

WEST YOST

Pumping with Curb Appeal:
A Residential Approach to Utility Design

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CONTENT

Lake Oswego South Side Storage Study

- Reservoir Siting and Sizing
- Pump Station Siting and Sizing

McVey Pump Station Replacement

- Existing Station and Operation
- Site Plan Challenges
- Curb Appeal



Existing McVey Pump Station

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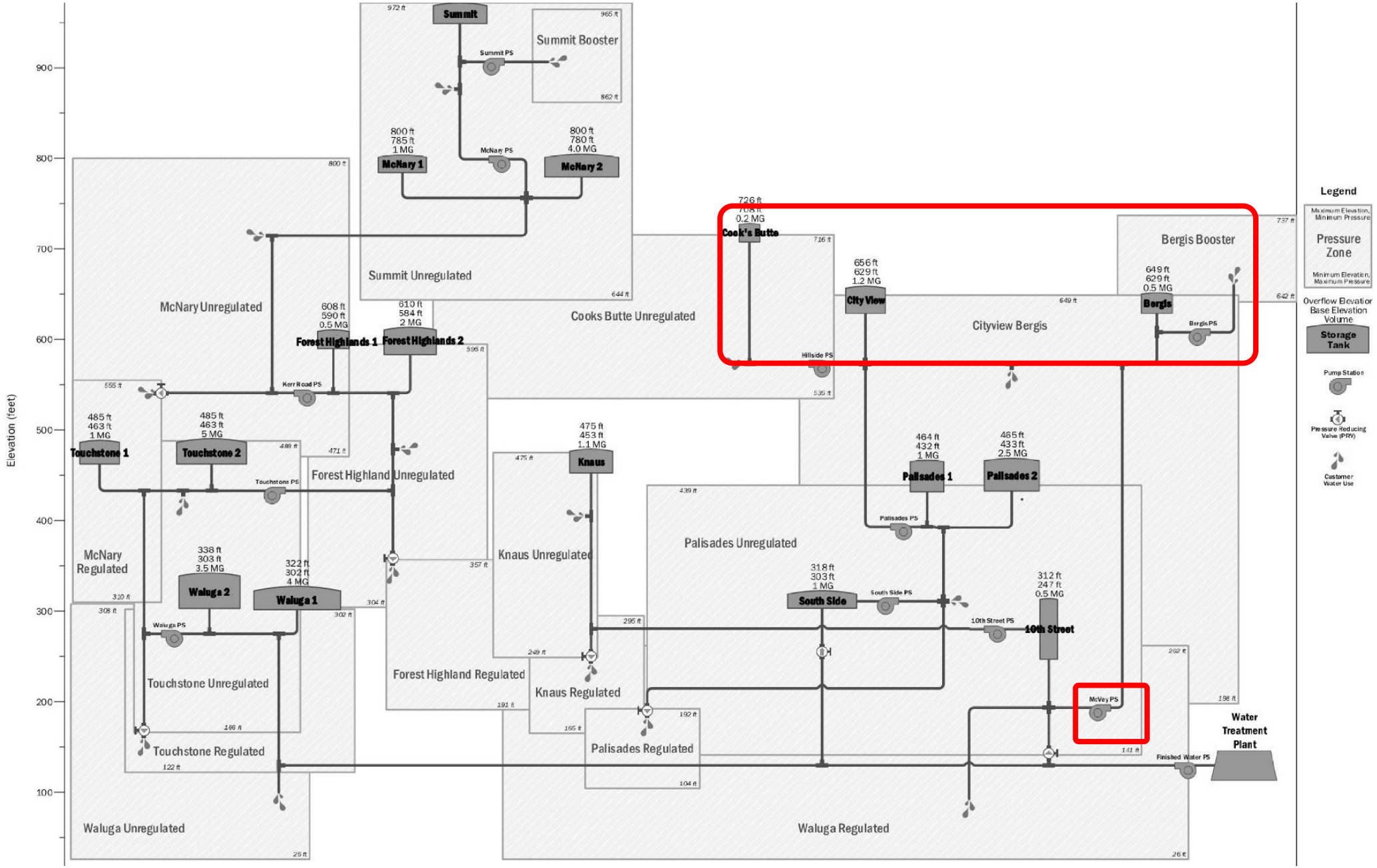
Project Location



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Project Driver:
Storage Needs for Cityview Bergis Zone

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Elevation (feet)
900
800
700
600
500
400
300
200
100
Summit
Summit PS
Summit Booster
McNary 1
McNary PS
McNary 2
Summit Unregulated
McNary Unregulated
Cooks Butte Unregulated
Forest Highlands 1
Forest Highlands 2
Kerr Road PS
Touchstone 1
Touchstone 2
Touchstone PS
Forest Highland Unregulated
McNary Regulated
Waluga 2
Waluga 1
Waluga PS
Touchstone Unregulated
Touchstone Regulated
Waluga Unregulated
Knaus
Knaus Unregulated
Forest Highland Regulated
Knaus Regulated
Palisades Regulated
Cook's Butte
Hillside PS
City View
Cityview Bergis
Bergis Booster
Bergis
Bergis PS
Palisades 1
Palisades 2
Palisades PS
Palisades Unregulated
South Side
South Side PS
10th Street PS
10th Street
McVey PS
Waluga Regulated
Water Treatment Plant
Finished Water PS
Legend
Maximum Elevation, Minimum Pressure
Pressure Zone
Minimum Elevation, Maximum Pressure
Overflow Elevation
Base Elevation
Volume
Storage Tank
Pump Station
Pressure Reducing Valve (PRV)
Customer Water Use

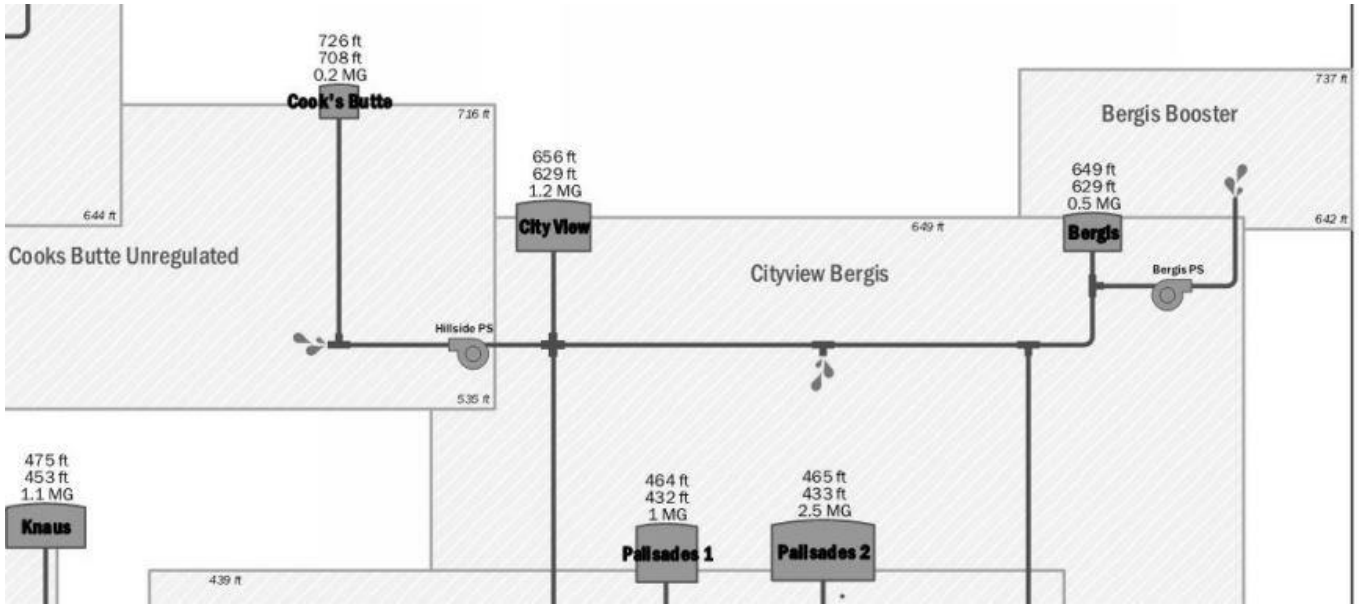
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Site Elevations

- Proposed sites must be located at a suitable elevation for hydraulic conditions
- Potential reservoir sites were selected with existing ground topography in the 620- to 650-foot elevation range to accommodate a reservoir overflow elevation of 656-feet.

West Yost team performed an additional siting analysis to confirm suitable sites.

- Land Use is Vacant, Agricultural, or Open Space
- Elevations 625-feet and above
- Proximity to existing City water infrastructure



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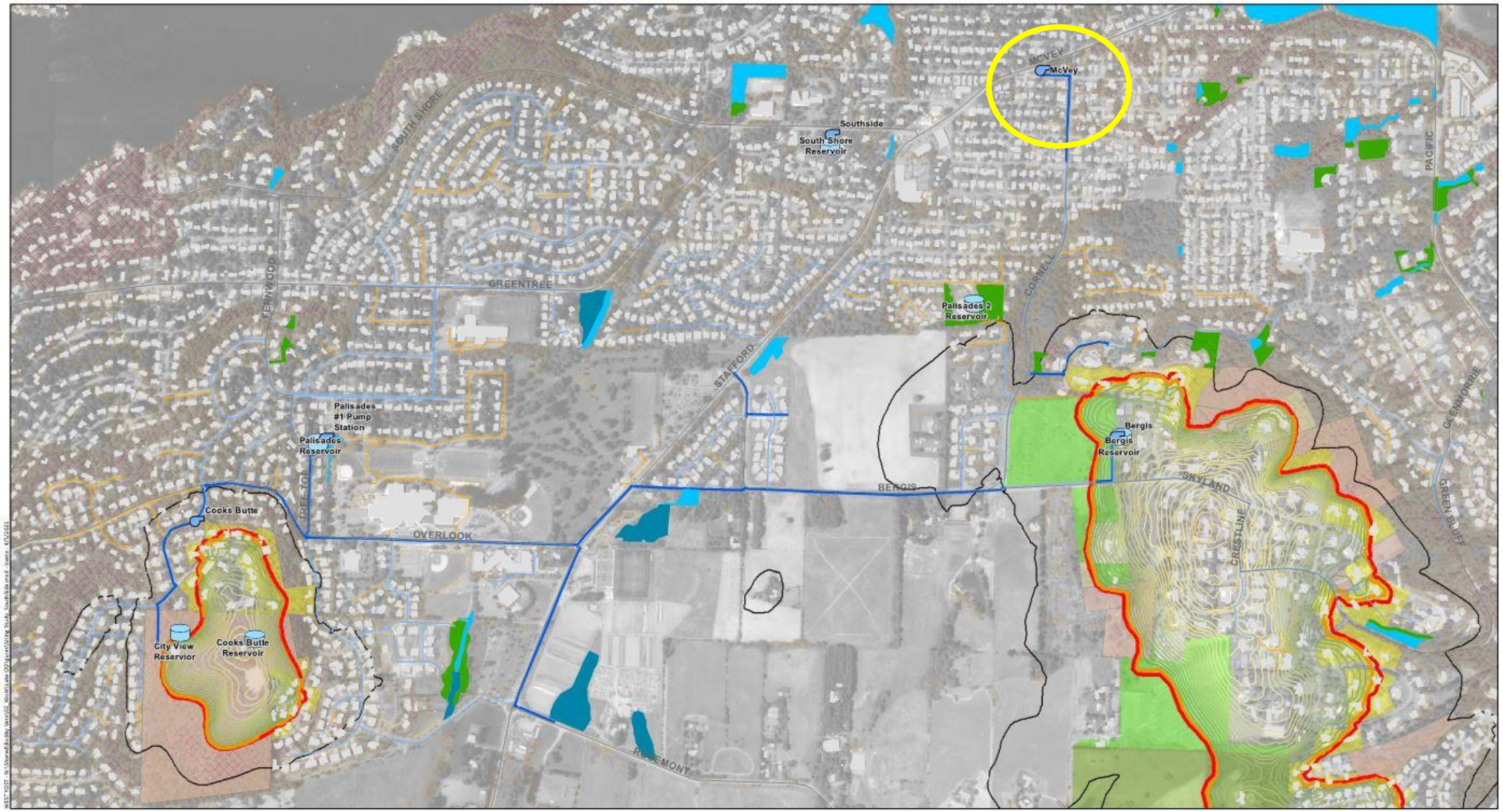
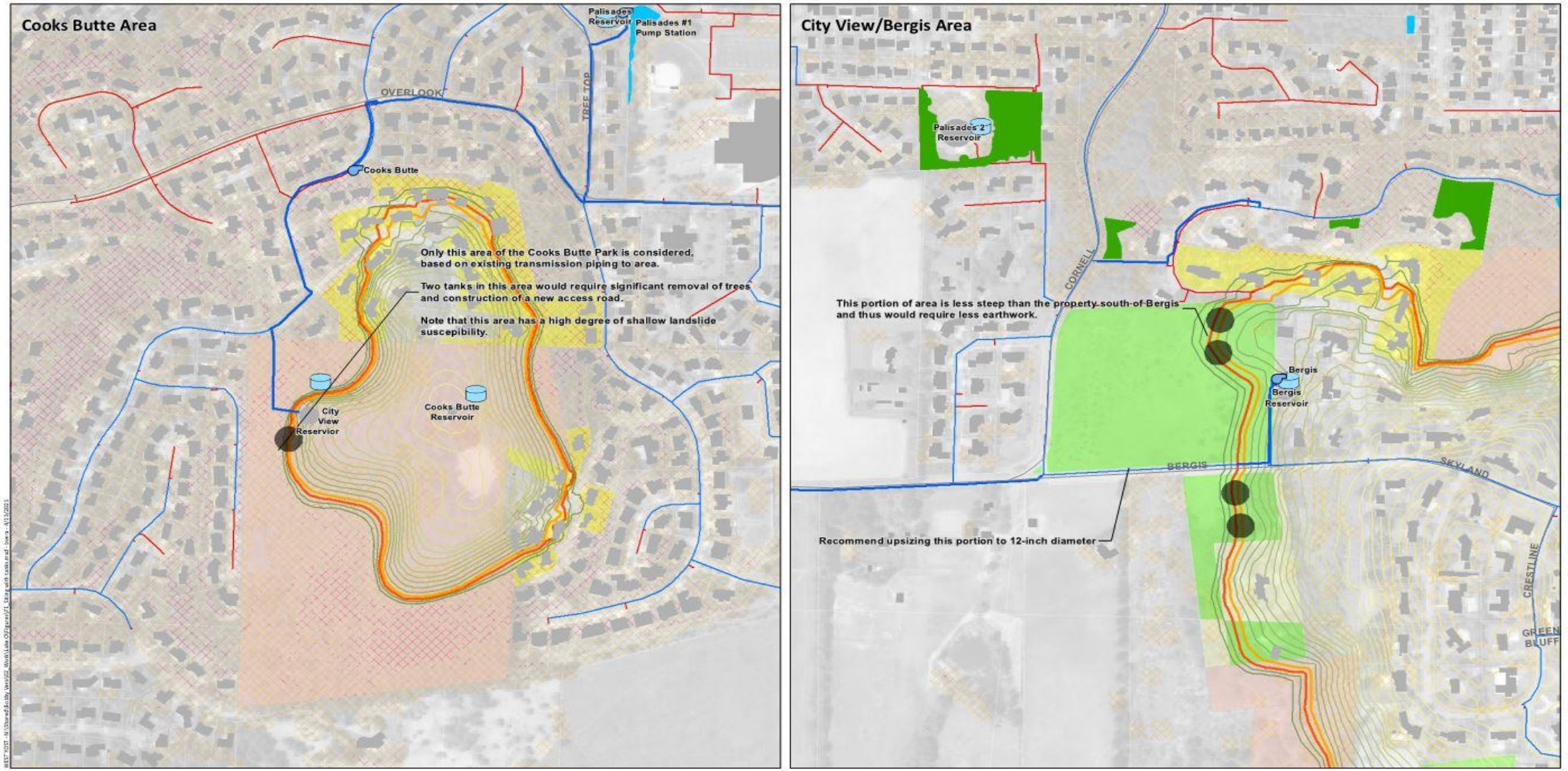


Figure 1

Potential Tank Site Candidates

City of Lake Oswego
Southside Storage Study and Condition Assessment



Notes:
1. Only distribution system facilities within the City View/Bergis pressure zone shown.

Figure 1

Potential Tank Site Candidates

City of Lake Oswego
Southside Storage Study and Condition Assessment

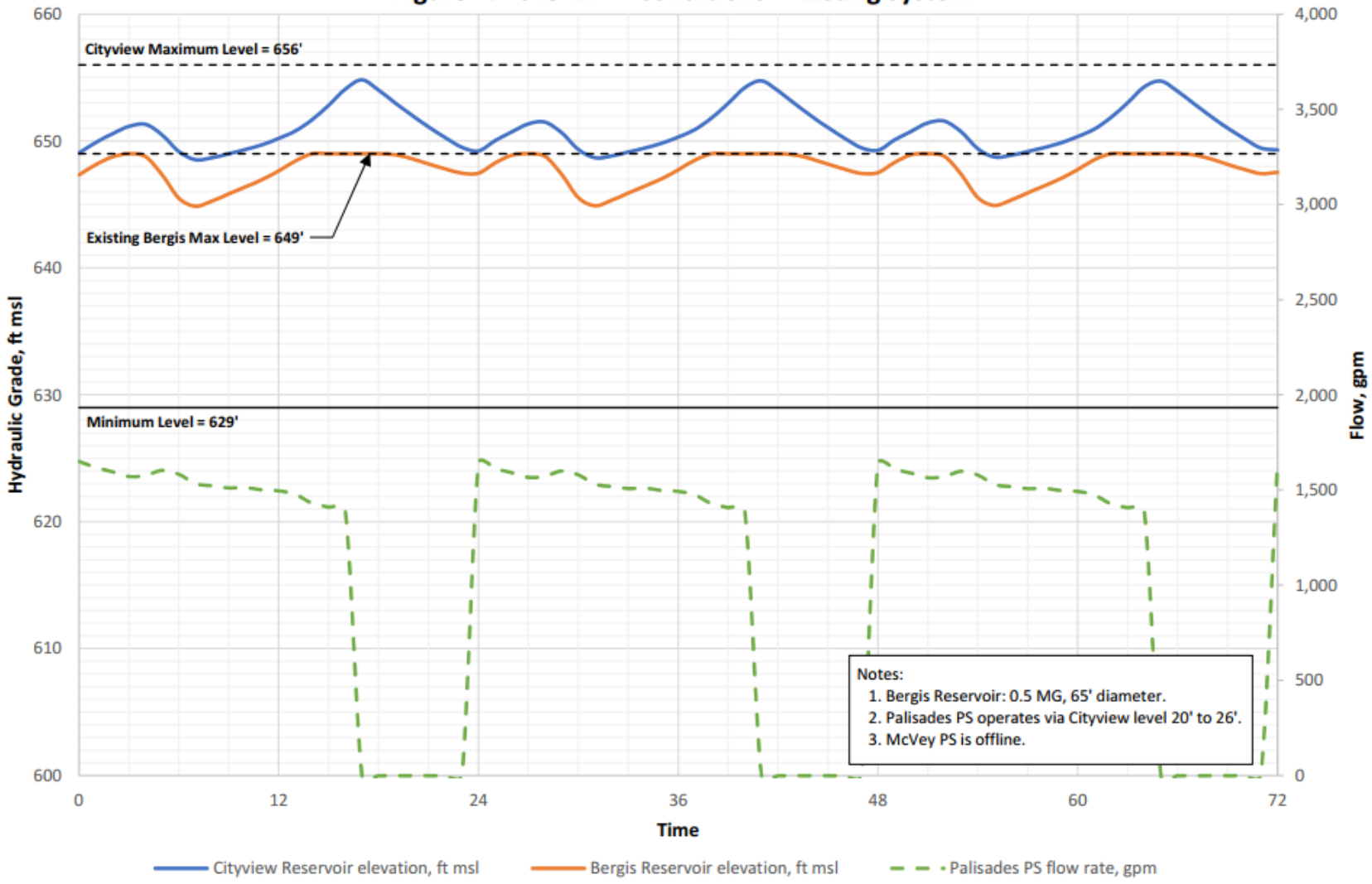
Preliminary Hydraulic Modeling Results

- As described in the Siting Evaluation, Bergis sites 1,2, and 3 have the highest ranking.
- Hydraulic modeling of the Bergis site was progressed, and evaluated assuming a new 2.0 MG tank (nominal)
  - Assumes existing 0.5 MG tank is replaced by this new tank (i.e. 1.2 MG of additional storage plus 0.5 MG, rounded to 2.0 MG)
- Evaluated under 2045 demand conditions and under the following conditions:
  - Normal Operations
  - Fire flow Conditions

1. Baseline Conditions

- Existing overflow at Bergis tank is limiting
- Palisades pump station assumed to be controlled based on City View levels
- McVey PS assumed to be offline

Figure 1. 2045 MDD Conditions - Existing System

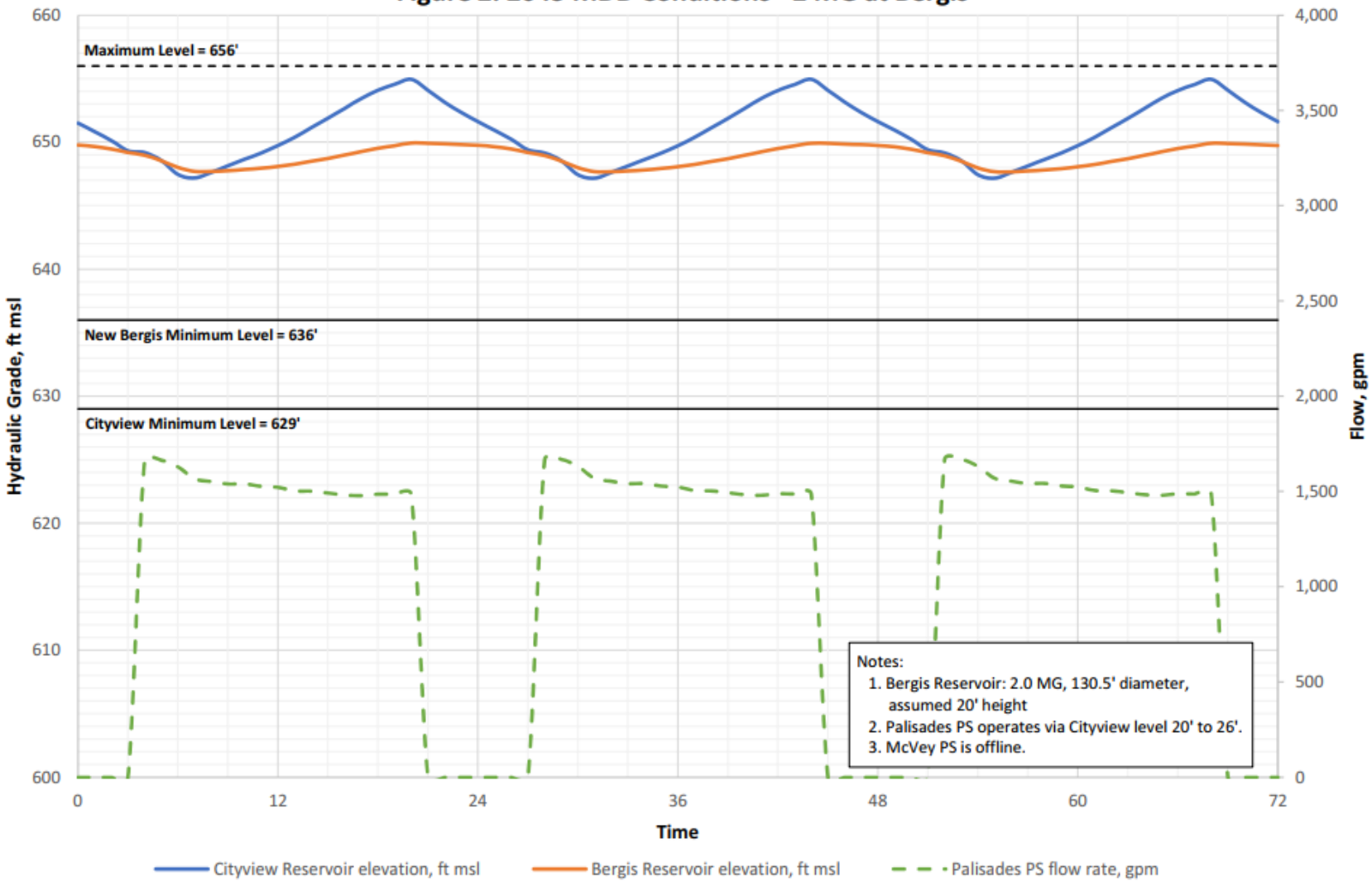


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2. New 2.0 MG Tank at Bergis

- Same controls as Scenario 1
- New Tank assumed to have 656’ overflow
- Bergis Tank experiences minimal turnover

Figure 2. 2045 MDD Conditions - 2 MG at Bergis

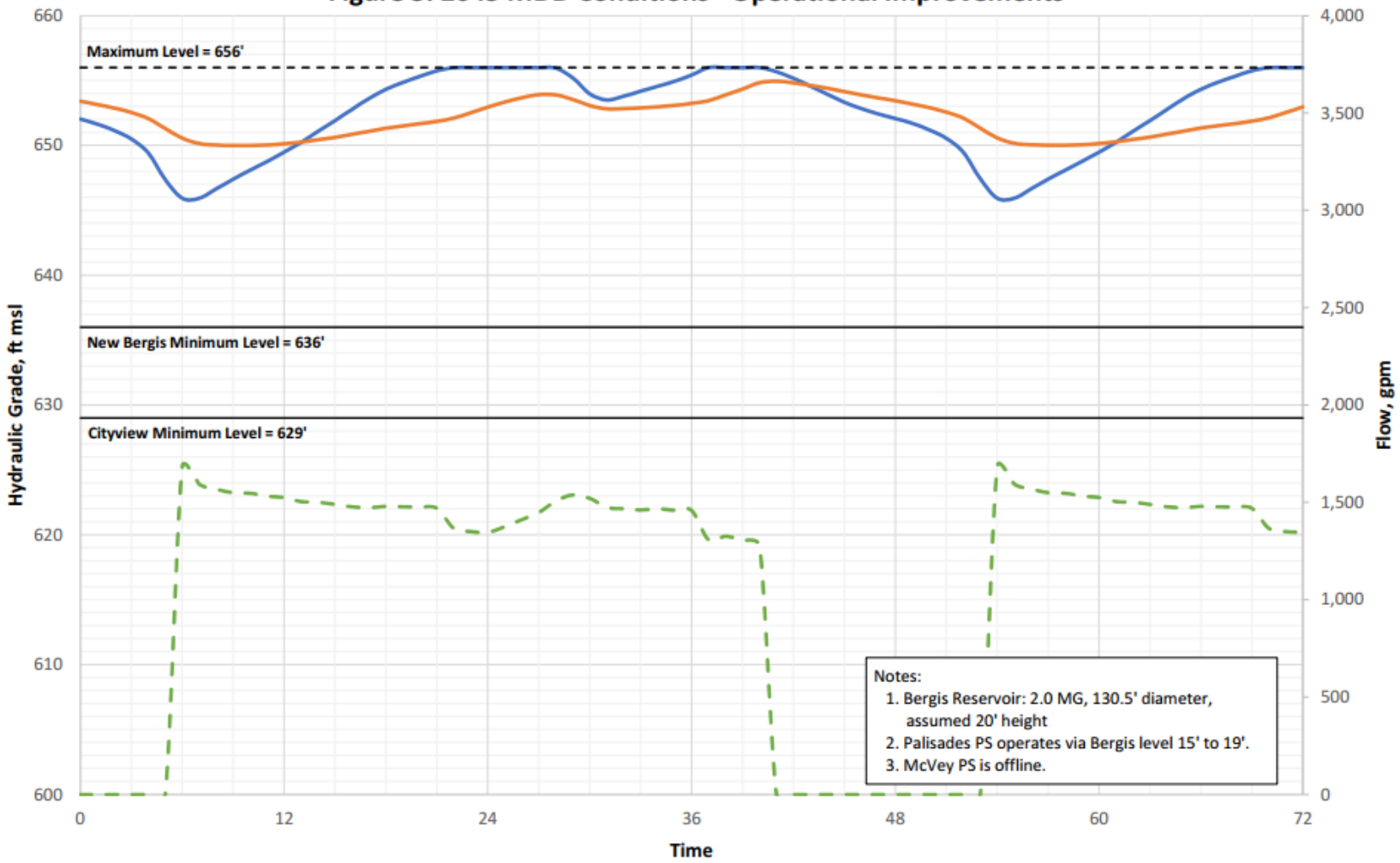


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3. New 2.0 MG Tank at Bergis with Ops. Imp.

- Controls for the Palisades PS updated to point to New Bergis Tank
- Bergis Tank levels increase but continues to experience minimal turnover
- Longer Palisades run times

Figure 3. 2045 MDD Conditions - Operational Improvements



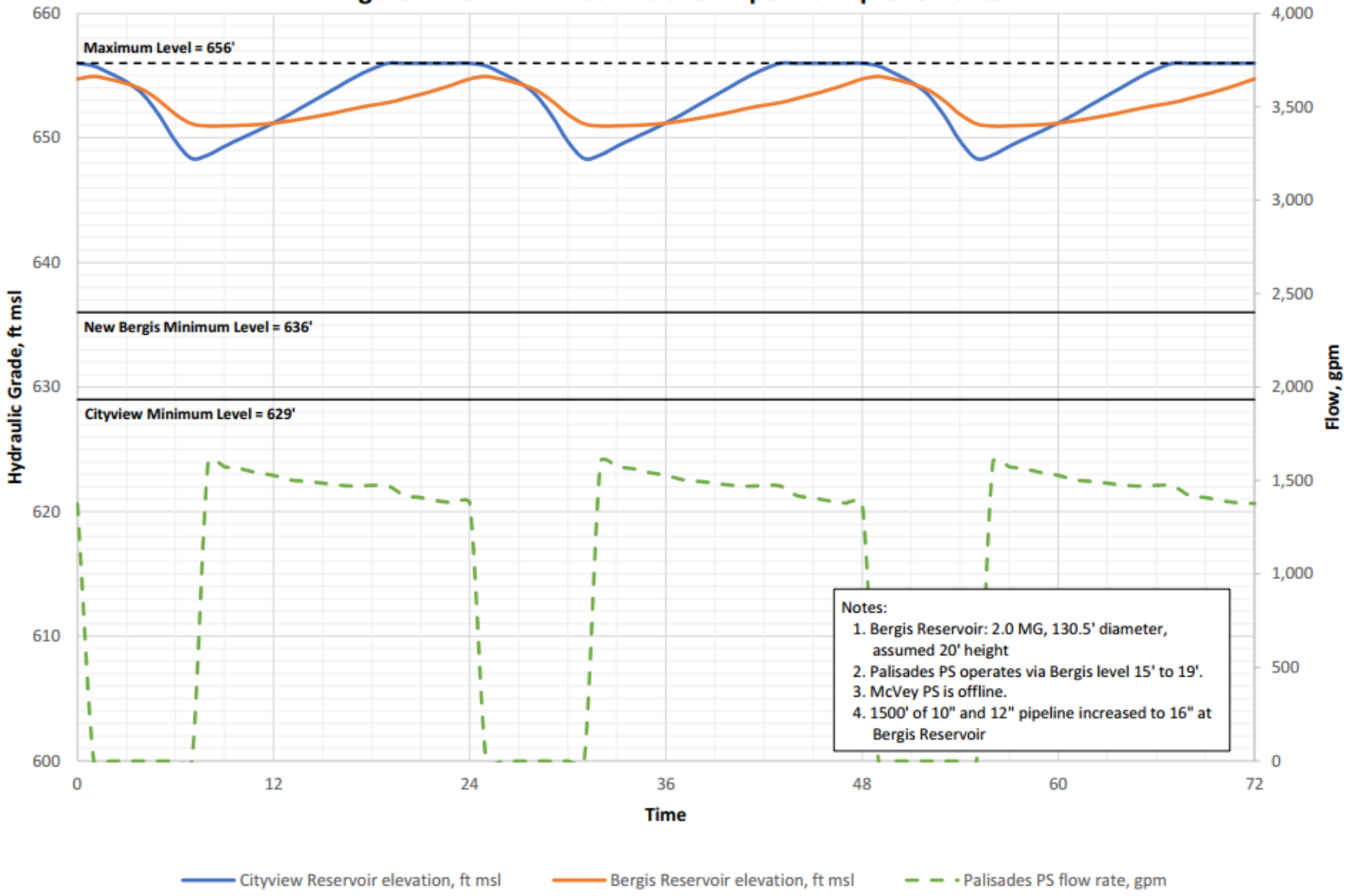
Results under Scenarios 2 and 3 indicate hydraulic restriction in getting water to and from new Bergis Tank.

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4. Piping Improvements at Bergis Site

- Controls same as Scenario 1
- 1,500 LF of 10/12-inch pipeline replaced with 16-inches (previously recommended for FF purposes)
- Turnover improves

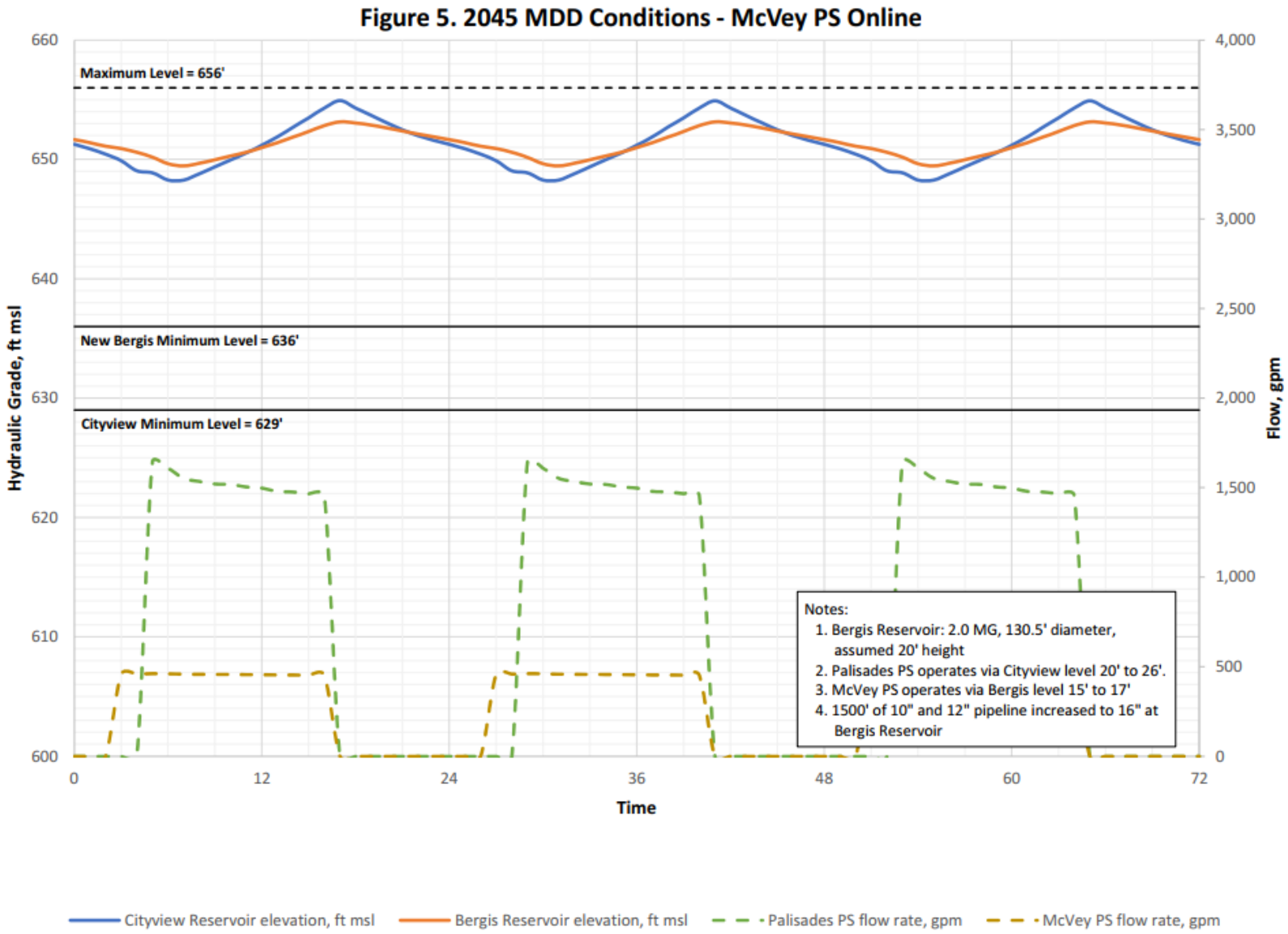
Figure 4. 2045 MDD Conditions - Pipeline Improvements



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5. McVey Online

- McVey assumed to be online
- 1,500 LF of 10/12-inch pipeline replaced with 16-inches
- Turnover similar to Scenario 4, but City View no longer “stuffs”
- Reduction in Palisades Run Time



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McVey PS Considerations

- Without Stafford area demands, pumping capacity is sufficient without the McVey PS
- As shown in hydraulic evaluation (scenario 5), however, McVey PS improves storage balancing within the City View/Bergis Zone, especially if new storage is built at Bergis Site
- McVey PS provides additional reliability to area, as it feeds from the Waluga PZ (i.e., bypasses South Side PS/Tank)
- McVey Pump station reduces pumping capacity deficit if any portion of Stafford is incorporated
  - At 100 percent incorporation, reduces deficit from **(0.88)** mgd to **(0.28)** mgd



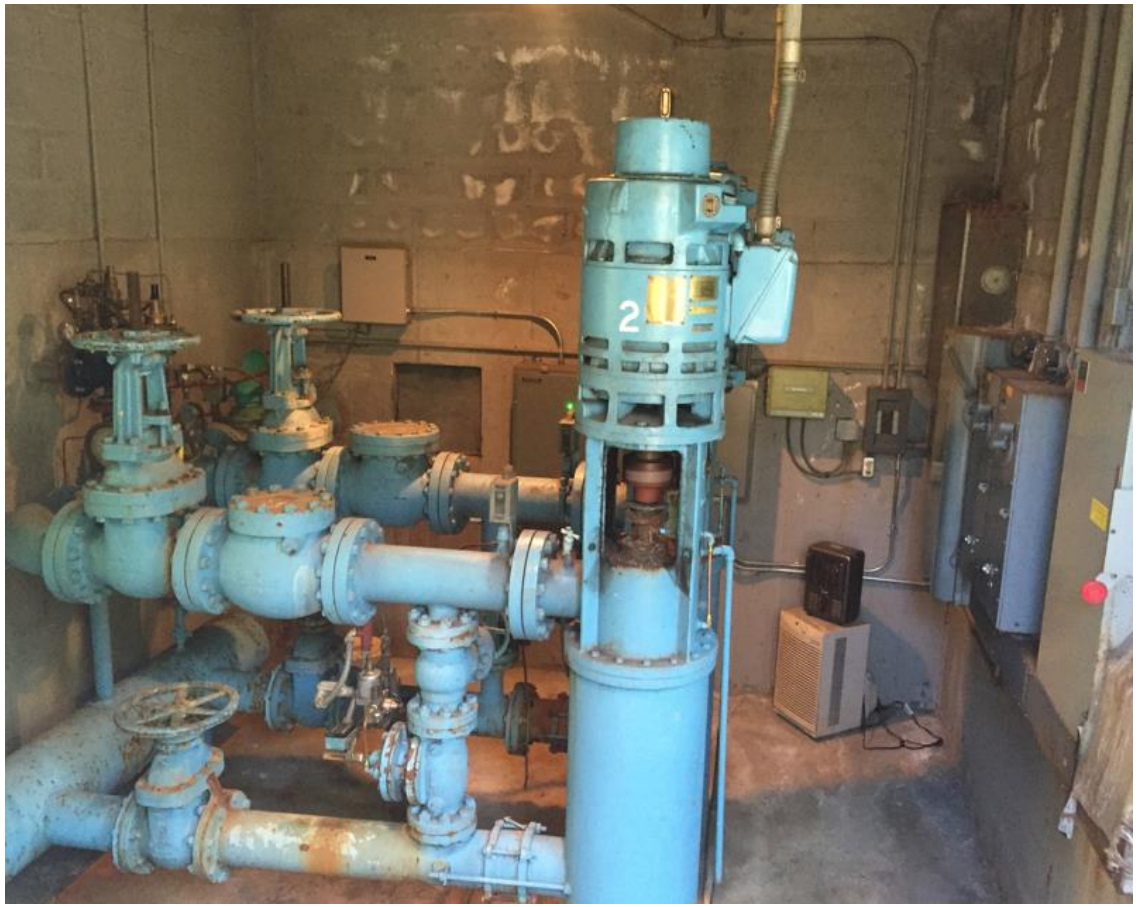
Recommended that McVey PS remain, and be expanded if Bergis storage site is selected and/or if Stafford Area Demands are incorporated.

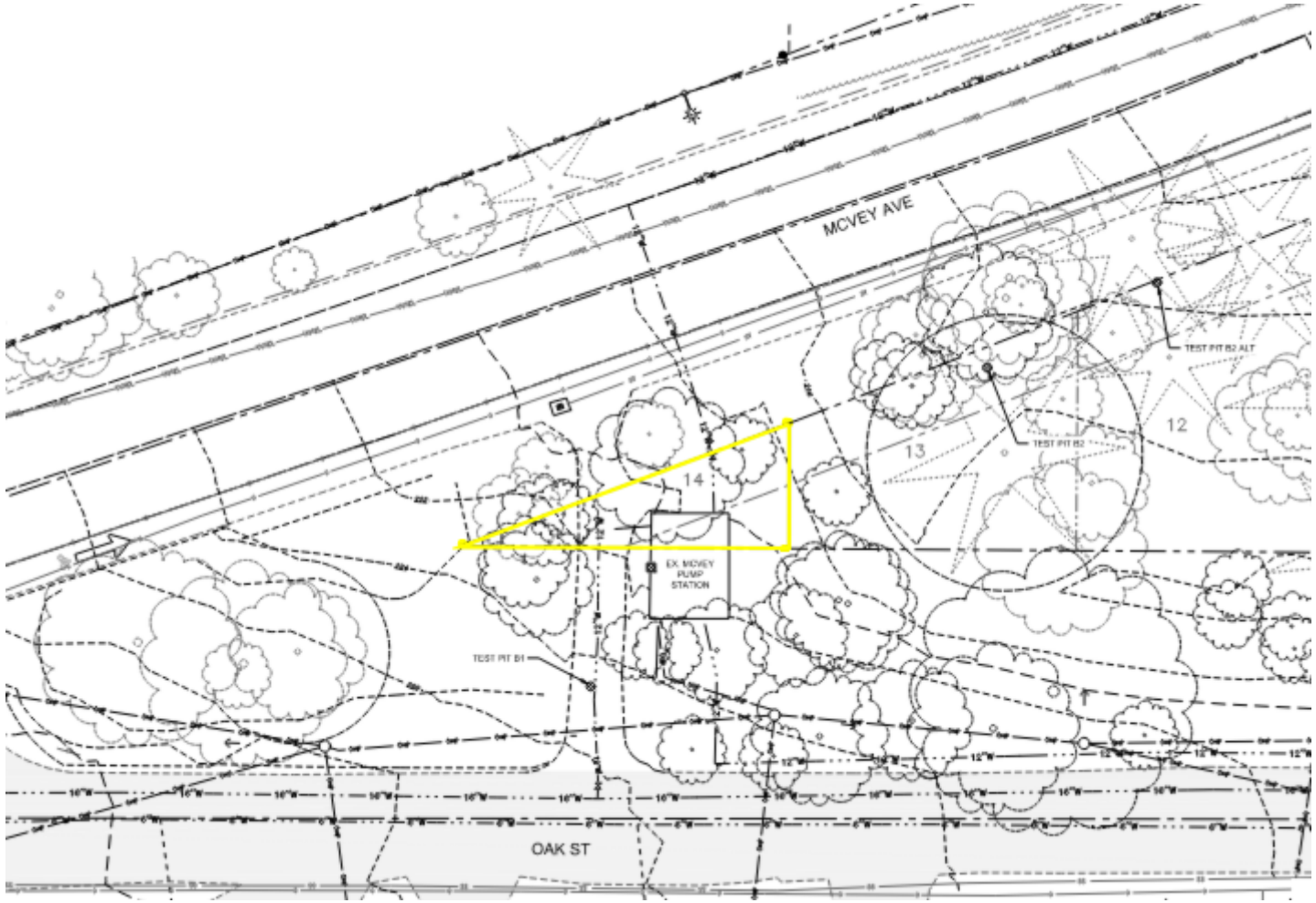
McVey Pump Station Replacement - Design

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1. Existing Pump Station - 1959






MCVEY AVE
TEST PIT B2 ALT
TEST PIT B2
12
13
14
EX. MCVEY PUMP STATION
TEST PIT B1
OAK ST

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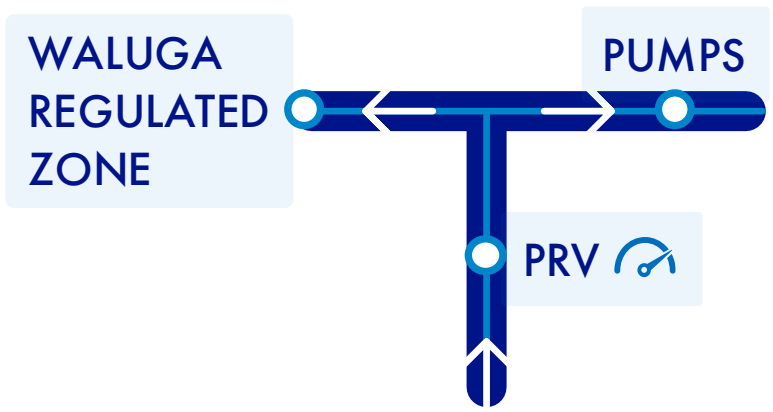
Piping Layout Considerations



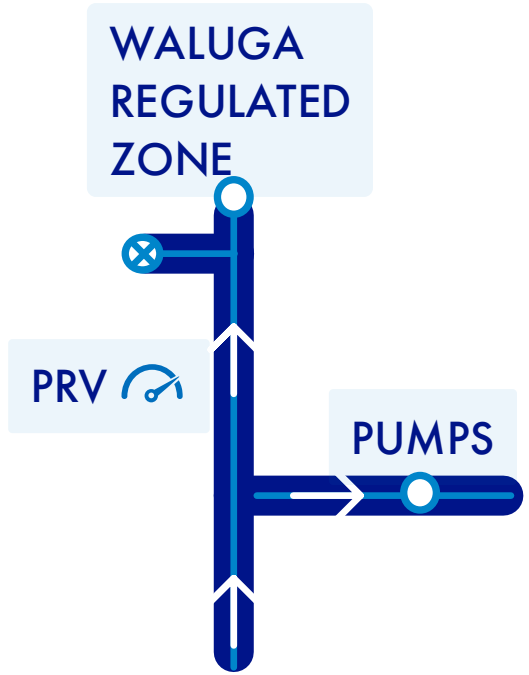


Piping / PRV Layout

EXISTING LAYOUT



OPTIONAL LAYOUT



McVey PS Capacity Sizing

Table 4-4. Existing and Projected Required Pumping Capacity Evaluation

Pressure Zone	Pump Station	Available Pumping Capacity		Required Pumping Capacity[b,c]	Pumping Surplus (Deficit), mgd
		Firm Capacity[a], mgd	Total Firm Capacity, mgd		
Waluga Regulated/Unregulated	Finished Water	31.39	31.39	33.59	(2.20)
Palisades Regulated/Unregulated	South Side	2.16	2.76	3.34	(0.58)
	McVey[d]	0.60			
Cityview/ Bergis	Palisades	2.88	3.48	2.32	1.16
	McVey	0.60			
Cooks Butte	Hillside	0.14	0.14	0.05	0.09
Bergis Booster	Bergis	0.43	0.43	0.14	0.30

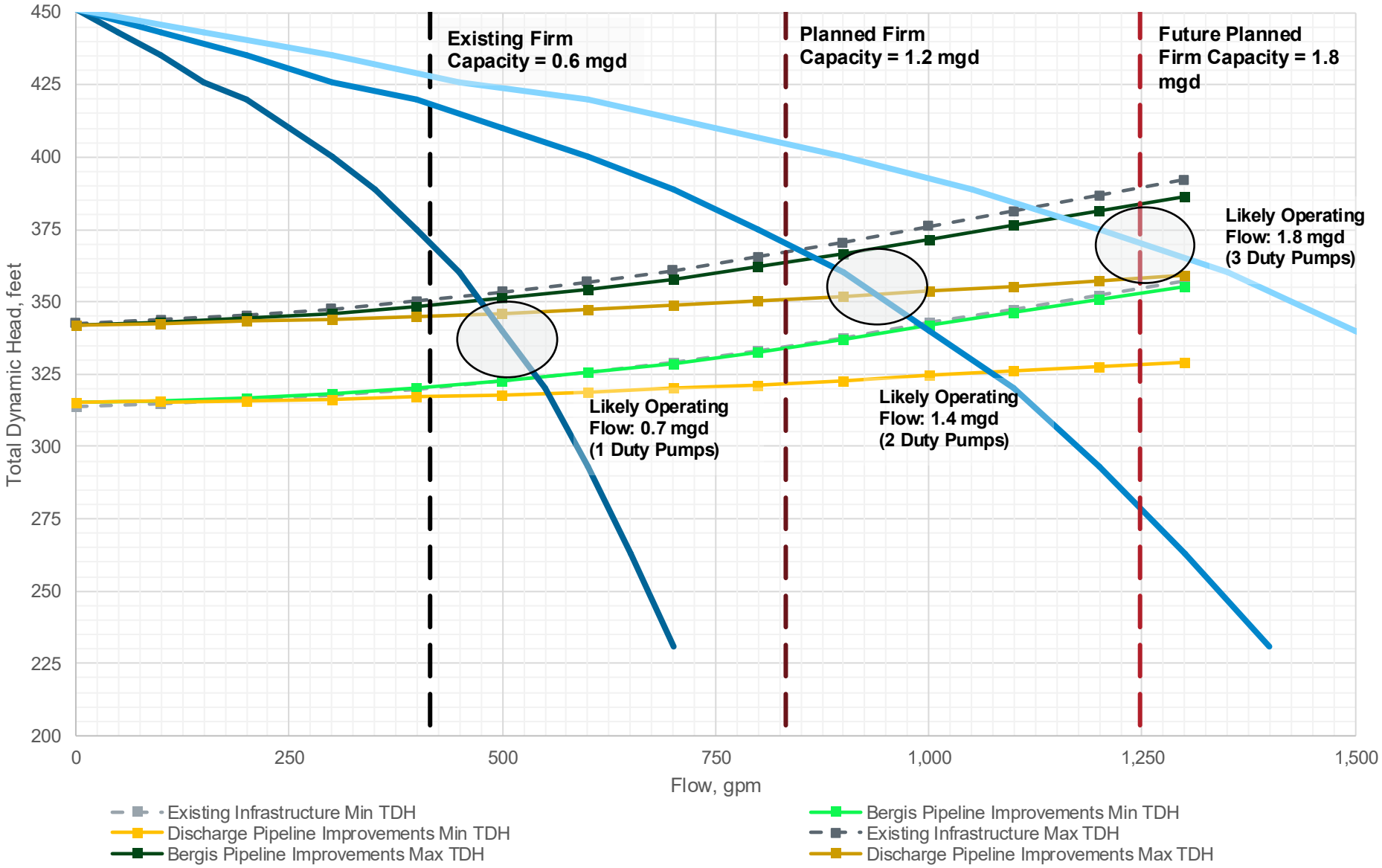
(a) Based on 2018 WMP Table 1-2.

(b) Based on the cumulative maximum day demand of each zone upstream of pump station (demands per Table 4-1). Includes 1/3 of Stafford area demands in the Cityview/Bergis Zone.

(c) Requires firm capacity greater than or equal to 100% of maximum day demand, per Section 2.6 of the 2018 WSMP. As Bergis Booster does not have storage, it was evaluated under peak hour demand.

(d) McVey PS draws suction from the Waluga Zone to serve the Cityview Bergis Zone, bypassing the Palisades Zone. Therefore, McVey PS can be included in the total capacity for the Palisades Zone as it directly serves upstream demands.

System Curves for McVey Pump Station

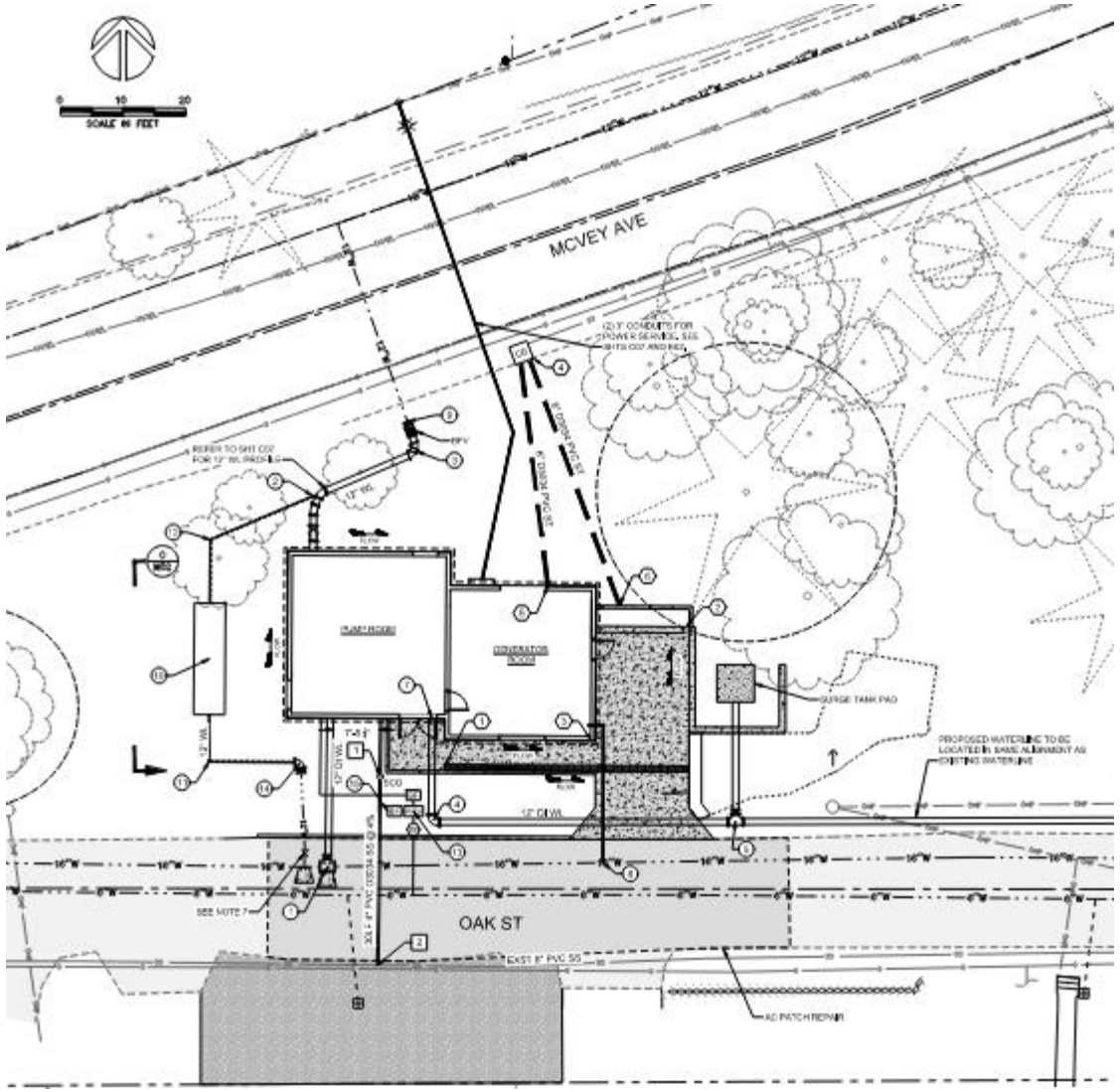


Pump Sizing and Selection

- Existing Pump Station
  - Firm Capacity 415 gpm
  - 50 hp motor
- Proposed Pump Station – Option 1
  - Firm Capacity 900 gpm
  - Two pumps + 3rd, 60 hp each
- Proposed Pump Station – Option 2
  - Firm Capacity 900 gpm
  - One pump + 2nd, 100 hp each

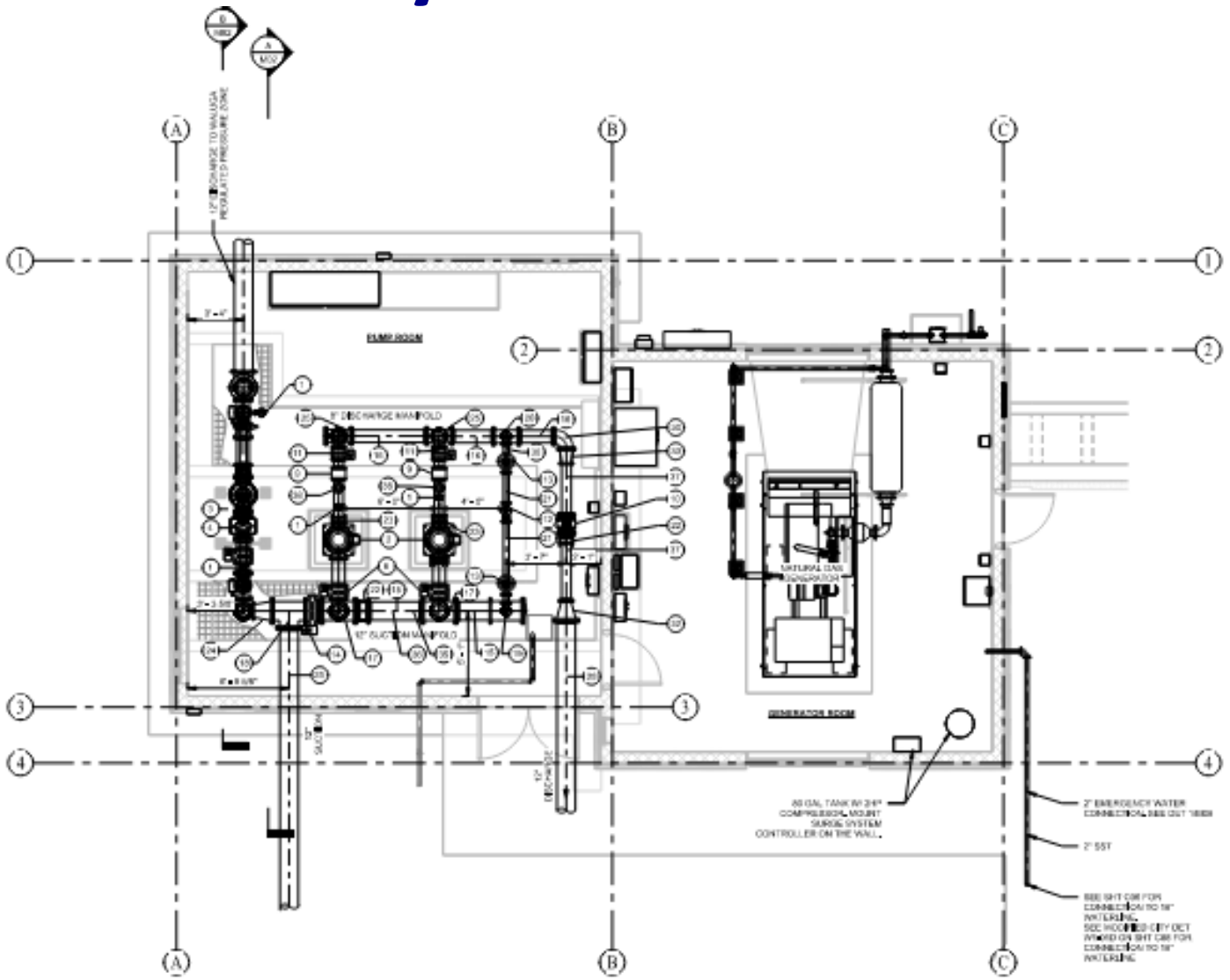
- Option 2 was selected
  - Cost: The cost of each pump in Option 1 was more than each pump in Option 2
  - O&M: Lower O&M required for one less pump and motor to maintain

McVey PS – Yard Piping



Our recommendation for the McVey PRVs is to replace them in kind (i.e., maintain the same PRV sizes that are currently there, to keep the same overall capacity to the zone). To address the fire flow deficiencies previously observed in the Waluga Regulated Zone, pipeline improvements are needed. (CIP Project D-03)

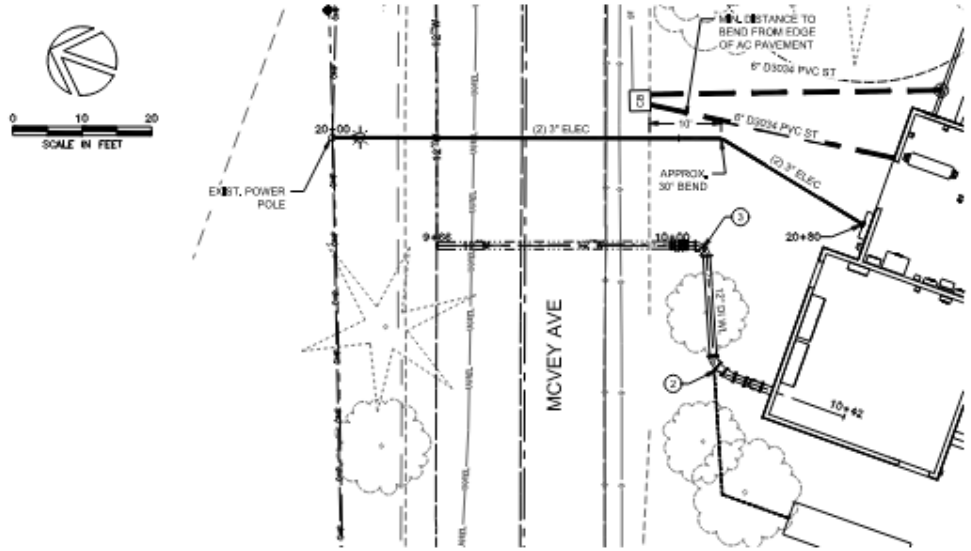
McVey Mechanical Layout



Power Service



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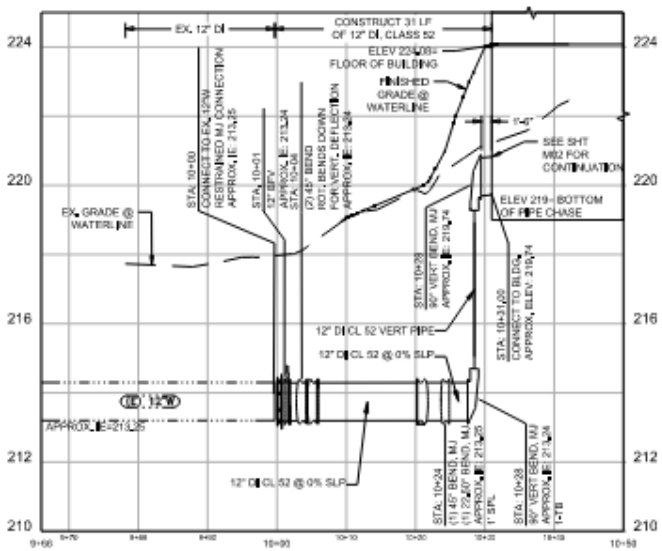
WATERLINE NOTES

(2) N:930927.3638, E:347804.0016
Fill
1-45° BEND, MJ
1-22½° BEND, MJ
1 SPOOL

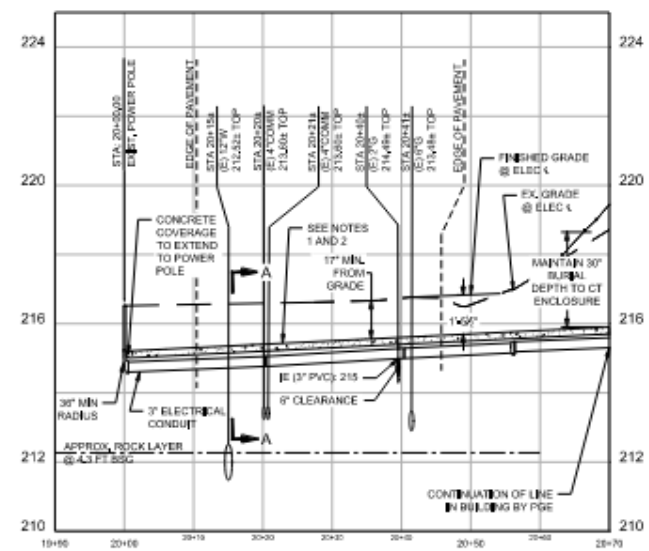
(3) N:930835.5993, E:347819.4391
CONNECT TO EXIST. 12" WL
Fill
2-12" 45° BENDS
1-12" BFV
11.5
1 SPOOL

SHEET NOTES:

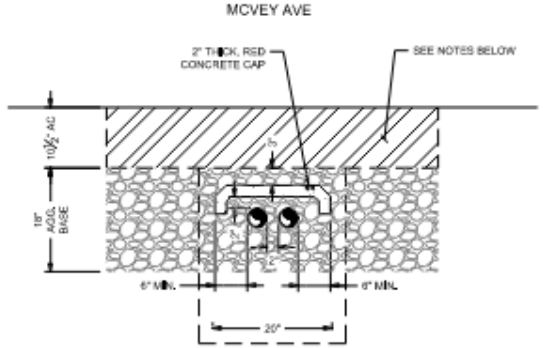
1. LAYER RED-DYED 3000 PSI CONCRETE MIN. 2" THICK WITH 6" HORIZONTAL COVERAGE BEYOND OUTER WALLS OF CONDUIT (EXTENDED TO POINT WHERE CONDUIT REACHES MIN. 30" BURIAL DEPTH). RED DYE MUST BE MIXED AT THE PLANT, PER PGE REQUIREMENTS.
2. FROM THE PGE ESR HANDBOOK: "FOR EXTREMELY ADVERSE GROUND CONDITIONS – SUCH AS SOLID ROCK FORMATIONS OR CONFLICTS WITH OTHER UTILITIES – CONDUIT MAY BE INSTALLED AT A MINIMUM DEPTH OF 12 INCHES IF MECHANICAL PROTECTION IS USED. ACCEPTABLE MECHANICAL PROTECTION IS A MINIMUM 2-INCH LAYER OF RED-DYED 3000 PSI CONCRETE DIRECTLY ABOVE THE CONDUIT THAT HAS AT LEAST 6 INCHES OF HORIZONTAL COVERAGE BEYOND THE OUTER WALLS OF THE CONDUIT." RED DYE MUST BE MIXED AT THE PLANT, PER PGE REQUIREMENTS.
3. ALL WATERLINE PIPING TO BE FULLY RESTRAINED.



12" DI WATERLINE PROFILE
SCALE H: 1"=10'
V: 1"=2'



3" ELECTRICAL PROFILE
SCALE H: 1"=10'
V: 1"=2'



NOTES:
1. USE ½" DENSE, GRADED AC PAVEMENT, LEVEL 3, MAX 3" LIFT THICKNESS.
2. USE ¾"-0" OR 1"-0" DENSE GRADED AGG BASE MEETING MATERIAL AND COMPACTION REQUIREMENTS OF OSSC SECTION 00641.
3. 12" MIN. T-CUT. TRENCH PATCH AND T-CUT TO BE IN ACCORDANCE WITH CITY OF LAKE OSWEGO DETAIL SS-03, SHT C-08.

PGE CONDUITS WITH PROTECTIVE CONCRETE

SECTION A-A

SCALE: 1" = 20'

Date:	No.:	Revisions:	By:

OREGON Daphne Mazzone EXPIRES: 12/31/2026

Drawn: OMV
Designed: KME
Checked: DAM

City of Lake Oswego
Engineering Division
ERICA RIDONEY, P.E. CITY ENGINEER

WORK ORDER NO. 340
MCVEY PUMP STATION REPLACEMENT
Date: 10/2025

PROFILES
File Name: 89330-2304-02-C07-PROF

Sheet C07
12 of 70

C:\USERS\OMENARD\DOCUMENTS\ACCDOCS\WEST YOST ASSOCIATES\MCVEY PUMP STATION\PROJECT FILES\02--CAD MODELS\07--CIVIL 3D\PRODUCTION\89330-2304-12--C07--PROF.DWG 10/20/2025 10:39 AM ovejanoy

Shallow Trench across McVey Ave, 4/21/26





Red Concrete Cap, 4/22/26





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Building Example – 10th Street Pump Station





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PROPOSED MCVEY PUMP STATION - RENDERINGS







Next Steps

- McVey Pump Station - Construction Complete Early 2027
  - BFV's
  - VT Pumps – 32 Weeks

THANK YOU





35th Anniversary Slide Deck #2

Presented to you!