	-1.46	0.00	0.00	0.01	0.00	0.00
P-31	J-28	J-29	-14.41	0.00	0.00	0.09	0.01	0.01
P-32	J-27	J-29	-13.52	0.00	0.00	0.09	0.01	0.01
P-33	J-30	J-27	-7.49	0.00	0.00	0.09	0.01	0.01
P-34	J-29	J-33	-33.96	0.04	0.00	0.39	0.14	0.14
P-35	J-31	J-32	-52.05	0.10	0.00	0.59	0.31	0.31
P-36	J-33	J-31	-28.22	0.04	0.00	0.32	0.10	0.10
P-37	J-33	J-129	-11.76	0.01	0.00	0.13	0.02	0.02
P-38	J-40	J-17	712.82	0.76	0.00	2.02	1.18	1.18
P-39	J-32	J-35	120.04	0.11	0.00	0.77	0.36	0.36
P-40	J-35	J-24	79.21	0.05	0.00	0.51	0.17	0.17
P-41	J-35	J-38	34.80	0.04	0.00	0.39	0.15	0.15
P-42	J-36	J-23	65.11	0.00	0.00	0.42	0.12	0.12
P-43	J-36	J-37	44.70	0.02	0.00	0.29	0.06	0.06
P-44	J-38	J-36	115.84	0.01	0.00	0.33	0.05	0.05
P-45	J-37	J-14	-60.89	0.00	0.00	0.17	0.01	0.01
P-46	J-37	J-39	99.56	0.01	0.00	0.28	0.04	0.04
P-47	J-39	J-38	-25.70	0.05	0.00	0.29	0.11	0.11
P-48	J-38	J-34	-112.77	0.02	0.00	0.32	0.06	0.06
P-49	J-34	J-41	-118.80	0.04	0.00	0.34	0.07	0.07
P-50	J-94	J-104	48.67	0.04	0.00	0.55	0.24	0.24
P-51	J-41	J-42	-124.83	0.00	0.00	0.35	0.07	0.07
P-52	J-32	J-52	-178.12	2.17	0.00	2.02	3.04	3.04
P-53	J-43	J-42	335.96	3.14	0.00	3.81	9.84	9.84
P-54	J-43	J-47	471.40	2.76	0.00	5.35	16.06	16.06
P-55	J-45	J-120	52.38	0.18	0.00	0.59	0.27	0.27
P-56	J-46	J-45	111.69	0.36	0.00	1.27	1.12	1.12
P-57	J-47	J-46	107.95	0.41	0.00	1.22	1.05	1.05
P-58	J-42	J-48	205.10	0.03	0.00	0.58	0.18	0.18
P-59	J-48	J-50	315.53	0.15	0.00	0.90	0.41	0.41
P-60	J-48	J-47	-238.62	0.42	0.00	1.52	1.29	1.29
P-61	J-50	J-53	370.87	0.18	0.00	1.05	0.55	0.55
P-62	J-46	J-50	66.82	0.16	0.00	0.76	0.49	0.49
P-63	J-45	J-51	53.28	0.03	0.00	0.34	0.08	0.08
P-64	J-51	J-118	766.75	1.30	0.00	2.17	2.11	2.11
P-65	J-52	J-43	-184.15	0.89	0.00	2.09	2.82	2.82
P-66	J-48	J-56	122.16	0.07	0.00	0.78	0.37	0.37
P-67	J-53	J-51	719.50	0.06	0.00	2.04	1.88	1.88
P-68	J-54	J-53	354.66	0.09	0.00	1.01	0.51	0.51

P-69	J-54	J-57	-254.23	0.09	0.00	0.72	0.27	0.27
P-70	J-56	J-62	82.05	0.08	0.00	0.52	0.18	0.18
P-71	J-55	J-56	-34.08	0.01	0.00	0.22	0.03	0.03
P-72	J-55	J-39	-28.91	0.01	0.00	0.18	0.03	0.03
P-73	J-57	J-61	-56.44	0.03	0.00	0.36	0.09	0.09
P-74	J-57	J-59	-203.82	0.06	0.00	0.58	0.18	0.18
P-75	J-59	J-130	-138.34	0.05	0.00	0.39	0.09	0.09
P-76	J-59	J-60	-71.50	0.01	0.00	0.20	0.02	0.02
P-77	J-60	J-64	-84.30	0.01	0.00	0.24	0.03	0.03
P-78	J-61	J-55	-56.96	0.04	0.00	0.36	0.09	0.09
P-79	J-60	J-61	30.50	0.04	0.00	0.35	0.12	0.12
P-80	J-62	J-54	106.46	0.09	0.00	0.68	0.29	0.29
P-81	J-62	J-61	-24.99	0.03	0.00	0.28	0.08	0.08
P-82	J-60	J-63	-23.74	0.04	0.00	0.27	0.06	0.06
P-83	J-64	J-39	-90.33	0.01	0.00	0.26	0.03	0.03
P-84	J-50	J-62	5.45	0.00	0.00	0.06	0.00	0.00
P-85	J-58	J-75	-1979.72	7.07	0.00	5.62	12.24	12.24
P-86	J-75	J-66	249.72	0.02	0.00	0.71	0.26	0.26
P-87	J-68	J-66	-243.69	0.06	0.00	0.69	0.25	0.25
P-88	J-68	J-69	22.55	0.04	0.00	0.26	0.07	0.07
P-89	J-69	J-68	-215.11	0.04	0.00	0.61	0.20	0.20
P-90	J-58	J-71	3692.06	12.80	0.00	10.47	38.82	38.82
P-91	J-71	J-70	17.46	0.02	0.00	0.20	0.04	0.04
P-92	J-71	J-112	3657.14	12.13	0.00	10.37	38.14	38.14
P-93	J-73	J-121	34.92	0.01	0.00	0.40	0.15	0.15
P-94	J-73	J-111	3587.30	10.98	0.00	10.18	36.81	36.81
P-95	J-75	J-123	-2235.47	0.06	0.00	6.34	15.33	15.33
P-96	J-123	O-Pump-3	-1120.74	0.03	0.00	3.18	4.27	4.27
P-97	J-123	O-Pump-2	-1120.76	0.03	0.00	3.18	4.27	4.27
P-98	R-1	J-122	2247.53	0.04	0.00	6.38	15.48	15.48
P-99	J-123	O-Pump-1	0.00	0.00	0.00	0.00	0.00	0.00
P-100	O-RV-1	R-1	0.00	0.00	0.00	0.00	0.00	0.00
P-101	I-Pump-1	J-122	0.00	0.00	0.00	0.00	0.00	0.00
P-102	I-Pump-2	J-122	-1120.76	0.01	0.00	3.18	4.27	4.27
P-103	J-74	J-67	17.46	0.00	0.00	0.05	0.00	0.00
P-104	J-74	J-76	17.46	0.03	0.00	0.20	0.04	0.04
P-105	J-77	J-49	-350.21	0.19	0.00	0.99	0.49	0.49
P-106	J-77	J-78	1082.04	0.31	0.00	3.07	2.93	2.93
P-107	J-49	J-80	-367.67	0.12	0.00	1.04	0.54	0.54
P-108	J-80	J-82	34.92	0.00	0.00	0.10	0.01	0.01
P-109	J-80	J-113	-420.05	0.72	0.00	1.19	0.69	0.69
P-110	J-82	J-79	17.46	0.01	0.00	0.20	0.04	0.04
P-111	J-83	J-81	-441.45	0.17	0.00	1.25	0.76	0.76
P-112	J-83	J-116	122.22	0.15	0.00	0.78	0.51	0.51
P-113	J-84	J-117	34.92	0.01	0.00	0.22	0.05	0.05
P-114	J-84	J-87	17.46	0.01	0.00	0.20	0.04	0.04
P-115	J-86	J-84	69.84	0.06	0.00	0.45	0.18	0.18
P-116	J-86	J-89	17.46	0.00	0.00	0.11	0.01	0.01
P-117	J-43	J-92	-997.54	1.15	0.00	2.83	3.44	3.44
P-118	VP-1	J-90	547.51	0.00	0.00	0.39	0.04	0.04
P-119	J-91	J-97	-1015.63	0.44	0.00	2.88	2.61	2.61
P-120	J-92	J-91	-1003.57	0.45	0.00	2.85	3.48	3.48
P-121	J-58	J-65	-682.67	1.54	0.00	1.94	1.09	1.09
P-122	J-93	J-47	-118.80	0.12	0.00	0.76	0.35	0.35

P-123	J-93	J-94	54.70	0.06	0.00	0.62	0.30	0.30
P-124	J-93	J-96	58.07	0.05	0.00	0.37	0.09	0.09
P-125	J-91	J-95	6.03	0.00	0.00	0.02	0.00	0.00
P-126	J-97	J-102	-765.69	0.98	0.00	2.17	1.55	1.55
P-127	J-97	J-100	-255.98	0.43	0.00	1.63	1.46	1.46
P-128	J-98	J-99	6.03	0.00	0.00	0.04	0.00	0.00
P-129	J-98	J-101	-208.75	0.67	0.00	1.33	1.00	1.00
P-130	J-100	J-98	-196.69	0.39	0.00	1.26	0.90	0.90
P-131	J-100	J-103	-65.31	0.12	0.00	0.74	0.41	0.41
P-132	J-102	J-88	-855.12	0.59	0.00	2.43	1.90	1.90
P-133	J-103	J-127	-71.34	0.24	0.00	0.81	0.56	0.56
P-134	J-90	J-88	861.15	0.12	0.00	0.61	0.09	0.09
P-135	VP-2	J-90	534.45	0.00	0.00	0.38	0.04	0.04
P-136	J-46	J-104	-76.59	0.18	0.00	0.87	0.55	0.55
P-137	J-104	J-105	6.03	0.00	0.00	0.07	0.01	0.01
P-138	J-104	J-96	-39.98	0.05	0.00	0.45	0.17	0.17
P-139	J-96	J-106	6.03	0.00	0.00	0.07	0.01	0.01
P-140	J-96	J-107	6.03	0.00	0.00	0.07	0.01	0.01
P-141	J-58	J-108	-1047.12	1.75	0.00	2.97	2.76	2.76
P-142	VP-3	J-81	458.91	0.24	0.00	1.30	0.52	0.52
P-143	I-Pump-3	J-122	-1120.74	0.02	0.00	3.18	4.27	4.27
P-144	J-83	J-124	-170.67	0.06	0.00	0.48	0.08	0.08
P-145	J-11	J-74	52.38	0.00	0.00	0.15	0.01	0.01
P-146	J-110	J-11	3552.38	11.27	0.00	10.08	36.15	36.15
P-147	J-111	J-110	3569.84	12.71	0.00	10.13	36.48	36.48
P-148	J-112	J-73	3639.68	14.31	0.00	10.32	37.81	37.81
P-149	J-113	J-114	-437.51	0.64	0.00	1.24	0.75	0.75
P-150	J-114	J-115	-454.97	0.36	0.00	1.29	0.80	0.80
P-151	J-115	J-83	-472.43	0.82	0.00	1.34	0.86	0.86
P-152	J-116	J-86	104.76	0.09	0.00	0.67	0.38	0.38
P-153	J-117	J-85	17.46	0.01	0.00	0.11	0.01	0.01
P-154	J-118	J-77	749.29	1.40	0.00	2.13	2.02	2.02
P-155	J-119	J-44	17.46	0.01	0.00	0.20	0.04	0.04
P-156	J-120	J-119	34.92	0.02	0.00	0.40	0.13	0.13
P-157	J-121	J-72	17.46	0.01	0.00	0.20	0.04	0.04
P-158	J-124	J-40	718.85	0.35	0.00	2.04	1.20	1.20
P-159	J-126	J-5	700.76	0.66	0.00	1.99	1.14	1.14
P-160	J-127	J-128	-77.37	0.09	0.00	0.88	0.65	0.65
P-161	J-128	J-102	-83.40	0.09	0.00	0.95	0.75	0.75
P-162	J-129	J-31	-17.79	0.03	0.00	0.20	0.04	0.04
P-163	J-130	J-69	-231.63	0.04	0.00	0.66	0.23	0.23
P-164	J-131	J-21	-72.36	0.01	0.00	0.21	0.03	0.03
P-165	J-75	I-RV-1	0.00	0.00	0.00	0.00	0.00	0.00
P-166	J-14	J-63	-57.48	0.01	0.00	0.16	0.01	0.01
P-167	J-63	J-130	-87.26	0.01	0.00	0.25	0.02	0.02
P-168	J-101	J-90	-214.78	0.20	0.00	0.61	0.13	0.13
P-169	J-108	J-78	-1064.58	1.81	0.00	3.02	2.48	2.48
P-170	J-124	R-2	-895.55	5.53	0.00	2.54	1.80	1.80
P-171	J-65	J-125	-688.70	2.40	0.00	1.95	1.11	1.11

PUMP/LOSS ELEMENT RESULTS

NAME	FLOWRATE gpm	INLET HEAD ft	OUTLET HEAD ft	PUMP HEAD ft	EFFICIENCY %	USEFUL POWER Hp	INCREMTL COST $	TOTAL COST $	#PUMPS PARALLEL	#PUMPS SERIES	NPSH Avail. ft
Device "Pump-1" is closed											
Pump-1	0.00	17.46	162.33	0.0	75.00	0.	0.0	0.0	**	**	50.7
Pump-2	1120.76	17.45	162.36	144.9	75.00	0.	0.0	0.0	**	**	50.5
Pump-3	1120.74	17.45	162.35	144.9	75.00	0.	0.0	0.0	**	**	50.5
VP-1	547.51	0.00	168.56	168.6	75.00	0.	0.0	0.0	**	**	33.2
VP-2	534.45	0.00	168.56	168.6	75.00	0.	0.0	0.0	**	**	33.2
VP-3	458.90	0.00	145.82	145.8	75.00	0.	0.0	0.0	**	**	33.2

N O D E   R E S U L T S

NODE NAME	NODE TITLE	EXTERNAL DEMAND gpm	HYDRAULIC GRADE ft	NODE ELEVATION ft	PRESSURE HEAD ft	NODE PRESSURE psi
J-1		6.03	555.22	388.00	167.22	72.46
J-2		6.03	558.57	386.00	172.57	74.78
J-3		6.03	558.93	389.00	169.93	73.64
J-4		6.03	559.08	388.00	171.08	74.14
J-5		6.03	557.16	410.00	147.16	63.77
J-6		6.03	559.18	389.00	170.18	73.75
J-7		6.03	559.22	389.00	170.22	73.76
J-8		6.03	559.26	390.00	169.26	73.35
J-9		6.03	559.28	391.00	168.28	72.92
J-10		6.03	559.56	395.00	164.56	71.31
J-11	FIRE	3500.00	478.49	395.00	83.49	36.18
J-12		6.03	559.59	399.00	160.59	69.59
J-13		6.03	559.50	396.00	163.50	70.85
J-14		6.03	559.59	400.00	159.59	69.16
J-15		6.03	559.56	399.00	160.56	69.57
J-16		6.03	559.56	399.00	160.56	69.58
J-17		6.03	558.36	420.00	138.36	59.95
J-18		6.03	559.55	402.00	157.55	68.27
J-19		6.03	559.58	399.00	160.58	69.58
J-20		6.03	559.59	397.00	162.59	70.46
J-21		6.03	559.58	399.00	160.58	69.59
J-22		6.03	559.59	397.00	162.59	70.45

J-23	6.03	559.61	400.00	159.61	69.16
J-24	6.03	559.61	401.00	158.61	68.73
J-25	6.03	559.59	399.00	160.59	69.59
J-26	6.03	559.59	398.00	161.59	70.02
J-27	6.03	559.59	392.00	167.59	72.62
J-28	6.03	559.59	391.00	168.59	73.06
J-29	6.03	559.59	392.00	167.59	72.62
J-30	6.03	559.59	390.00	169.59	73.49
J-31	6.03	559.67	399.00	160.67	69.62
J-32	6.03	559.77	402.00	157.77	68.37
J-33	6.03	559.63	393.00	166.63	72.21
J-34	6.03	559.64	403.00	156.64	67.88
J-35	6.03	559.67	403.00	156.67	67.89
J-36	6.03	559.61	400.00	159.61	69.16
J-37	6.03	559.59	405.00	154.59	66.99
J-38	6.03	559.62	401.00	158.62	68.74
J-39	6.03	559.58	401.00	158.58	68.72
J-40	6.03	559.12	422.00	137.12	59.42
J-41	6.03	559.68	403.00	156.68	67.90
J-42	6.03	559.69	403.00	156.69	67.90
J-43	6.03	562.83	405.00	157.83	68.39
J-44	17.46	559.09	403.00	156.09	67.64
J-45	6.03	559.29	403.00	156.29	67.73
J-46	6.03	559.66	403.00	156.66	67.89
J-47	6.03	560.07	403.00	157.07	68.06
J-48	6.03	559.65	403.00	156.65	67.88
J-49	17.46	556.75	414.00	142.75	61.86
J-50	6.03	559.50	403.00	156.50	67.82
J-51	6.03	559.27	403.00	156.27	67.72
J-52	6.03	561.94	403.00	158.94	68.87
J-53	6.03	559.32	403.00	156.32	67.74
J-54	6.03	559.41	403.00	156.41	67.78
J-55	6.03	559.57	401.00	158.57	68.71
J-56	6.03	559.58	403.00	156.58	67.85
J-57	6.03	559.50	401.00	158.50	68.68
J-58	17.46	552.70	399.00	153.70	66.60
J-59	6.03	559.56	401.00	158.56	68.71
J-60	6.03	559.56	399.00	160.56	69.58
J-61	6.03	559.53	401.00	158.53	68.69
J-62	6.03	559.50	402.00	157.50	68.25
J-63	6.03	559.60	399.00	160.60	69.59
J-64	6.03	559.57	401.00	158.57	68.71
J-65	6.03	554.24	403.00	151.24	65.54
J-66	6.03	559.75	403.00	156.75	67.92
J-67	17.46	478.49	393.00	85.49	37.05
J-68	6.03	559.69	399.00	160.69	69.63
J-69	6.03	559.65	400.00	159.65	69.18
J-70	17.46	539.88	400.00	139.88	60.61
J-71	17.46	539.89	399.00	140.89	61.05
J-72	17.46	513.43	399.00	114.43	49.59
J-73	17.46	513.45	399.00	114.45	49.59
J-74	17.46	478.49	393.00	85.49	37.05
J-75	6.03	559.77	397.50	162.27	70.32
J-76	17.46	478.46	393.00	85.46	37.03

J-77	17.46	556.56	403.00	153.56	66.54
J-78	17.46	556.25	403.00	153.25	66.41
J-79	17.46	556.87	403.00	153.87	66.68
J-80	17.46	556.88	403.00	153.88	66.68
J-81	17.46	559.59	413.00	146.59	63.52
J-82	17.46	556.88	403.00	153.88	66.68
J-83	17.46	559.41	412.00	147.41	63.88
J-84	17.46	559.11	404.00	155.11	67.21
J-85	17.46	559.10	408.00	151.10	65.48
J-86	17.46	559.17	404.00	155.17	67.24
J-87	17.46	559.10	404.00	155.10	67.21
J-88	6.03	566.43	399.00	167.43	72.55
J-89	17.46	559.17	404.00	155.17	67.24
J-90	6.03	566.55	398.00	168.55	73.04
J-91	6.03	564.43	401.00	163.43	70.82
J-92	6.03	563.98	401.00	162.98	70.62
J-93	6.03	559.95	404.00	155.95	67.58
J-94	6.03	559.89	403.00	156.89	67.98
J-95	6.03	564.43	401.00	163.43	70.82
J-96	6.03	559.90	403.00	156.90	67.99
J-97	6.03	564.87	401.00	163.87	71.01
J-98	6.03	565.68	399.00	166.68	72.23
J-99	6.03	565.68	399.00	166.68	72.23
J-100	6.03	565.30	399.00	166.30	72.06
J-101	6.03	566.36	397.00	169.36	73.39
J-102	6.03	565.85	396.00	169.85	73.60
J-103	6.03	565.42	399.00	166.42	72.12
J-104	6.03	559.84	403.00	156.84	67.97
J-105	6.03	559.84	403.00	156.84	67.96
J-106	6.03	559.89	405.00	154.89	67.12
J-107	6.03	559.89	405.00	154.89	67.12
J-108	17.46	554.45	403.00	151.45	65.63
J-109	6.03	559.56	396.00	163.56	70.88
J-110	17.46	489.77	397.00	92.77	40.20
J-111	17.46	502.47	399.00	103.47	44.84
J-112	17.46	527.76	399.00	128.76	55.80
J-113	17.46	557.60	405.00	152.60	66.12
J-114	17.46	558.23	412.00	146.23	63.37
J-115	17.46	558.60	412.00	146.60	63.52
J-116	17.46	559.26	404.00	155.26	67.28
J-117	17.46	559.10	405.00	154.10	66.78
J-118	17.46	557.97	403.00	154.97	67.15
J-119	17.46	559.10	403.00	156.10	67.64
J-120	17.46	559.12	403.00	156.12	67.65
J-121	17.46	513.44	399.00	114.44	49.59
J-122	6.03	414.96	397.50	17.46	7.57
J-123	6.03	559.83	397.50	162.33	70.34
J-124	6.03	559.47	424.00	135.47	58.70
J-125	6.03	556.64	407.00	149.64	64.84
J-126	6.03	557.82	415.00	142.82	61.89
J-127	6.03	565.67	396.00	169.67	73.52
J-128	6.03	565.76	396.00	169.76	73.56
J-129	6.03	559.64	395.00	164.64	71.34
J-130	6.03	559.61	403.00	156.61	67.86

J-131		6.03	559.57	399.00	160.57	69.58
I-Pump-1		0.00	414.96	397.50	17.46	7.57
I-Pump-2		0.00	414.95	397.50	17.45	7.56
I-Pump-3		0.00	414.95	397.50	17.45	7.56
R-1	NEW 1 MG RES	----	415.00	397.50	17.50	7.58
R-2	NEW 750,000	----	565.00	540.00	25.00	10.83
O-RV-1		0.00	415.00	397.00	18.00	7.80
VP-1	WELL 1	----	566.56	398.00	168.56	73.04
VP-2	WELL 2	----	566.56	398.00	168.56	73.04
VP-3	WELL 3	----	559.82	414.00	145.82	63.19
O-Pump-3		0.00	559.85	397.50	162.35	70.35
O-Pump-2		0.00	559.86	397.50	162.36	70.35
O-Pump-1		0.00	559.83	397.50	162.33	70.34
I-RV-1		----	559.77	397.00	162.77	70.53

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

P R E S S U R E S

JUNCTION NUMBER	MAXIMUM PRESSURES psi	JUNCTION NUMBER	MINIMUM PRESSURES psi
J-2	74.78	I-Pump-3	7.56
J-4	74.14	I-Pump-2	7.56
J-7	73.76	J-122	7.57
J-6	73.75	I-Pump-1	7.57
J-3	73.64	R-1	7.58

V E L O C I T I E S

PIPE NUMBER	MAXIMUM VELOCITY (ft/s)	PIPE NUMBER	MINIMUM VELOCITY (ft/s)
P-90	10.47	P-30	0.01
P-92	10.37	P-10	0.02
P-148	10.32	P-125	0.02
P-94	10.18	P-13	0.03
P-147	10.13	P-128	0.04

H L + M L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL+ML/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL+ML/1000 (ft/ft)
P-90	38.82	P-30	0.00
P-92	38.14	P-125	0.00
P-148	37.81	P-10	0.00
P-94	36.81	P-13	0.00

P-147	36.48	P-128	0.00

H L / 1 0 0 0

PIPE NUMBER	MAXIMUM HL/1000 (ft/ft)	PIPE NUMBER	MINIMUM HL/1000 (ft/ft)
P-90	38.82	P-30	0.00
P-92	38.14	P-125	0.00
P-148	37.81	P-10	0.00
P-94	36.81	P-13	0.00
P-147	36.48	P-128	0.00

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

VALVE LABEL	VALVE TYPE	VALVE SETTING psi or gpm	VALVE STATUS	UPSTREAM PRESSURE psi	DOWNSTREAM PRESSURE psi	THROUGH FLOW gpm
RV-1	PSV	72.00	CLOSED	70.53	7.80	0.00

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

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

NODE NAME	FLOWRATE gpm	NODE TITLE
R-1	2247.53	NEW 1 MG RES
R-2	895.55	NEW 750,000
VP-1	547.51	WELL 1
VP-2	534.45	WELL 2
VP-3	458.90	WELL 3

NET SYSTEM INFLOW = 4683.95
NET SYSTEM OUTFLOW = 0.00
NET SYSTEM DEMAND = 4683.94

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