

Larger Facility Needs, Constrained Site, Oh My!

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Agenda



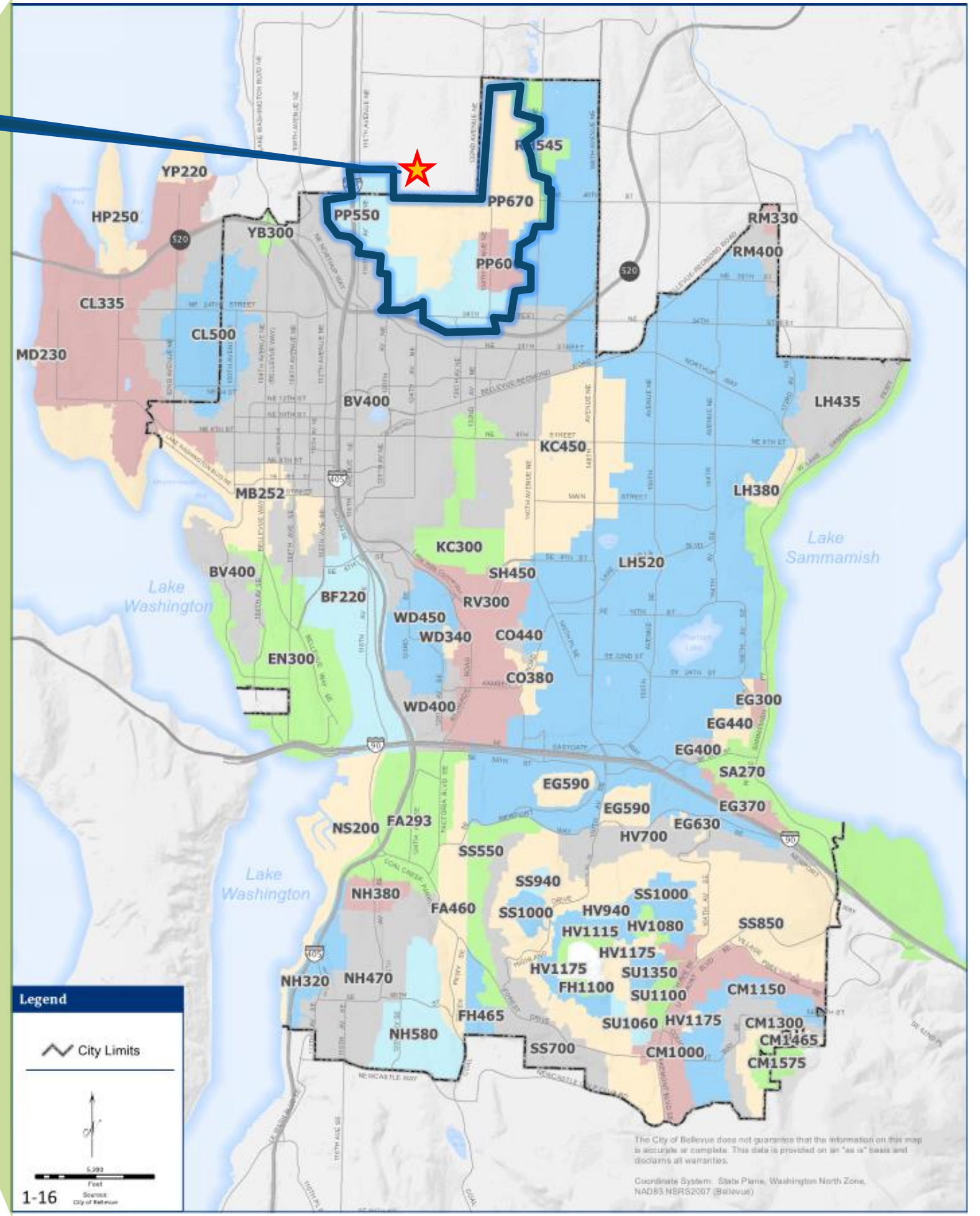
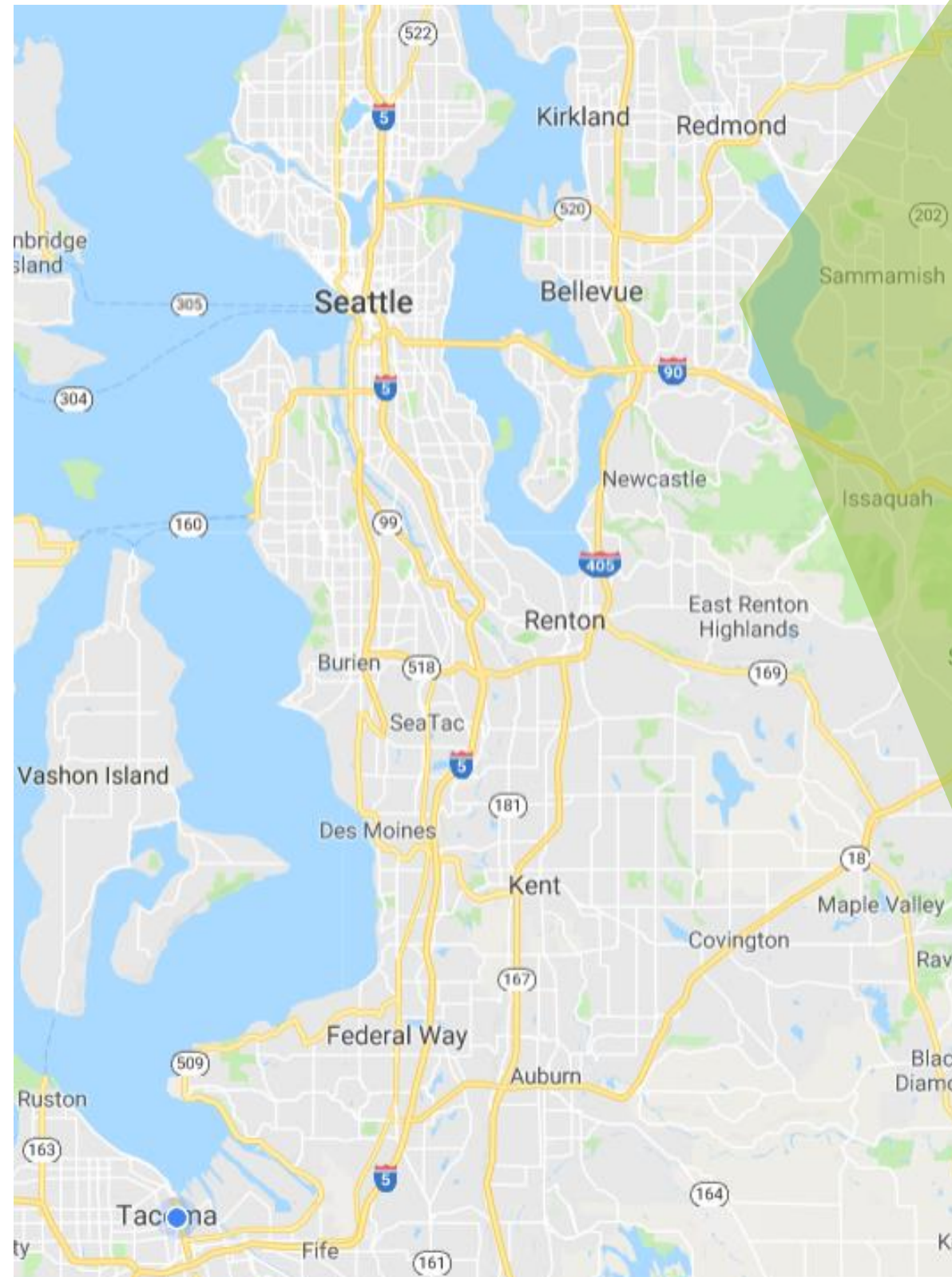
- 01 Project Background
- 02 Creative Brainstorming
- 03 Existing Facilities Evaluation
- 04 Public Outreach and Alternatives Evaluation
- 05 Design of Selected Alternative
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Project Background

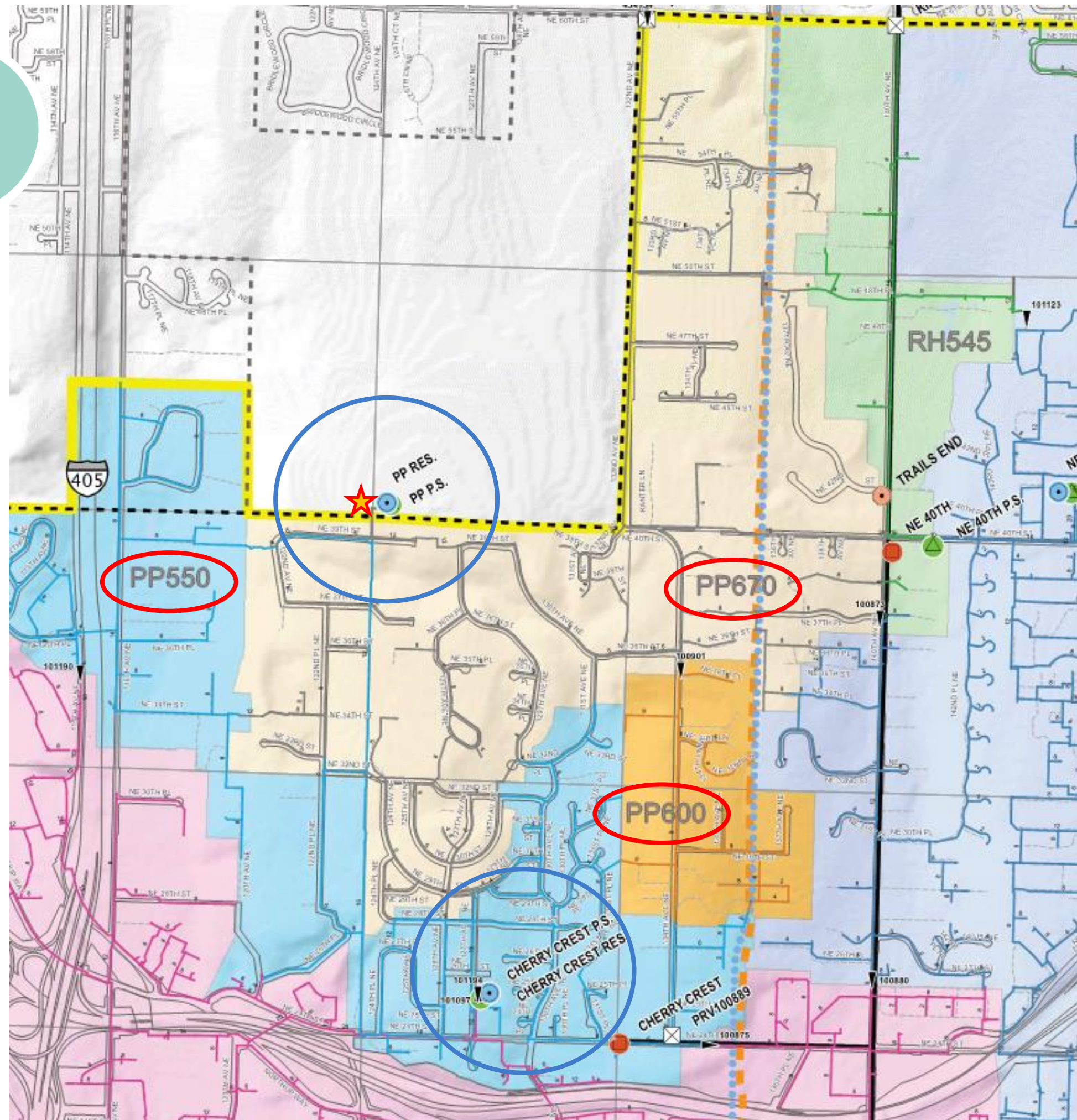




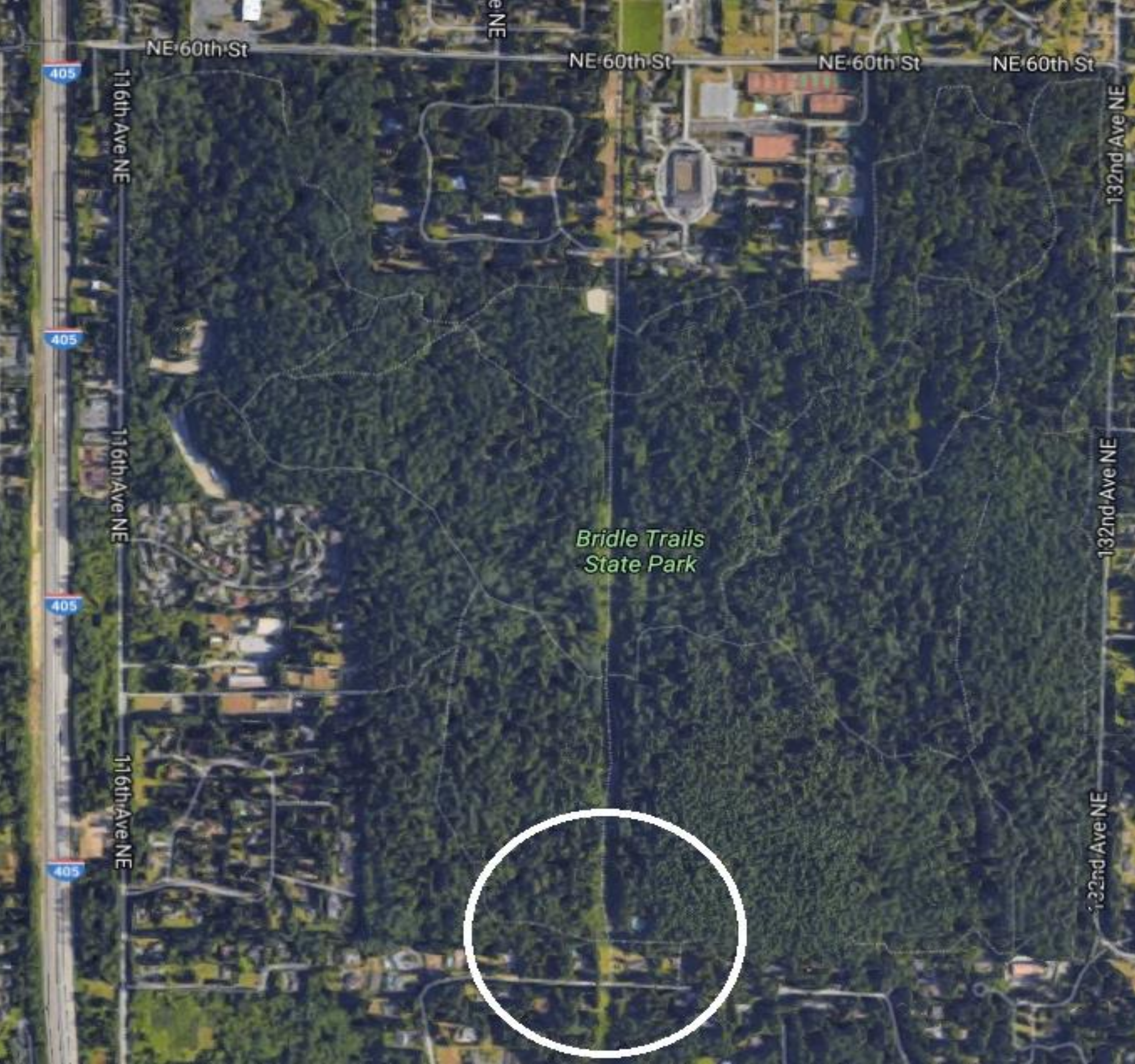
Pikes Peak Reservoir & Pump Station



Pikes Peak Service Area



- Three pressure zones
 - PP550
 - PP600
 - PP670
- Pikes Peak site
 - 1.0 MG Reservoir
 - PP670 Pump Station
- Cherry Crest site
 - PP550 Pump Station



Pikes Peak Site

- Leased area within Bridle Trails State Park
- Outside City Limits
- In Unincorporated King County



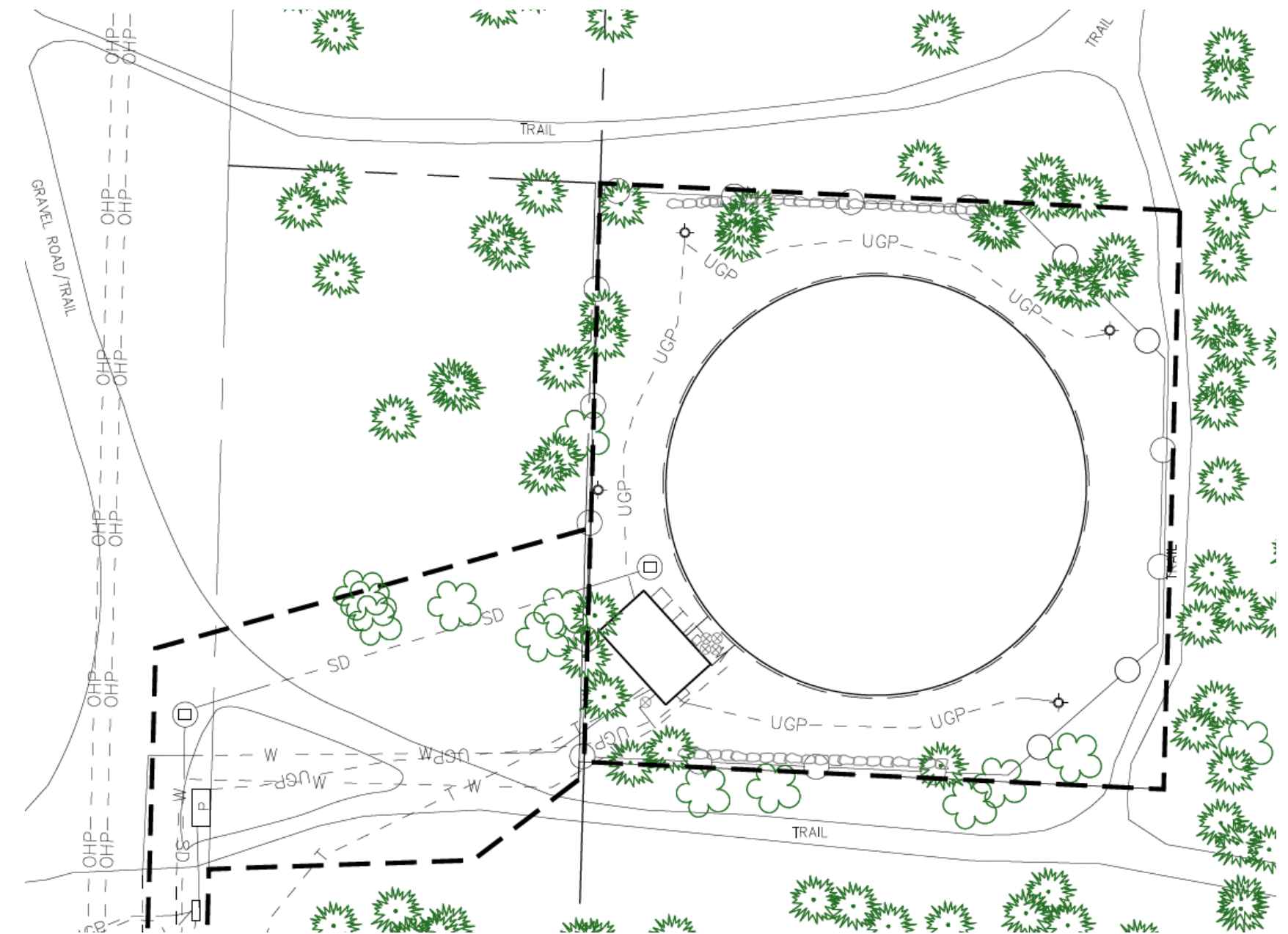
Constrained Site

- Trees
- Trails
- Horses
- Park users
- Adjacent Seattle City Light easement



Constrained Site

- 118'x117' lease area
- 85' diameter existing reservoir





Pikes Peak Reservoir

- 1.0 MG
- Welded steel
- Constructed in 1968
- Seismic deficiencies
- 0.75 MG usable storage
- Limited access around reservoir



Pikes Peak Pump Station

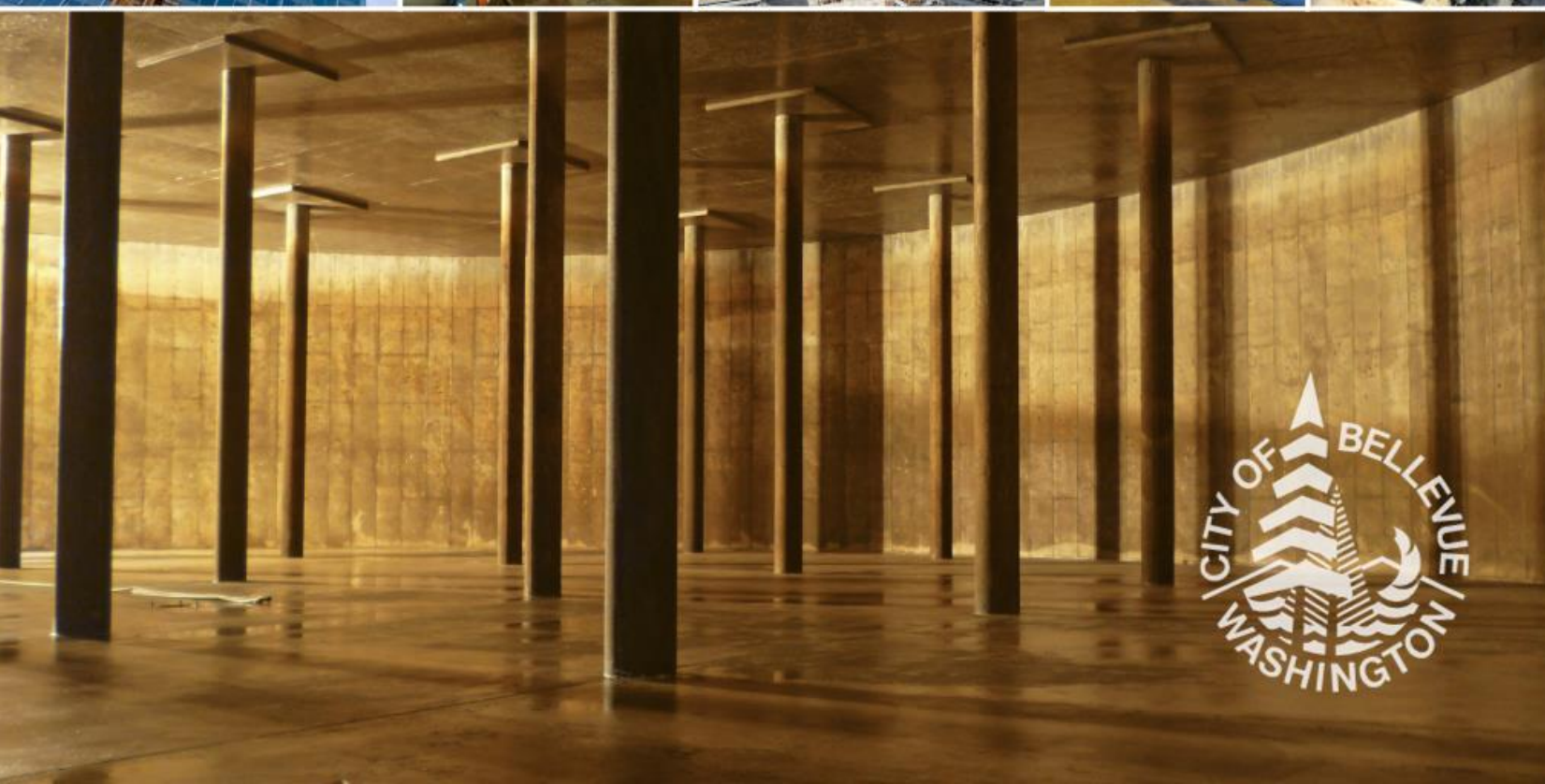
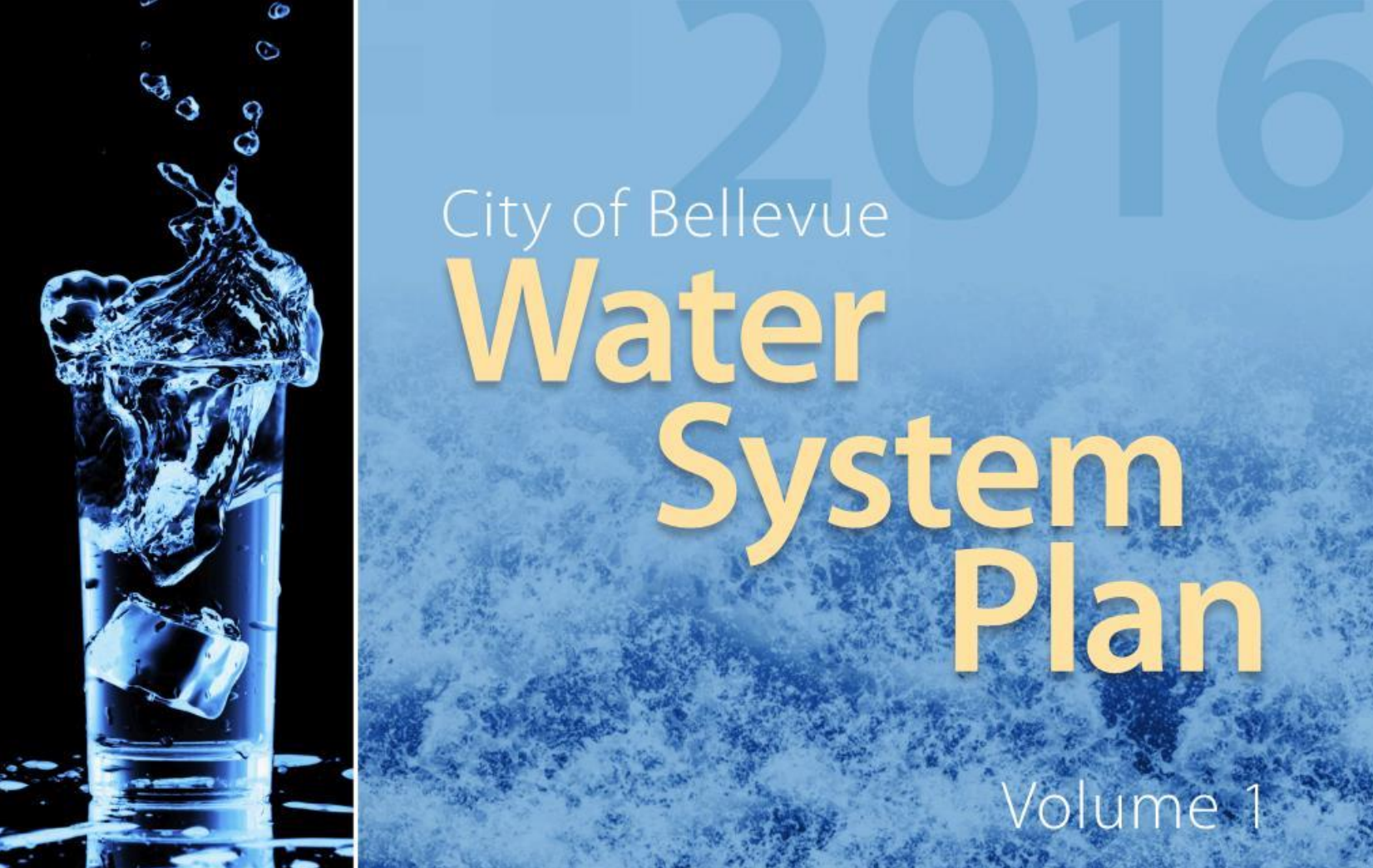
- Constructed in 1968
- Three vertical turbine pumps
- Prioritized for rehabilitation or replacement in 2016 WSP

Existing Cherry Crest Pump Station



Cherry Crest Pump Station

- Constructed in 1984
- Two pumps
- Scheduled for rehabilitation or replacement



2016 WSP Update & Revised Storage Needs

Storage Component	Previous Criteria	New Criteria
Operational	Assumed Not Applicable	Pump on/off (where applicable) 2-3 feet buffer (all tanks)
Equalizing	20% of MDD	25% of MDD (SF Areas) 10% of MDD (Mixed-Use)
Emergency/Standby	200 gal/ERU; Separate from Fire storage (not nested)	200 gal/ERU; Separate from Fire storage (not nested)
Fire	5,500 gpm for 5 hours in each operating area; Assume adequate transmission capacity between zones.	Largest fire per IFC Table B105.1 in each Storage Region based on zone-by-zone hydraulic analysis
Dead Storage	Assumed Not Applicable	Volume available only at < 20 psi

- Revised storage evaluation criteria
- 1.25 MG storage needed
- Deficient by 0.5 MG

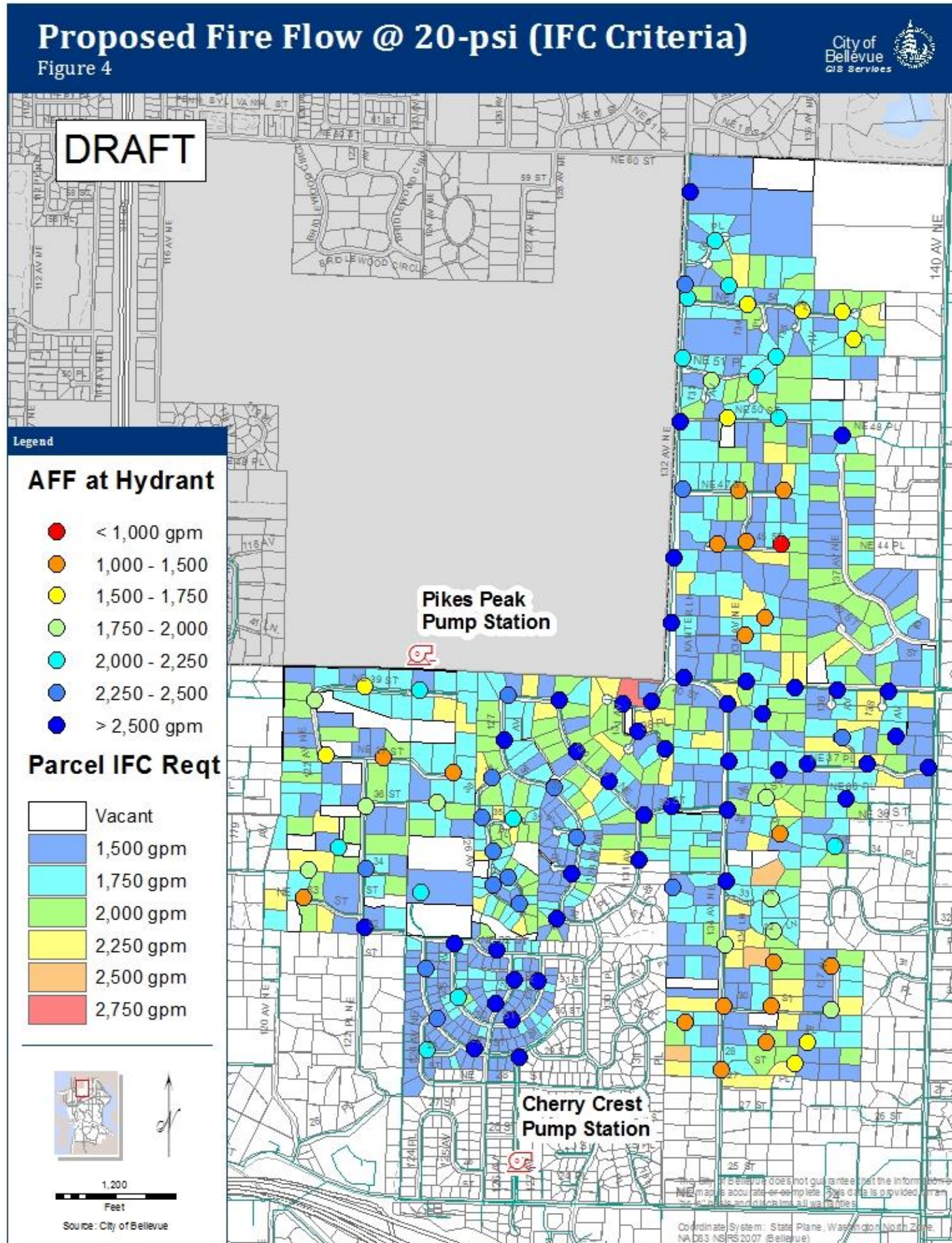
Creative Brainstorming





Relocate Pikes Peak Pump Station to Cherry Crest Site

- Project team collaboration
- Benefits
 - One less facility to operate and maintain
 - Less trips to the site, less interruptions to park users
 - Removes noise in the park
 - Cherry Crest Pump Station needed improvements
- Cost savings
 - Capital costs
 - O&M costs



Relocate Pikes Peak Pump Station to Cherry Crest Site

■ Evaluation

- Pump station at Cherry Crest
- City modeled fire flows

■ Results

- Confirmed no significant impact on fire flows

Existing Facilities Evaluation





Reservoir Options

- Rehabilitation
- Replacement

Pump Station Options

- Rehabilitation
- Replacement
- Replacement at Cherry Crest site



Triple Bottom Line Evaluation of Reservoir Rehabilitation v. Replacement

Criteria	(A) Criteria Weight (1 - 3)	Reservoir Rehabilitation		Reservoir Replacement	
		Alternative 1		Alternative 2	
		(B) Score (1 - 3)	Weighted Score (1 - 9)	(B) Score (1 - 3)	Weighted Score (1 - 9)
Financial					
F1 Minimize Life Cycle Costs	3	1	3	3	9
Social					
S1 Reliable Operation	3	3	9	3	9
S2 Long Service Life	3	2	6	3	9
S3 Minimize O&M Requirements	2	2	4	3	6
S4 Capacity to Meet Future Needs	2	1	2	3	6
S5 Safety for Employees	3	2	6	3	9
S6 Minimize Traffic Impacts	1	2	2	1	1
S7 Minimize Noise Impacts	1	2	2	1	1
S8 Minimize Odor Impacts	1	2	2	2	2
S9 Minimize Visual Impacts	2	3	6	2	4
S10 Minimize Construction Duration	1	2	2	1	1
S11 Minimize Water Service Impacts During Construction	2	3	6	1	2
S12 Create Jobs/Boost Local Economy	1	1	1	2	2
Environmental					
E1 Minimize Area of Land Disturbed	1	2	2	1	1
E2 Minimize Amount of New Materials Required	1	2	2	1	1
E3 Minimize Construction Equipment Impacts	1	2	2	1	1
E4 Minimize Drinking Water Quality Impacts	3	2	6	3	9
E5 Minimize Surface Water Quality Impacts	2	2	4	1	2
E6 Meets Existing & Potential Future Regulations	2	2	4	3	6
(C) Total Weighted Score		Alt 1 = 71		Alt 2 = 81	

Key Issues

- Additional storage needed
- Code deficiencies

Recommendation

- Replace both reservoir and pump station

Public Outreach & Alternatives Evaluation





Public Outreach Plan

- Use team with experience
- Launch early
- Involve stakeholders
- Build trust
- Be transparent and fair
- Address input and concerns
- Inform project decisions



Program Elements

- Community Advisory Group (CAG)
- CAG meetings
- Public open house
 - In person & online
- Project website
- Social media
- Email and U.S. mail
- Project fact sheet
- FAQ document



Community Advisory Group

- Broad representation
- Meetings
 - 7 Meetings Dec 2016 – Sept 2018
- Online surveys
- Site visits

- Bridle Trails Community Club (2 members)
- Lake Washington Saddle Club (2 members)
- Bridle Trails Park Foundation (1 member)
- Washington State Parks (2 members)
- Pikes Peak residents (2 members)
- Cherry Crest resident (1 member)



CAG Site Visit

- Understand the need
- Input on reservoir height
- Input on areas affected
- Input on site restoration
- Trail impact concerns
- Construction concerns



Screening Reservoir Alternatives

- Seven reservoir alternatives screened in Tier 1
- Four passed screening for Tier 2 evaluation

Tier 1 Screening Results

Alternative Number	Reservoir Location	Reservoir Type	Pump Station Location	Tier I Results
1.A	Existing Easement	Prestressed	Existing Easement	Fail
1.B	Existing Easement	Steel	Existing Easement	Fail
1.C	Existing Easement	Reinforced	Existing Easement	Pass
2.A	Modified Easement	Prestressed	Modified Easement	Pass
2.B	Modified Easement	Steel	Modified Easement	Fail
3.A	Existing Easement	Prestressed	Cherry Crest	Pass
3.B	Existing Easement	Steel	Cherry Crest	Pass

Conceptual Alternatives

– Tier 2 Evaluation



Alternative A

- Rectangular, reinforced concrete reservoir
- Pump station at Pikes Peak
- Within existing lease area

Conceptual Alternatives

– Tier 2 Evaluation



ALTERNATIVE B - PRESTRESSED CONCRETE RESERVOIR AND PUMP STATION WITHIN MODIFIED EASEMENT

Alternative B

- Prestressed concrete reservoir
- Pump station at Pikes Peak
- Additional lease area

Conceptual Alternatives

– Tier 2 Evaluation



Alternative C

- Prestressed concrete reservoir
- Pump station at Cherry Crest
- Within existing lease area

Conceptual Alternatives

– Tier 2 Evaluation



Alternative D

- Welded steel reservoir
- Pump station at Cherry Crest
- Within existing lease area



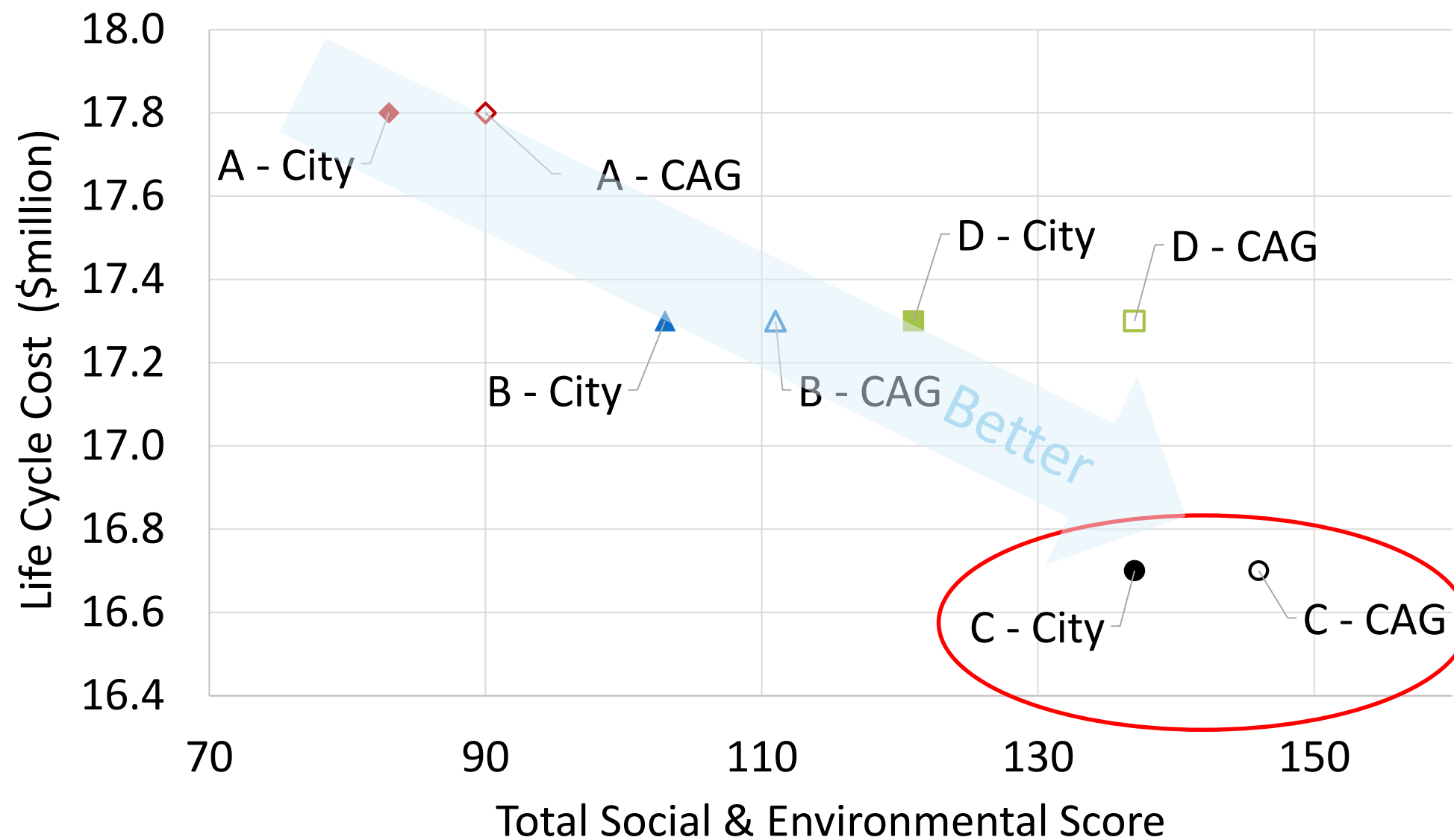
Triple Bottom Line Scoring

Criteria	Short Term or Long Term (S v. L)	(A) CAG Weight Criteria (1-3)	(A) City Criteria Weight (1 - 3)	Reinforced Conc Res & PS, Exist Esmt		Prestressed Conc Res & PS, Modified Esmt		Prestressed Conc Res, Exist Esmt, & PS Cherry Crest		Steel Res, Exist Esmt, & PS Cherry Crest	
				Alternative A		Alternative B		Alternative C		Alternative D	
				(B) Score (1 - 3)	Weighted Score	(B) Score (1 - 3)	Weighted Score	(B) Score (1 - 3)	Weighted Score	(B) Score (1 - 3)	Weighted Score
Financial											
F1 Minimize Life Cycle Costs	L	NS	NS	See preliminary cost		See preliminary cost		See preliminary cost		See preliminary cost	
F2 Minimize Initial Capital Costs	S	NS	NS	estimates for comparison		estimates for comparison		estimates for comparison		estimates for comparison	
Social											
S1 Minimize Trail Impacts During Construction	S	3	1	3	3	2	2	3	3	3	3
S2 Minimize Construction Traffic Impacts on Haul Route	S	3	2	1	2	2	4	2	4	3	6
S3 Minimize Construction Duration	S	3	2	1	2	2	4	3	6	3	6
S4 Minimize Water Service Impacts During Construction	S	3	3	1	3	1	3	3	9	3	9
S5 Minimize Operational & Maintenance Requirements (fewer periodic visits)	L	2	3	1	3	1	3	3	9	2	6
S6 Minimize/Eliminate Periodic Re-Coating (approx. every 20 years)	L	2	3	2	6	3	9	3	9	1	3
S7 Minimize Operational Noise Impacts (emergency generator, pumps)	L	2	3	1	3	1	3	2	6	2	6
S8 Minimize Visual Impacts	L	2	2	2	4	2	4	3	6	3	6
S9 Minimize Odor Impacts (emergency generator exhaust)	L	1	1	1	1	1	1	2	2	2	2
S10 Maximize Reliable Operation	L	NS	3	3	9	3	9	3	9	3	9
S11 Maximize Service Life	L	NS	3	2	6	3	9	3	9	1	3
S12 Maximize Safety for Employees	L	NS	3	3	9	3	9	3	9	1	3
S13 Minimize Trail Modifications	L	NS	1	3	3	1	1	3	3	3	3
S14 Minimize Risk of Reservoir Failure in a Seismic Event	L	NS	2	2	4	3	6	3	6	3	6
S15 Minimize Reservoir Leakage	L	NS	2	1	2	2	4	2	4	3	6
City Social Subtotal					60		71		94		77
CAG Social Subtotal					64		74		97		84
Environmental											
E1 Minimize Tree Removal and Area of Land Disturbed	S	3	3	1	3	1	3	3	9	3	9
E2 Minimize Noise Impacts During Construction	S	3	1	1	1	2	2	2	2	3	3
E3 Minimize Equipment Impacts During Construction	S	3	2	1	2	1	2	2	4	3	6
E4 Minimize Amount of Waste Disposal During Construction	S	2	2	1	2	2	4	2	4	3	6
E5 Maximize Use of Locally Sourced Materials	S	1	1	3	3	2	2	2	2	1	1
E6 Minimize Drinking Water Quality Impacts	L	NS	3	1	3	3	9	3	9	2	6
E7 Maximize Ability to Incorporate Envision Principles in Design & Construction	L	NS	1	1	1	1	1	1	1	1	1
E8 Minimize Amount of New Materials Required	S	NS	1	1	1	2	2	2	2	3	3
E9 Maximize Use of Recycled Materials	S	NS	1	1	1	1	1	1	1	1	1
E10 Minimize Energy Use	L	NS	2	2	4	2	4	3	6	3	6
E11 Minimize Surface Water Impacts (impervious area, runoff collection)	L	NS	1	2	2	2	2	3	3	2	2
Ctiy Environmental Subtotal					23		32		43		44
CAG Environmental Subtotal					26		37		49		53
(C) City Total Weighted Score				Alt A = 83		Alt B = 103		Alt C = 137		Alt D = 121	
(C) CAG Total Weighted Score				Alt A = 90		Alt B = 111		Alt C = 146		Alt D = 137	
(C) Overall Ranking				4TH		3RD		1ST		2ND	

- CAG input on non-financial criteria
- Scored separately by CAG and City
- Alternative C ranked highest by CAG and City

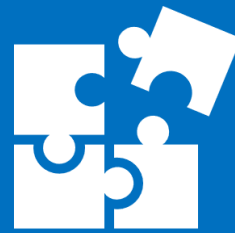


Triple Bottom Line Evaluation Results with Life Cycle Cost



- Life cycle costs included
- Alternative C ranked highest by CAG and City

Design of Selected Alternative





New Cherry Crest Pump Station

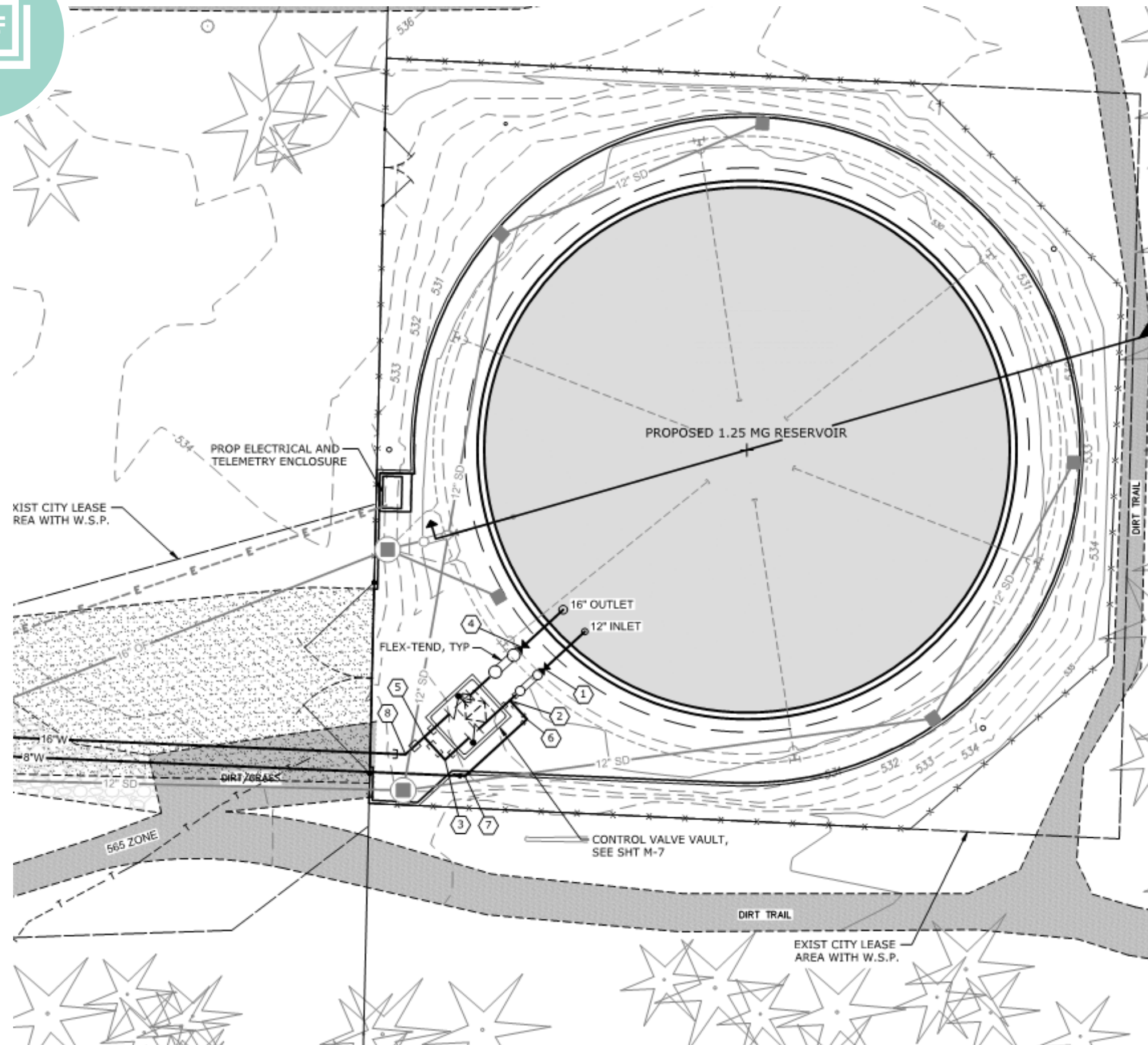
- Two pump stations in one
- Emergency generator
- Same site as other City facilities
- Closer to City shops



New Pikes Peak Reservoir

- 1.25 MG
- 82.5' diameter
- Partially buried
- Prestressed concrete
- Low maintenance
- No painting

Proposed Site Plan



Unique Features

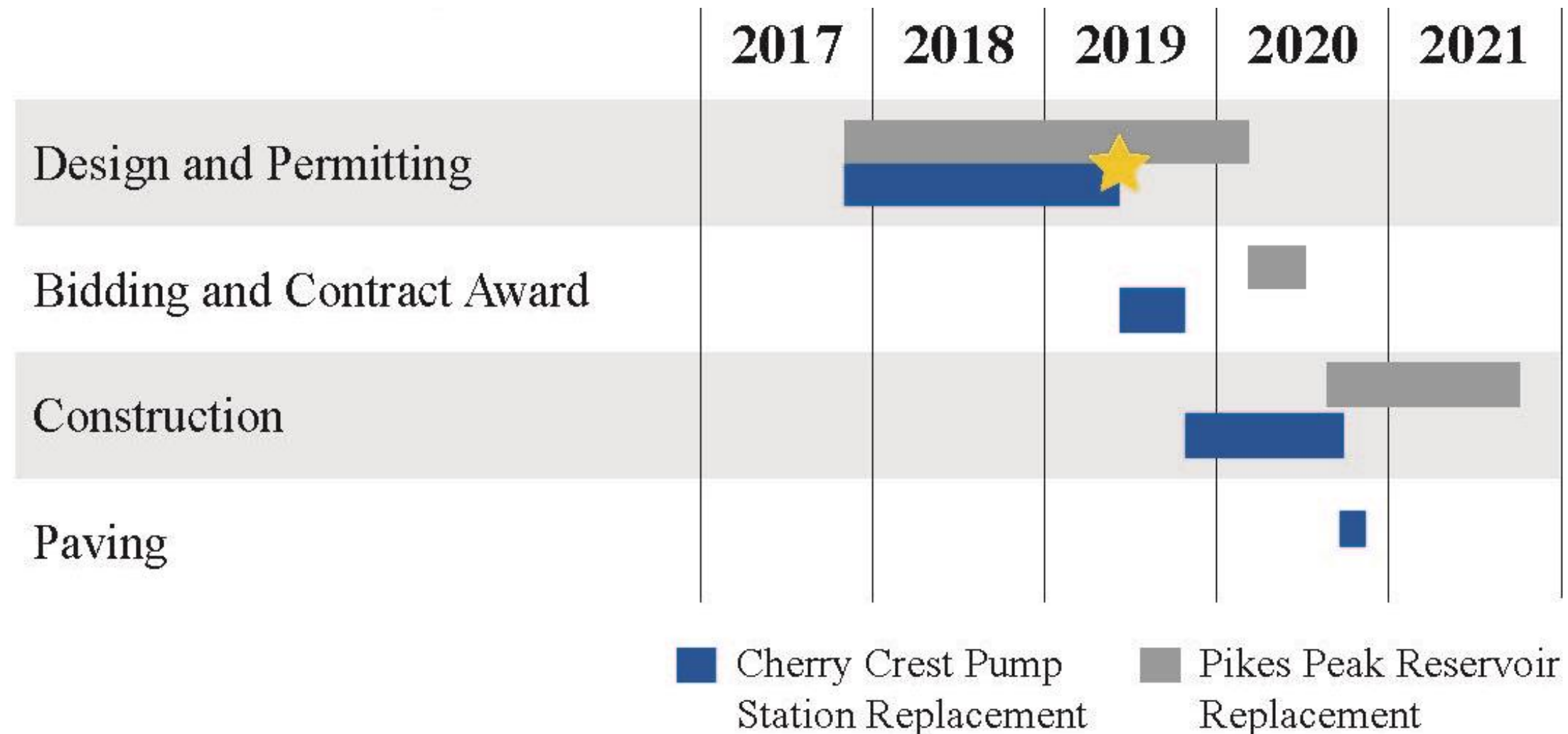
- Fill tank from 565 Zone or 670 Zone
- Backup supply
- Water quality improvements
- Tideflex mixing system
- Dedicated inlet

Current Status





- Construct Cherry Crest Pump Station first
- Operate new Cherry Crest Pump Station
- Construct Pikes Peak Reservoir last



Q&A

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Thank you!