CASCADE NATURAL GAS CORPORATION
A Subsidiary of MDU Resources Group, Inc.

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December 4, 2020

Oregon Public Utility Commission
Attention: Filing Center
P.O. Box 1088
Salem, OR 97308-1088

RE: LC 76 – Cascade Natural Gas Corporation's Errata to 2020 Integrated Resource Plan Errata of 12/3/2020

Attention Filing Center:

Subsequent to conversations with OPUC Staff on December 4, 2020, please find enclosed an updated redacted Appendix I to replace the errata filed on December 3, 2020. The purpose of this errata is to correct redaction errors in the December 3, 2020 errata filing. Cascade inadvertently redacted the names of several projects on page 3 of Appendix I although Staff had already identified those projects their public comments. Cascade regrets the error.

If you have any questions concerning this submittal, please contact me at (206) 617-2708 or Brian Robertson at 509-221-9808.

Sincerely,
CASCADE NATURAL GAS CORPORATION

Mark Sellers-Vaughn
Manager, Supply Resource Planning

Appendix I

Distribution System Planning

2020 OR IRP

Appendix I - Introduction

The purpose of this document is to show the Company's five-year budget for its engineering projects. These projects were identified by Cascade's engineers through the Distribution Scenario Decision- Making Process that can be seen on Page 9-9 of the IRP. For Oregon projects, the Company identified several projects in Pendleton, Southern Hermiston, Bend, Prineville, Redmond, and Baker City. These projects are areas that the Company is forecasting growth to a point where there may be capacity issues and therefore has begun budgeting to improve capacity needs. Cascade is in the process of creating a uniform reporting process and documentation for Distribution System plans that are put in the budget, therefore, there are different types of reports seen in this appendix. Also, projects will include more detail if they're earlier in the budget timeline compared to those towards the end of the budget timeline.

Description	2020	[redacted]	[redacted]	[redacted]	[redacted]
FP-306990 - PENDLETON 4" IP REINFORCEMENT	$ -				
FP-306991 - PENDLETON 4" HP REINFORCEMENT	$ -				
FP-306992 - PENDLETON KORVOLA ROAD 4" PE REINF.	$ -				
FP-316851 - South Hermiston to Feedville Rd HP	$ -				
FP-316854 - BEND GATE REBUILD	$ -				
FP-316863 - Prineville Gate Rebuild	$ -				
FP-317586 - RF-REDM-6"S-4,750'-VETERANS WY	$ 1,295,377.66				
FP-318466 - RF-Baker-GT-NW Baker Gate	$ -				
FP-318468 - RF-Baker-GT-NW Baker Regulation	$ -				
FP-318469 - RF-Baker-GT-NW Baker Gate Odorizer	$ -				
FP-318475 - RF-Baker-GT-NW Baker GT Line Heater	$ -				
FP-318682 - RF-BEND-6"S-1100'-SHEVLIN PK	$ 772,070.00				
FP-318733 - RF-BEND-6"S-2MI-SHEVLIN PK	$ -				
FP-318737 - RF-BEND-R-SHEVLIN PK RD 2" STD	$ -				
FP-318741 - RF-BEND-6"PE-1200'-PONDEROSA ST	$ 235,682.00				
FP-318744 - RP-PRINEVILLE-GT-TRANSCANADA	$ -				
FP-318745 - RP-BEND-GT-TRANSCANADA	$ -				
FP-318770 - RF-REDM-R-VETERANS WAY-2" STD	$ 130,658.00				

Project Summary – Bend 6 in HP Line and New Reg Station – WO# 276113

Submitted by Linda Offerdahl
2/28/2020

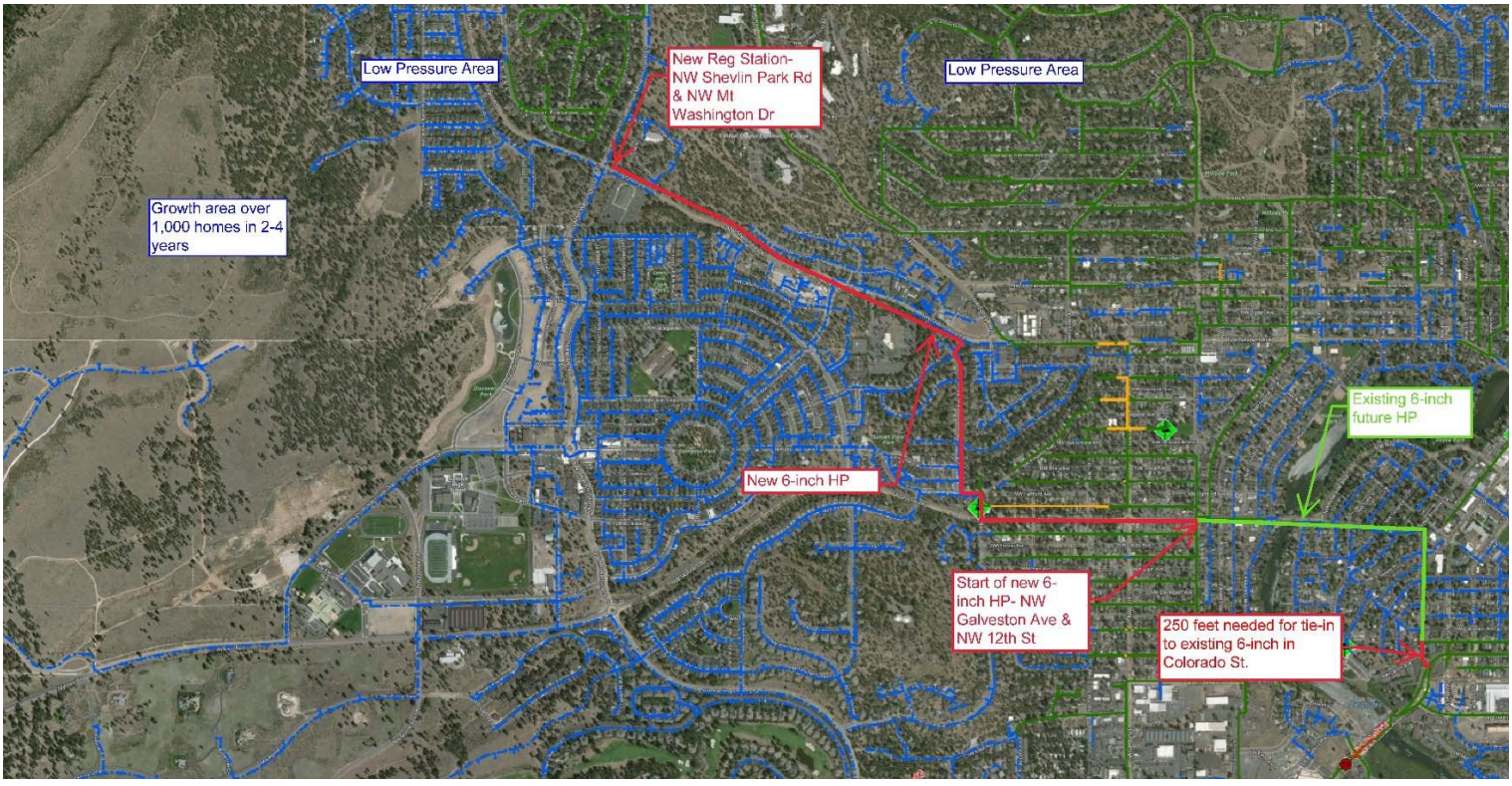
Background

The pressure in the Bend northwestern distribution system during peak usage is below design criteria, which requires the district to bypass during cold weather events. This area is the outer edge of the Bend distribution system, farthest from existing high-pressure pipelines and regulation. Though the customers in northwestern Bend are primarily residential, most are large homes with higher gas demand. The existing system does not allow for ongoing accelerated growth in the western area of Bend planned over the next four years, with development in progress and already permitted by the City. [1]

[redacted]

In 2012, in conjunction with replacement of aging main, 4,000 feet of 6-inch future HP steel main was installed from NW Broadway St and NW Delaware Ave to the intersection of NW 12th St and NW Galveston Ave, this main was placed on nitrogen. An additional 250-feet needs to be installed from Delaware Ave to Colorado Ave to tie into the existing HP 6-inch main and gas up the future HP main. Extending the 6-inch future HP main west and installing a regulator station is necessary to relieve the low-pressure areas and accommodate for the growth in the western area of Bend.

The project site starts at NW Galveston Ave and NW 12th St and heads northwest to end at NW Shevlin Park Road and NW Mt Washington Drive. The location is shown on the map below:



[1] In October 2018, four developers on Bend's westside successfully negotiated a development agreement for the planning and development of more than 1,000 homes on 383 acres.

Project Summary – Bend 6 in HP Line and New Reg Station – WO# 276113

Submitted by Linda Offerdahl
2/28/2020

Proposal

This project consists of installing approximately 1.8 miles of 6-inch steel HP pipe and a new regulator station. [redacted]

Timing

Design for the pipeline will begin in March 2020 and is scheduled to be completed in November 2020. Construction of the 250-feet to tie-into the 6-inch HP on Colorado Ave is planned for 2020. The remainder of the construction is planned to begin February 2021 and estimated to be complete and in-service by September 2021.

Costs

The estimated costs for the total project, including pipeline and regulator station, are summarized below:

Materials	$	302,935.88
CNGC Labor	$	51,236.02
Contractor Costs	$	2,260,398.75
Resources	$	97,889.00
Subtotal	**$**	**2,712,459.64**
Corporate Overhead	**$**	**220,200.00**
Total Estimated Project Costs	**$**	**2,932,659.64**

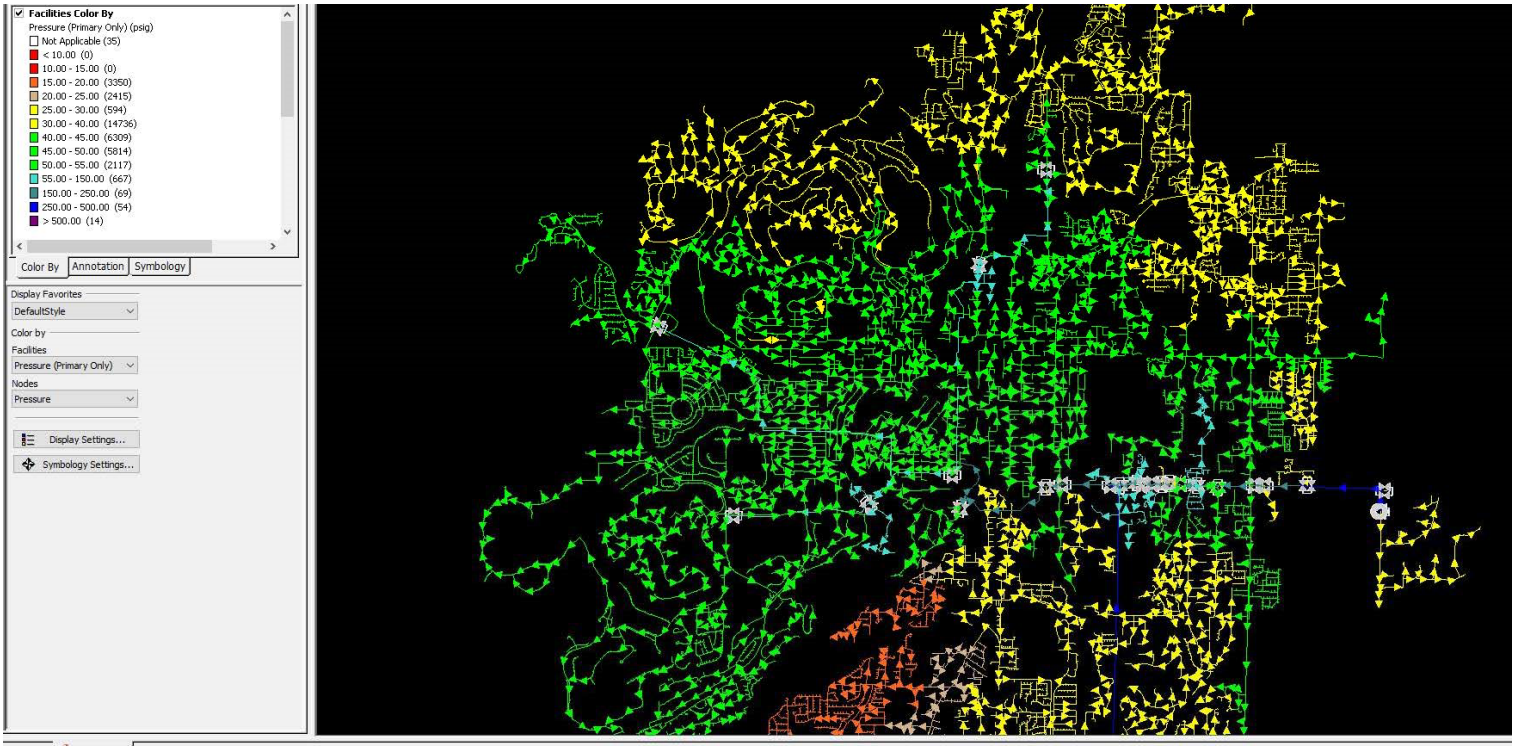
Benefits

1. New HP pipeline and regulator station will bring the northwestern Bend distribution system above design criteria during peak usage and cold weather events, eliminating the need for bypass operations.
2. This project allows Cascade to bring high pressure gas closer to the areas of Bend with larger residential gas load and allowing for gas service to be offered to new growth occurring in this area of accelerated development.
3. The Synergi diagrams below illustrate the anticipated improvements to the Bend system resulting from this project:

Project Summary – Bend 6 in HP Line and New Reg Station – WO# 276113

Submitted by Linda Offerdahl
2/28/2020

Synergi Model: Bend – Current Model



Synergi Model: Bend – Improved Model Upon Project Completion

Project Summary – Bend 6 in HP Line and New Reg Station – WO# 276113

Submitted by Linda Offerdahl
2/28/2020

Alternatives

1. No reinforcement: This alternative means that district personnel will need to bypass during cold weather events to keep system pressures in the northwestern Bend system deliverable to the customer. There are many factors that affect the decision to bypass regulation, some of these factors are dependent on current temperatures, inlet pressure from the transmission company, time of day, and flow rates. Due to these fluctuating variables, it is difficult to make a concrete rule on when bypass needs to occur and instead requires close on-site system observation often occurring in extreme weather conditions. There are risks involved with bypass operations with personnel required to manually bypass regulation and closely monitor system pressures to prevent over pressuring the downstream pipeline systems and customer services and meters. Other risks include not performing bypass operations soon enough and potentially losing gas service to thousands of customers.
2. Postponing reinforcement: This alternative means district personnel will need to bypass during cold weather events until a reinforcement is in place. By not bringing higher pressure and regulation closer to the load, this will affect Cascade's ability to provide service to new gas customers and developers building homes in the western Bend area. Not being able to install gas main while developments and construction are in progress, make it difficult and expensive to install main and services at a later date when the system capacity is increased and new neighborhoods are built out with finished infrastructure (roads, sidewalks, storm, sewer, water, phone, cable, and power).
3. Shorter reinforcement: This alternative looked at changing the route and making the new pipe installation shorter (3,000-4,000 feet) putting the high pressure and regulator station farther from the existing and new load. This option provided some improvements in the northern Bend distribution system, however there were still customers in the western Bend distribution system that experienced pressures below design criteria and would result in needing to bypass during peak usage and cold weather events.

Responsible People

District Operations Manager: Josh Aigner
District Manager: Marcus McCloskey
Project Engineer: Linda Offerdahl
Project Foreman: TBD
Cascade Inspector: TBD

Project Summary – Redmond 6 in HP Line and New Reg Station – WO# 267431

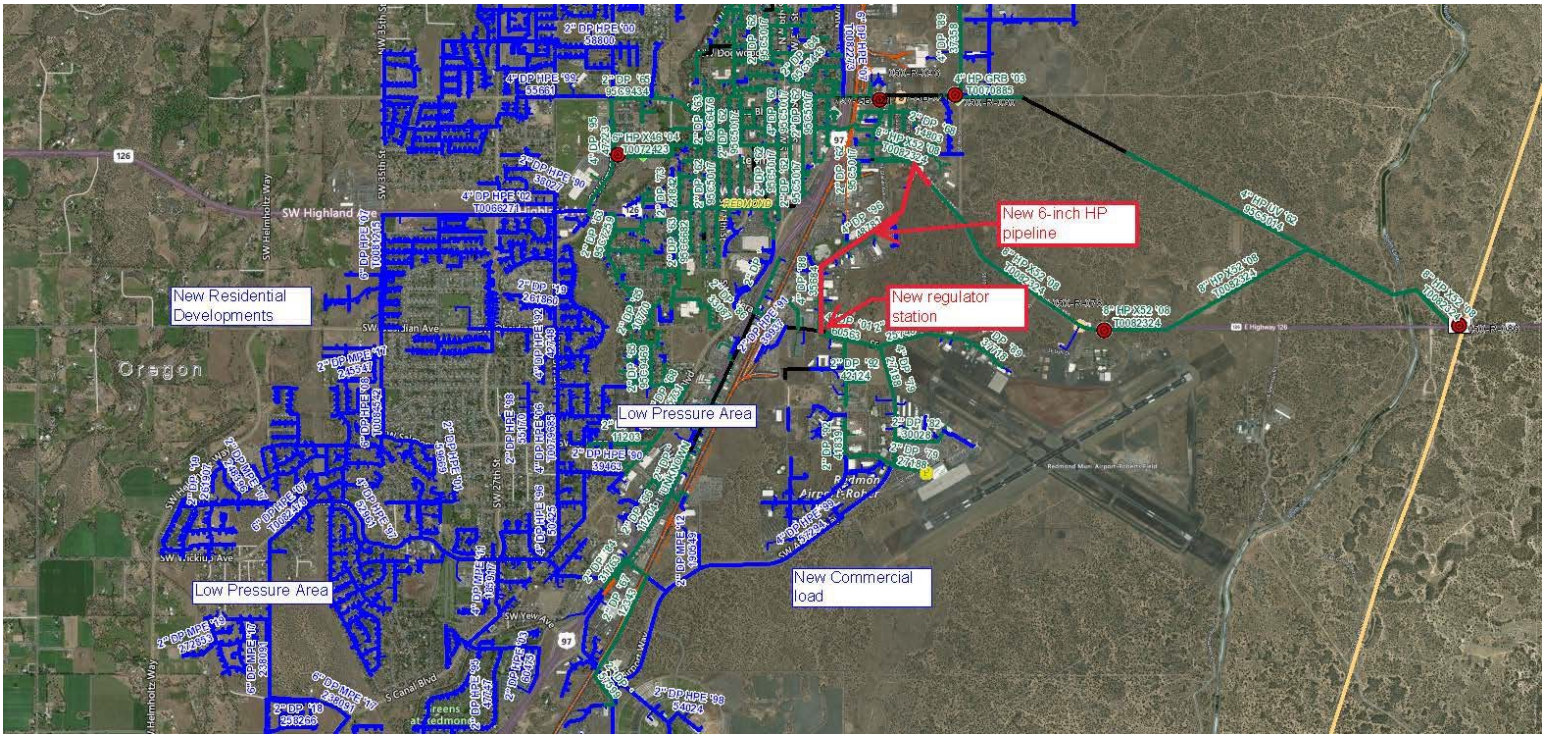
Submitted by Linda Offerdahl
2/28/2020

Background

The pressure in the Redmond southern distribution system during peak usage is below design criteria. The existing system does not allow for residential and commercial growth and increased existing commercial loads requested in the southern area of Redmond.[1]

While the City of Redmond does employ several large volume industrial customers, the gas loads of industrial customers on an interruptible rate are not used in distribution planning modeling of the gas system. Cascade only includes core customer loads in determining if reinforcements of the system are necessary on a peak design day. Even with the interruptible customer loads removed, the southern Redmond system, being farthest from the existing high-pressure mains and regulation, consistently experiences low pressures during cold weather events.

The project site starts at E Highway 126 and SE Lake Road and heads southwest to end at Veterans Way. The location is shown on the map below:



Proposal

This project consists of installing approximately 1 mile of 6-inch steel HP pipe and a new regulator station. This pipeline will operate at 300 psig. Considering the location and the conditions, much of the project will be installed via open trench with 3 bores across roadways and to maintain separation from conflicting utilities.

[1] Redmond continues to be one of the strongest housing markets in Central Oregon. Home sales volume in Redmond increased by over 12% in the second quarter of 2019 year over year. The City's Planning Commission recently completed a Housing Grant Project for the Redmond Housing Needs Analysis and Buildable Lands Inventory, according to the analysis, approximately 7,000 housing units are needed over the next 20 years.

Project Summary – Redmond 6 in HP Line and New Reg Station – WO# 267431

Submitted by Linda Offerdahl
2/28/2020

Timing

Design for the pipeline will be complete by March 2020. Construction is planned to begin April 2020 and estimated to be complete and in-service by May 2020.

Costs

The estimated costs for the total project, including pipeline and regulator station, are summarized below:

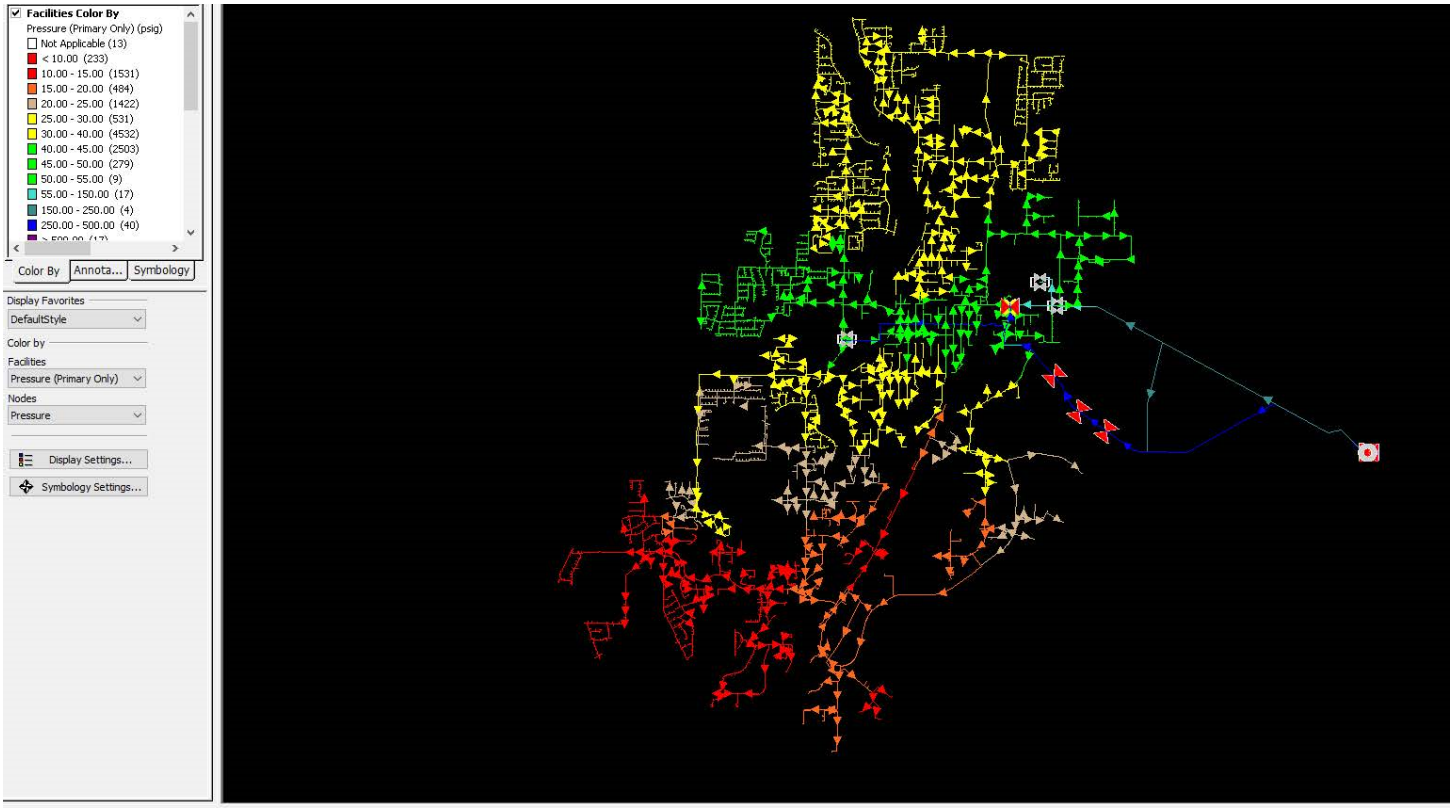
Materials	$	193,755.58
CNGC Labor	$	45,076.02
Contractor Costs	$	919,455.43
Resources	$	42,009.00
Total Direct Costs	**$**	**1,200,296.03**
Corporate Overhead	**$**	**176,203.46**
Total Estimated Project Costs	**$**	**1,376,499.49**

Benefits

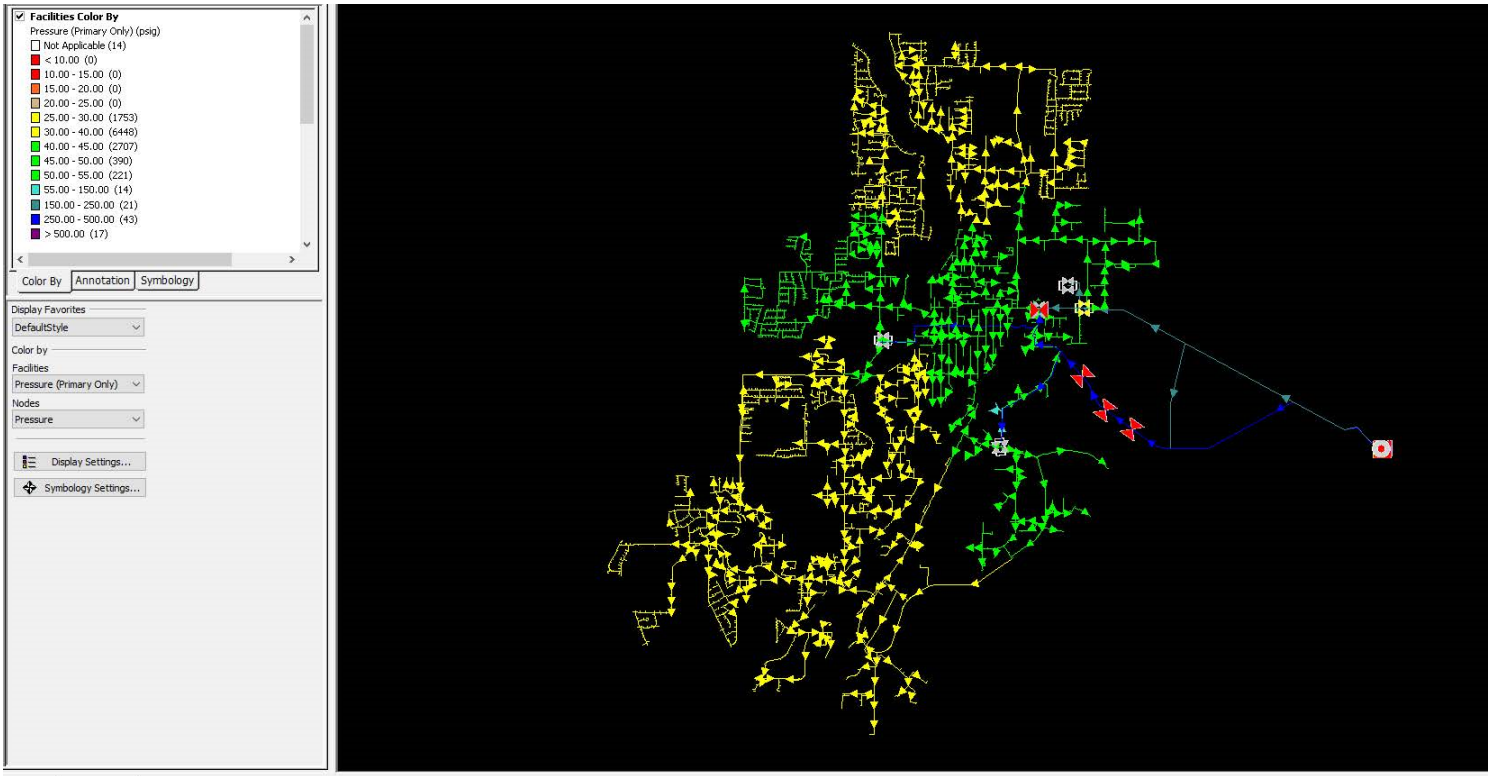
1. New HP pipeline and regulator station will bring the southern Redmond distribution system above design criteria during peak usage and cold weather events.
2. This project allows for new commercial and residential growth occurring in the area.
3. The Synergi diagrams below illustrate the anticipated improvements to the Redmond system resulting from this project:

Project Summary – Redmond 6 in HP Line and New Reg Station – WO# 267431

Submitted by Linda Offerdahl
2/28/2020



Synergi Model: Redmond – Current Model



Synergi Model: Redmond – Improved Model Upon Project Completion

Project Summary – Redmond 6 in HP Line and New Reg Station – WO# 267431

Submitted by Linda Offerdahl
2/28/2020

Alternatives

1. No reinforcement: This alternative means that the southern Redmond distribution system will continue to experience low pressures during peak usage and cold weather events. In addition, by not installing a reinforcement Cascade is unable to provide gas service to new residential and commercial customers and existing customers wanting to increase their commercial gas load in the southern Redmond distribution system.
2. Postponing reinforcement: Residential and commercial growth is occurring in the City of Redmond currently and growth is anticipated to continue to increase. By not bringing higher pressure and regulation closer to the load, this will affect Cascade's ability to provide service to new residential and commercial customers and existing customers wanting to increase their commercial gas load in the southern Redmond distribution system. Not installing gas main while developments and construction are in progress, make it difficult and expensive to install gas main and services at a later date when the system capacity is increased and new neighborhoods are built out with finished infrastructure (roads, sidewalks, storm, sewer, water, phone, cable, and power).
3. Shorter reinforcement: This alternative looked at making the new pipe installation shorter (2,000 feet) putting the high pressure and regulator station farther from the existing and new load. This option provided some improvements in the southern Redmond distribution system, however there were still areas experiencing low pressure and not allowing for new requested added load.

Responsible People

District Operations Manager: Josh Aigner
District Manager: Marcus McCloskey
Project Engineer: Linda Offerdahl
Project Foreman: TBD
Cascade Inspector: TBD

Project Summary – Bend 6 in PE Ponderosa St Reinforcement – WO# TBD

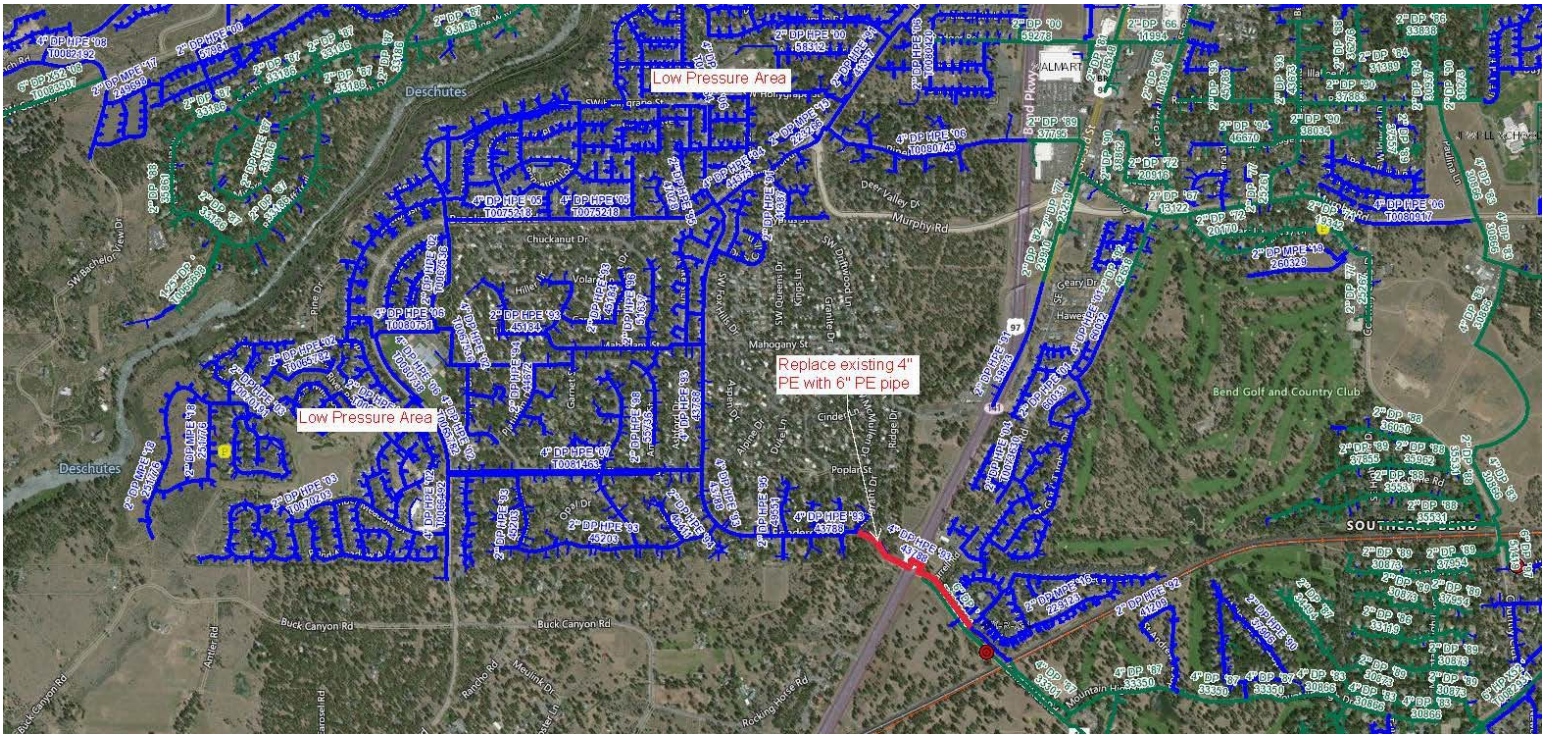
Submitted by Linda Offerdahl
2/28/2020

Background

The pressure in the Bend southcentral distribution system during peak usage is below design criteria and the system is isolated due to the river on the west and the highway to the east. This scenario results in the district needing to perform bypass during cold weather events and restricts the ability to install reinforcement loops from areas of the system above design criteria.

Several reinforcement projects for this area have been reviewed to determine which option offers the greatest system improvement, and is constructible, for the least cost. The reinforcement that meets this criterion is increasing the size of approximately 1,200 ft of existing 4-inch PE in Ponderosa Street coming out of R-84, the regulator station that feeds this area.

The project site starts at China Hat Road and Stonegate Drive and heads northwest to end at Ponderosa Street and Emigrant Drive. The location is shown on the map below:



Proposal

This project consists of replacing approximately 1,200 feet of 4-inch PE pipe with 6-inch PE pipe. [redacted]

Timing

Design for the pipeline will be complete in April 2020. Construction is anticipated in early July 2020 to utilize the lower summer flows and two-way feeds by installing the new pipe while removing the old pipe, a City of Bend requirement.

Project Summary – Bend 6 in PE Ponderosa St Reinforcement – WO# TBD

Submitted by Linda Offerdahl
2/28/2020

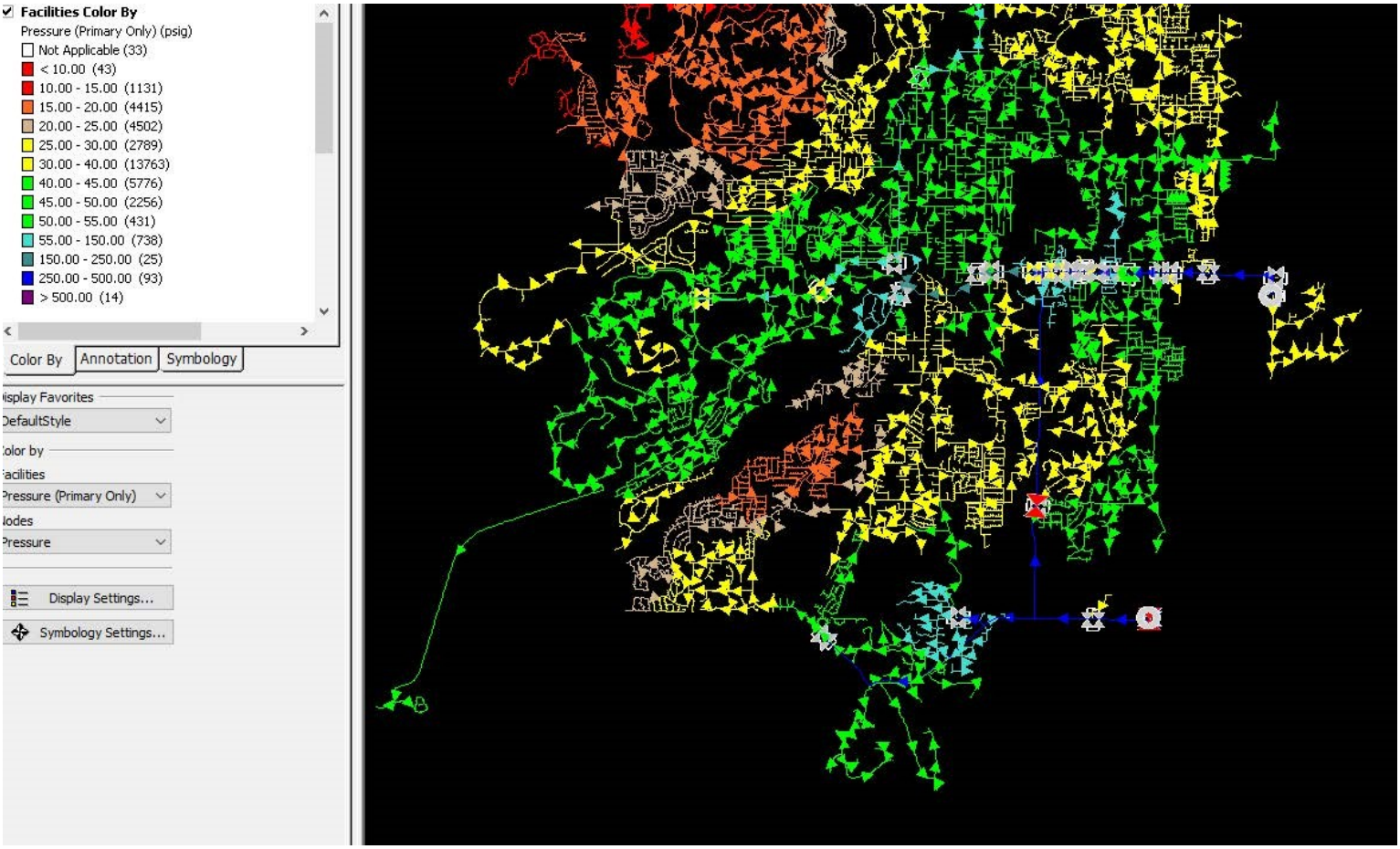
Costs

The estimated costs for the total project are summarized below:

Materials	$	10,941.04
CNGC Labor	$	4,719.94
Contractor Costs	$	186,688.20
Other Direct Costs	$	2,275.20
Total Direct Costs	$	204,624.37
Corporate Overhead	$	27,405.83
Total Estimated Costs	$	232,030.20

Benefits

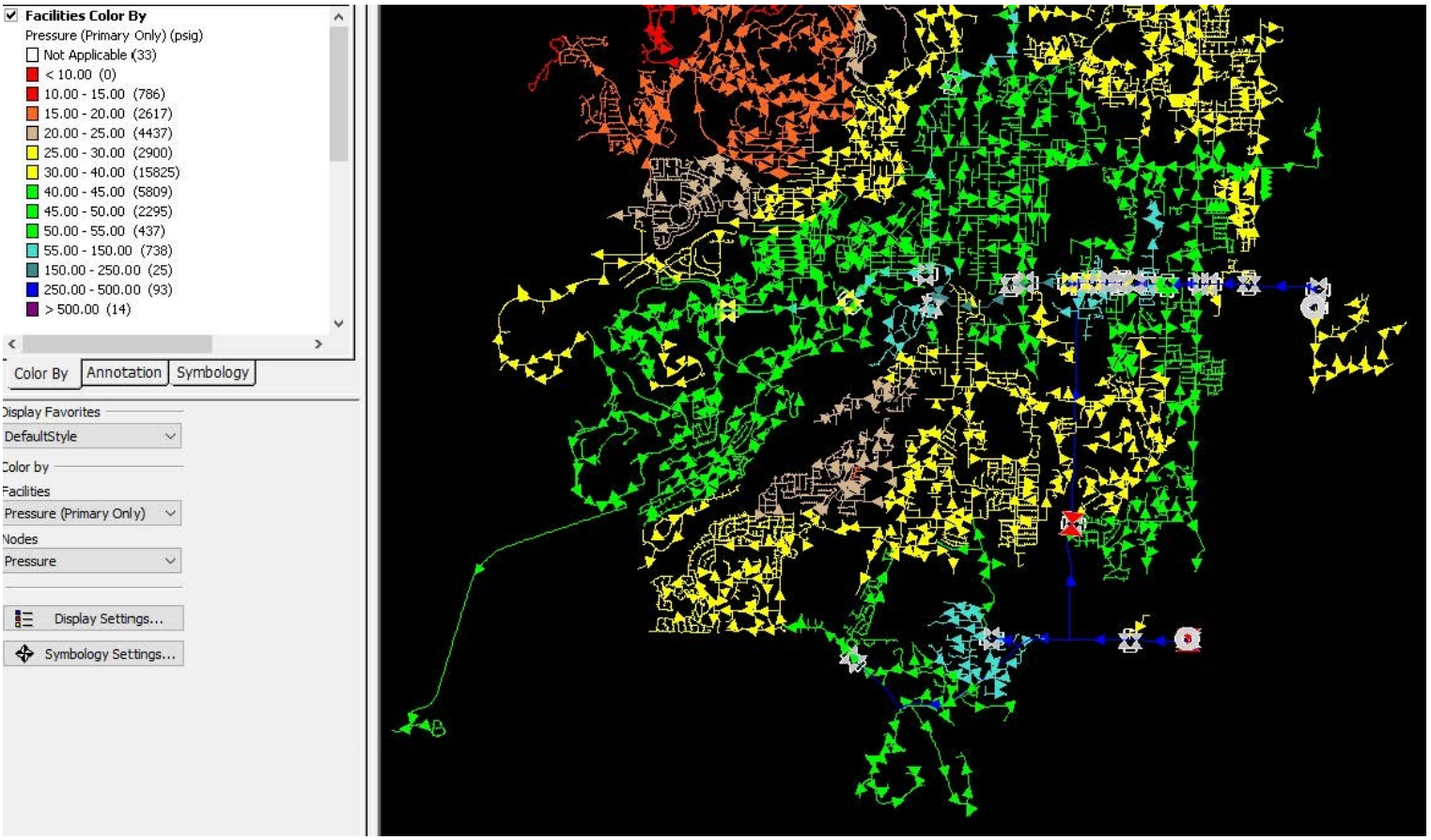
1. New 6-inch pipeline will bring the southcentral Bend distribution system above design criteria and eliminate the need to bypass during peak usage and cold weather events.
2. The Synergi diagrams below illustrate the anticipated improvements to the Bend system resulting from this project:



Synergi Model: Bend – Current Model

Project Summary – Bend 6 in PE Ponderosa St Reinforcement – WO# TBD

Submitted by Linda Offerdahl
2/28/2020



Synergi Model: Bend – Improved Model Upon Project Completion

Alternatives

1. No reinforcement: This alternative means that district personnel will need to bypass during cold weather events to keep system pressures in the southcentral Bend system deliverable to the customer. There are many factors that affect the decision to bypass regulation, some of these factors are dependent on current temperatures, inlet pressure from the transmission company, time of day, and flow rates. Due to these fluctuating variables, is difficult to make a concrete rule on when bypass needs to occur and instead requires close on-site system observation often occurring in extreme weather conditions. There are risks involved with bypass operations with personnel required to manually bypass regulation and closely monitor system pressures to prevent over pressuring the downstream pipeline systems and customer services and meters. Other risks include not performing bypass operations soon enough and potentially losing gas service to thousands of customers.
2. Alternate Route 1: An evaluation was completed to install 600 feet of 4-inch PE pipe under Highway 97 to connect the distribution system on SE Hayes Avenue. Upon further review it was determined that due to other utility conflicts and the widened highway in the area, this route is not practical for construction. In addition, where the connections occur and feed into the system, this option would not provide the greatest improvement in system capacity.
3. Alternate Route 2: A review was conducted to replace approximately 1,500 feet of 2-inch steel pipe with 4-inch steel pipe in SE Badger Road. However, due to the permiting requirements from the City of Bend to remove all abandoned pipe when installing new pipe in its place, this project was determined to be too costly for the system benefit.

Project Summary – Bend 6 in PE Ponderosa St Reinforcement – WO# TBD

Submitted by Linda Offerdahl
2/28/2020

Responsible People

District Operations Manager: Josh Aigner
District Manager: Marcus McCloskey
Project Engineer: Linda Offerdahl
Project Foreman: TBD
Cascade Inspector: TBD

Proposed Project Overview Worksheet

Rev. 1/18

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Proposed Project Overview Worksheet

Rev. 1/18

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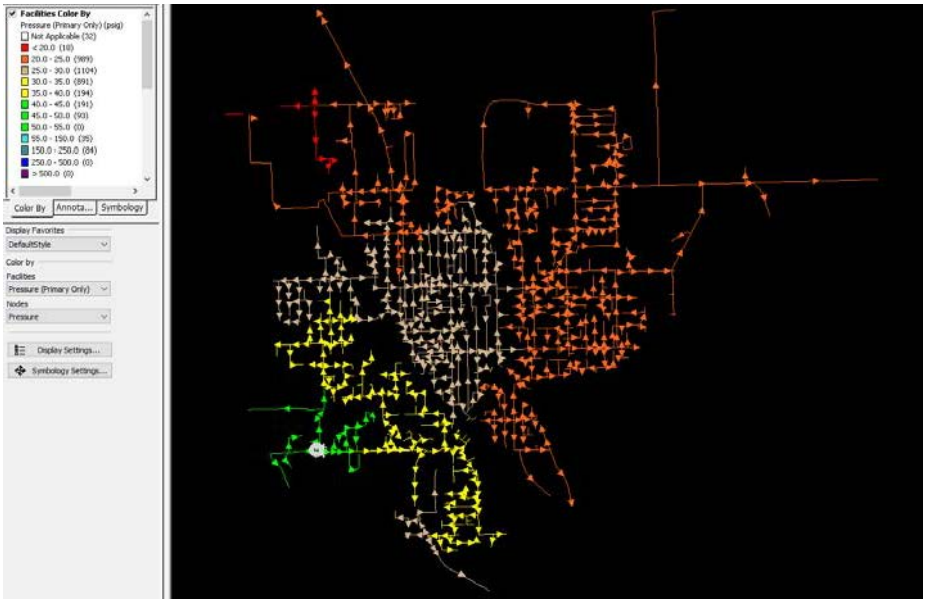

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[redacted]

Form Completed By:	Ricky Schatz
Date:	11/25/2019

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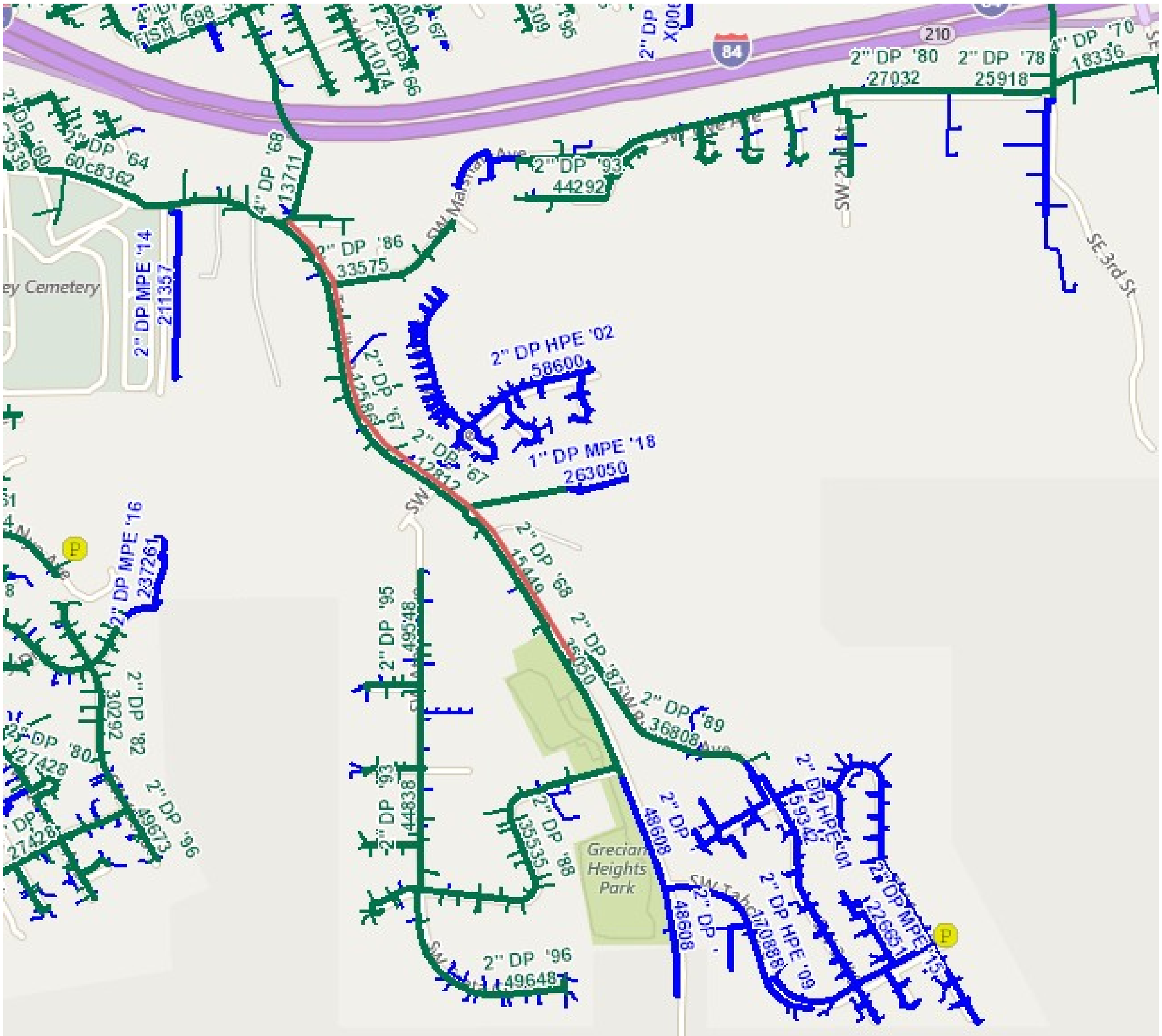
Proposed Project Overview Worksheet

Rev. 1/18



Cascade Natural Gas Corporation

In the Community to Serve

Proposed Project Overview Worksheet

Rev. 1/18

Form Completed By:	Ricky Schatz
Date:	11/26/2019

(●) Budgeting Proposal ( ) Design Proposal

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[redacted]: Engineering

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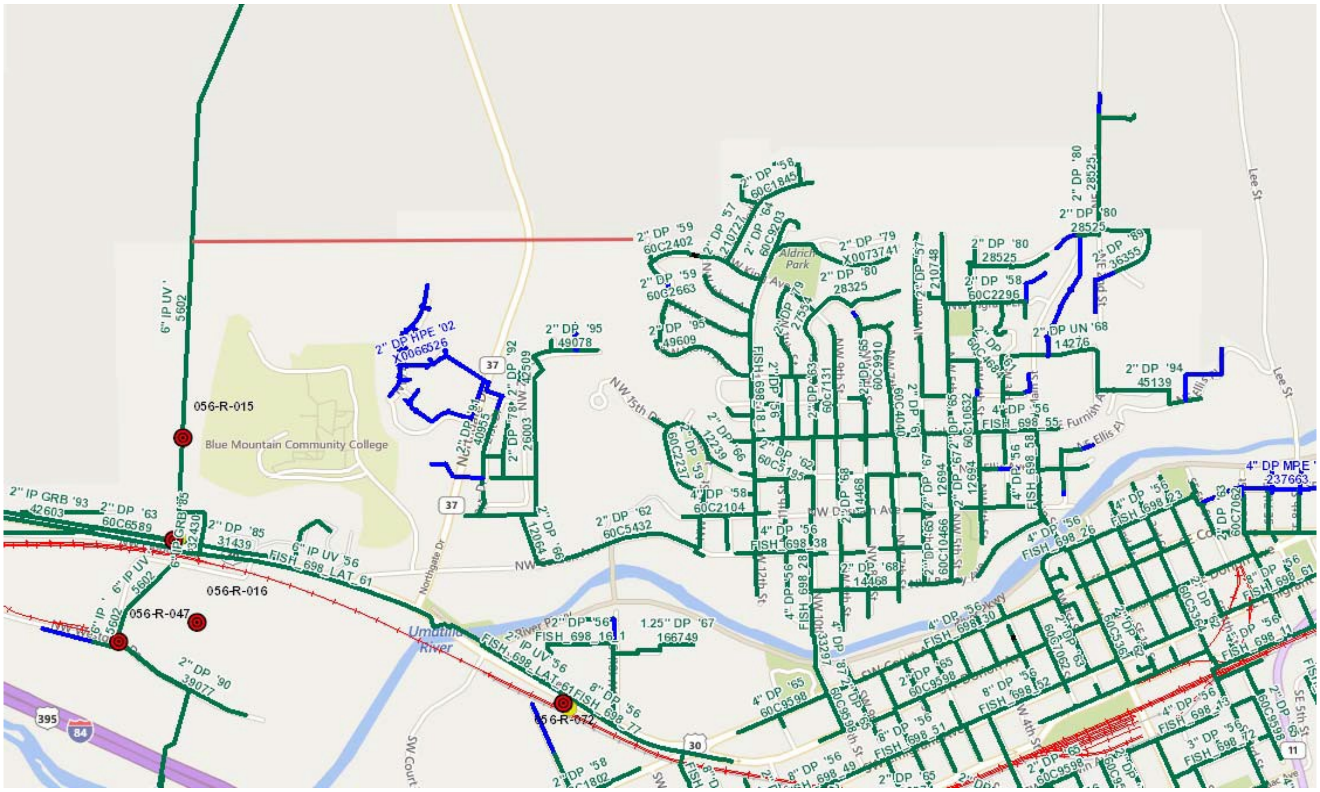
056-R-015
Blue Mountain Community College
056-R-016
056-R-047
Umatilla River
Aldrich Park
Lee St

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[redacted] Pendleton Korvola Road 4 inch DP Reinforcement

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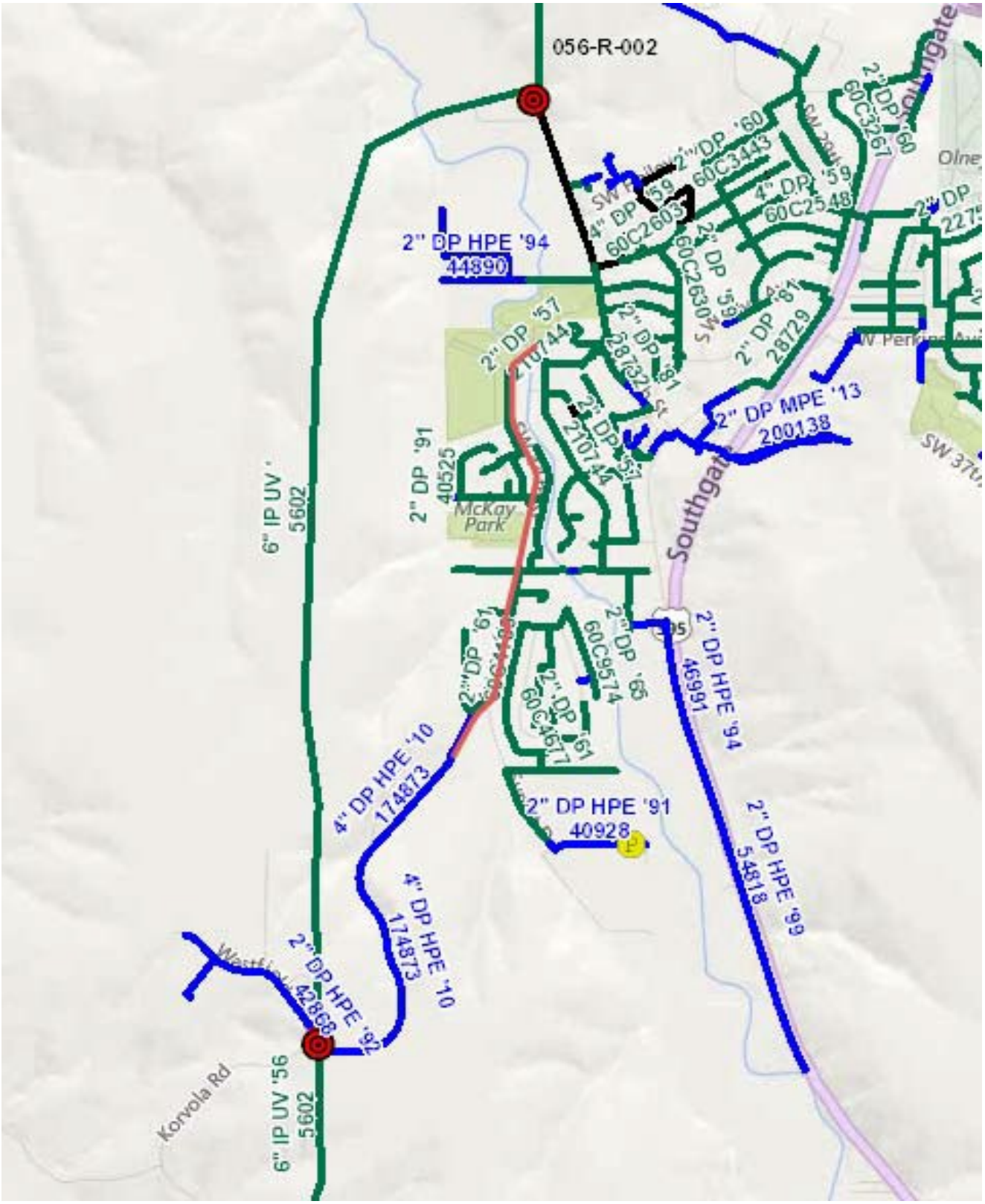
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2" DP HPE '94
44890
2" DP '57
2" DP '91
40525
6" IP UV '
5602
McKay Park
2" DP MPE '13
200138
Southgate
2" DP HPE '94
46991
2" DP HPE '99
54818
2" DP '65
60C9574
2" DP '61
60C4677
2" DP HPE '91
40928
4" DP HPE '10
174873
2" DP HPE '92
42868
Korvola Rd
6" IP UV '56
5602

CASCADE NATURAL GAS CORPORATION
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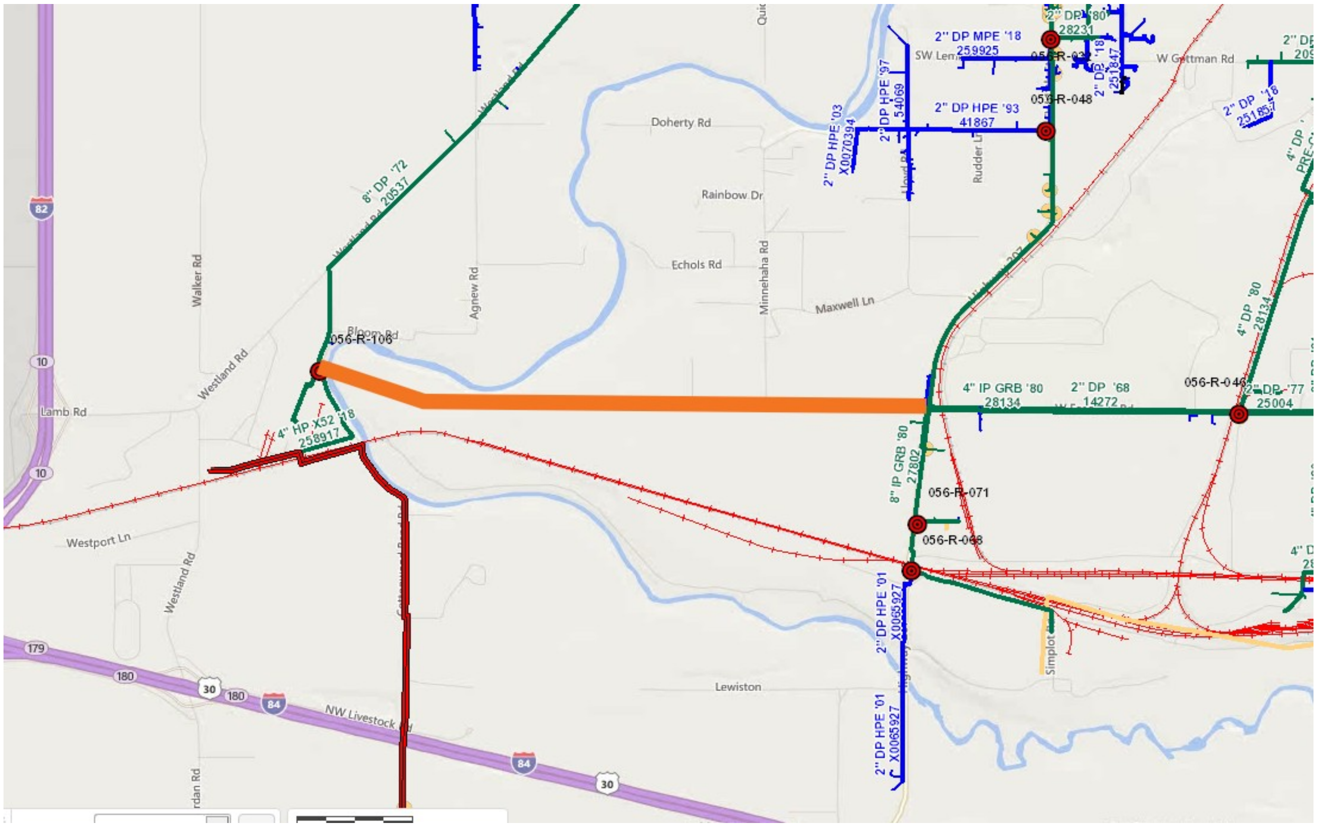
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20537
056-R-106
4" HP X52 '18
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2" DP MPE '18
259925
2" DP HPE '93
41867
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X0070394
2" DP HPE '97
54069
056-R-048
4" IP GRB '80
28134
2" DP '68
14272
056-R-046
2" DP '77
25004
4" DP '80
28134
8" IP GRB '80
27802
056-R-071
056-R-068
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Doherty Rd
Rainbow Dr
Echols Rd
Maxwell Ln
Walker Rd
Agnew Rd
Minnehaha Rd
Westland Rd
Lamb Rd
Westport Ln
Rudder Ln
W Gettman Rd
Simplot
Lewiston
NW Livestock Rd