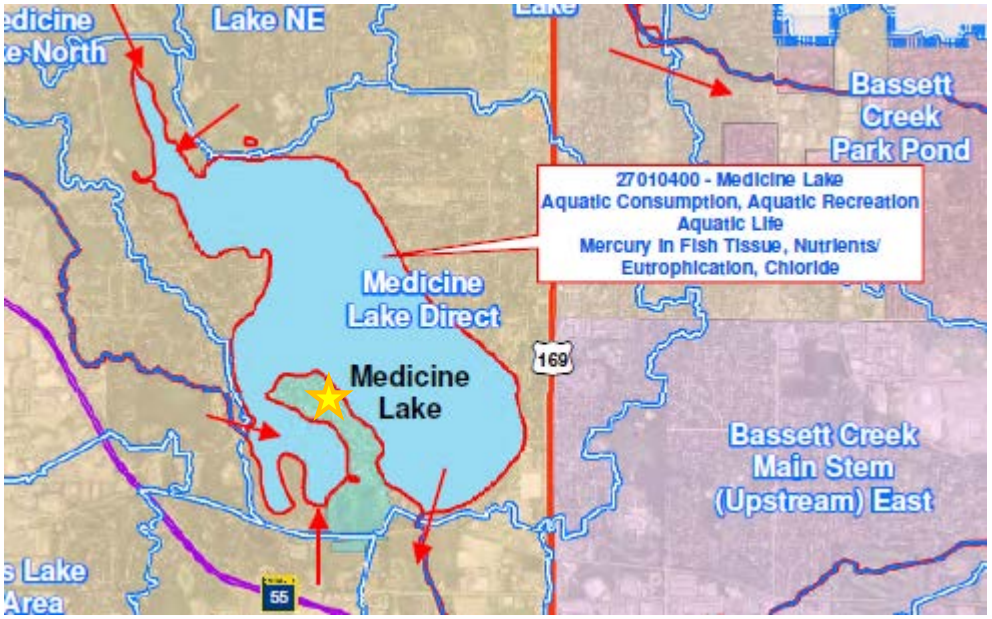
April 2019

Jevne Park Stormwater Improvement Project Feasibility Study

Prepared for Bassett Creek Watershed Management Commission

Jevne Park Stormwater Improvement Project



- Increase flood storage for smaller, more frequent events
- Improve drainage
- Increase water quality treatment of runoff to reduce sediment and phosphorus load to Medicine Lake
- Improve wildlife habitat

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Watershed Map

Existing Conditions

Summary

Increase in Flood Mitigation Volume:
Not applicable

Flood Level*:
2-year: 889.6 ft MSL
10-year: 890.0 ft MSL
100-year: 890.4 ft MSL
(*Peninsula Road overtops at 889.7 ft MSL)

Phosphorus Removal:
2.9 lbs/year

Open Water, Wetland, and Buffer
Open water = 0.06 ac
Total wetland = 0.86 ac
Buffer = 0.15 ac

Existing Conditions – Peak Flood Elevations

Event	Existing Conditions
Jevne Park Wetland (MLD-039A)	
1-yr (100% chance in any given year)	889.3
2-yr (50% chance in any given year)	889.6
10-yr (10% chance in any given year)	890.0
100-yr (1% chance in any given year)	890.4
Wetlands South of Peninsula Road (MLD-039B)	
1-yr	888.8
2-yr	889.0
10-yr	889.6
100-yr	890.4

Peninsula Road Overtops at ~889.7

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Existing Conditions – Water Quality Treatment

Component	Existing Conditions	Total Phosphorus Removal (lbs/yr (%))
Jevne Park Wetland (MLD-039A)		
Permanent Pool Volume (ac-ft)	0.031	2.9 lbs TP/yr (29% removal)
Flood Pool Volume (ac-ft)	2.52	
Wetlands South of Peninsula Road (MLD-039B)		
Permanent Pool Volume (ac-ft)	0.28	1.9 lbs TP/yr (57% removal)
Flood Pool Volume (ac-ft)	4.79	

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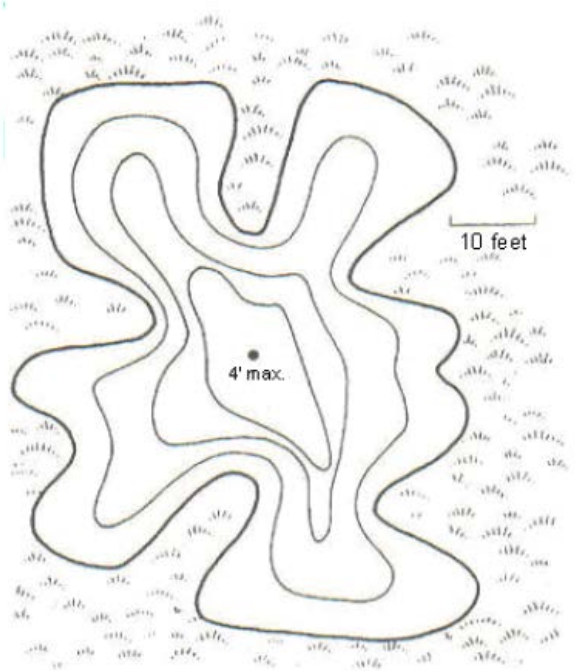
Permitting/Habitat Considerations

- Preserve wetland type/depth
- Provide optimum habitat - a complex of wetland types interspersed with upland
- Shallow water (no more than 4 ft)
- Flatter slopes
- Variable/undulating depths
- Larger, irregular shape
- Floating logs, nest boxes, etc.
- Seeding and planting for more diverse species
- Wetland buffer

FIGURE 1. Diagram of a good basin design; this design emphasizes shallow slopes and depths (each line represents one foot of depth), and good shoreline features. Adjacent uplands are seeded to native grasses.



Source: MnDNR Excavated Ponds for Wildlife

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BCWMC Buffer Requirements

Wetland Classification*	Buffer Width (Average/Min) (ft)
Preserve	75 ft avg / 50 ft min
Manage1	50 ft avg / 30 ft min
Manage 2	25 ft avg / 15 ft min
Manage 3	25 ft avg / 15 ft min

*Based on MnRAM Classification - Jevne wetland was classified as a Manage 1 as part of the MnRAM completed with the Wetland Delineation

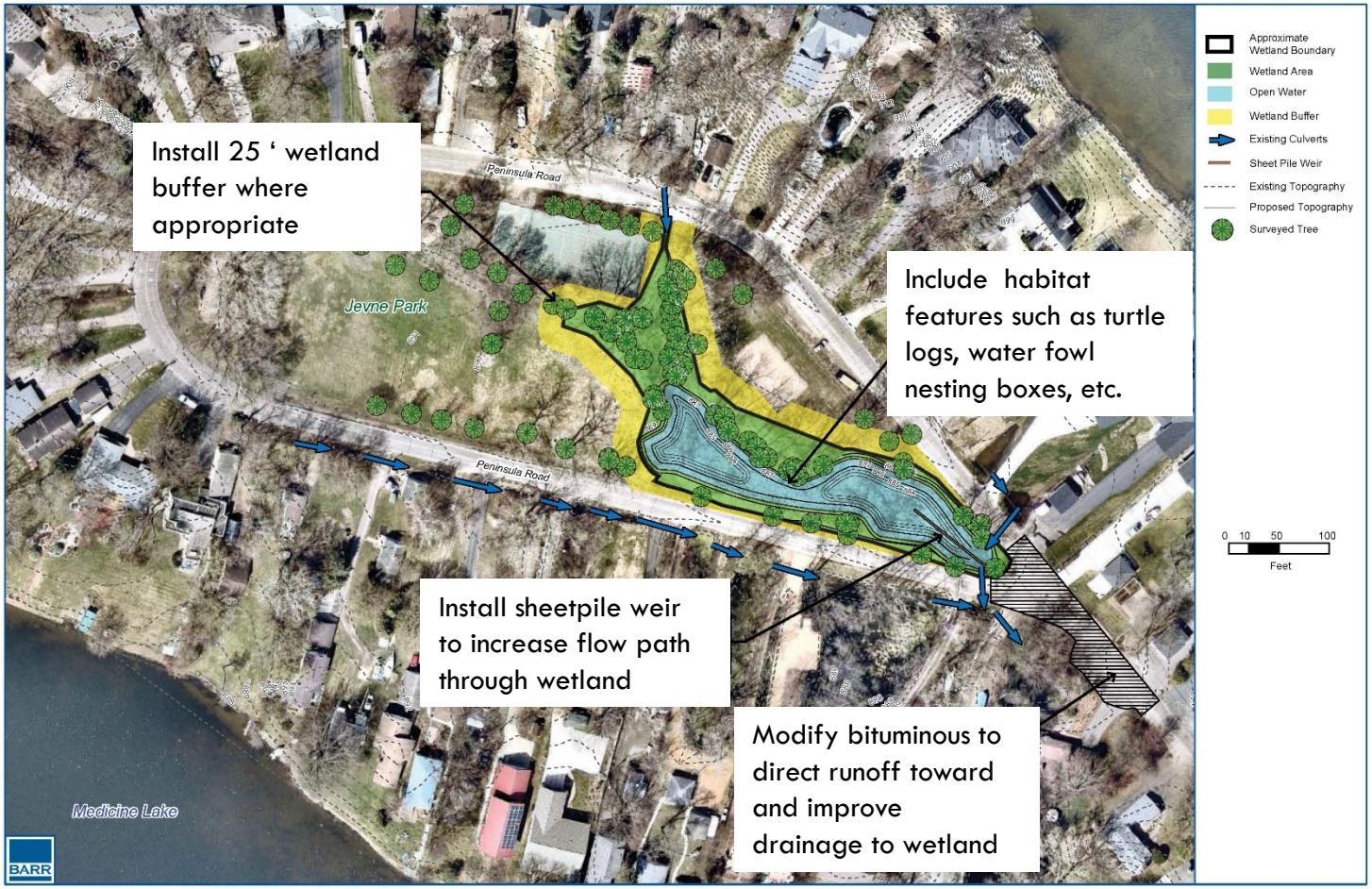
Because this project does not trigger the typical application of the buffer rules (1acre of new or fully-redeveloped impervious), at a minimum, the minimum buffer standards should be applied

Concept Summary

- ***Concept 1***: Develop additional flood & water quality treatment volume within ***existing wetland footprint*** in Jevne Park
- ***Concept 2***: Develop additional flood & water quality treatment volume in ***expanded wetland footprint*** in Jevne Park

Concept 1

Estimated Cost (-20%/+30%) = $404,000



Concept Summary

Increase in Flood Mitigation Volume:
0.38 acre-feet

Reduction of Flood Level:
2-year: -0.2 feet
10-year: no change
100-year: no change

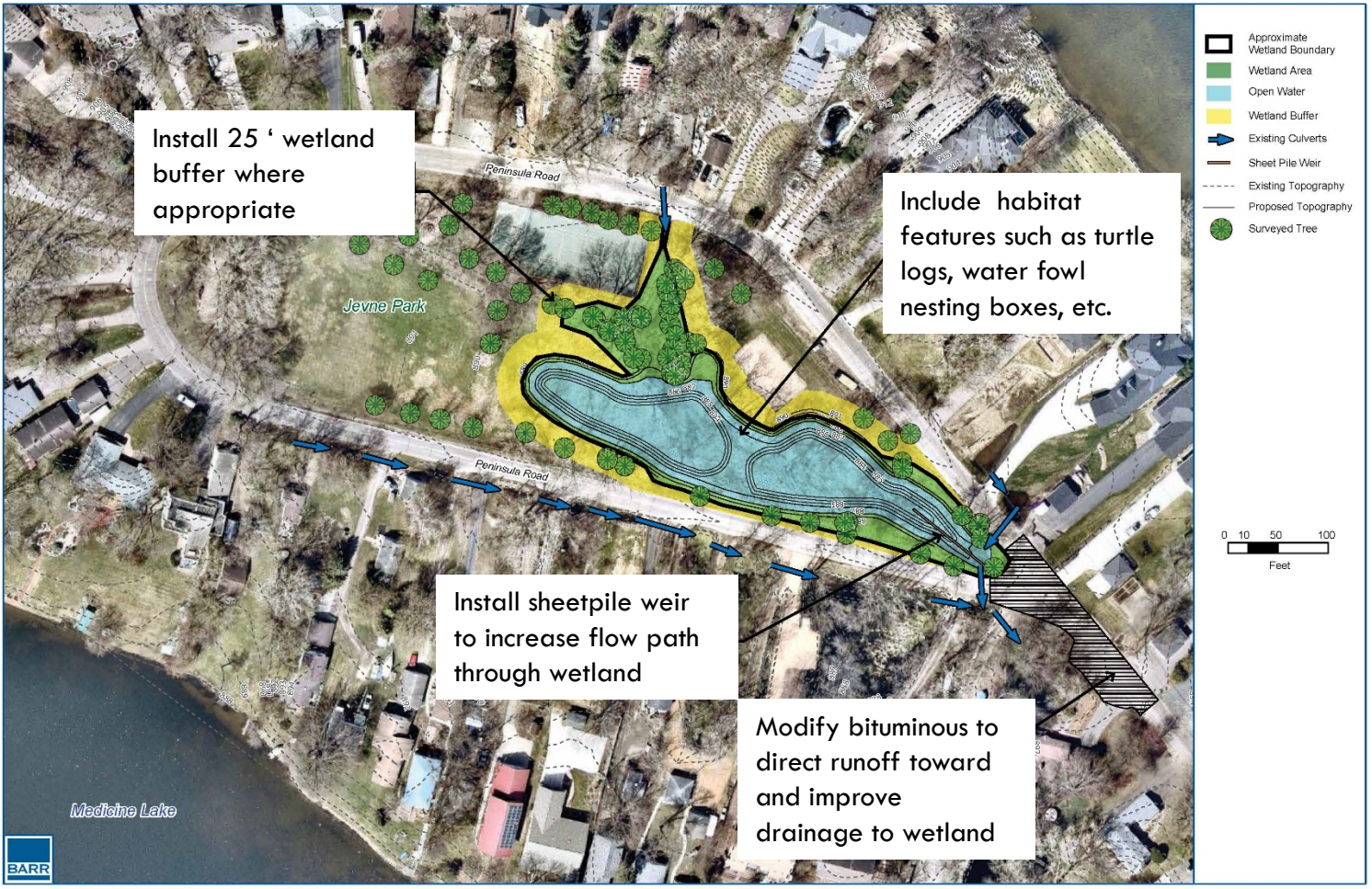
Increase in Phosphorus Removal:
4.1 pounds/year

Open Water, Wetland, and Buffer:
Open water = 0.39 ac
Total wetland = 0.92 ac
Buffer = 0.47 ac

Estimated Tree Removal:
8 trees

Concept 2

Estimated Cost (-20%/+30%) = $562,000



Concept Summary

Increase in Flood Mitigation Volume:
0.93 acre-feet

Reduction of Flood Level:
2-year = -0.5 feet
10-year = -0.2 feet
100-year = no change

Increase in Phosphorus Removal:
4.9 pounds/year

Open Water, Wetland, and Buffer:
Open water = 0.72 ac
Total wetland = 1.16 ac
Buffer = 0.53 ac

Estimated Tree Removal:
24 trees

Comparison of Areas

Component	Existing Conditions	Concept 1	Concept 2
Open Water (ac)	0.06 ac	0.39 ac	0.72 ac
Average Depth (ft)	0.6 ft	1.9 ft	1.6 ft
Max Depth (ft)	1.1 ft	3.7 ft	3.7 ft
Wetland (ac)	0.86 ac	0.92 ac	1.16 ac
Buffer (ac)	0.15 ac	0.47 ac	0.53 ac
Tree Removal (#)	--	8	24
Potential Tree Replacement (#)*	--	4	12

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Comparison of Estimated Volumes

Component	Existing Conditions	Concept 1	Concept 2
Jevne Park Wetland			
Permanent Pool (Water Quality) Volume (ac-ft)	0.03	0.72	1.63
Increase in Water Quality Volume (ac-ft)	--	+0.69	+1.60
Flood Pool Volume (ac-ft)	2.52	2.90	3.45
Increase in Flood Volume (ac-ft)	--	+0.38	+0.93

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Peak Elevation Summary

Event	Existing Conditions	Concept 1	Concept 2
Jevne Park Wetland (MLD-039A)			
1-yr	889.3	889.1 (-0.2 ft)	888.8 (-0.5 ft)
2-yr	889.6	889.4 (-0.2 ft)	889.1 (-0.5 ft)
10-yr	890.0	890.0 (0.0 ft)	889.8 (-0.2 ft)
100-yr	890.4	890.4 (0.0 ft)	890.4 (0.0 ft)

Peninsula Road Overtops at ~889.7

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Water Quality Treatment Summary

Component	Existing Conditions	Concept 1	Concept 2
Jevne Park Wetland (MLD-039A)			
TSS Removal (lbs/yr)	1601	2659 (+1058)	2804 (+2804)
TSS Removal Efficiency (%)	50%	84%	88%
TP Removal (lbs/yr)	2.9	7.0 (+4.1)	7.7 (+4.9)
TP Removal Efficiency (%)	25%	60%	66%

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Project Benefits

- Improves drainage to Jevne Park wetland and reduce standing water on road during smaller events
- Decreases pollutant loads to Medicine Lake
- Improves wetland and upland habitat
- Provides educational opportunity
- Provides variation in the open space and future recreational opportunity (eg. future benches, boardwalk/bridge, etc.)
- Only opportunity on peninsula to improve runoff water quality

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Anticipated Permitting

- Clean Water Act Section 404 Permit (USACOE)
- Public Waters Work Permit (MnDNR)
- Section 401 Water Quality Certification (MPCA)
- Construction Stormwater General Permit (MPCA)
- City of Medicine Lake Permits – Wetland overlay district, potential variance, review of impacted trees
- Compliance with the Minnesota Wetland Conservation Act (WCA)

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Cost Summary

Concept 1	Concept 2
Total Project Cost* = $404,000 ($324,000-$526,000)	**Total Project Cost* =** $562,000 ($450,000-$731,000)
Annual O & M Cost =** $3,300/yr	**Annual O & M Cost** =** $3,800/yr

*BCWMC CIP has budgeted $500,000 for ML-21 feasibility, design & construction, estimated construction in 2020

**O & M Cost for wetland & buffer area maintenance based on typical restoration contractor cost ($2,500-$3,500/acre) & estimated cost for sediment removal

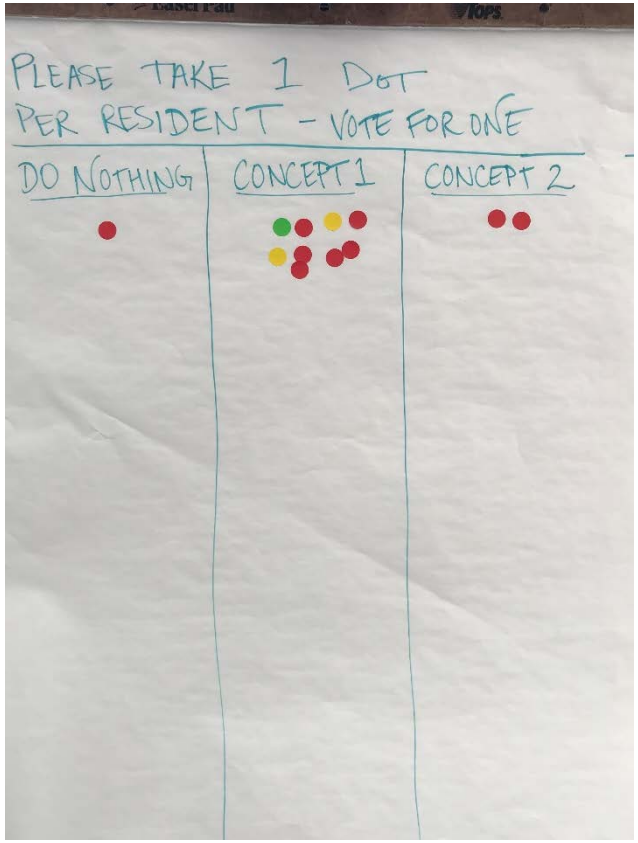
Cost:Benefit

Concept 1	Concept 2
Increase in Annual TP Removal = 4.1 lbs/yr	**Increase in Annual TP Removal** = 4.9 lbs/yr
Annualized Cost = $24,000	**Annualized Cost =** $32,000
Cost:Benefit = $5,800 per lb TP/yr	**Cost:Benefit =** $6,700 per lb TP/yr

*30-year annualized cost-benefit, considering annualized total project cost, annual maintenance, and the increase in annual TP removal

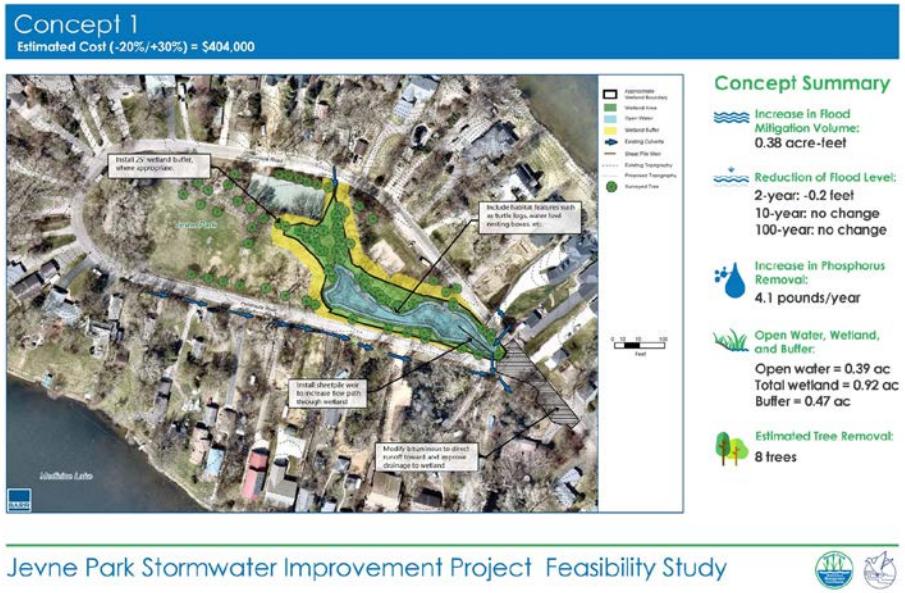
Public Open House

- Public Open House: Held 2/28/2019
- ~12-15 residents attended
- Few residents expressed concern about temporary inundation of Peninsula Road during small events
- Concern about safety of open water & sheet pile weir as kids play in park/wetland



Recommendation: Concept 1

- More cost-effective approach for pollutant removal
- Slight reductions in peak elevations of small events – however, limited concern about standing water on Peninsula Road
- Opportunity to improve/ increase habitat and establish buffer around wetland
- Preference based on public input



Discussion/Questions?

Project Site Photos

Source: Google Maps

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Concept 1: Inundation Summary

Concept 2: Inundation Summary