



**To:** Park Board

**Agenda Item #:** VI.C.

**From:** Ann Kattreh  
Parks & Recreation Director

**Action**   
**Discussion**   
**Information**

**Date:** January 13, 2015

**Subject:** Water Quality, Wetland and Natural Resources Plan – Braemar Golf Course

**Action Requested:**

Water Quality, Wetland and Natural Resources Plan for Braemar Golf Course – Review and Comment

**Information / Background:**

At the December 2014 Park Board meeting, the Park Board provided review and comment on the Braemar Golf Course Driving Range and Executive Course renovation. Later in December, Parks & Recreation Department staff and Engineering Department staff met with Barr Engineering to discuss further environmental improvements that could be encompassed as part of the plan, including a funding source for the additional improvements. These renovations are proposed to be completed in conjunction with the executive course and driving range renovations and would be paid for by the stormwater utility. Ross Bintner, Environmental Engineer for the City of Edina, will be presenting the proposal. On Tuesday, Jan. 6, 2015 staff presented the driving range and executive course renovation plan along with the water quality, wetland and natural resources plan to the City Council. The City Council supported the plan and authorized staff to publically bid this project.

**Water Quality, Wetland and Natural Resources Plan**

This portion of the report has been prepared and will be presented by Ross Bintner, Environmental Engineer:

Edina has a history of natural resource perseveration at Braemar Park. In addition to managing the golf course toward the “Audubon Classic” designation, the park includes preserved wetlands and oak savannah. These natural resource conservation areas stabilize soils, reduce runoff and sedimentation of waters, and provide flood storage, wildlife habitat and passive recreation area. The development of the driving range and course is planned in coordination with the 2014-2015 Flood Protection and Clean Water Improvement project (CIP-13-012.) CIP-13-012 was programmed to coincide with the driving range and executive course project and is designed to maximize benefits to flood protection, clean water, soil stability, wetland function and wildlife habitat while providing a pleasing aesthetic that is complimentary to the golf enterprise.

The City of Edina Comprehensive Water Resources Management Plan, December 2011 (CWRMP) describes clean water and flood protection projects that meet the goals articulated in section 8.2 of the 2008 Comprehensive Plan. Flood protection and clean water projects include maintenance and improvement of; stormwater conveyance, storage and treatment systems, local flood protection works, or wetland function and values. The CWRMP prioritizes 46 construction projects (C1-46) and 16 engineering (E1-16) studies to improve local flood protection and surface water quality. This project will address items E-12, C-15 and C-16 described in CWRMP section 9.3.1.2, 9.3.2.4, and 9.3.2.5.

The city contracted with Barr Engineering to develop a natural resources inventory and assessment and to make recommendations for stormwater and natural resources improvements in conjunction with the Driving Range and Executive Course project. Barr presented three stormwater treatment options, and options for the management of wetland buffers and natural areas. Option A, a pond expansion in the NMSB\_85 sub watershed in the center of the executive course was chosen as it was the most cost effective option and best compliments the golf enterprise.

In addition to the expanded pond; recommendations to provide stable soils, wetland protection and wildlife habitat include removal of invasive species, planting of native species, a native buffer with wildflowers, demarcation of buffer areas, and public education are included. Some consideration was also give to the enhancement of passive uses though the establishment of nature walking paths, but this was not included in the plan. The plan includes natural resource improvements in areas outside safely away from the main golf use. The improvements include converting unmaintained and unused areas of forest into wildflower prairie, oak savannah, and wet meadow and improving existing oak woodlands. Natural resource improvements will include removal of exotic invasive plant species, low value or invasive woody species such as Siberian elm, cottonwood and box elder, and planting of high value trees and establishment of native plants and wildflowers.

Water quality, wetland and natural resources components are estimated at \$180,000. Of the \$1.8 million golf course renovation estimate approximately \$60,000 of project scope overlaps with the Flood Protection and Clean Water Improvement project scope and will be paid for by the stormwater utility. Wetland, wetland buffer and natural resources items will include ongoing wetland monitoring and maintenance expenses estimated at under \$50,000 over a 5-year monitoring and establishment period that will be programmed in future professional services budget recommendations. As future plans are developed for Braemar Park, more opportunities for environmental improvements will be explored.

**Project Timeline**

January/February 2015	Obtain permits and request authorization from City Council to bid project
January/February 2015	Release plans for bidding
February 2015	Select contractor and award project
July 7, 2015	Begin construction
Oct. 1, 2015	Complete construction
October 2015 - May 2016	Grow-in and maturation
May 1, 2016	OPEN - Driving Range - mats only
June 1, 2016	OPEN - new Par 3 course

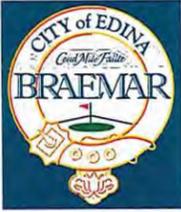
**Attachments:**

Braemar Golf Course Driving Range and Executive Course Routing Plan

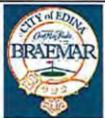
Budget Estimate

Water Quality and Natural Resource Management Recommendations (Barr Engineering 12/2/14)

Natural Area Concept Development Plan



# Practice Range and 9-Hole Par 3 Golf Course Improvements



**Braemar Golf Course**  
6364 John Harris Drive  
Edina, Minnesota 55439  
(952) 903-5750

**City of Edina**  
Parks & Recreation Department  
4801 W. 50th Street  
Edina, Minnesota 55424

**Golf Course Architect:**  
**HERFORD & NORBY**  
100 East Second Street, Suite 200  
Chaska, MN 55318  
(952) 351-6214  
www.herfordnobbygolf.com

I hereby specify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly registered Landscape Architect under the laws of the State of Minnesota.

*[Signature]*

Date: 12/03/14 Registration #: 20144

Date: December 29, 2014  
Designed by: KN & JS  
Drawn by: JS  
Revisions:

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## Routing Plan

**HERFORD NORBY**  
Golf Course Architects, LLC.

**Braemar Golf Practice Facility**

8/12/14

Estimate to renovate the existing practice facility and instructional facility.

**Final Concept Plan**

Practice Range & Related Executive Course Improvements	Low Range	High Range
Mobilization	\$ 10,000.00	- \$ 15,000.00
Strip & replace topsoil (15,000 cy)	37,500.00	- 45,000.00
Mass grading (40,000 cy)	100,000.00	- 120,000.00
Wetland Mitigation		
Wetland construction (53,200 cy)	26,600.00	- 39,900.00
Wetland buffer (54,000 sf)	10,800.00	- 13,500.00
Post construction monitoring	15,000.00	- 20,000.00
Erosion control	24,000.00	- 30,000.00
Erosion control blanket (20,000 sf)		
Silt fence (3,000 lf)		
Tree & stump removal (3 acres)	13,500.00	- 18,000.00
Demolition (paving, fence, etc.)	10,000.00	- 12,500.00
Reconstruct 4 putting greens w/ drain tile, 12" greensmix (16,000 sf)	104,000.00	- 120,000.00
17,050 sf target greens	8,525.00	- 10,230.00
2,600 sf target bunkers	2,600.00	- 3,900.00
New range tees (124,722 sf) w/ 4" topmix, shaping	137,194.20	- 149,666.40
39,000 sf Executive Course Golf Tees w/ 4" topmix, shaping	78,000.00	- 97,500.00
8,915 sf Championship Course Golf Tees w/ 4" topmix, shaping	17,830.00	- 22,287.50
New and rebuilt bunkers on executive course (2,600 sf)	13,000.00	- 18,200.00
Concrete tee line with mats		
5,130 sf Concrete	23,085.00	- 28,215.00
100 Mats	45,000.00	- 50,000.00
Fairways & roughs (12 acres)	30,000.00	- 33,000.00
Fill existings sand bunkers (10,500 sf)	10,500.00	- 15,750.00
Sod installation around greens and tees (8,000 sy)	24,000.00	- 28,000.00
Drainage (drain pipe, catch basins, flared end sections)	70,000.00	- 80,000.00
Irrigation system for range and 4 renovated holes	155,000.00	- 170,500.00
Materials (~155 heads, pipe, wire, satellite, valves)		
Cart Paths	31,543.75	- 37,852.50
Sub-cut & granular cart path base - 25235 sf		
Bituminous paving of cart paths - 25,235 sf		
Bituminous cart path curbing at tees & greens		
Sub-cut & gravel cart path at range, holes 4 & 8 - 11,600 sf	5,800.00	- 8,120.00
Landscaping (trees & shrubs)	15,000.00	- 20,000.00
Grow-in (fertilizer, erosion control, etc.)	10,000.00	- 12,500.00
Netting (1,100 lf)	33,000.00	- 36,300.00
10' High chain link fence (600 lf)	12,000.00	- 15,000.00
New lesson building	20,000.00	- 25,000.00
New scorecard	2,000.00	- 2,500.00
Disconnect/reconnect utilities	20,000.00	- 25,000.00
Final design, engineering & permitting	110,000.00	- 130,000.00
<b>Total</b>	<b>\$ 1,225,477.95</b>	<b>- \$ 1,453,421.40</b>
5% Contingency	61,273.90	72,671.07
<b>Total Practice Range Improvements</b>	<b>\$ 1,286,751.85</b>	<b>- \$ 1,526,092.47</b>

**Optional Costs**

Option to expand the 4 greens by 1,000 sf each to get 5,000 sf avg. *	26,000.00	- 30,000.00
Option to rebuild the 5 remianing greens at 5,000 sf each *	162,500.00	- 187,500.00
Option: Irrigation system for remianing 5 holes	50,000.00	- 55,000.00
Materials (~50 heads, pipe, wire, satellite, valves)		
<b>Total Optional Costs</b>	<b>\$ 238,500.00</b>	<b>\$ 272,500.00</b>

\* The increased green sizes would allow for 2 flags per green similar to how Fred Richards GC is currently used.

This estimate is for the reconstruction of the existing driving range and practice facilities including the partial rerouting and reconstruction of the Executive Course. This estimate includes not only those changes to the Executive Course which are necessitated by the changes to the driving range project but also those optional changes which would be required to maintain consistent conditions on the remaining Executive Course holes. This proposal does not include changes or improvements to the Championship Course other than shown on holes 1 & 10. Since no detailed plans have been prepared, this estimate was prepared using approximate quantities derived from the Final Concept Plan dated August 12, 2014 and should therefore be considered a "ball park" estimate only.

Kevin Norby, President



Herford Norby Golf Course Architects, LLC.



## Memorandum

**To:** Ross Bintner, City of Edina  
**From:** Janna Kieffer and Fred Rozumalski  
**Subject:** Braemar Executive Course Water Quality and Natural Resources Management Recommendations  
**Date:** December 2, 2014  
**Project:** 23271398.00 PH1  
**c:** Ann Kattreh, City of Edina  
Kevin Norby, Herfort Norby  
Deric Deuschle, SEH Inc.

The City of Edina is in the process of redesigning the Executive Course of the Braemar Golf Course. As part of this effort, the City asked Barr to provide information to the golf course architect and design engineers regarding floodplain restrictions, and provide recommendations for stormwater treatment and management of the natural areas, with special emphasis on buffer management. This memo summarizes the stormwater treatment opportunities identified by Barr in and near the Executive Course and a buffer management strategy for the course.

### Stormwater Treatment Recommendations

Redesign and construction of the Executive Course presents an opportunity to provide additional treatment of stormwater from the golf course and adjacent roadways and residential areas prior to the stormwater reaching downstream wetlands and the South Fork of Nine Mile Creek. Currently, stormwater from approximately 52 acres of residential area northeast of the course is conveyed via the trunk storm sewer along Gleason Road to a small wetland on the northeast edge of the executive course (north of Braemar Boulevard), then to the long, narrow pond within subwatershed NMSB\_85b (see Figure 1). Pond NMSB\_85b also receives flows from NMSB\_7, which has a large tributary drainage area. An additional 16 acres of residential area to the east of the Executive Course is currently conveyed to the wetland located south of Braemar Boulevard and east of John Harris Drive (subwatershed NMSB\_57, Figure 1).

Since stormwater from the nearby residential areas east of the course receives no treatment prior to discharge to the Braemar wetlands, the focus of our assessment was to identify opportunities to provide additional treatment of runoff from these areas. Our stormwater treatment recommendations are summarized below.

**Option A: NMSB\_85 Pond Expansion**

Currently, the NMSB\_85b pond is quite shallow and the permanent pool volume (volume below the outlet) is well below suggested stormwater pond design guidance based on the tributary drainage area, which reduces the water quality treatment achieved. The City of Edina Comprehensive Water Resources Management Plan (CWRMP) recommends that the pond in subwatershed NMSB\_85 be expanded to provide additional sedimentation and phosphorus removal. Modeling conducted for the CWRMP was based on an assumption that the pond has an average of four feet of depth, with a permanent pool volume of 1.3 acre feet. However, observations from our site visit indicate that the pond is much shallower. We recommend that the permanent pool of the NMSB\_85b pond be expanded, preferably with some larger and deeper pools to promote sedimentation.

The MPCA's Protecting Water Quality in Urban Areas (March 2000) recommends sizing the permanent pool of a stormwater pond to capture and store the runoff from a 2.5-year storm event. Based on this sizing guidance and the tributary drainage area (subwatershed NMSB\_85), the permanent pool volume of the NMSB\_85 pond should be 2.5 acre-feet. However, recognizing that the golf course layout may pose a significant design constraint, we evaluated a range of permanent pool volumes for the NMSB\_85 pond. We modified the P8 model originally developed for the 2003 CWRMP to reflect a range in permanent pool volumes, with each volume scenario assuming an average depth of four feet. The predicted pollutant removals for the range of permanent pool volumes based on a 30 year simulation (1977 – 2007) are summarized in Table 1. The treatment removal efficiency percentages shown in Table 1 are somewhat lower than expected given the large, untreated tributary drainage area to the NMSB\_85b pond. The removal efficiencies reported reflect that runoff conveyed to NMSB\_85b from NMSB\_7 and its large tributary drainage area receives substantial treatment prior to conveyance through NMSB\_85b, so the remaining pollutants flowing in from NMSB\_7 are primarily very fine sediments or phosphorus in the dissolved form. The estimated total phosphorus removal efficiencies from the untreated NMSB\_85 subwatershed (includes NMSB\_85a and NMSB\_85b) range from 30% to 42% for 1.3 acre-feet to 2.5 acre-feet, respectively.

**Table 1. Summary of Total Phosphorus (TP) and Total Suspended Solids (TSS) Removals from NMSB\_85 Pond for a Range of Permanent Pool Volumes**

Permanent Pool Volume (acre-feet)	Average Annual TP Removal (lbs)	Average TP Removal (%)	Average TSS Removal (%)
1.3	14	24%	55%
1.7	15	26%	57%
2	16	27%	59%
2.5	17	29%	61%



### **Option C: Shallow Wet Prairie**

Stormwater from the 16.5-acre NMSB\_57a subwatershed is currently collected at the intersection of Dewey Hill Road and Gleason Road and conveyed to the wetland located south of Braemar Boulevard and east of John Harris Drive (subwatershed NMSB\_57b, Figure 1) via storm sewer. Based on a wetland assessment conducted in 2012, the NMSB\_57b wetland is considered to be a Medium Value wetland per the Nine Mile Creek Watershed District (NMCWD) Rules. Currently, stormwater from subwatershed NMSB\_57a does not receive treatment prior to discharging to the wetland. To provide water quality treatment prior to discharging to the NMSB\_57b wetland, we recommend considering construction of a shallow wet prairie infiltration/filtration feature upstream of the wetland. As identified in Figures 2 and 3, the shallow infiltration/filtration feature could be located in the open space area on the northeast side of the existing wetland. This area currently serves as a "no mow" area, with tall grasses and numerous bird houses providing habitat. The proposed shallow wet prairie could be planted with diverse plantings, including grasses and pollinator species, so this area can continue to provide wildlife habitat.

The pollutant removal efficiency of the shallow wet prairie was estimated using the P8 model, with the infiltration/filtration area sized to capture 1.1 inches of runoff from the impervious surfaces of the tributary watershed (0.3 acre footprint, one foot average depth). For modeling purposes, it was assumed that the soils are conducive for infiltration (infiltration rates based on hydrologic soil group C). If field tests indicate soils are not conducive for infiltration, the feature could be designed as a vegetated filtration system. The estimated pollutant removals based on infiltration are summarized in Table 2. If infiltration is not feasible, construction of a filtration feature will likely result in reduced total phosphorus removals, unless the filtration system is enhanced to target removal of dissolved phosphorus.

### **Other Stormwater Considerations**

The CWRMP recommended expansion of several other waterbodies within the Braemar Golf Course to improve water quality treatment, including the wetland in subwatershed NMSB\_7. Given that the NMSB\_7 wetland receives minimal direct, "untreated" stormwater runoff from impervious surfaces and much of the incoming stormwater has received some level of treatment prior to reaching NMSB\_7, expansion of the NMSB\_7 wetland is not specifically recommended. However, should the proposed golf course lay out be conducive for expansion of the NMSB\_7 wetland, some additional pollutant removal benefit may be achieved.

There are several wetlands that receive runoff from Braemar Boulevard or golf cart trails. Where opportunities arise, the Executive Course redesign should incorporate vegetated swales to provide pretreatment of runoff from the adjacent roadways and/or trails prior to discharge into the wetlands.



- 3. Manage Buffer Restorations.** Providing regular maintenance is critical to the success of restored wetland buffers. This cannot be stressed enough. If management cannot occur, investing resources to establish a native buffer may not be worthwhile. The seed of invasive species blows, floats or is transported into restored buffers through the movement of animals. It is relatively inexpensive to keep invasive species out of restored buffers through monthly site visits by maintenance crews if done from the start. This will prevent their establishment. Once invasive species establish it becomes much more expensive to eliminate them from a buffer.
- 4. Demarcation.** To preserve the extent of the buffers and prevent accidental mowing it may be best to mark the edges of the buffer zones with a simple marker that signals mower operators not to cut within the buffer and that marks for management crews the extent of their work. These markers can be simple or complex. A few examples are shown below.



Simple markers.

- 5. Education.** In certain areas where people have close and frequent access to wetland buffers, educational signage may be posted. These could be very simple labels stating – Restored Wetland Buffer, or much more involved describing, for example, the purpose of the buffer or describing some interesting element such as a plant or animal species that resides within the buffer. Education can also be conducted through programs that allow students to tour and explore the buffers, or classes that sample or inventory species within the buffers. There are many possibilities.



A simple sign.



An interpretive sign.

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SWS ID: NMSB\_85b  
Area: 14.7 acres

SWS ID: NMSB\_85a  
Area: 51.9 acres  
Impervious Area: 7.9 acres

SWS ID: NMSB\_57a  
Area: 16.5 acres  
Impervious Area: 3.3 acres

- Treatment Subwatersheds
- Existing Storm Structure
- Existing Storm Sewer

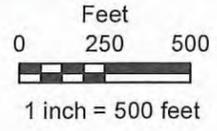
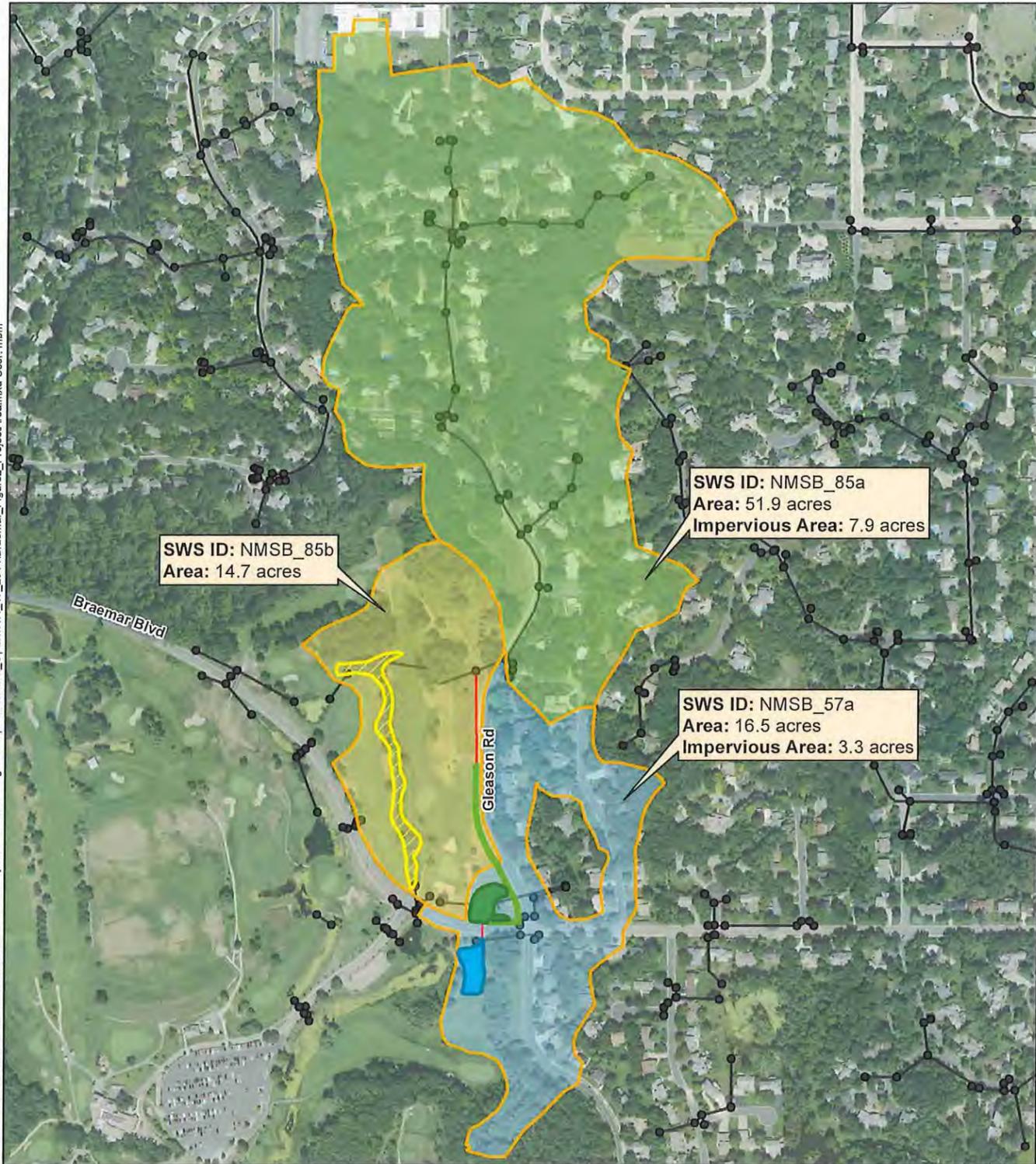


Figure 1

BRAEMAR EXECUTIVE COURSE:  
EXISTING CONDITIONS  
City of Edina, Minnesota  
11/17/14



- |   |  |
|---|--|
|  Swale + Infiltration/Filtration Feature |  Existing Storm Structure |
|  Infiltration/Filtration Feature         |  Existing Storm Sewer     |
|  Pond Expansion                          |  Proposed Storm Sewer     |
|  Treatment Subwatersheds                 |  |

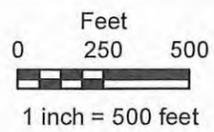
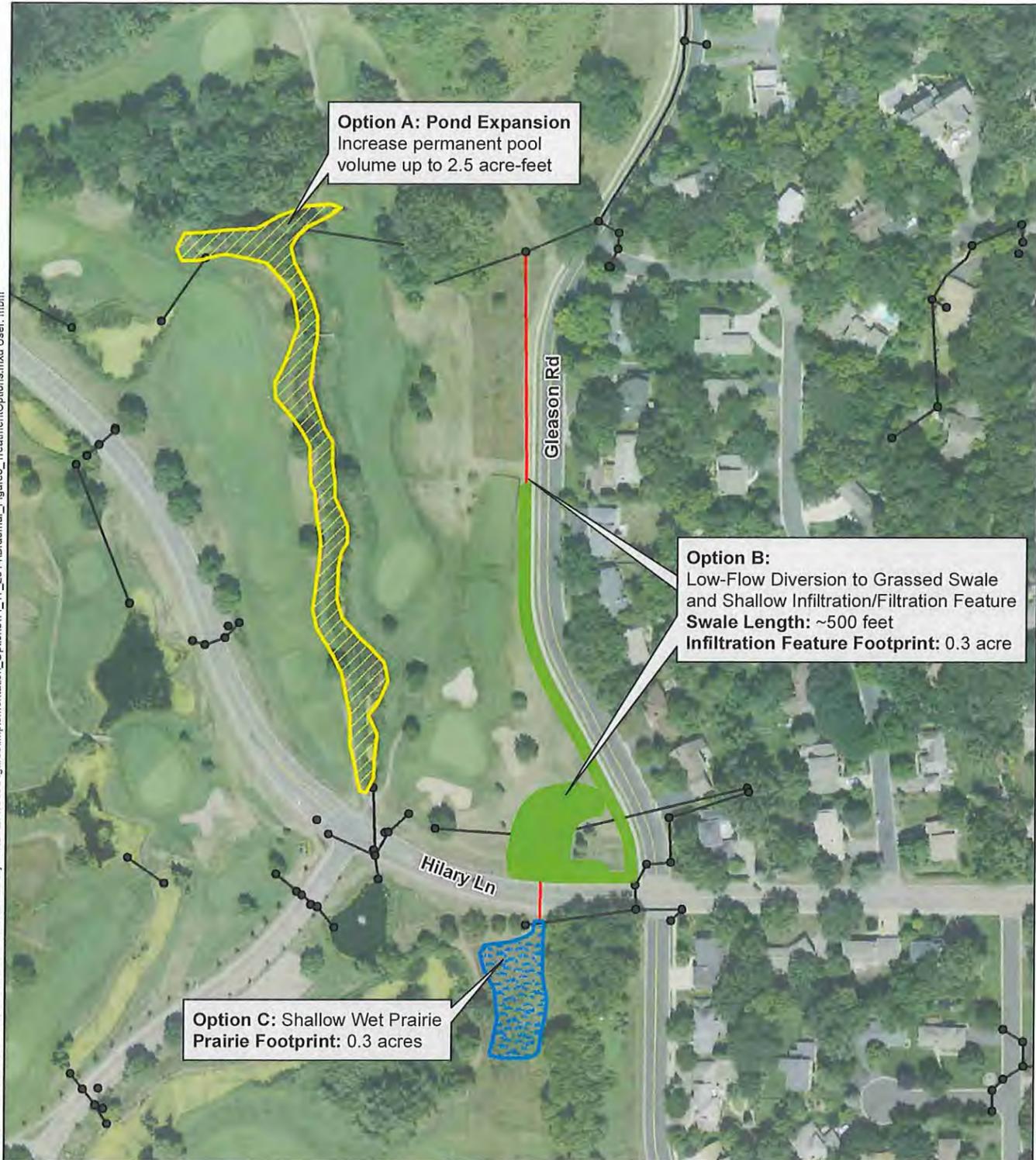


Figure 2

BRAEMAR EXECUTIVE COURSE:  
PROPOSED TREATMENT AREAS  
City of Edina, Minnesota  
11/17/14

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**Option A: Pond Expansion**  
 Increase permanent pool  
 volume up to 2.5 acre-feet

**Option B:**  
 Low-Flow Diversion to Grassed Swale  
 and Shallow Infiltration/Filtration Feature  
**Swale Length: ~500 feet**  
**Infiltration Feature Footprint: 0.3 acre**

**Option C: Shallow Wet Prairie**  
**Prairie Footprint: 0.3 acres**

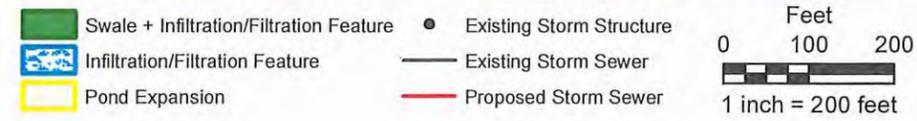


Figure 3

BRAEMAR EXECUTIVE COURSE:  
 STORMWATER TREATMENT  
 CONCEPTUAL PLAN  
 City of Edina, Minnesota  
 11/17/14

# Natural Area Concept Development

- **Pedestrian Trail**
  - Connect to existing trails
- **Oak Savanna**
  - Remove buckthorn, box elder and Siberian elm
  - Plant savanna wildflowers and grasses
- **Wetland**
  - Plant native wildflowers, sedges, and grasses
- **Wet Meadow**
  - Plant native wildflowers, sedges, and grasses
- **Oak Woodland**
  - Remove buckthorn, Siberian elm
  - Plant native ferns, wildflowers, and sedges
- **Open Water**
  - Manage against cattail colonization
- **Entrance Planting**
  - Update main entrance planting
- **Prairie**
  - Remove lawn
  - Plant native wildflowers, and grasses

