

White Bear Lake Area Comprehensive Plan Amended Study 1

Redirect Stormwater to Augment White Bear Lake
(Initial Evaluation)

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Previous Study - Recap

- Existing Stormwater Ponds & Volume Calculations
- Potential challenges, issues, concerns with redirecting stormwater to the lake
 - Pumping and Routing/Distribution
 - Stormwater Contaminants
 - Dry Weather Considerations
 - Property Value Impacts

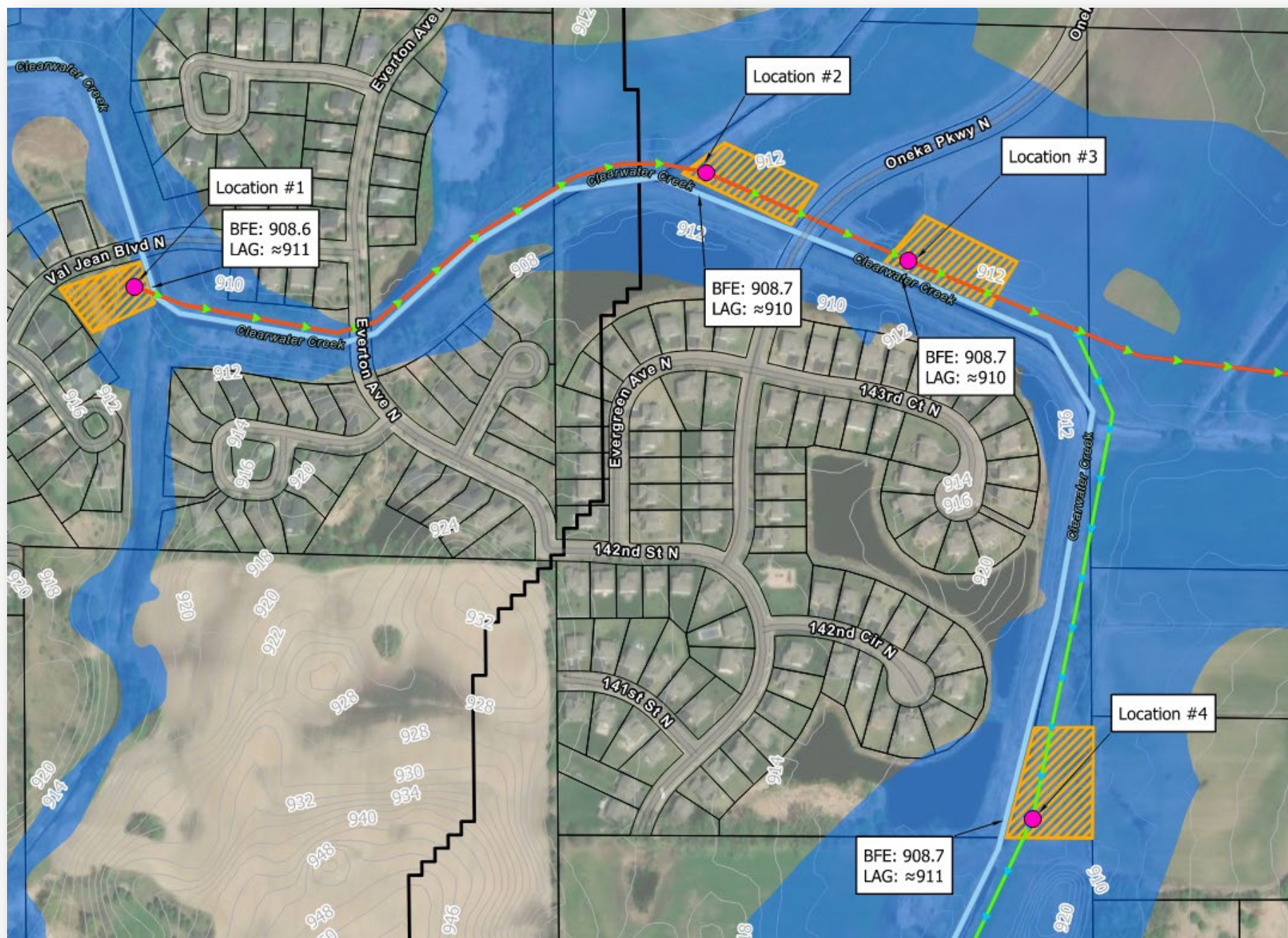
Scope of Update

- Water Quality Results – Bald Eagle Lake
- Pump Station Siting and Forcemain Route Options
[Clearwater Creek to White Bear Lake]
- Detention Basin Siting – Ramsey/Washington Counties Ditch 1
- Downstream Impacts due to Pumping

Pump Station Locations

Legend

	White Bear Lake		Parcels
	Bald Eagle Lake		FEMA Flood Zone AE
	Contributing Area		Force Main Alignment 1
	Clearwater Creek		Force Main Alignment 2
	Possible Pump Station Footprints		Force Main Alignment 3
	Possible Pump Station Locations		Contours - 2 ft



- Reviewed 4 Pump Station Locations
- Existing FEMA Floodplain

Force Main Routing

Legend

- White Bear Lake

Bald Eagle Lake

Contributing Area

Clearwater Creek

Possible Pump Station Footprints
- Possible Pump Station Locations

Force Main Alignment 1

Force Main Alignment 2

Force Main Alignment 3

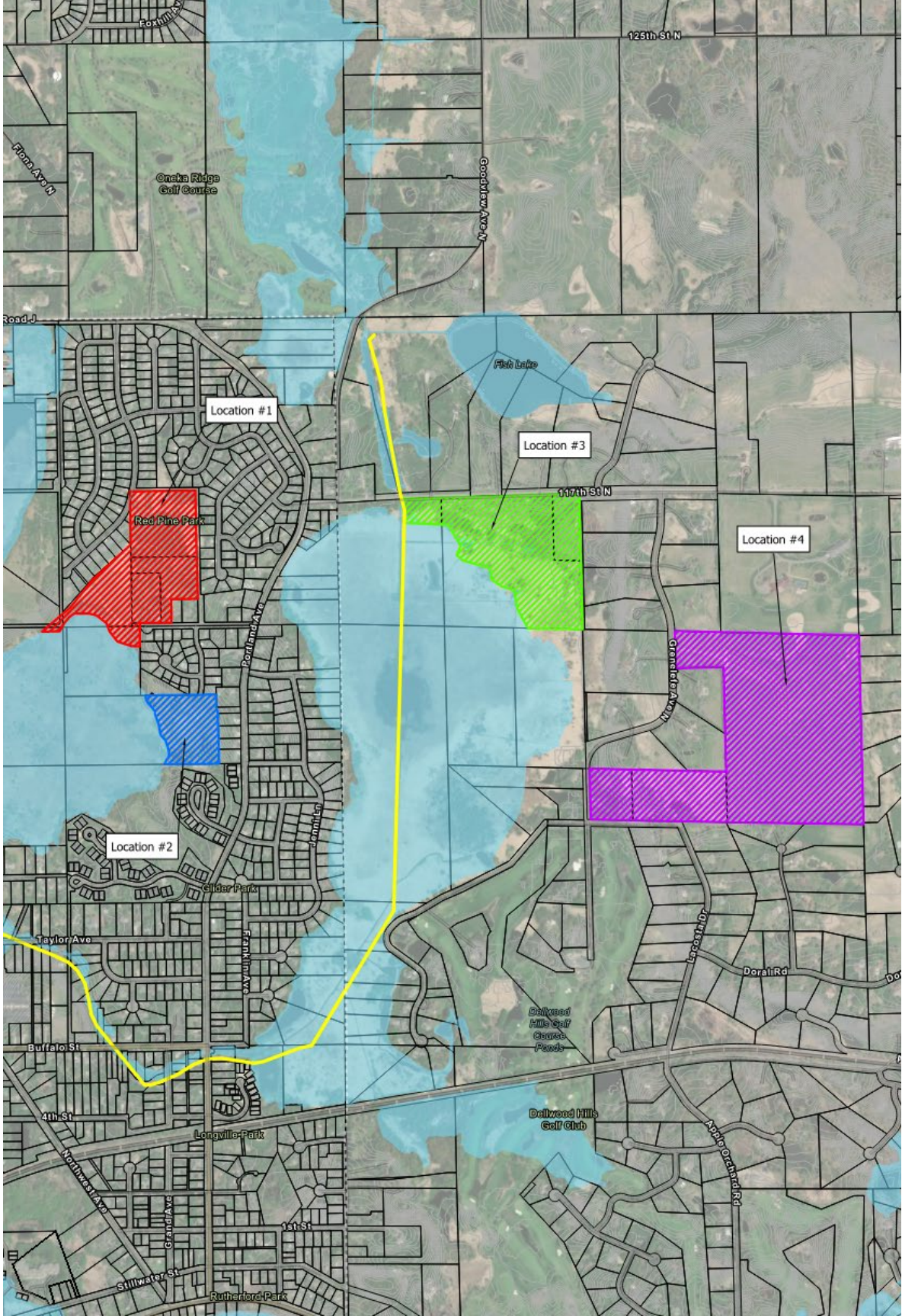
Parcels
- FEMA Flood Zone A

FEMA Flood Zone AE

Contours - 2 ft

- Reviewed 3 Force Main Alignments
- Existing FEMA Floodplain

Force Main	Length (Miles)
Alignment 1	5.6
Alignment 2	5.4
Alignment 3	5.8



Ramsey/Washington Ditch 1 Basin Locations

Legend

Ramsey/Washington Counties Ditch 1

Location 1

Location 2

Location 3

Location 4

FEMA Flood Zone A

Parcels

Contours - 2 ft

- Reviewed 4 Basin Locations
- Existing FEMA Floodplain

Basin	Area (Acres)
Location 1	24.3
Location 2	8.4
Location 3	30.3
Location 4	71.7

Water Quantity and Limitations

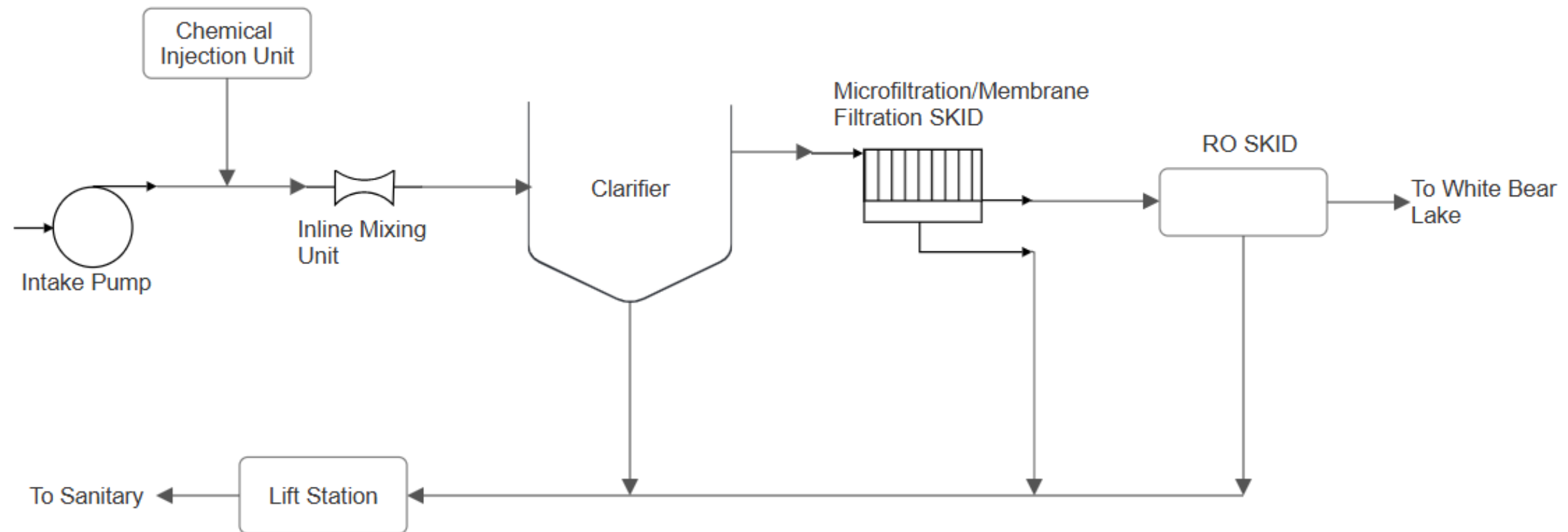
- Pumping from a lake in Minnesota would likely require the DNR to establish a protective lake elevation for Bald Eagle Lake which could place greater restrictions on pumping directly from the lake. In addition, Minnesota rules state that the annual pumping volume from a lake cannot exceed 0.5-acre feet per acre per year. **This would allow a maximum annual pumping volume of approximately 170 million gallons per year from Bald Eagle Lake.** In comparison, the annual augmentation rate needed for White Bear Lake to maintain the lake at or above elevation 922.0 feet is at least 780 million gallons per year as estimated by the DNR.
- Any pumping downstream of the lake outlet structure, as an alternative to pumping directly from the lake, would be considered a diversion of stream flow which would need to be approved by the Rice Creek Watershed District.

Water Quality

- To adhere to the proposed water quality recommendations, additional treatment is likely required.
- Assuming lake augmentation occurs for 9 months.

Analytes	Bald Eagle Lake Results	Unit	White Bear Lake Results	Units	Barr Study 7 Recommended
Phosphorus, Total as P	0.063	mg/L	0.016-0.020	mg/L	<0.023 mg/L for up to 780 million gallons of augmentation water per year
Nitrogen, Total Kjeldahl (TKN)	1.3	mg/L	0.576-0.63	mg/L	<0.9 mg/L for up to 780 million gallons of augmentation water per year
Chlorophyll-a, Pheophytin Corrected	20.7	ug/L	2.786-4.571	ug/L	<9 mg/L for up to 780 million gallons of augmentation water per year

Treatment Train



Treatment and Transmission Costs

Water Treatment Facility

Proposed Water Treatment Facility	
Capital Costs	\$ 42,000,000
Annual O&M	\$ 1,142,000

Conveyance System

	Alignment 1	Alignment 2	Alignment 3
Capital Coast	\$ 11,000,000	\$ 11,300,000	\$ 11,200,000
O&M Costs	\$ 221,000	\$ 234,000	\$ 34,000

Total Cost Estimate

	Alignment 1	Alignment 2	Alignment 3
Capital Coast	\$ 53,000,000	\$ 53,300,000	\$ 53,200,000
O&M Costs	\$ 1,363,000	\$ 1,376,000	\$ 1,376,000

Water Treatment Facility costs are assumed to be similar for BEL and R/W Counties Ditch 1

Downstream Impacts

- Location of Pump Station will result in varying impacts
- Upstream of confluence of Clearwater Creek and JD 3 Br3
 - Less contributing area to system
 - Less impact downstream (free flowing tributary)
- Need to balance solving one problem to create another
- Pumping from R/W Counties Ditch 1 may create water level challenges on Bald Eagle Lake

Study 1 Amendment 1 - Conclusions

- Multiple pumping locations
- Multiple force main routing options
- Pumping directly from Bald Eagle Lake would likely require the DNR to establish a protective lake elevation while the maximum annual withdrawal rate cannot exceed 0.5-acre feet per acre per year or 170 million gallons per year.
- Pumping downstream of the lake outlet from the stream flow as an alternative to pumping directly from the lake would divert streamflow and require approval from the Rice Creek Watershed District.
- Downstream impacts need quantitative assessment

Questions