

Lilydale Regional Park “North Knob” Stabilization Meeting

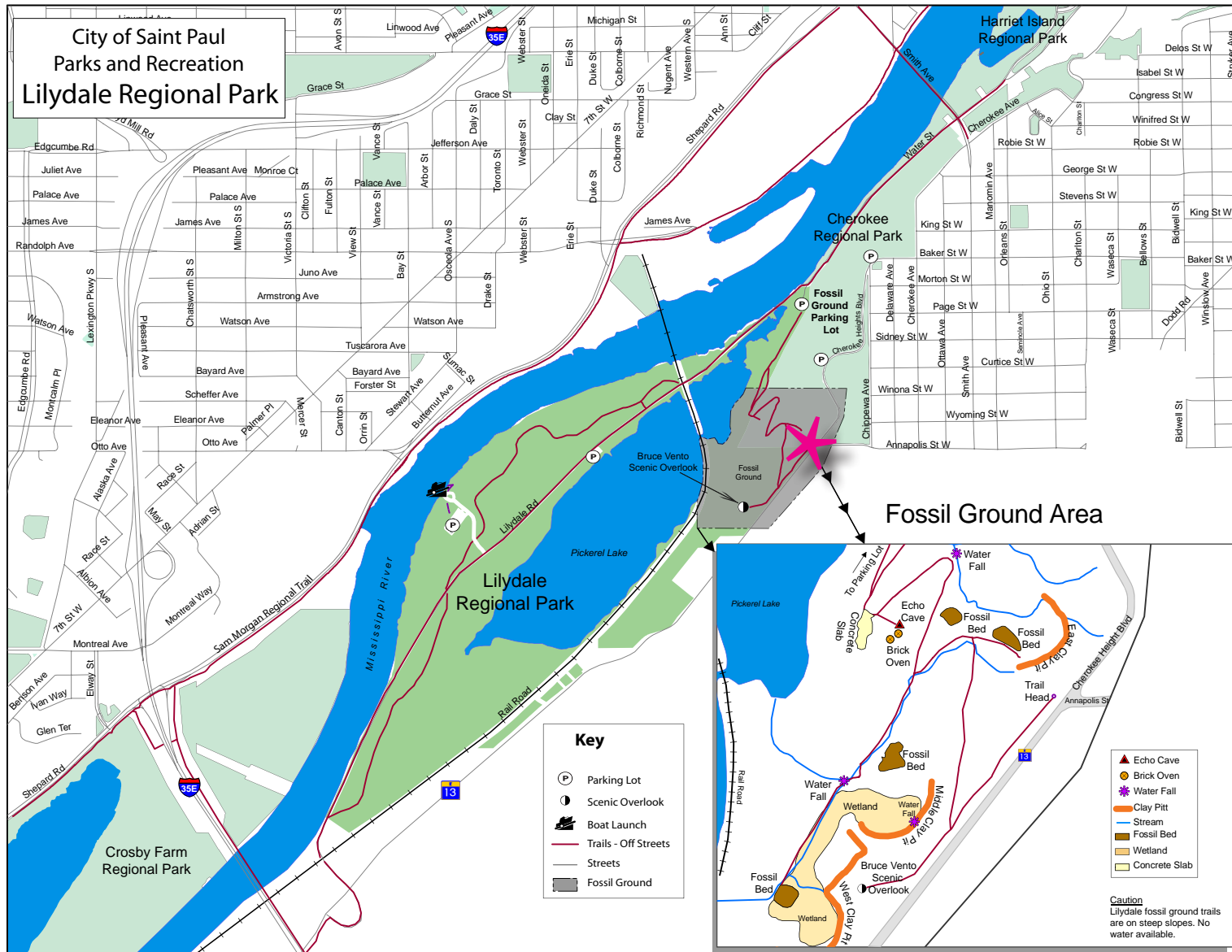
February 1, 2018



Meeting Agenda

1. Introductions & Project Background
 - General
 - Cherokee Heights Ravine
2. Engineering Design Items
 - North Knob Slope Design/Geometry
 - Disposal Site
 - Restoration-3D simulation
3. Schedule
 - Bidding
 - Construction
4. Questions/Discussion

Location Map



History of Site



Annapolis

Cherokee Hts
Ravine

Hwy 13

North Knob

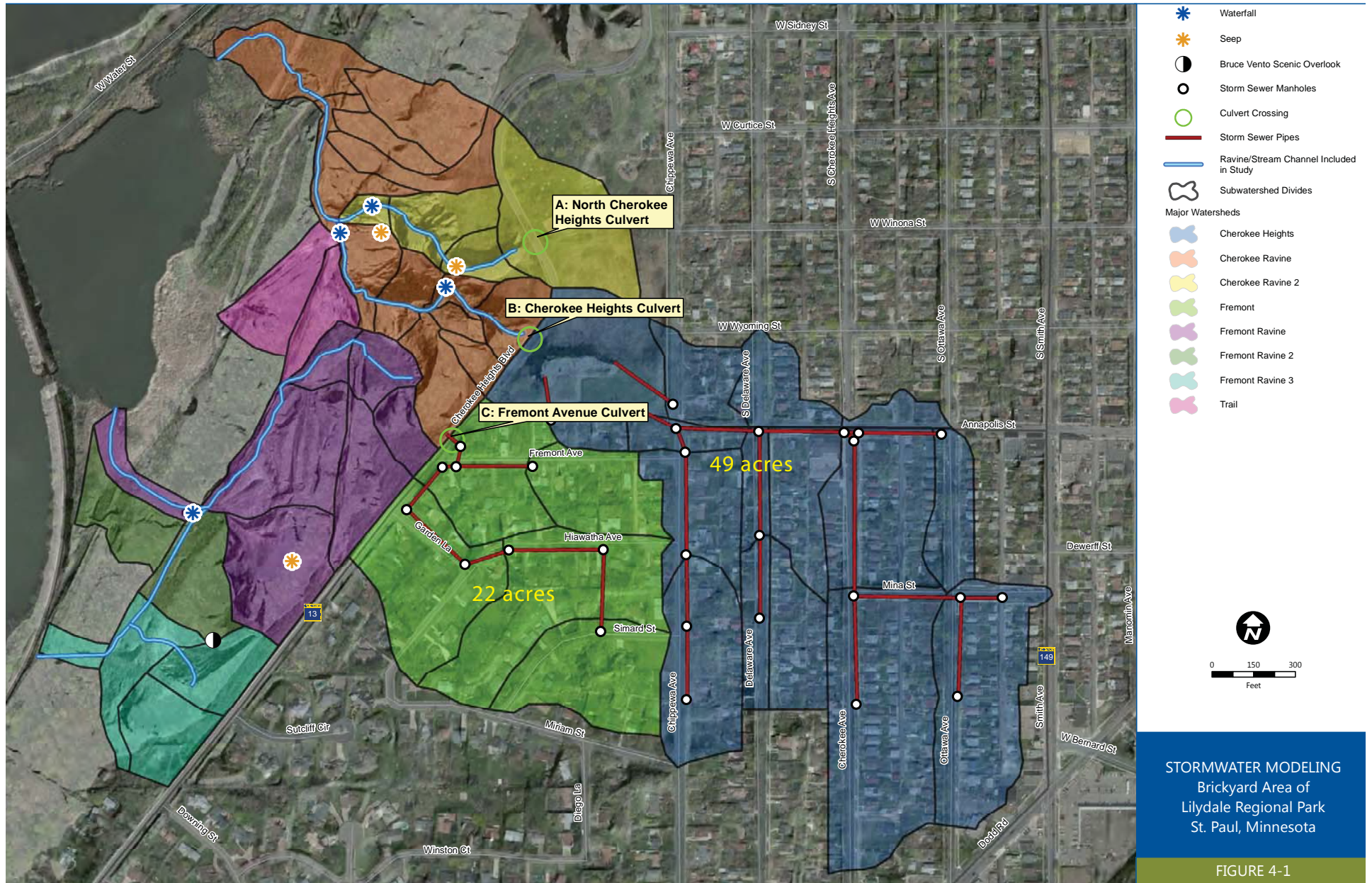
Brickyard Trail

Mississippi River

Pickerel Lake

Former location of Twin Cities Brickyards

Drainage Areas

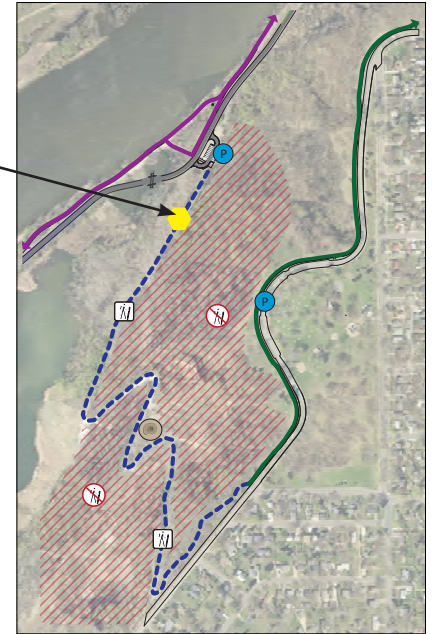




Pre-construction condition (March 2015)



4' gully across path-
culvert 100% blocked and
washout around



Culvert Repair (April 2015)



Culvert removed, ravine channel regraded and culvert replaced.



Post Rain Event (May 8, 2015)



75% blockage after rain event. Upstream channel diverted during rain event and resulted in erosion west of culvert.



Post Rain Event (May 28, 2015)



100% blockage after
additional rain events.



Sediment carried to Mississippi River via Pickerel Lake



***Sediment from North Knob area
will continue to be deposited into
Pickerel Lake and Mississippi River
until North Knob stabilized.***

Sediment caught by floating silt curtain



Funding Request Summary

February 2016 - request \$4.584 million to Minnesota Board of Water and Soil Resources (BWSR) - Unsuccessful.

May 2016 - resubmitted request to BWSR for Disaster Relief Funds (DRAP) for \$1.905 million focusing on steep slope stability.

December 2016 - Received \$925,000 in DRAP funds.

Need for additional funds for restoration

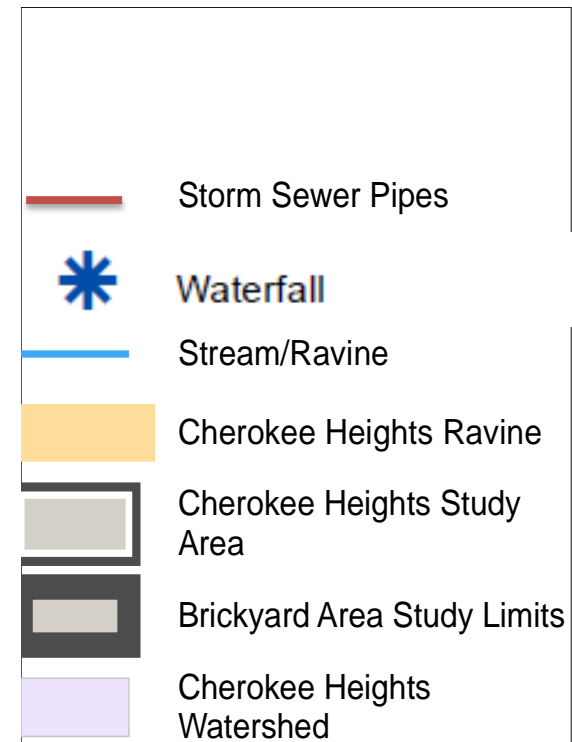
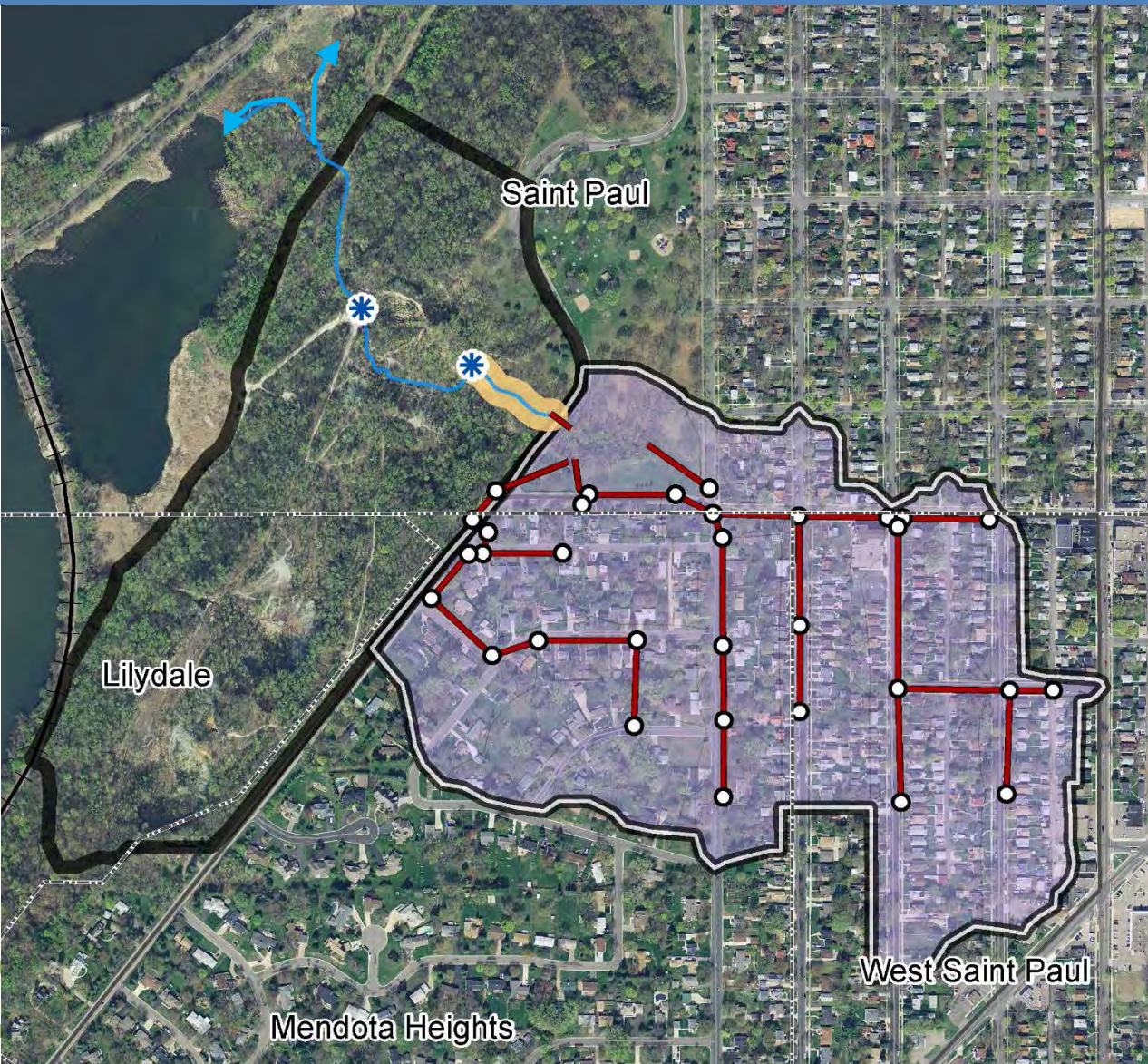
- Received \$164,500 Conservation Partners Legacy to enhance 61 acres of forest and prairie habitat in Cherokee Regional Park. Portion of funds will go towards bluff restoration.

- Reviewing application for restoration funds from Natural Resource Trust Fund in partnership with Ramsey Conservation District and Great River Greening. February 2018 deadline.

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Upstream Drainage Area Cherokee Heights Ravine



Cherokee Heights Ravine Improvement Alternatives Considered

1. Downstream channel stabilization

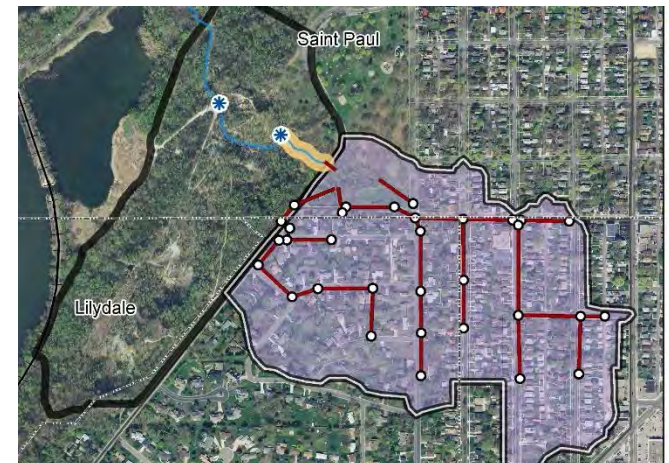
- Engineered and bioengineering techniques
- Selective planting and vegetation management

2. Peak flow reduction (US storage/culvert modifications)

- Upstream storage & infiltration reduced bluff slope stability
- Significant excavation changed park aesthetics
- Loss of trees and park space

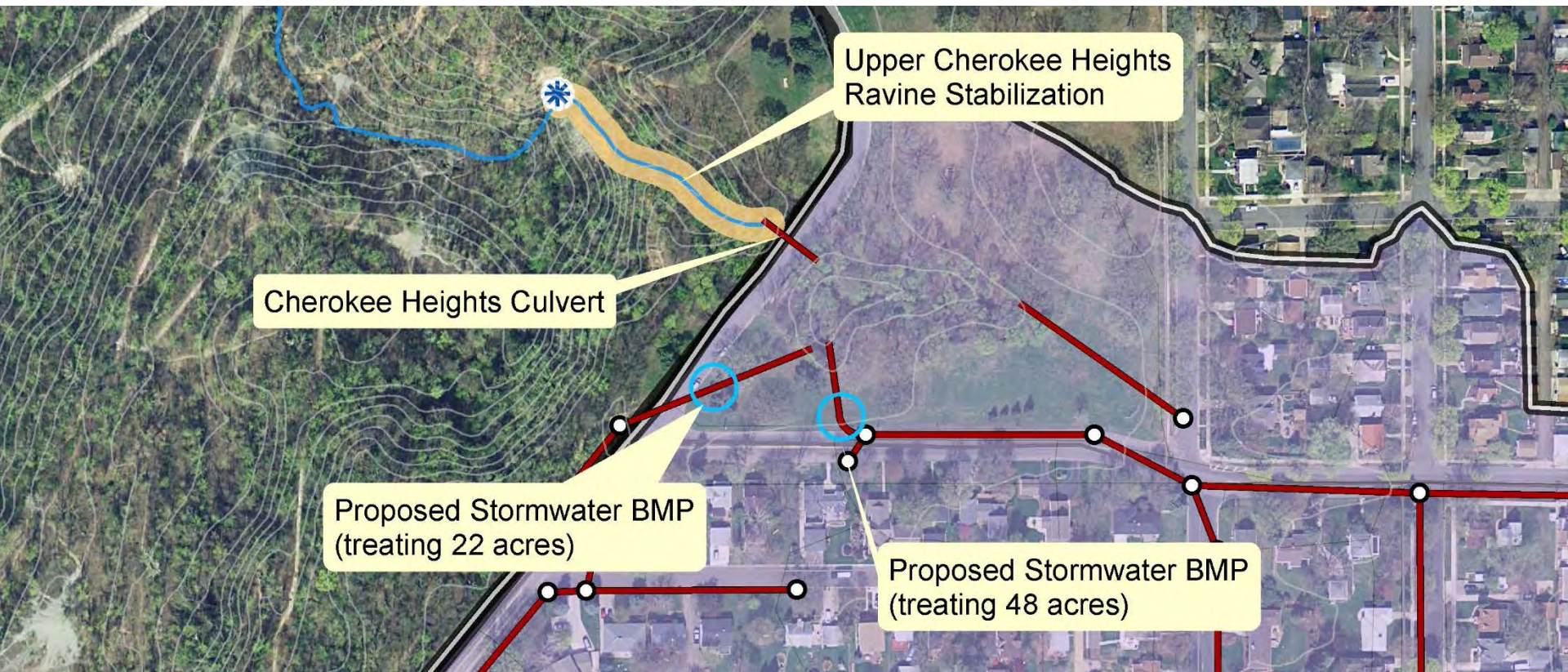
3. Downstream piped system

- Riprap channel & piped system to Mississippi River
- High construction cost



Cherokee Heights Ravine 2018-2019 Improvements

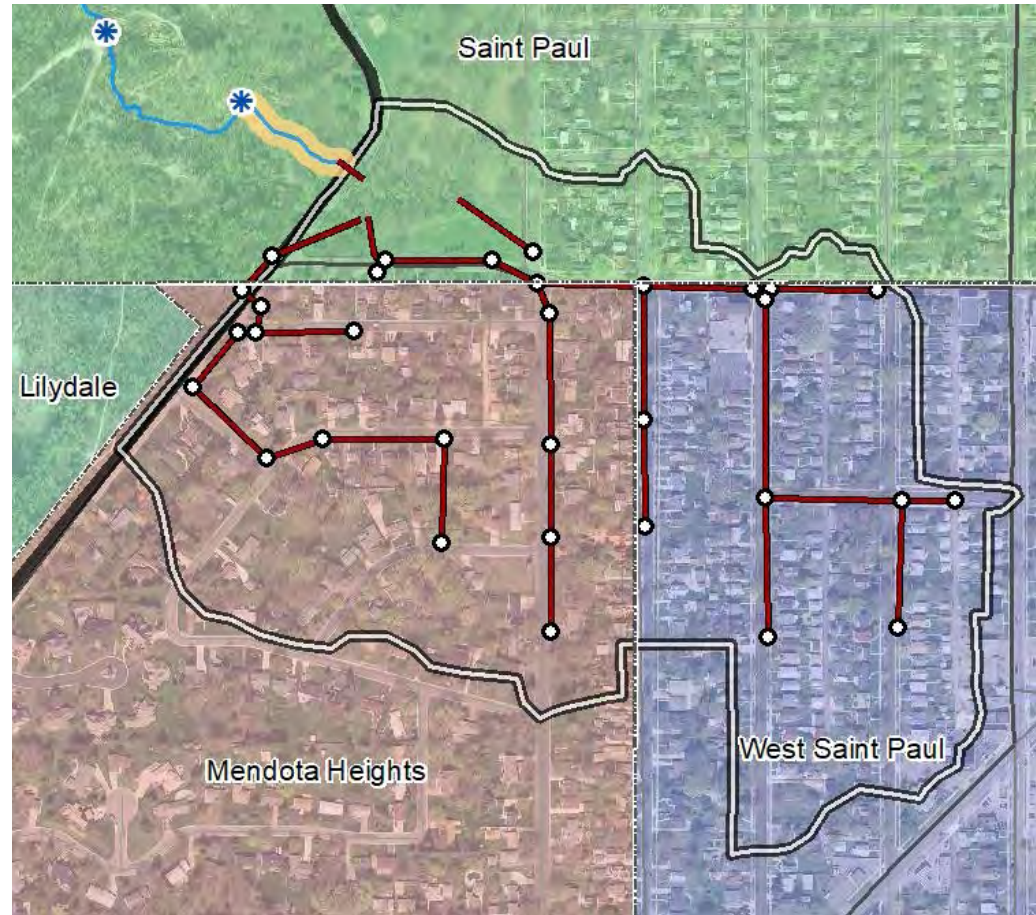
1. Downstream channel stabilization
2. Underground stormwater treatment systems



Cherokee Heights Ravine Improvements Funding Sources

Project to be funded by
BWSR Clean Water Fund
grant award and
contributing cities:

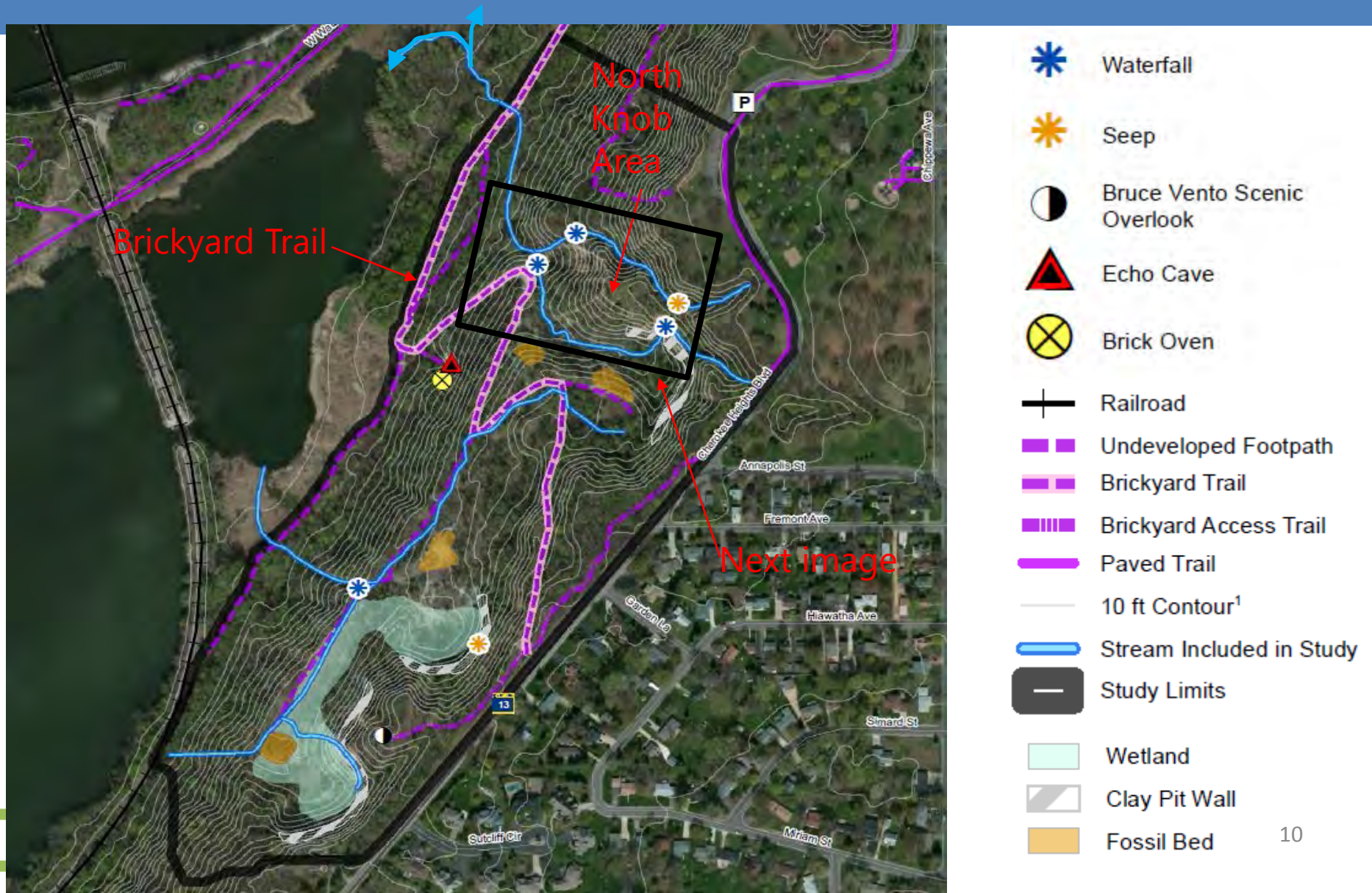
- Mendota Heights
- West St. Paul
- St. Paul



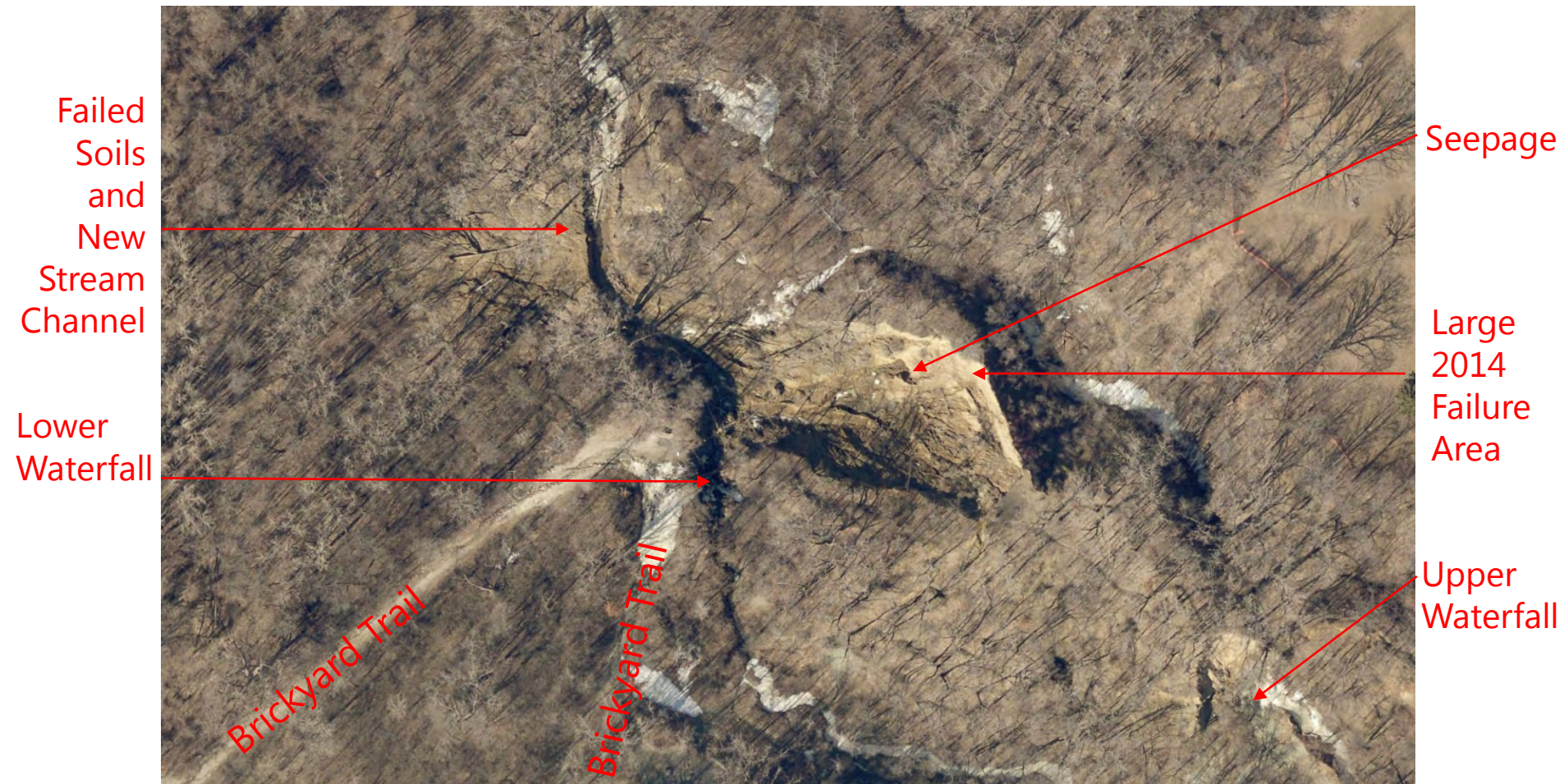
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Lilydale Park – Site Map



2015 Aerial Image (Post-June 2014 Failure)



Slope Failure Area & Lower North Stream Channel



Slope Failure Area & Lower North Stream Channel



Large June 2014 slope failure from below with inset showing seepage (July 2014 site visit)

Slope Failure Area & Lower Stream Channel



Large slide, looking up through eroded stream channel (December 4 2017 site visit)

Lower Stream Channel & Washed-out Culvert



North Knob Stabilization

Improvement Alternatives Considered

1. Mechanical Stabilization – soil nails

- Unnatural aesthetics
- High cost

2. Mechanical Stabilization – piles

- Constructability issues
- High cost

3. Mechanical Stabilization – walls

- Unnatural aesthetics
- Constructability issues
- High cost

4. Graded Slope Stabilization

- Selected alternative due to aesthetics, cost and constructability

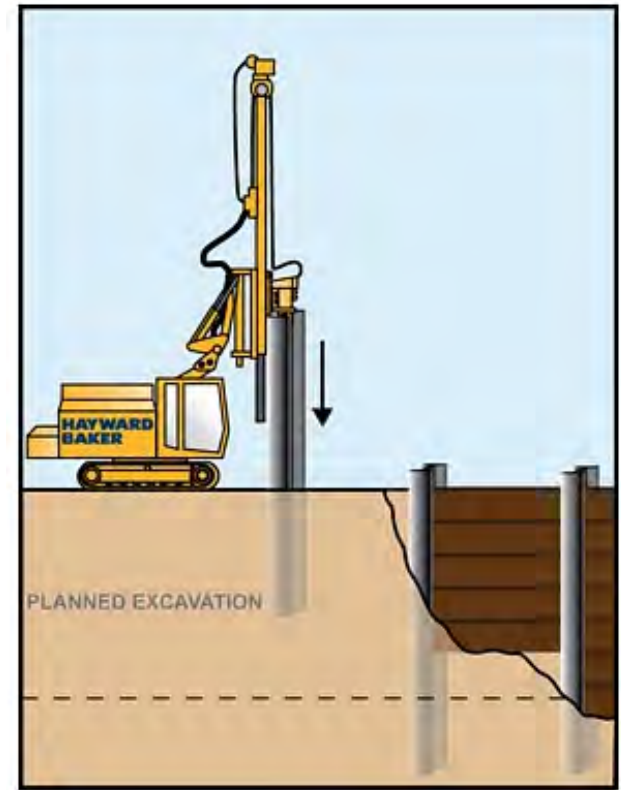
Conceptual Slope Stabilization Options

Soil Nails



Conceptual Slope Stabilization Options

Piles



Conceptual Slope Stabilization Options

Walls, Graded Slope, Soils Nails

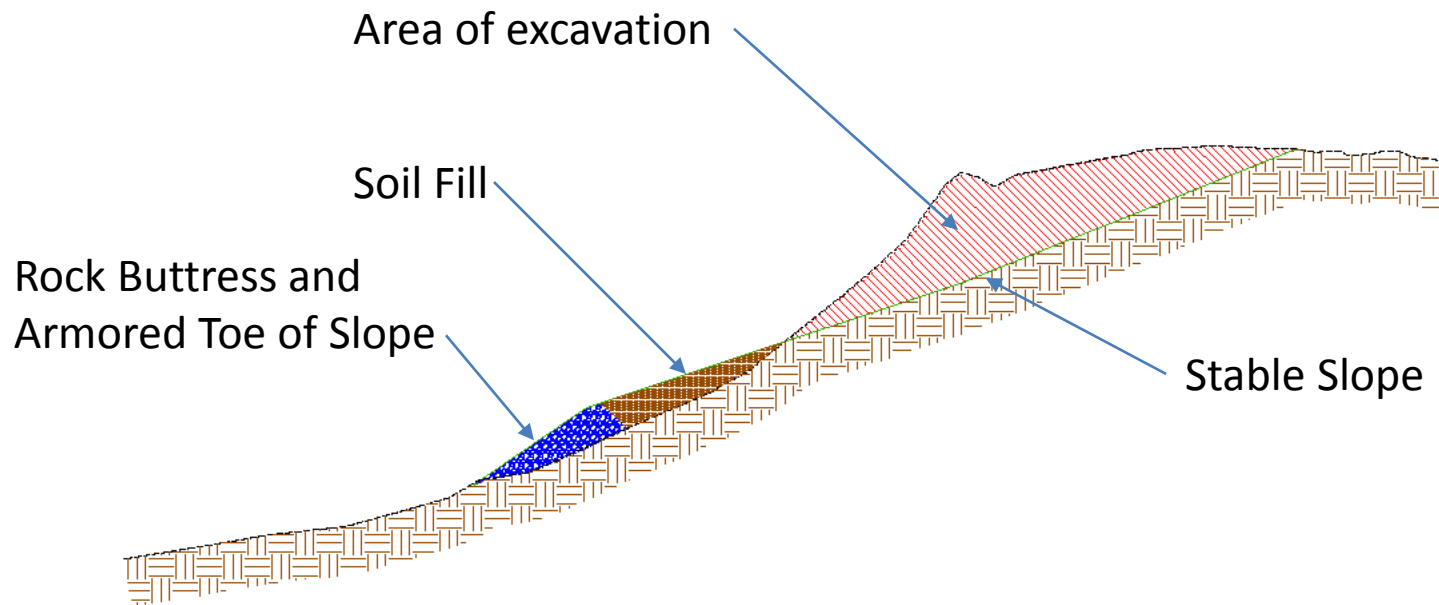


Conceptual Slope Stabilization Options

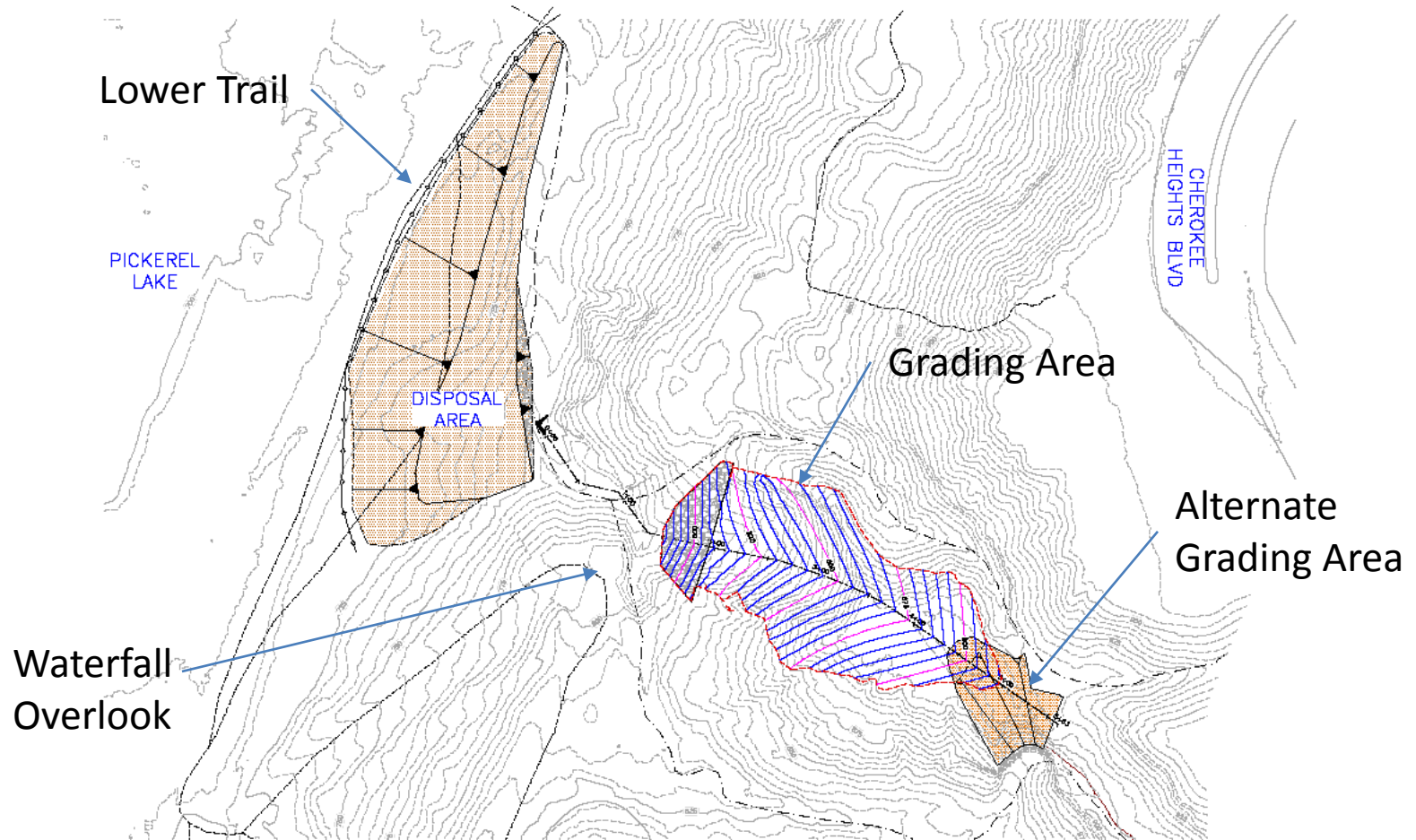
Graded Slope, Toe Protection



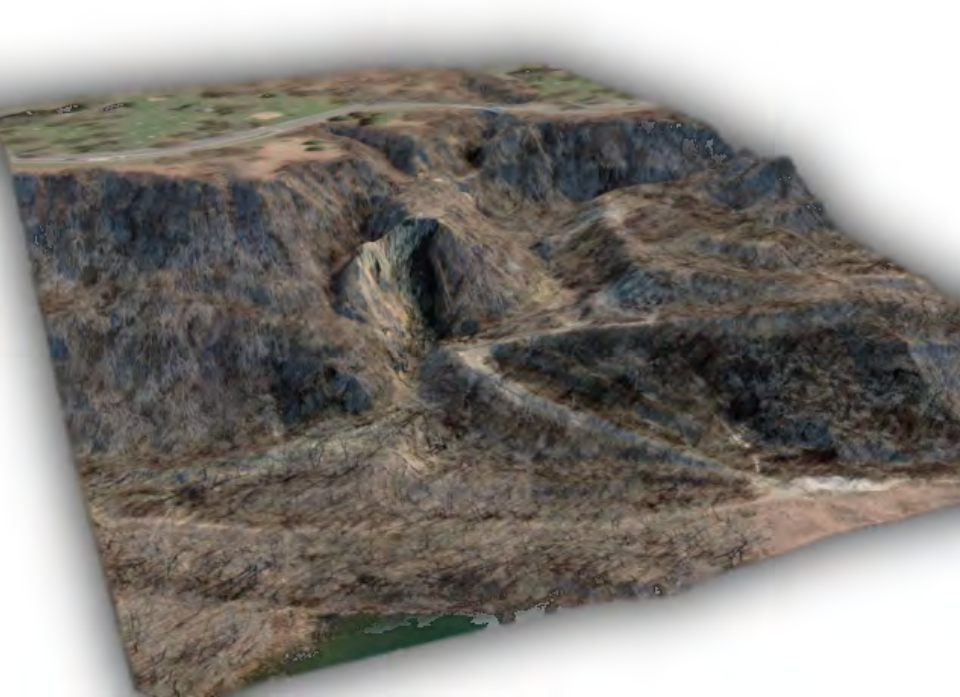
Final Grading Cross-Section



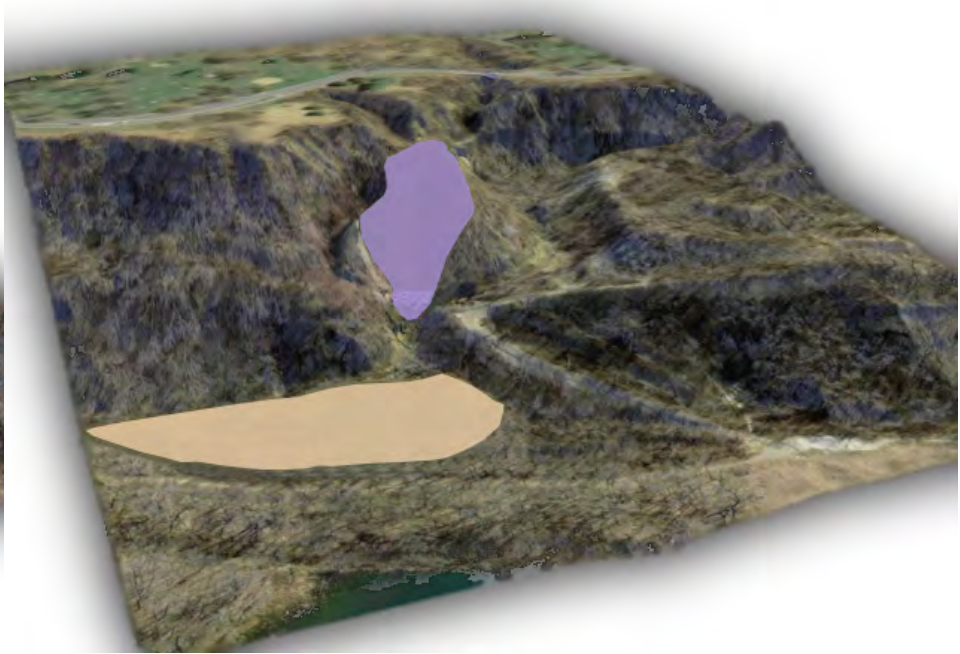
Final Grading Concept



Restoration - 3D Simulation



Existing



Proposed

Restoration - Simulation



Restoration - Examples



Restoration - Examples



Disposal Area



Disposal Area



Work Elements

- Clearing & grubbing – slope and disposal area
- Excavation & grading
- Graded filter blanket for seepage conveyance
- Riprap armoring at toe of slope
- Erosion control & site restoration
- Topsoil and vegetation

Grading and Earthwork Summary

- North Knob
 - 43,000 – 45,000 sq. ft. slope grading (2.5 hockey rinks)
 - 13,500 C.Y. of cut (8 ft. soil over 1 football field)
 - 3,300 C.Y. of filter rock and riprap toe protection
(5 ft. covering 1 hockey rink)
- Disposal Site
 - 50,000 sq. ft. grading (1 football field)
 - 10,000 cubic yards of fill (5.5 ft. over 1 football field)

Schedule

- WSCO Meeting – February 1, 2018
- Bidding – February/March 2018
- Construction – Summer 2018

Questions/Discussion

