

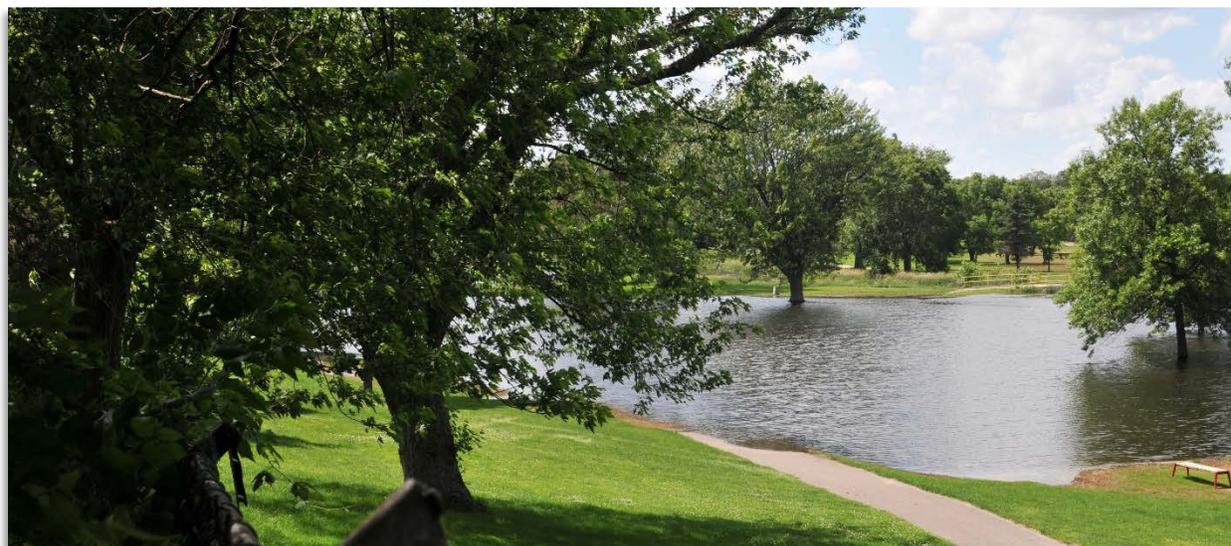


Hiawatha Golf Course Area Water Management Alternatives Assessment

Impact Assessment

Prepared for
Minneapolis Park and Recreation Board, City of Minneapolis, &
Minnehaha Creek Watershed District

7/14/2017





Technical Memorandum

MPRB Hiawatha Golf Course Alternatives Assessment Project

Impact Assessment

To: Michael Schroeder, MPRB & Katrina Kessler, City of Minneapolis
From: Jennifer Koehler, PE & Kurt Leuthold, PE
Subject: Hiawatha Golf Course Area – Impact Assessment Memo
Date: 7/14/2017
Project: 23/27-1466.03
c: Della Schall Young, Paul Hudalla, Tyler Pederson, Rachel Crabb, Deb Pilger, Matt Just, Shane Stenzel, James Wisker, Janna King, Cody Krier

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1.0 Introduction

The Barr Engineering team, including Economic Development Services, Inc. and HZ United (the project team), has been assisting the Minneapolis Park and Recreation Board (MPRB) and the City of Minneapolis (City) on the evaluation of the surface, storm, and groundwater management issues related to the Hiawatha Golf Course area. As part of this project, the MPRB has directed Barr to perform a detailed assessment of two alternatives for the Hiawatha Golf Course area, selected by MPRB, City, and Minnehaha Creek Watershed District (MCWD) staff. This project is not a complete master plan for the Hiawatha Golf Course area, but rather a high level comparative assessment of two alternative visions for the area that will help the MPRB select the future direction of and set the stage for master planning, budgeting, permitting, and ultimately, design.

Because the issues in the Hiawatha Golf Course area are primarily related to groundwater and surface water management, the MPRB, City and MCWD selected two alternatives based on differing water management approaches for the area. The water management assessment and selection process is documented in the Hiawatha Golf Course Area – Water Management Alternatives memo dated 6/21/2017.

Alternative A maintains the area as an 18-hole golf course (with existing pumping rates) while Alternative B considers a reduced-pumping approach and modifications to water management in the golf course area. Table 1 summarizes the general components for each of the two Alternatives.

Table 1: Alternatives Summary

| Alternative | Description of Components |
|----------------------|---|
| Alternative A | Existing Conditions (18-hole golf course, existing pumping rate) with an open channel along the northern and eastern edge of the golf course |
| Alternative B | Reduced pumping alternative with a direct gravity connection to Lake Hiawatha, an open channel and realignment of Minnehaha Creek through the golf course area, development of wetlands & open water, and a change in the recreational use of the park area |

The following memo summarizes the impact assessment that was performed to help quantify the differences between Alternative A and Alternative B, considering the following:

- Surface water and groundwater impacts
- Ecological implications
- Recreation and economic concepts
- Traffic and parking impacts
- Applicable regulations
- Cultural resources review

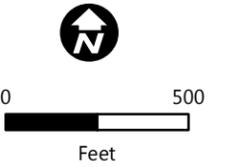
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The project boundary shown on Figure 1 was used to quantify the impacts of the two alternatives, especially for the ecological assessment.

Ultimately, the information compiled in this impact assessment memo was used to inform the assumptions and inputs for full-alternative assessment which includes reviewing each alternative through the sustainability lens (using the Envision rating system developed by the Institute for Sustainable Infrastructure & Zofnass Program for Sustainable Infrastructure) and performing a benefit-cost assessment for the two alternatives that quantifies the triple bottom line (social, economic, and ecological costs and benefits) of each alternative (using AutoCASE, an economic model developed by Impact Infrastructure). The methodology and results of the Envision rating system and the AutCASE benefit-cost analysis are summarized in two subsequent technical memorandums.



 Alternative Assessment Boundary



ALTERNATIVE ASSESSMENT
PROJECT BOUNDARY
Hiawatha Golf Course
Minneapolis Park & Recreation Board

FIGURE 1

1.1 Available Data

This impact assessment (along with the full alternatives assessment) is building on previous studies completed for the Hiawatha Golf Course area, data from the Metropolitan Council and MPRB related to existing users, revenues, expenses, and planning information, comparable information from other parks districts in the region, other publicly available information, and public input collected through this project. Additionally, MPRB, City, and MCWD staff were involved throughout the impact assessment process and will continue to be involved through the full alternatives assessment process. The following section outlines the various sources of data used for the impact assessment.

1.1.1 Previous Water Management Studies

Barr has been assisting the MPRB and the City on the evaluation of the surface, storm, and groundwater management issues related to the Hiawatha Golf Course area since 2013. The initial work was in relation to stormwater management in the Hiawatha Golf Course for the City of Minneapolis. However, beginning in late 2015, Barr was hired to help the MPRB begin understanding the groundwater impacts to the golf course area. All of the information compiled and work completed related to the water management at the Hiawatha Golf Course is summarized in a draft memo dated 2/28/2017 and in a water management memo dated 6/21/2017.

1.1.2 MPRB Nokomis-Hiawatha Regional Park Master Plan (2015)

The Nokomis-Hiawatha Regional Park Master Plan was completed in 2015 by HKGi for the MPRB. This master planning effort focused on the regional park surrounding Lake Nokomis, Lake Hiawatha, and a portion of Minnehaha Creek. Although the master planning effort did not include the Hiawatha Golf Course area, there were key messages from the master plan that were utilized in developing the assumptions about the future alternative for the Hiawatha Course Area. These were considered in each of the respective sections below (as appropriate).

1.1.3 Other Information

MPRB staff involvement includes representatives from various departments within the organization, including representatives from the Environmental Stewardship Division, the Planning Services Division, and the Recreation Services Division. City staff involved include representatives from the Public Works Surface Waters and Sewers Division.

Staff were able to provide historic data related to the Hiawatha Golf Course including recent wetland delineation information (2015) and forestry information, annual rounds of golf played, total revenues and expenses, net revenues, and other golf-related data. MPRB staff were also able to provide information related to MPRB enterprise/concession features such as Sea Salt, Nicollet Island Pavilion, Bread and Pickle, Tin Fish, and Sand Castle, water craft/bike rentals, weddings, pavilion rentals, and recent capital

investments. For the traffic and parking assessment, the project team utilized traffic data provided by the City of Minneapolis.

The project team also utilized planning efforts and concepts for the Hiawatha Golf Course and other MPRB golf courses before water issues at Hiawatha were recognized, including:

- *MPRB Golf Course Master Plan Study Narrative*, Herfort Norby Golf Course Architects, October 2013
- *MPRB Golf Course Operational and Consulting Review, Presenting a 10 Year Vision*, Golf Convergence, January 2, 2014, which included a review of all MPRB golf courses, including Hiawatha Golf Course.

The project team also utilized comparable information from other publicly-owned park and recreational facilities to help inform the discussion surrounding the recreation concepts. This included information from St Paul (Como Park and golf course), Roseville (parks buildings), Edina (Centennial Lakes) and Chaska (golf course restaurant). Demographic information was from MNCompass, a website that aggregates credible sources of demographic and economic information (US Census and American Community Survey), led by Saint Paul-based Wilder Research. Excensus, LLC provides detailed housing and demographic profiles for the Twin Cities. Additionally, Metropolitan Council regional park system user data from 2015 was consulted for this analysis.

For the ecological assessment, publicly available data, such as the Minnesota Department of Natural Resources (MnDNR) 2011 LiDAR data along with the US Fish and Wildlife Service (USFWS) National Wetlands Inventory data were utilized.

1.1.4 Public Input

Four public meetings were conducted as part of this phase of the Hiawatha Golf Course project. Additionally, the MPRB conducted an online public input survey in July 2017 to gather input for the public in the neighborhood and surrounding areas of the city that had not attended the public meetings.

Public Meeting #1 was held on 3/30/2017. This meeting provided an update to the public on the project and laid out current phase of the project including the scope, timeline, and public input process.

Public Meeting #2 was held on 4/20/2017. At this meeting, the public attendees were divided into nine (9) working groups and were tasked with identifying potential recreation concepts for the potential upland and wetland/open water areas expected under a reduced-pumping water management alternative. The MPRB, City, and MCWD staff considered this public input throughout this process.

Public meeting #3 was held on May 18, 2017 to provide an update to the public on the information compiled through impact and alternatives assessment process, including the proposed recreation approach for the reduced pumping alternative.

Public meeting #4 was held on June 21, 2017 to provide an update on the project and present the results of the preliminary benefit-cost assessment for the two alternatives.

2.0 Surface Water and Groundwater Impacts

Surface and groundwater implications were quantified and summarized in the water management memo, including the summary of the two selected water management alternatives. Table 2 below summarizes the surface and ground water related impacts of Alternatives A and B. Pumping rates are presented as millions of gallons per year (MGY).

Table 2: Summary of Surface Water and Groundwater Impacts for Alternatives A and B

| | Alternative A | Alternative B |
|---|---|---|
| Groundwater Pumping | 242 MGY | 94 MGY |
| <i>Shallow, Regional</i> | 100 MGY | 51 MGY |
| <i>Groundwater</i> | | |
| <i>Seepage from</i> | 141 MGY | 43 MGY |
| <i>Lake/Creek</i> | | |
| Stormwater Pumping | 66 MGY | 0 MGY (No Pumping) |
| Total Pumping | 308 MGY | 94 MGY |
| Reduction in Total Pumping (%) | No Reduction | 70% |
| Impact on the # of Basements impacted by Groundwater | No Change (with operation of existing lift station) | No Change (with proposed drain and well systems) |
| Impact on the # of Structures impacted by Surface Flooding | No impact in Hiawatha West Reduction in Hiawatha North | No impact in Hiawatha West Reduction in Hiawatha North |
| Total Phosphorus Load Reduction | No Change | Increase in TP removal by 183 lbs/yr (~25% of TMDL required reduction for Minneapolis/~5% of Total TMDL required reduction) |
| Open Water Area | 9 acres | 41 acres |

| | Alternative A | Alternative B |
|-------------------------------------|--|--|
| Impact on Regional Resources | No Impact | 0.5 foot increase at Powderhorn Lake |
| Trash in Lake Hiawatha | Open channel provides opportunity for trash mitigation | Open channel and land use changes provide opportunity for trash mitigation |

3.0 Ecological Impacts

The following sections summarize the ecological conditions for the Hiawatha Golf Course area during presettlement conditions (prior to the development of South Minneapolis and the creation of the Hiawatha Golf Course), as well as the anticipated ecological conditions for Alternatives A and B.

3.1 Presettlement Vegetation of the Hiawatha Golf Course Area

Rice Lake (renamed Lake Hiawatha in 1925) was described by Theodore Wirth as a “swampy lake”. The size of Rice Lake presented in historical maps varies; probably due more to the individual surveyor than actual changes in the lake size over time. The Trygg map compilation, based upon 1853 public land survey maps, shows a lake 134 acres in size. The 1892 Minneapolis plat map depicts Rice Lake as being 76 acres in size. Both maps show the creek entering the lake at a point further west than the current inlet. The lake configuration and depth were greatly altered by the dredging that took place between 1929 and 1931, based mostly upon Theodore Wirth’s 1924 plan. Lake Hiawatha is currently 53 acres in size; approximately 80 acres of lake/wetland were filled with dredge materials to create the upland areas for the golf course.

Prior to European settlement, the area around Lake Hiawatha (and most of south Minneapolis) was a matrix of upland prairies and oak woodlands. Wetlands and wet prairie communities were found along the stream corridors and bordering lakes, with many of the landscape depressions that retained water also being wetlands. The public land survey made a distinction between upland prairie and marsh (wet prairie, marshes and sloughs), but often did not differentiate between woodland/savanna and upland prairie. Based upon this pre-settlement mapping information the Minnehaha Creek riparian areas and the Rice Lake delta areas were primarily wetlands; wetland existed on 35 to 92 acres of the area within the project boundary (depending upon the size of Rice Lake used). The surrounding upland landscape was comprised of prairie (upland prairie) and oak openings and barrens (oak woodland/savanna and brush land). These upland, fire-dependent plant communities comprised 47 acres of the project area. Many of the large remnant burr oaks of these savannas can still be found in south Minneapolis.

3.2 Analysis of Alternatives

Analysis of the ecological conditions for the Hiawatha Golf Course area was completed on three land cover scenarios – the current land cover patterns, Alternative A which incorporated the existing conditions

(18-hole golf course, existing pumping rate) with an open channel along the northern and eastern edge of the golf course and targeted native plant restoration throughout the golf course, and Alternative B which reduces pumping with an open channel and realignment of Minnehaha Creek through the golf course area. Alternative B allows for the development of wetlands and open water (greater than 6.6' in depth) with a direct gravity-connection to Lake Hiawatha and the creation of a second distributary channel of Minnehaha Creek to the lake. This alternative also incorporates more extensive native plantings and wetland buffers, and ultimately changes the recreational use of the area.

Evaluation of land cover were completed using ArcGIS for the both current land cover and land uses present on the site and the proposed alternatives to evaluate the ecological changes and impacts. These land uses were derived from existing land cover mapping and wetland delineation data provided by the MPRB, the City and MCWD, along with existing topographic information and recent aerial photography.

The original project boundary for this analysis included the golf course, Lake Hiawatha and Minnehaha Creek downstream of the lake to 31st Avenue South when the project options included potential changes to water levels in Lake Hiawatha (Figure 1). However, through the water management alternatives selection process, the City, MPRB, and MCWD staff eliminated the lowering of Lake Hiawatha as part of the management alternatives. The ecological conditions figures reflect the initial project boundary, however no changes are anticipated to occur to either the lake, creek, wetlands or land uses in the creek corridor downstream of the lake under either alternative.

Wetland types were derived from the wetland delineation completed in 2015 by Kjohlhaug Environmental Services for the golf course area and the existing digital data files of wetlands location and classification by the U.S. Fish & Wildlife Service (for the 1974 – 1988 time period) developed as the National Wetlands Inventory (NWI). Both wetland datasets were reviewed, merged and reconciled as to Wetland Type as per Shaw and Fredine (1971). Lake Hiawatha lakeshore and Minnehaha Creek stream bed wetlands were excluded for this analysis (Wetlands 14A, 20, 21 and 22); Wetlands 23 - 29 (downstream of Lake Hiawatha) are unchanged under both proposed Alternatives and all were also excluded from the alternatives analysis. Wetlands areas with water depth greater than 78" (2 meters/6.6 feet) were classified at open water as per USACE guidance.

Figure 2 and Table 3 below provide a summary description of the wetland types used in this analysis, as modified from Shaw and Fredine (1971). Figure 2 illustrates a general characterization of the landscape position of the five wetland types and the water depth relationship between the wetland types. Type 6 – Shrub Swamp wetlands can be found in the same landscape and water depth settings as the Type 1, 2 and 3 wetlands. Table 3 provides a general summary of the soils, hydrology and typical vegetation found in each of the wetland types present at the golf course study area.

The hydrology of the site will have the greatest influence upon wetland location and wetland plant community composition. Extreme fluctuations in water elevations in wetlands can lead to plant die off,

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which provides the opportunity for invasive and weedy species to colonize the wetlands. The current assessment for hydrologic conditions for Alternative B indicate that the maximum depth of water level fluctuation events will be less than one foot for 80% of the events and the event duration for 94% of the bounce less than one foot are for 10 days or less in duration. Flooding depth and duration are tolerable by most wetland species, but plant species selection for each of the proposed wetland types will need to be guided by water level fluctuation tolerances of the specific species used.

Plant community type, the interface of each of the wetland zones and the interspersions of the wetland and upland community types will be dictated by the water level fluctuations across the site. The current site topography has been used to assess the future conditions for each alternative and summarize the wetland community types. The five wetland types proposed for the site, along with the adjoining upland buffers will be a continuum of plant communities, once established, can be expected to have rather indistinct community boundaries; the edges will likely fluctuate over time based upon long-term hydrologic fluctuations.

Existing topographic data was used to evaluate existing conditions and the two alternatives (2011 MnDNR LiDAR). During the planning and design process, the site topography may be altered from the existing conditions in the proposed changes; however for these analyses, no such changes were included. Water level and soil saturation conditions for the proposed conditions in each alternative also utilized existing topography.

Figure 2: Wetland Types and Typical Landscape Position

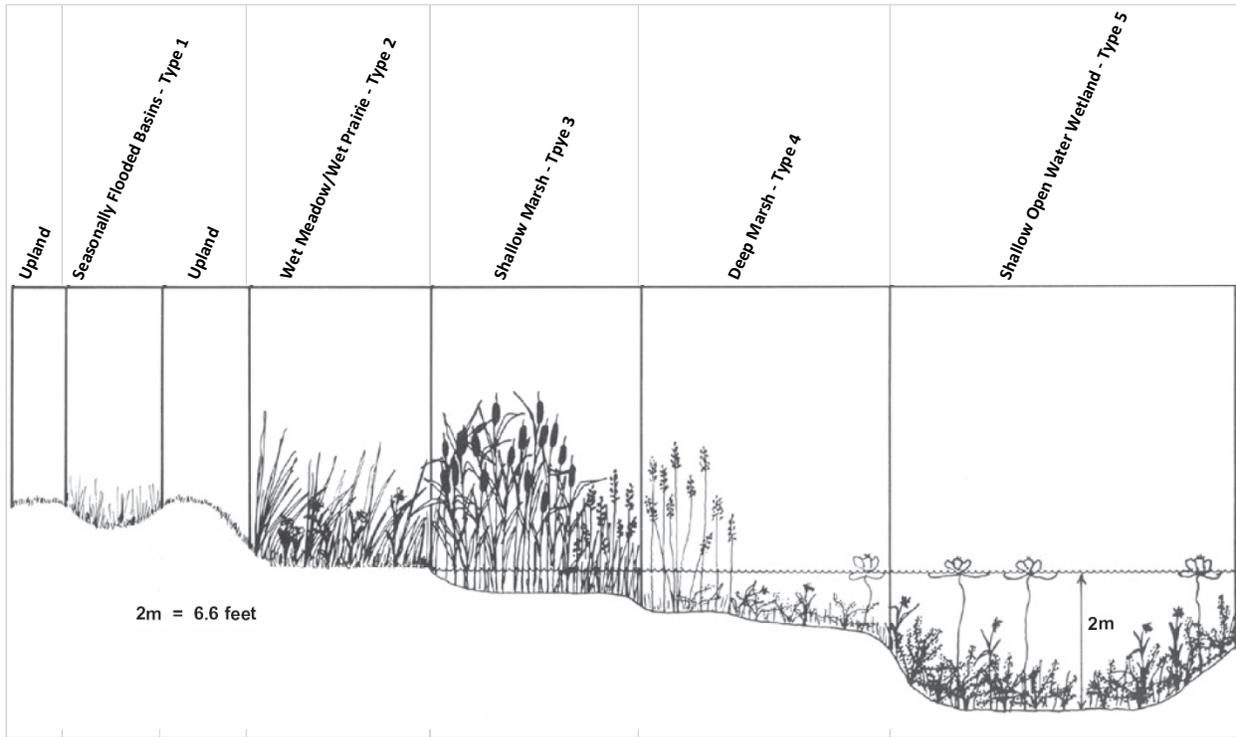


Table 3: Summary of Wetland Community Types

| Wetland Type - Community Descriptions | |
|---------------------------------------|---|
| Type 1 | |
| Seasonally Flooded Basins | |
| Soil/Hydrology: | Generally mineral soils, usually well-drained during much of the growing season but inundated or waterlogged during variable seasonal periods, especially in the spring |
| Vegetation: | Grasses, sedges, strong component of annual plants such as smartweeds, beggarticks and wild millet |
| Floodplain Forests | |
| Soil/Hydrology: | Generally mineral soils, usually well-drained during much of the growing season but inundated or waterlogged during variable seasonal periods, especially in the spring |
| Vegetation: | Flood-tolerant tree species such as silver maple, cottonwood, American elm; often sparse understory but includes jewelweed, clearweed, nettles |
| Type 2 | |
| Wet Meadow/Wet Prairie | |
| Soil/Hydrology: | Organic or mineral soil, saturated or nearly saturated during most of the growing season; usually without standing water |
| Vegetation: | Grasses, sedges, rushes, various broad-leaved plants |

| Wetland Type - Community Descriptions | |
|--|---|
| Type 3 | |
| Shallow Marsh | |
| | Soil/Hydrology: Organic or mineral soil, usually waterlogged early during growing season and often covered with six inches or more of water. |
| | Vegetation: Grasses; bulrush; spikerush; and various other marsh plants, such as cattail, arrowhead, pickerelweed, and smartweed |
| Type 4 | |
| Deep Marsh | |
| | Soil/Hydrology: Organic or mineral soil, inundated in most years with six inches to three feet or more of water during growing season |
| | Vegetation: Cattail, reed, bulrush, spikerush, and wild rice; open areas may have pondweed, naiad, coontail, watermilfoil, waterweed, duckweed, waterlily, and spatter |
| Type 5 | |
| Shallow Open Water Wetland | |
| | Soil/Hydrology: Organic or mineral soil, usually inundated with three to 10-foot-deep water |
| | Vegetation: Fringe of emergent and floating leaf vegetation similar to marshes; submergent vegetation such as pondweed, naiad, coontail, watermilfoil |
| Type 6 | |
| Shrub Swamp | |
| | Soil/Hydrology: Organic or mineral soil; water table is at or near the surface for most of the growing season and may be covered with as much as six inches of water |
| | Vegetation: Includes alder, willow, dogwood, and buttonbush |
| Modified from: Shaw, S. and C. G. Fredine (1971). <i>Wetlands of the United States</i>. Circular 39, US Dept. of the Interior. Fish and Wildlife Service. | |

The creation of a new distributary channel of Minnehaha creek stream as proposed in Alternative B is intended to follow the historic alignment of the creek and to recreate the historic delta conditions that existed west of Lake Hiawatha. An open channel is proposed to be constructed in the northwest quadrant of the site under both alternatives, although the two channel locations and lengths are different. In Alternative A, the open channel primarily serves a drainage function to help alleviate flooding while in Alternative B, it helps address flooding while also integrating with the proposed wetlands/floodplain. Channel length changes, due to modifications to Minnehaha Creek as part of the proposed changes, was used as a surrogate for evaluating stream functional lift. An important aspect of stream functional lift is reconnection of stream to its floodplain; this was not quantified in the analysis as grading plans were not developed as part of this assessment.

Existing tree counts were provided by the City and MPRB; these were revised based upon review of post-flood (2014) aerial photos. The post-flood aerial photos allowed for the tree counts to be adjusted to reflect current conditions and changes due to recent tree removals. Tree canopy coverage was calculated

using existing post-flood air photos. For Alternative B, the estimated number of trees were adjusted to reflect tree loss due to construction of the open channel and restoration of wetlands within the golf course area. As part of future cost estimating for the alternatives, a planning level tree replanting plan will be developed. A list of appropriate tree species was developed for the soil conditions expected under Alternative B. In all three scenarios the tree counts and canopy extent downstream of Lake Hiawatha do not change.

3.3 Existing Conditions

Under existing conditions, the Hiawatha Golf Course area is operated as an 18-hole golf course with several ponds/wetlands within the system. The results of the ecological/land cover analysis of the existing conditions show that turf grass is currently the largest land cover, covering 64% of the project area. Wetlands cover slightly over 33 acres under existing conditions; 21.9 acres of the current wetlands are Type 1 seasonally flooded areas composed of turf grasses that can be temporarily flooded during storm events. The 1,206 trees in project area have a tree canopy that covers about 30 acres. These estimates reflect the large numbers of trees that died/were removed due to the 2014 flooding.

Minnehaha Creek and Lake Hiawatha are separated from the golf course area (a mapped FEMA floodplain) by an earthen berm. This berm prevents direct connection between the creek and its historic floodplain during smaller storm events. However, at higher flows and during large events, the creek over tops the berms and can flood large areas of the golf course.

Figure 3 shows the existing ecological conditions in the Hiawatha Golf course site. Table 4 summarizes the areal extents and relative changes in ecological communities and components for existing conditions and proposed Alternatives A and B, further discussed below.

Table 4: Ecological Summary - Existing Conditions and Proposed Alternatives

| WETLANDS TYPE* (Acres) | Existing Conditions | Alternative A | Relative Change from Existing | Alternative B | Relative Change from Existing | Relative Change from Alternative A |
|--|---------------------|---------------|-------------------------------|---------------|-------------------------------|------------------------------------|
| Type 1 - Seasonally Flooded Basins | 21.9 | 8.0 | Decrease | 23.6 | Increase | Increase |
| Type 2 - Wet Meadows/Wet Prairie | 1.2 | 2.8 | Increase | 12.0 | Increase | Increase |
| Type 3 - Shallow Marsh | 5.1 | 0.5 | Decrease | 11.6 | Increase | Increase |
| Type 4 - Deep marsh | 3.5 | 1.2 | Decrease | 11.2 | Increase | Increase |
| Type 5 - Shallow Open Water Wetland | 0.0 | 2.1 | Increase | 5.2 | Increase | Increase |
| Type 6 - Shrub Swamp | 1.6 | 1.6 | No change | 1.6 | No change | No change |
| *Shaw, S. and C. G. Fredine (1971). <i>Wetlands of the United States</i> . Circular 39, US Dept. of the Interior. Fish and Wildlife Service. | | | | | | |
| LAND COVER (Acres) | Existing Conditions | Alternative A | Relative Change from Existing | Alternative B | Relative Change from Existing | Relative Change from Alternative A |
| Total Wetlands | 33.3 | 16.2 | Decrease | 65.3 | Increase | Increase |
| Developed ¹ | 1.8 | 2.2 | Increase | 4.0 | Increase | Increase |
| Herbaceous Vegetation (primarily turf grasses) | 93.0 | 84.4 | Decrease | 30.0 | Decrease | Decrease |
| Non-wetland Native Vegetation | 0.0 | 19.7 | Increase | 30.2 | Increase | Increase |
| Beach | 0.2 | 0.2 | No change | 0.2 | No change | No change |
| Tree Canopy | 30.1 | 30.1 | No change | 25.1 | Decrease | Decrease |
| Number of Trees | 1,206 | 1,189 | Decrease | 1,017 | Decrease | Decrease |
| WATER AREA | Existing Conditions | Alternative A | Relative Change from Existing | Alternative B | Relative Change from Existing | Relative Change from Alternative A |
| Lake Hiawatha (acres) | 52.8 | 52.8 | No change | 52.8 | No change | No change |
| Other Open Water (>6.5 feet, (Golf Course Ponds)) (acres) | 0.4 | 0.4 | No change | 2.2 | Increase | Increase |
| Channel Lengths and Areas | | | | | | |
| Minnehaha Creek Channel Lengths (45 ft wide) | | | | | | |
| Upstream of Lake Hiawatha (feet) | 1,928.5 | 1,928.5 | No change | 3,696.9 | Increase | Increase |
| (acres) | 1.7 | 1.7 | No change | 3.7 | Increase | Increase |
| Downstream of Lake Hiawatha (feet) | 2,209.5 | 2,209.5 | No change | 2,209.5 | No change | No change |
| (acres) | 2.0 | 2.0 | No change | 2.0 | No change | No change |
| Open Channel (feet) | 0.0 | 2,153.9 | Increase | 594.2 | Increase | Decrease |
| (acres) | 0.0 | 2.3 | Increase | 0.6 | Increase | Decrease |

1 – Although specific locations of proposed additional developed areas for Alternatives A & B (e.g. new parking lots, facilities) have not specifically been sited and are not show on associated figures, the estimates for the developed areas for Alternatives A & B are reflected in the table above based on the estimated additional facility and parking lot footprints.

3.4 Proposed Conditions

3.4.1 Alternative A

Alternative A results in slight changes of ecological conditions over existing conditions as the 18-hole golf course and continuation of the existing pumping rates. The open channel along the northern and eastern edge of the golf course will help alleviate flooding in the watershed to the north (and overflows into the golf course), reducing the estimated acres of seasonally flooded basins (Type 1 wetlands), while also decreasing the total acres of wetlands. Select areas were targeted for native plan restoration based on a revised golf course layout provided by MPRB staff.

The results of the ecological/land cover analysis of the existing conditions show that turf grass remains the largest land cover, covering 46.6% of the project area. Changes in ecological conditions under Alternative A arise primarily from changes in water levels and decreased areas of prolonged soil saturation adjacent to existing wetlands, as well as additional plantings of native vegetation within some of the out of play areas and roughs. Alternative A assumes that water levels may rise to 811.6 MSL once every 10 years, based on the peak elevations estimated by the surface water modeling from the local watershed runoff for the 10-year design storm event. The areal extents of Type 2 wetlands expands, but the total increase in Type 2 wetlands is less than two acres (1.6 acres). Wetlands cover just over 16 acres of the site under Alternative A conditions. Only 8.0 acres of the wetlands are Type 1 (seasonally flooded areas) which, similar to existing conditions, would primarily be composed of temporarily flooded turf grasses. Wetland function under Alternative A would not be appreciably different than what is currently found on the site. Unless the wet turf areas were converted to native vegetation, their ecological value would be limited.

It is estimated that approximately 17 trees would be lost in the construction of the open channel. The 1,189 trees in the project area and would have a tree canopy cover about 30 acres.

There are no projected changes in Minnehaha Creek function as the current configuration and berms would remain in-place, keeping the floodplain disconnected from the creek during most events.

Figure 4 shows the estimated ecological conditions in the Hiawatha Golf course project area for Alternative A, and Table 4, above, summarizes the ecological factors for Alternative A.

3.4.2 Alternative B

The ecological evaluation for Alternative B developed assumption for the analysis based on public input compiled for the Nokomis-Hiawatha Regional Park Master Plan and the April 20, 2017 public meeting conducted as part of this project. The input from these efforts included:

- Water quality a high concern for park users
 - Stormwater treatment areas/wetlands

- Preference for a naturalized style of landscaping (less mowed turf) – in strategic locations (50% naturalized/wildlife habitat, 50% turf)
- Increasing recreation opportunities for birding/nature observations
- Ecological Restoration of intermittently inundated wetland area and wet meadows/prairie

Additionally, for Alternative B, we have assumed a 50 foot (minimum) wetland buffer would be established around the wetland edges to align with the MCWD buffer rules.

The reduced pumping alternative proposed in Alternative B, along with the realignment of a new channel for Minnehaha Creek through the golf course area, and the development of wetlands and open water with a direct gravity connection to Lake Hiawatha, will likely result changes in the recreational use of the park area and greatly increase ecological diversity and functionality. These hydrologic reconnection raises the normal water level for this area to 812.8 MSL, which is ultimately controlled by flows in Minnehaha Creek and water levels in Lake Hiawatha. This, along seasonal flooding from the lake and creek will greatly increase the area where hydrologic conditions will be conducive to the development and persistence of wetland plant communities. The open water areas will be composed of the wetland areas greater than 6.6' (78") deep, open channels and creek and Lake Hiawatha, which while not being considered wetlands will have improved ecological value over the existing conditions..

The results of the ecological/land cover analysis of Alternative B show that turf grass would not be the predominant land cover, covering only 16% of the site. Changes in ecological conditions under Alternative B arising from changes in water levels increases wetlands cover to 65.3 acres. Under Alternative B conditions; 23.6 acres of the wetlands are expected to be Type 1 (seasonally flooded areas) which would likely be managed as wet prairie/wet meadow communities rather than the flooded turf grasses under both existing conditions and Alternative A. Wetland function would be appreciably different than what is currently found on the site; the increase in saturated soils areas around the existing wetlands would increase wetland quality and function once converted to native vegetation. In Alternative B, all of the wetland areas would be surrounded by a 50-foot wide buffer on the upland edge of the wetland. The wetland buffer would be planted into a native plant community appropriate to the soil moisture and shade conditions present along the buffer length. Under the conditions proposed in Alternative B, approximately half of the project area would become native vegetation within the upland and wetland plant communities.

It is estimated that for Alternative B, there would be 1,017 trees in the project area and would have tree canopy cover about 25 acres. Approximately 189 trees would be lost in Alternative B. This reduction in tree numbers and canopy would be due to flooded soil condition in and around the expanded wetlands, as well as losses due to construction of the open channel and the new Minnehaha Creek channel.

Alternative B provides for greater stream functionality and floodplain connectivity, larger areas of wetlands with greater interspersions of wetland types, wetland buffers and native upland plantings. Much

of this change is due to changes in seasonal water levels once the site is reconnected to the lake and creek. The creation of a second channel on Minnehaha Creek recreates the delta distributary functions to the creek – reconnection to the floodplain, water inputs into the wetlands that provides for treatment, and increased channel length leads to greater stream diversity (functional lift). The open channel from the north also discharges into the large wetland complex that is created, providing further water quality treatment benefits.

Figure 5 shows the estimated ecological conditions in the Hiawatha Golf course project area for Alternative B, and Table 4 summarizes the ecological factors for Alternative B.

3.4.2.1 Ecological Restoration Expectations

Should the MPRB select to pursue Alternative B, it is important to consider the following when setting expectation for a successful restoration project.

Stressed and fragmented urban wetlands generally have lower species diversity (for example, the Lake Nokomis stormwater wetlands average about 20 species) and high numbers of weedy/invasive species; whereas natural and restored wetlands in areas within a matrix of native plant communities can have 90 – 130 species. This number of species could be present within 4 to 5 years after establishment of wetland hydrology in some cases. In many cases this high species diversity is due a release of the existing seed bank from earlier wetland conditions rather than any seeding or planting. In rural, agricultural settings it is more common to find 30 – 40 species following establishment, with most species be derived from seeding of the site.

Potential species colonization from the seedbank can be evaluated by completing seedbank studies. A seedbank study could be completed to evaluate potential recruitment of native and problem species from the existing seed bank at the Hiawatha Golf Course site. Weedy and invasive species will also arrive from off-site sources via Minnehaha Creek and stormwater runoff, as well wind-blown seed sources from adjoining urban land uses.

Management approaches in all wetland restorations are highly dependent upon an integrated pest management (IPM) approach, which is even more critical in urban settings. IPM methods should be based upon the adaptive vegetation management plan (AMP) developed for the site. The AMP would define performance standards, specify responses to deficiencies in planting success and identify management approaches. The AMP is a science-based approach to management that reflects the site conditions, proposed plant communities and available management methods.

MPRB policy defines Integrated Pest Management (IPM) as a pest management strategy that focuses on long-term prevention or suppression of pest problems with minimum impact on human health, the environment, and non-target organisms. A number of concepts are vital to the development of the MPRB IPM policy goal:

- 1) Integrated pest management is not a predetermined set of practices, but a gradual stepwise process for improving pest management.
- 2) Integrated pest management programs use a combination of approaches, incorporating the judicious application of ecological principles, management techniques, cultural and biological controls, and chemical methods to keep pests below levels where they cause economic damage.
- 3) Implementing an integrated pest management program requires a thorough understanding of pests, their life histories, their environmental requirements and natural enemies, as well as establishment of a regular, systematic program for surveying pests, their damage and/or other evidence of their presence. When treatments are necessary, the least toxic and most target specific plant protectants are chosen (MPRB 2008).

Adaptive management is defined as management decision making based upon project specific monitoring. Adaptive management requires that prior to implementation of a restoration, project goals, performance standards and monitoring methods be fully defined and documented in the AMP. Site monitoring provides the information needed to make science-based management decisions; the AMP is continually evaluated and adjusted based upon the management outcomes. Management considerations will be critical to long-term plant community viability and will be based upon the MPRB IPM Policy.

Invasive species can become dominant and greatly reduce species diversity in restored and/or existing native plant communities, to the point that large monotypic stands can form and preclude most other plant species. Highest priority is best reserved for the control or removal of those species which pose the greatest threats. These include invasive plant species that are particularly mobile and pose an ecological threat (SER 2004). Many invasive species can alter the soil microbial activity and prevent regeneration or establishment of native species. The potential control methods available diminish, in terms of both the number of alternative methods and their effectiveness, the longer invasive plants are present. Failure to control problems species early will ultimately require greater use of herbicides; initial control of small infestations may require limited spot sprays, but as these infestations grow in size control may no longer be possible without damage to adjacent native and desirable plants. A large number of problematic wetland invasive species cannot be effectively controlled without the selective use of herbicides.

Each of the proposed wetland and upland buffer communities will present unique management considerations; as such planning, establishment and long-term management needs to be designed for each of the native plant community types. Native plant community management can be targeted to specific time periods, making the overall management effort less than traditional manicured landscapes. Monitoring is the basis of all good management decisions; without a disciplined monitoring program and timely, fully funded management measures even the best written adaptive management plan will fail. The Type 1 and Type 2 wetland areas will be most easily established and maintained as wet prairies. Management methods for these communities is currently in the MPRB natural area management

expertise. The shallow marsh (Type 3), shrub swamp (Type 6 within the Type 3 wetlands), deep marsh (Type 4) and shallow open water wetlands (Type 5) will require maintenance activities similar to what are currently used for stormwater wetlands and lake shore areas. The Type 3 – 5 wetlands are best managed using qualified contractors due to the need for specialized equipment and applicator certifications requirements.

Vegetation maintenance for all these communities, once established, will need to be funded annually within the MPRB budget. During the initial establishment period, funding for management/maintenance should be considered part of the project implementation budget for at least years 1 – 5. Thereafter, continuous management is required whether contractually or by MPRB forces. A site specific plan would need to be developed based on the final design; however, the following outlines typical establishment, management, and maintenance activities for a full ecological restoration:

Proposed construction/establishment period (contractual) management:

Year 1 – 3 Hydrology restoration and grading (keep site offline from flood pulses for years 1 – 3)

- Pre-seeding preparation – invasive species control, prescribed burning soil prep
- Seed/plugs depending upon community type
- Intensive vegetation monitoring
 - Limited spot sprays for weeds and invasive species
- Prescribed burns (year 3)
 - Reseed as needed

Year 3 – 5 Intensive vegetation management and monitoring

- Vegetation monitoring
 - Limited spot sprays for weeds and invasive species
- Prescribed burns (3 -5 year cycle)
 - Reseed as needed

Proposed post-construction/establishment period (contractual) management:

Year 6 – 10 Vegetation monitoring and management based upon AMP

- Vegetation monitoring
 - Limited spot sprays for weeds and invasive species
- Prescribed burns
 - Reseed as needed
- Evaluate need for AMP revisions

Long-term management of vegetation (either contractual or MPRB)

Year 11 - 25 Vegetation monitoring and management based upon AMP

- Vegetation monitoring
 - Limited spot sprays for weeds and invasive species
- Prescribed burns and reseed as needed
- Evaluate need for AMP revisions

As the site will be hydraulically connected to Minnehaha Creek and Lake Hiawatha, consideration of management measures (whether physical or operational) for common carp should be included in the project design and AMP preparation as well.

3.4.2.2 Potential Reforestation

Under Alternative B extensive reforestation could also be undertaken. The reforestation of the site would be targeted at three forest communities based upon the soil saturation period, elevation, aspect and flooding frequency:

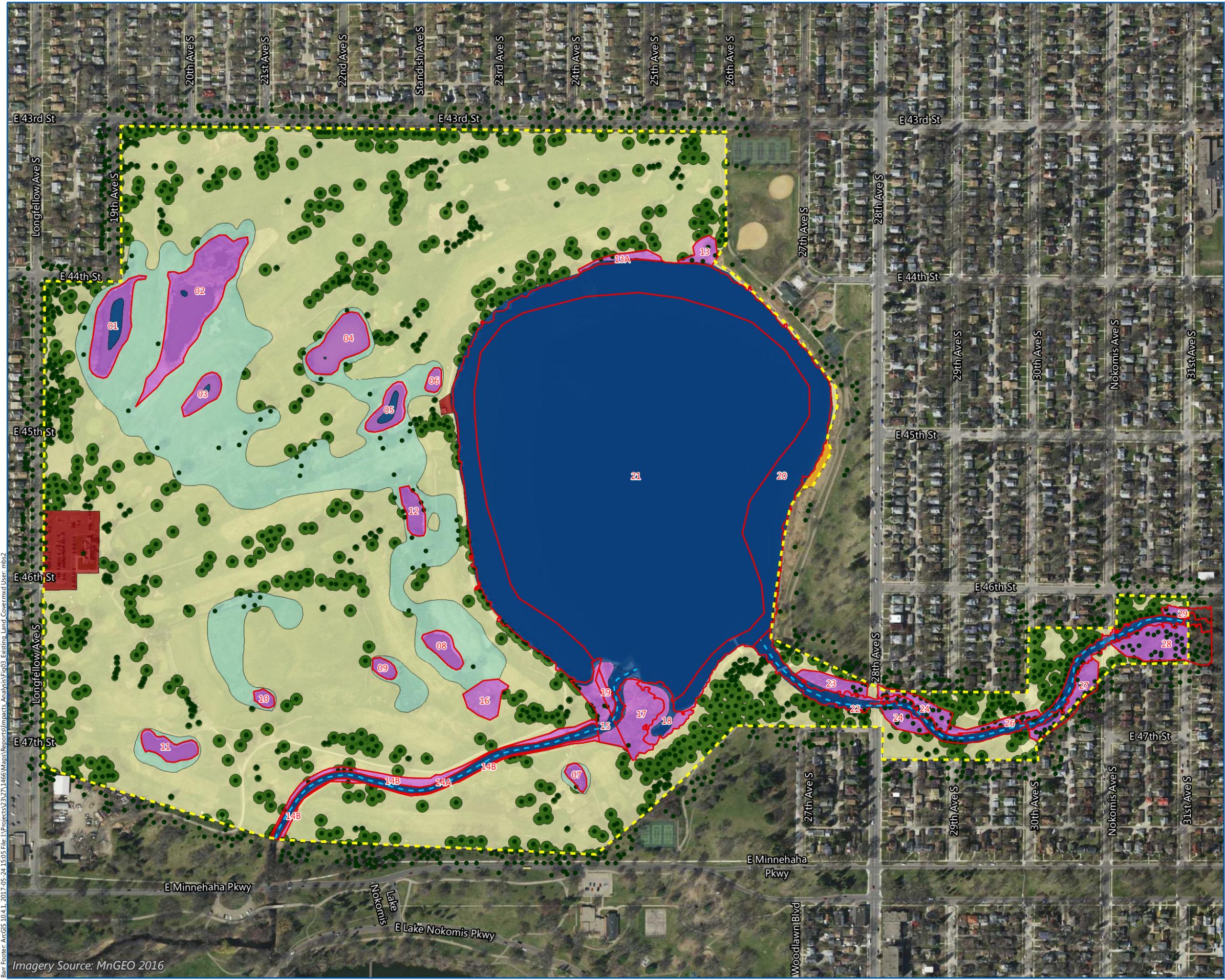
- Floodplain Forest in the intermittently flooded areas adjacent to the wetland edges (typically flooded about one out of ten years);
- Floodplain Terrace Forest in areas of saturated soils that are flooded about one out of every 20 years, mostly within the wetland buffer areas; and
- Mesic Forest in the upland soils that never flood, or very rarely (Once in a 100 years) on sites upland of the buffer area.

Planting densities for these three forests would be varied based upon site micro-topography, with a target of 180 trees per acre in areas targeted for reforestation. Potential species for these three forest communities will have some overlap due to the gradient in moisture and elevation of the site. Table 5 summarizes tree species that area appropriate for the potential reforestation of the Hiawatha Golf Course area for Alternative B.

To: Michael Schroeder, MPRB & Katrina Kessler, City of Minneapolis
From: Jennifer Koehler, PE & Kurt Leuthold, PE
Subject: Hiawatha Golf Course Area – Impact Assessment Memo
Date: 7/14/2017
Page: 21

Table 5: Potential Trees and Shrubs for Reforestation of the Hiawatha Golf Course Area for Alternative B

| Floodplain Forest | Floodplain Terrace Forest | Mesic Forest |
|---|---|--|
| Trees | Trees | Trees |
| Silver maple (<i>Acer saccharum</i>) | Swamp white oak (<i>Quercus bicolor</i>) | Basswood (<i>Tilia americana</i>) |
| Black willow (<i>Salix nigra</i>) | Hackberry (<i>Celtis occidentalis</i>) | American elm (<i>Ulmus americana</i>) |
| Eastern Cottonwood (<i>Populus deltoides</i>) | Basswood (<i>Tilia americana</i>) | Sugar maple (<i>Acer saccharum</i>) |
| Pin oak (<i>Quercus palustris</i>) | Eastern Cottonwood (<i>Populus deltoides</i>) | Hackberry (<i>Celtis occidentalis</i>) |
| Sycamore (<i>Plantus occidentalis</i>) | Pin oak (<i>Quercus palustris</i>) | Bur oak (<i>Quercus marcoparpa</i>) |
| River birch (<i>Betula nigra</i>) | Slippery elm (<i>Ulmus rubra</i>) | White oak (<i>Quercus alba</i>) |
| Bald cypress (<i>Taxodium distichum</i>) | Silver maple (<i>Acer saccharum</i>) | Kentucky coffeetree (<i>Gymnocladus dioicus</i>) |
| | Bur oak (<i>Quercus marcoparpa</i>) | Bitternut hickory (<i>Carya cordiformis</i>) |
| | Bald cypress (<i>Taxodium distichum</i>) | Black walnut (<i>Juglans nigra</i>) |
| Shrubs | Shrubs | Shrubs |
| Buttonbush (<i>Cephalanthus occidentalis</i>) | Alder (<i>Alnus sp.</i>) | Chokecherry (<i>Prunus virginiana</i>) |
| Alder (<i>Alnus sp.</i>) | Willow (<i>Salix sp.</i>) | Gooseberry (<i>Ribes sp.</i>) |
| Willow (<i>Salix sp.</i>) | Dogwood (<i>Cornus sp.</i>) | Pagoda dogwood (<i>Cornus alternifolia</i>) |



- Approximate Existing Tree Location
- Minnehaha Creek Centerline
- Wetland Boundary*
- Alternative Assessment Boundary

Existing Land Cover

Upland Areas

- Turf Grass
- Deep Water Habitat/ Channel Open Water
- Tree Canopy
- Developed
- Beach

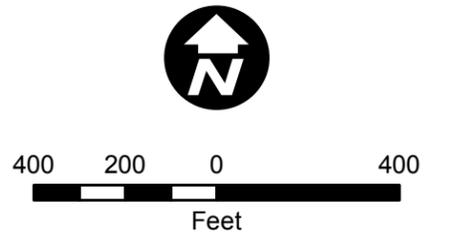
Wetland Areas

- Wetland (Kjølhaug & NWI)*
- Type 1/Seasonally Flooded Basin

Notes:

* Wetland boundary based on field survey and Updated National Wetland Inventory

** Lake Hiawatha and Minnehaha Creek assumed to be open water.



EXISTING LAND COVER
 Lake Hiawatha Golf Course
 Minneapolis Park and Recreation Board
 Minneapolis, Minnesota
FIGURE 3

Barr Footer: ArcGIS 10.4.1, 2017-05-24 15:05 File: I:\Projects\2372\1466\Maps\Reports\Impacts_Analysis\Fig03_Existing_Land_Cover.mxd User: mbs2
 Imagery Source: MnGEO 2016



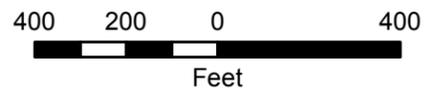
- Approximate Existing Tree Location
- Tree Lost Under Alternative A
- Minnehaha Creek Centerline
- Storm Sewer Open Channel
- Alternative Assessment Boundary

- Alternative A Land Cover**
- Upland Areas**
- Turf Grass
 - Native Vegetation
 - Deep Water Habitat/ Channel Open Water
 - Tree Canopy
 - Developed
 - Beach
- Wetland Areas**
- Type 1/Seasonally Flooded Basin
 - Type 2
 - Type 3
 - Type 4
 - Type 5
 - Baseline Wetland (Kjolhaug & NWI)**

Notes:

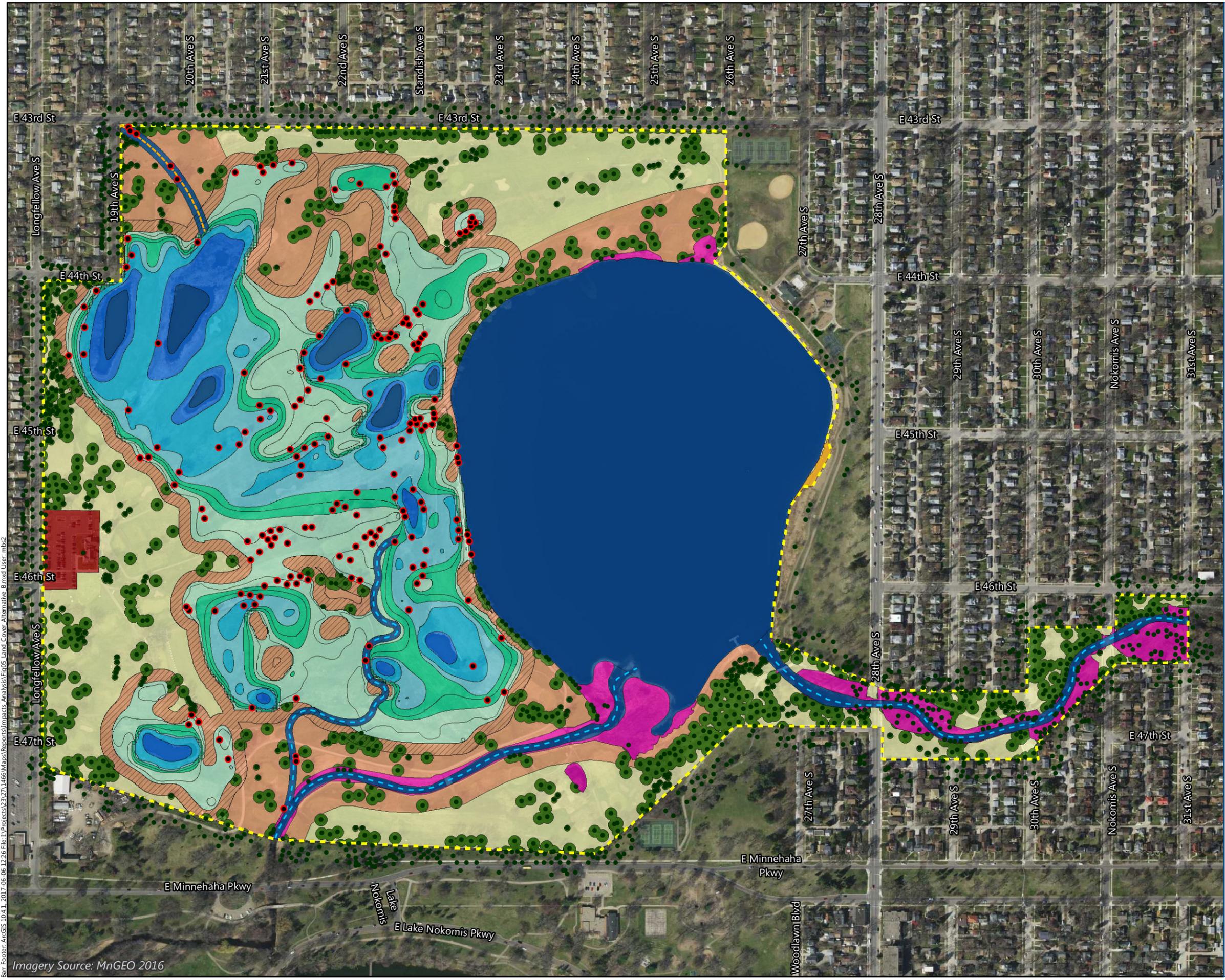
* Lake Hiawatha, Minnehaha Creek and open storm sewer channel assumed to be open water.

** Wetland boundary based on field survey and Updated National Wetland Inventory



ALTERNATIVE A LAND COVER
 Lake Hiawatha Golf Course
 Minneapolis Park and Recreation Board
 Minneapolis, Minnesota
 FIGURE 4

Barr Footer: ArcGIS 10.4.1, 2017-06-05 15:11 File: I:\Projects\23727\1466\Map\Reports\Impacts Analysis\Fig04_Land_Cover_Alternative_A.mxd User: mbs2
 Imagery Source: MnGEO 2016

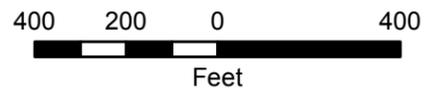


- Approximate Existing Tree Location
 - Tree Lost Under Alternative B
 - Minnehaha Creek Centerline
 - Storm Sewer Open Channel
 - Alternative Assessment Boundary
 - 50 Foot Wetland Buffer (Natives)
- Alternative B Land Cover**
- Upland Areas**
- Turf Grass
 - Native Vegetation
 - Deep Water Habitat/ Channel Open Water
 - Tree Canopy
 - Developed
 - Beach
- Wetland Areas**
- Type 1/Seasonally Flooded Basin
 - Type 2
 - Type 3
 - Type 4
 - Type 5
 - Baseline Wetland (Kjolhaug & NWI)**

Notes:

* Wetland boundary based on field survey and Updated National Wetland Inventory

** Lake Hiawatha and Minnehaha Creek assumed to be open water.



ALTERNATIVE B LAND COVER
 Lake Hiawatha Golf Course
 Minneapolis Park and Recreation Board
 Minneapolis, Minnesota
 FIGURE 5

Barr Footer: ArcGIS 10.4.1, 2017-06-06 12:26 File: I:\Projects\23727\466\Map\Reports\Impacts Analysis\Fig05_Land_Cover_Alternative B.mxd User: mbs2

Imagery Source: MnGEO 2016

4.0 Recreation & Economic Concepts

This section outlines the process used to define the recreation concepts and implications of both Alternatives A and B. As recreation concepts were considered, it is important to take note that the MPRB operates and maintains the park system through several different funds. Although the majority of the park system is operated through the general fund and capital project funding, the MPRB also operates revenue-generating facilities (that operate like a business) through its enterprise operating fund. The MPRB also has a special revenue fund that can be a mix of funding types from a variety of sources, and is typically the fund where large capital investments come from. Examples of MPRB system features that are part of the enterprise operating fund, operate as a business, and generate revenue for the MPRB include: concessions (such as Sea Salt, Sand Castle, Tin Fish, and Bread & Pickle), bike, canoe, and kayak rentals, facility rentals (e.g. buildings, pavilions, ice arena), parking, and operations of the MPRB golf courses, including Hiawatha Golf Course.

The MPRB Comprehensive Master Plan and 2017 annual budget outlines the goal that “financially independent and sustainable parks prosper,” and the MPRB annual budget continues to focus on sustainable funding of the parks system while meeting the needs of the individuals, families, and communities.

The following summarizes the approach to defining the two recreation concepts for Alternatives A and B, including identifying both recreation and enterprise features.

4.1 Process

The MPRB and City staff recognize that decision related to water management could result in significant changes to the Hiawatha Golf Course area. As such, it was important to MPRB and City staff to gather input from the general public as it related to Alternative B (the reduced pumping alternative) and consider the preferred recreation types and values presented by the public at these meetings to inform the recreational concept considered for the alternatives assessment. Additionally, the MPRB staff also considered themes and concepts identified in the Nokomis-Hiawatha Regional Park Master Plan.

As previously mentioned, a variety of MPRB staff from several departments were involved in the discussions surrounding and development of the recreation concepts for the two alternatives and provided a variety of perspectives, insight, and information to inform the discussion. City staff were also involved in several discussions.

Because the Hiawatha Golf Course operates as an enterprise feature and generates revenue for the MPRB system, the goal for Alternative B was to identify a concept that would incorporate both the recreation types identified by the public and complementary enterprise features that would generate the same (or more) net revenue as the existing golf course. Demographic information, existing data from the MPRB

system and comparable data from other park systems and facilities were considered to estimate potential revenues.

4.2 Demographics

The following is a summary of recent demographic information for the area surrounding the Hiawatha Golf Course area and the Nokomis-Hiawatha Regional Park. The demographics of the area surrounding the Nokomis-Hiawatha Regional Park were compared to the demographics of the seven-county metro area to provide insight into programming and enterprise options for the park. Additionally, the Nokomis-Hiawatha Regional Park Master Plan indicated that the baby boomers are retiring and leaving the neighborhood and young families of greater ethnic and racial diversity are moving in.

The **total population** of the seventeen neighborhoods surrounding the Nokomis-Hiawatha Regional Park (see Figure 6) is 75,089 compared with 2,952,114 in the metro area.

Compared to the seven-county metropolitan area:

- The **population** is concentrated in the 18-64 year age group (68% for the neighborhoods vs. 64% for the metro area, with 2% of the difference in the 17 and younger age group, and 2% of the difference in the 65+ age category).
- The **population of color** in the neighborhoods is 29% of the total population, compared to 25% for the metro area
 - The Hispanic or Latino population is more concentrated in the area neighborhoods at 12% compared with 6% for the metropolitan area
 - The Asian or Pacific Islander population is less represented in area neighborhoods at 2% compared with 7% in the metro area
- The **median household income** for the neighborhoods is \$66,570 compared with \$68,873 for the seven county metro.
- **Home-ownership** is higher in the area neighborhoods, 72% compared with 68% metro-wide. Renters represent the balance, 28% in the neighborhoods compared to 32% metro-side.
- The **housing stock** is generally older than the metro area, with a concentration of homes valued at less than \$250,000 (Excensus 2010). Much of the park surrounded by single-family residential.
- **Cost-burdened households** are more concentrated in the neighborhoods (31.8%) compared to the metro (30.5%).
- **Educational attainment** in the neighborhood is higher than the region as a whole; 49% of area residents have a Bachelor's degree or higher, compared with 42% regionally.
- **Public transportation** is used by twice as many people in the neighborhoods 10.7%, compared with residents of the seven-county metro area 5.3%
- The percent of the population that **walked, biked to work, worked at home** or other was nearly 13% in the Nokomis-Hiawatha neighborhoods, compared with 9% regionally
- Other population characteristics are similar to the metropolitan area as a whole.

The economic characteristics for City of Minneapolis neighborhoods that are likely to be more frequent users of the site were considered (Table 6). Neighborhood characteristics surrounding Nokomis-Hiawatha (Figure 6) were compared to neighborhoods around Lake Calhoun-Lake Harriet (Figure 7) where MPRB currently has a two enterprise facilities. Review of the economic performance of enterprise facilities like Tin Fish (Calhoun), Bread and Pickle (Harriet) and SandCastle (Nokomis), in the context of neighborhood demographics is useful in developing revenue assumptions.

In summary, the population 18 years and younger is greater in Hiawatha; there are more owner-occupied homes with most valued at \$250,000 or less. Housing values and incomes are higher in the Calhoun-Harriet neighborhoods. The percent of renters burdened by the cost of housing is significantly higher in Hiawatha. A comparison of neighborhood economic characteristics near some of the MPRB enterprise facilities are summarized in Table 6.

Figure 6: Nokomis-Hiawatha Area Neighborhoods

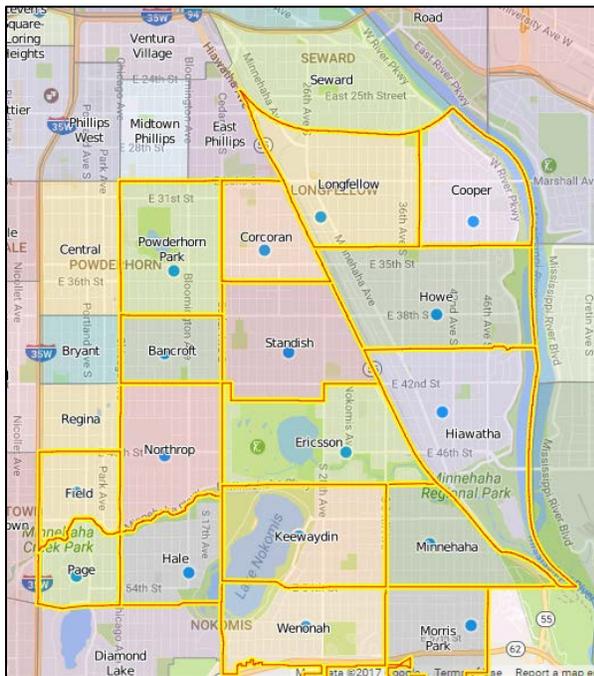


Figure 7: Calhoun-Harriet Area Neighborhoods

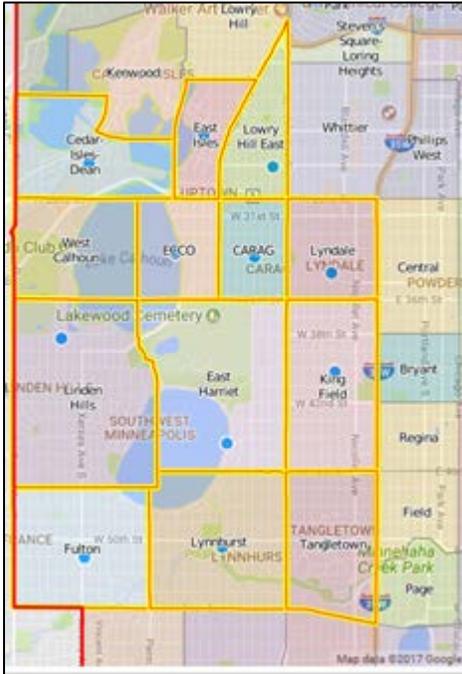


Table 6: Comparison of Economic Characteristics of Minneapolis Neighborhoods near MPRB Enterprise Facilities

| | Nokomis-Hiawatha | Calhoun-Harriet |
|---|------------------|-----------------|
| Total Population (2015 ACS) | 75,089 | 66,303 |
| <18 years old (%) | 22.0% | 17.3% |
| <18 years old | 16,490 | 11,502 |
| Median Household Income (2015) | \$66,570 | \$78,081 |
| % Below Poverty | 11.0% | 9.2% |
| Owner-Occupied Housing | 72.2% | 49.3% |
| Renter Occupied Housing | 27.8% | 50.7% |
| Assessed Value, Single Family Housing Units (2010) | | |
| \$250,000 or less | 85.1% | 21.8% |
| \$250,000 to \$299,999 | 7.3% | 18.2% |
| \$300,000+ | 7.6% | 60.0% |
| Cost-Burdened Owner Households | 24.6% | 24.4% |
| Cost-Burdened Rental Households | 50.2% | 33.8% |

4.3 Recreational Uses

The following sections outline the recreation concepts for Alternatives A and B for the Hiawatha Golf Course area. These concepts were developed based on input from MPRB and City staff and also considered public input collected during the development of the Nokomis-Hiawatha Regional Park Master Plan and during the public meetings held as part of this project.

4.3.1 Existing Park Use and Information Profile

4.3.1.1 Nokomis-Hiawatha Regional Park Master Plan

The Nokomis-Hiawatha Regional Park is one of the most visited parks in the MPRB system, with an estimated 1.5 million visitors per year. 75 percent of the park visitors used the larger regional park for walking/running, biking, beach, and picnicking. Modest growth is expected for the larger park due to influx of young families into the neighborhood.

4.3.1.2 MPRB Golf Course Trends

Similar to other public and private courses in Minnesota and around the nation, MPRB courses have experienced a decline in number of rounds played and net revenue from golf over the past 20 years. This is a trend that is expected by the industry to continue. In the face of declining revenue and stable or increasing expenses, other communities have scaled back; for example, Edina Parks and Recreation recently downsized from 45 holes to 27 holes. Figures 8 and 9 below summarize the total rounds of golf played and net revenue for all MPRB golf courses from 1997 – 2016.



Figure 8: Total Annual Rounds of Golf for All MPRB Golf Courses

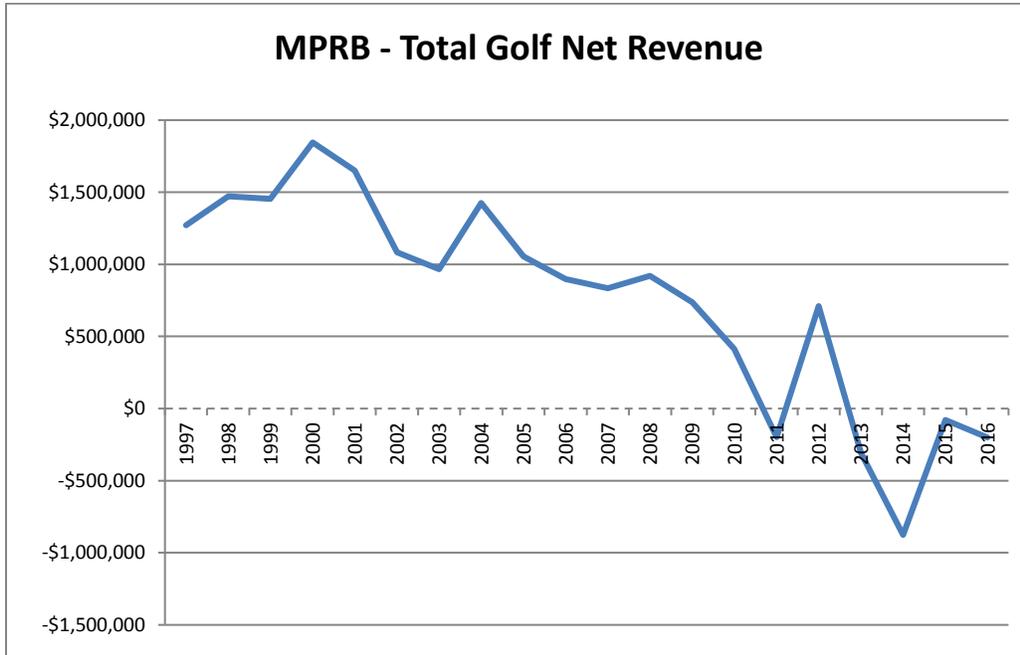


Figure 9: Total Net Revenue for All MPRB Golf Courses

4.3.1.3 Hiawatha Golf Course

Hiawatha Golf Course was originally constructed by the MPRB in 1929/1930 with the dredging of Rice Lake (Lake Hiawatha). The golf course was finally playable in 1934, opening with the first nine holes. The golf course has been operating as an 18-hole golf course since 1935. Historic data for Hiawatha Golf Course for the past 20-years reveals that the annual number of rounds of golf played has ranged from a high of 55,000 rounds played in 2001 to a low of 14,000 rounds in 2014 when the course was flooded. The annual average rounds played per year for the twenty year period 1997-2016 is 40,800; however in the most recent six years impacted by flooding and wet conditions as well as changes in the market, the average was 23,800 rounds per year. Additionally, the MPRB system-wide golf study completed in 2014 indicated that with an average of 31,700 rounds per year (considering years 2010-2013), Hiawatha Golf Course is operating at 47% of its practical capacity. This study also estimated 3.9 rounds per user per year for the golf course.

The 20-year data record provided by the MPRB provides insight into the total costs and revenues for the operation of the Hiawatha Golf Course as well as the net revenue. The average annual net revenue for twenty year period is \$120,000; however this includes the past 6 years which were impacted by wet conditions, flooding and recovery, resulting in a reduction in the number of holes available for play. The average net revenue for the golf course for the period prior to wet and flooded conditions was \$250,000

per year, while the average net revenue for the 6 years impacted by the wet conditions was a loss of \$180,000 per year.

Net revenue is returned to the MPRB enterprise fund to support longer term capital and maintenance costs associated with the MPRB golf courses. MPRB is in the process of making substantial investments in upgrading those facilities.

Based on the rounds data provided by the MPRB, the average rounds in recent years ranged from 20,000 to 40,000. The majority of MPRB golf course users are white males in the age range from 35 to 65+; however, the Hiawatha Golf Course also supports the local youth golf program, The First Tee of the Twin Cities, which serves ~300+ kids in Minneapolis and the surrounding metro area. The Hiawatha golf course is also used by the golf teams from three local high schools.

In the winter, the golf course area is used for walking and cross-country skiing, though the MPRB does not have specific counts on the number of winter visits/users.

Hiawatha Golf Clubhouse operates year round for both golf operations (March thru November) and cross country ski operations during the winter months (December thru February). The maximum capacity in the clubhouse standing is 348 and sitting is 145. The clubhouse kitchen, which is currently being remodeled, has not been used for food service since November 2015, when it was closed due to code violations. The facility currently has limited food (packaged items only) and bar (licensed to sell 3.2% beer) services. There is not a neighborhood draw to the clubhouse facility and the primary users of the current clubhouse are golfers.

The number of full-time employees (FTE) dedicated to the Hiawatha Golf Course has ranged from 1.1 FTE to 4.2 FTE, with an average of 2.5 FTE.

4.3.2 Proposed Park Use and Information Profile

The following sections layout the proposed recreation and enterprise concepts for Alternative A and B, including the estimated number of park visits.

Table 7 below summarizes the estimated recreation impacts for Alternatives A and B.

Table 7: Comparative Table Summarizing Recreation Impacts for Alternative A & B

| Metric | Alternative A | Alternative B |
|-----------------------------------|-------------------|-----------------------------|
| Park Area (ac) | 146 | 146 |
| Average Annual Park Visits | 211,000 | 525,000 |
| Length of Trails (Miles) | 2.6 (winter-only) | 3.5 (multiuse, multiseason) |

Table 8 below summarizes the approximate facility sizes and capacities for the Alternatives A and B.

Table 8: Comparative Table Summarizing Enterprise-Related Features for Alternative A & B

| Metric | | Alternative A | Alternative B |
|---|---------------------------------|---------------|--|
| Golf Course (18-hole) | Facility Size (ac) | 146 | N/A |
| | Facility Capacity | 100 | N/A |
| Clubhouse Area Improvements including Banquet Facility | Facility Size (SF) ¹ | 12,000 | 12,000 |
| | Facility Capacity | 450 | 450 |
| Flexible Interior Space for Events and Gatherings | Facility Size (SF) | 3,000 | 3,000 |
| | Facility Capacity | 150 | 150 |
| Picnic Pavilions (3 Smaller & 1 Large Reservable) | Facility Size (SF) | N/A | 3,600 |
| | Facility Capacity | N/A | 174 |
| Festival Grounds | Facility Size (acre) | N/A | 3.0 |
| | Facility Capacity | N/A | 1300 |
| Canoe Rentals/Storage Racks | Facility Number (# of racks) | N/A | Canoe/kayak rental & 6 private storage racks |

1 – Includes estimated indoor and outdoor space

4.3.2.1 Nokomis-Hiawatha Regional Park Master Plan

Although the Nokomis-Hiawatha Regional Park Master Plan and the public input process did not specifically include the Hiawatha Golf Course area, there were key messages from the master plan that were considered as part of this process, including:

- Consciousness about health and fitness is an increasing trend, with increases in activities like biking, walking, running, and yoga. Use of urban recreational trails is expected to increase and a full trail connection around the golf course/Lake Hiawatha is desired.
- Conventional/organized sports are anticipating flat to modest growth.
- There is an increasing trend in nontraditional sports (skateboarding, rock climbing, rugby, lacrosse, ultimate, disc golf, pickle ball) and users expressed interested in improvements related to skateboarding, and pickle ball. The public also expressed interest in nature and wildlife-oriented activities, such as birding, fishing, and wildlife viewing.
- Other recreation concepts that were included in the master plan included expansion of cross country skiing on the golf course (in winter), increasing opportunities for birding and nature observations, more walking/biking/running trails, dog park, skate park, disc golf, and ADA accessible equipment, and more restrooms.

- There is growing demand for more social gathering places and event spaces in the regional park. The plan identified maintaining the existing picnic areas and adding picnic shelters in the park area around Lake Hiawatha.
- The plan identified adding a designated canoe/kayak launch and storage racks near the Lake Hiawatha shore.

Additionally, the master plan indicates that based on recent data, the regional park visits have grown by 4.9% per year.

4.3.2.2 Public Input

For this project, Public Meeting #2 was held on 4/20/2017. At this meeting, the public attendees were divided into nine (9) working groups and were tasked with identifying potential recreation concepts for the potential upland and wetland/open water areas expected under a reduced-pumping water management alternative. The input from these groups was summarized and counted, and a word cloud was developed to highlight the recreation types and activities that were identified by more than half of the groups.

Table 9 summarizes the recreation concepts identified by each of the groups and the number of groups that identified that concept. Items highlighted in bold italics represent recreation activities identified by 5 or more groups. Figure 10 shows the summary word cloud based on this input. The public input from this meeting along with the 2015 Nokomis-Hiawatha Regional Park Master Plan was used to define some of the high level recreation concepts for the reduced pumping alternative (Alternative B).

Table 9: Summary of Public Input for a Reduced Pumping Alternative from the 4/20/2017 Meeting

| Recreation Concept | Recreation Activity | Selected by # of Groups (Out of 9) |
|-------------------------------|--|------------------------------------|
| Golf-Related | <i>9-hole golf course</i> | 9 |
| | Top Golf Style Drive Range | 2 |
| | Driving Range | 2 |
| | First Tee 3-Hole Education Learning | 1 |
| | Origins Golf Course | 1 |
| | Miniature Golf | 1 |
| Facilities | Brew Pub/Restaurant | 3 |
| | Wedding/Event Space | 2 |
| Gathering/Picnics | Outdoor gathering space | 2 |
| | Small Picnic Area | 3 |
| | Group Shelter/Patio Picnic Area | 2 |
| Ecological Restoration | <i>Intermittently Inundated Wetland</i> | 7 |
| | <i>Prairie/Wet Meadow Restoration</i> | 8 |
| | Shoreline Habitat Restoration | 1 |

| Recreation Concept | Recreation Activity | Selected by # of Groups (Out of 9) |
|--------------------------|---|---------------------------------------|
| | Wild Rice Paddy | 2 |
| | Monarch Way Station | 1 |
| | Pollinator Gardens | 8 |
| | Forest Restoration | 5 |
| | Stormwater Management (Clean Creek and pipe water before it goes into lake) | 1 |
| Urban Farming | Urban Agriculture Area | 7 |
| | Veteran’s Farm in conjunction with Food Forest Learning Farm | 1 |
| | Deep Winter Greenhouses | 1 |
| | Integrated Edible Forest | 1 |
| | Food Forest | 3 |
| | Art/Farming Center | 1 |
| | Youth Training | 1 |
| | Bee Keeping Space | 5 |
| Misc | Arboretum | 2 |
| | Environmental Learning Facility | 1 |
| | Table Activities | 1 |
| | Dog Park | 3 |
| | Bird Sanctuary | 3 |
| | Fishing Pier | 6 |
| | Wildlife Blind | 5 |
| | Wetland Jetty | 8 |
| | Canoe/Kayak Trailhead/Launch | 7 |
| | Skate Park | 2 |
| | Bike Park | 2 |
| | Climbing Wall | 3 |
| | Ropes and Skills Course | 1 |
| | Disc Golf | 2 |
| | Nature Playground | 3 |
| | Public Art | 4 |
| | Viewing Mound or Platform | 1 |
| Sport Fields | Pollinator-Friendly Open Play Field | 2 |
| | Small Space Sports | 1 |
| | Field Sports | 1 |
| Winter Activities | Ice Skating | 2 |
| | Winter Rink Sports | 3 |
| | Sledding | 3 |

This concept assumes improvements will be made to the golf course including the incorporation of an open channel along the northern and eastern edge of the golf course and the reconfiguration of some of the holes on the course. MPRB staff assumed that the clubhouse would be reconstructed to better serve the golf course and surrounding neighborhood, include a neighborhood-focused restaurant with both indoor and outdoor seating and a banquet/flex space to generate additional revenue through hosting of receptions, corporate, and community events.

The estimated number of annual visits to the Hiawatha Golf Course area for Alternative A is 211,000.

4.3.2.4 Alternative B

Alternative B represents the reduced-pumping alternative, resulting in higher water levels in the golf course area and less upland space. With this change, the area would no longer be able to support an 18-hole golf course. Based on the information in the Nokomis-Hiawatha Regional Park Master Plan, the public input from the meeting in April 20, 2017, and further discussions with MPRB staff, the following are the recreation and enterprise concepts for this alternative:

- Construction of flexible interior space for events and gatherings, such as weddings and memorial services, corporate retreats and meetings in the central area of the park.
- Reconstruction of the clubhouse to include a neighborhood-focused restaurant with both indoor and outdoor seating and a banquet/flex space for hosting of receptions, corporate, and community events.
- Develop picnic pavilions (2-3) and a larger reservable pavilion with seasonal restrooms, gathering areas, and open spaces on north end of park.
- Creation of minimally-developed festival ground on south end of park (primarily turf/pollinators with concrete pads for portapotties and electrical hook-ups)
- Creation of a canoe launch and storage racks along with canoe/kayak rentals
- Incorporation of a fishing pier
- Construction of paved hiking and biking trails that will create a full connection around Lake Hiawatha and the park area; it may include boardwalk-style trails through the wetland areas.
- Restoration of approximately half the upland area to incorporate pollinator/native restorations
- Open water and wetland restorations in the lowest areas of the park that will fluctuate with the flows in Minnehaha Creek and Lake Hiawatha
- Continued winter uses including walking, cross country skiing, natural ice skating, sledding

The estimated number of annual visits to the Hiawatha Golf Course area for Alternative B is 525,000.

The MPRB staff recognizes the public's interest in the creation of a nine (9)-hole golf course and investigated the potential opportunity in the context of the expected available space, the 2014 MPRB golf course strategic planning study, and golf revenues and trends. For this alternatives assessment, the MPRB

staff eliminated including a nine (9)-hole golf course/driving range, a three-hole training course, or a stand-alone driving range in the recreation and enterprise concept for Alternative B for the following reasons:

- Nine (9)-hole golf courses do not have the ability to produce half the revenue that an 18-hole facility. This is because the majority of golfers that frequent golf facilities desire 18-hole courses and league play cannot be optimized on a nine (9)-hole course. Ultimately, nine (9)-hole courses are not a regional destination, cannot generate tournament revenue, and do not generate the golf volume needed to make the course financially sustainable, let alone profitable. This is supported by MPRB data from the Wirth Par 3, nine (9)-hole Golf Course.
- The land requirements for a nine (9)-hole golf course (40-60 acres) with driving range (15-18 acres) would utilize much of the estimated upland area for Alternative B.
- A three (3)-hole training course and driving range (requires 37-40 acres) could be included; however, this would likely not be operated as an enterprise feature for the MPRB, meaning it would not be generating revenue but would require costs to operate and maintain.
- Based on recent trends, a stand-alone driving range is not attractive to new golfers.

However, if the MPRB commissioners would proceed with Alternative B, based on public and MPRB commissioner questions, maintaining golf in some capacity will be further investigated through the master planning process.

4.3.2.5 Park Visitation Estimates

Table 10 summarizes the estimated number of annual park visitors for each of the alternatives.

The estimated number of annual park visits for each alternative were based on data from the MPRB (rounds of golf), the Nokomis-Hiawatha Regional Park Master Plan, and the Metropolitan Council Annual Use Estimate of the Regional Parks System for 2015. Additionally, for the proposed facilities, annual use was estimated based on facility capacity and assumptions based on discussions with MPRB staff on anticipated rentals and demand.

The more recent MPRB golf data suggests that 20,000-40,000 rounds of golf are played at the Hiawatha Golf Course per year. For Alternative A, we utilized 30,000 rounds as the anticipated number of golfers is expected to stay the same as the current numbers (or potentially decline).

The Nokomis-Hiawatha Regional Park Master Plan indicates that there are 1.5 million annual users for the regional park (not including the Hiawatha Golf Course area). This translates to approximately annual 2,300 users per acre. This number was applied to the golf course area for Alternative B to estimate general recreational use estimates. For comparison, data for the Minneapolis Chain of Lakes Regional Parks suggests 3,300 annual users per acre and for the Minnehaha Regional Park, the annual users are 10,200 per acre.

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Data from the Metropolitan Council annual use estimates indicates that 91% of the Nokomis-Hiawatha Regional Park visits happen in the spring, summer, and fall, and 9% of the visits happen in winter. This would be equivalent to approximately 30,000 winter visits to the golf course property, and does not distinguish the type of winter use. However, anecdotal observations of existing winter users (skiers and walkers) indicates approximately 50 to 100 visits per day, which is equivalent to 5,000 to 12,000 visits in the winter. For Alternative A, we have assumed 10,000 winter visits. For alternative B, we have assumed that due to increased access, trails, and types of winter recreation, the number of winter visits would be double.

For both Alternatives, the clubhouse area improvements are assumed to be similar. For the neighborhood focused restaurant, total revenues and estimated visitors for Sandcastle (at Lake Nokomis) and Tin Fish (at Lake Calhoun) were used as comparable MPRB facilities. Based on the average of the estimated annual visitors, these seasonal facilities serve approximately 125,000 customers per season and this number was applied to the proposed restaurant for Hiawatha. For the proposed banquet facility at the improved clubhouse, the assumption was that the facility was rented at full capacity once per week.

For Alternative B, there were several other enterprise type features considered. For the flexible open space for retreats, weddings, and memorial services, we have assumed the facility would be rented at full capacity twice per week based on demand discussions with MPRB staff. For the pavilions, we have assumed they would be rented at full capacity once per week for 25% of the year. And for the minimally developed festival grounds, we have assumed four festivals per year at full capacity.

Table 10: Estimated Annual Park Visitation

| Site Use | Alternative A Projected Annual Visits | Alternative B Projected Annual Visits |
|--|---------------------------------------|---------------------------------------|
| 18-Hole Golf Course (including League, First Tee, & High School Leagues) – 146 acres | 30,000 | N/A |
| Golf Driving Range & Practice Area | 25,000 | N/A |
| Clubhouse: Indoor/Outdoor Neighborhood Restaurant | 125,000 | 125,000 |
| Clubhouse: Banquet Facility | 20,800 | 20,800 |
| Flexible Interior Space for Events and Gatherings | N/A | 15,600 |
| Parkland – 146 acres | N/A | 335,800 |
| Winter Activities | 10,000 | 20,000 |
| Picnic Pavilions | N/A | 1,350 |
| Large Picnic Pavilion | N/A | 1,350 |
| Festival Grounds | N/A | 5,200 |
| Total Annual Visits | 211,000 | 525,000 |
| Annual Visits per Acre | 1,400 | 3,600 |

4.3.2.6 Impacts on Neighborhood Property Values

Literature on the impact of parks and open space on property values was reviewed to determine if the changes proposed in Alternative B would impact property values in the surrounding neighborhood. The literature indicates that parks, trails, and golf courses generally have a positive impact on property values. The impact varies based on proximity to the park, population density, the nature of park activity and a variety of other factors. However, we do not anticipate a significant impact on property values in the neighborhood because property values already reflect the positive effect of the golf course and adjacent regional park land.

5.0 Traffic/Parking Impacts

The following section summarizes the existing and anticipated conditions surrounding the Hiawatha Golf Course area, based on existing conditions and the two Alternatives. A complete traffic study was not conducted as part of this project and this assessment is based on the best available existing data for the project area. However, as plans for the selected alternative develop, the MPRB will continue to coordinate with City of Minneapolis and Hennepin County to address ongoing transportation infrastructure, vehicle circulation, and on and off-street parking needs.

5.1 Roadways

Figure 11 below summarizes the main roadways around the Hiawatha Golf Course area. The principal arterial roadway that are used to access the Hiawatha Golf Course are TH 35W, TH 62 and TH 55. Most traffic is then routed to Cedar Avenue or 46th Street. Other collector roadways that may be accessed include Minnehaha Parkway, 42nd Street and 28th Avenue. The Hiawatha Golf Course clubhouse is located on Longfellow Avenue which is a low volume, low speed roadway. All other unlabeled roadways are also low volume, low speed, and are mainly used by local resident traffic. Table 11 identifies the available data for the collector roadways area used by traffic to access Hiawatha Golf Course, including the annual average daily traffic (AADT) counts.

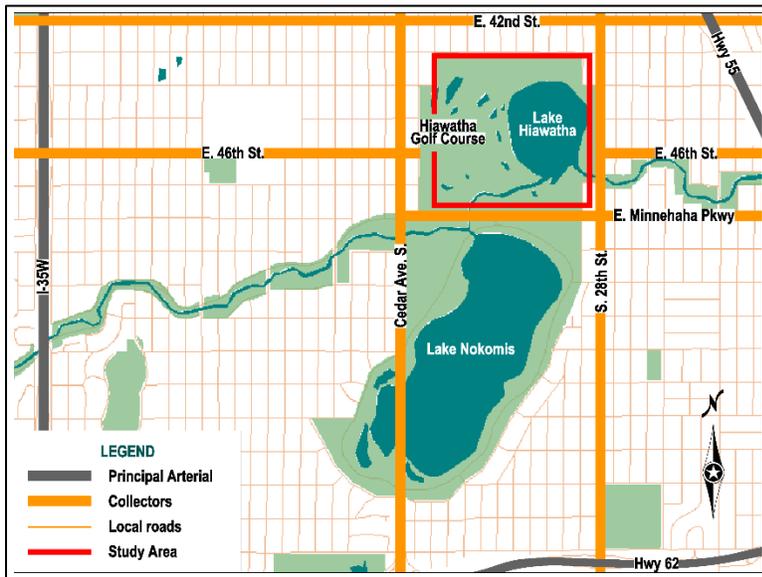


Figure 11: General roadway layout around Hiawatha Golf Course Area

Table 11: Collector Roadway Data around the Hiawatha Golf Course Area

| Roadway | Traffic Direction | AADT (year) | Speed (mph) |
|-------------------------------|-------------------|--------------|-------------|
| Cedar Avenue | North / South | 14194 (2016) | 30 |
| 46th Street | East / West | 5366 (2016) | 30 |
| Minnehaha Parkway | East / West | 7784 (2016) | 25 |
| 42nd Street | East / West | 8470 (2016) | 30 |
| 28th Avenue | North / South | 6293 (2016) | 30 |

Estimated traffic related to existing conditions (and the future alternatives) was based on vehicle occupancy data from the Bureau of Transportation Statistics (2001) and the anticipated percent of visitors arriving in vehicles.

Based on our estimate of existing driving range use and rounds of golf played annually at the Hiawatha Golf Course (100% in vehicles, 1 user/vehicle) along with the winter visits (30% in vehicles, assuming 2.05 users/vehicle), we have estimated the total annual number of vehicle arrivals to the golf course at per year or about 150 to 300 vehicles per day (~3-6 percent of the traffic on 46th Street).

5.2 Parking

The current parking lot for the Hiawatha Golf Course clubhouse is approximately 46,500 square feet and has 116 stalls with an additional 5 handicap stalls. There is on-street parking available on both sides of all local roads within 0.25 miles of the clubhouse with an estimated 330 on-street parking stalls available, not including Cedar Avenue or the area to the west. These estimates have not been reduced to reflect on-street parking utilized by local residents.

There are also three additional MPRB parking lots located south of the Hiawatha Golf Course area on the south side of Minnehaha Parkway, but are over 0.5 miles from the clubhouse area (see Figure 12). P1 has 20 stalls with 1 handicap stall, P2 has 29 stalls with 3 handicap stalls, and P3 has 50 stalls with 2 handicap stalls.

Table 12 summarizes the existing on-street and off-street parking available around the Hiawatha Golf Course area

Table 12: Existing Parking Summary for the Hiawatha Golf Course Area

| Parking Area | Existing Parking |
|--|--------------------------------|
| Hiawatha Golf Course Clubhouse Parking Lot | 116 stalls + 5 handicap stalls |
| MPRB Parking Lots (3) South of Minnehaha Parkway | 99 stalls + 6 handicap stalls |
| On-Street Parking within 0.25 miles of the Clubhouse area | 1005 |
| On-Street Parking within 0.25 miles of the Clubhouse area – not including Cedar Ave S or area west | 330 |

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5.3 Other Traffic Features

Figure 12 highlights the type of intersections around the Hiawatha Golf Course area. Signalized intersections include 46th Street/Cedar Avenue and Cedar Avenue/Minnehaha Parkway, Figure 13 and 14 show the turning movements at each of these intersections.

There is currently a four-way stop at the Longfellow Avenue/ 46th Street intersection where the entrance of the parking lot to the clubhouse is located. 43rd Street is also a local road that is located adjacent to the north end of the golf course.

There is no sidewalk on the east side of Longfellow Avenue, although all other roads in the area have sidewalk located on both sides.

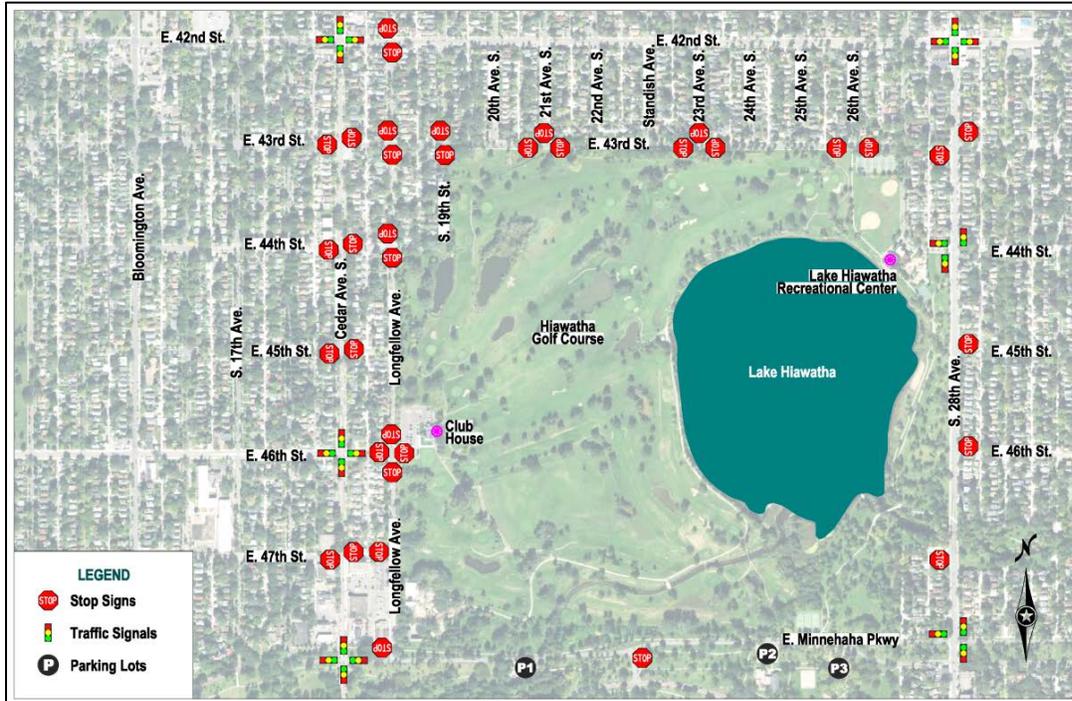


Figure 12: Intersections and parking around the Hiawatha Golf Course area

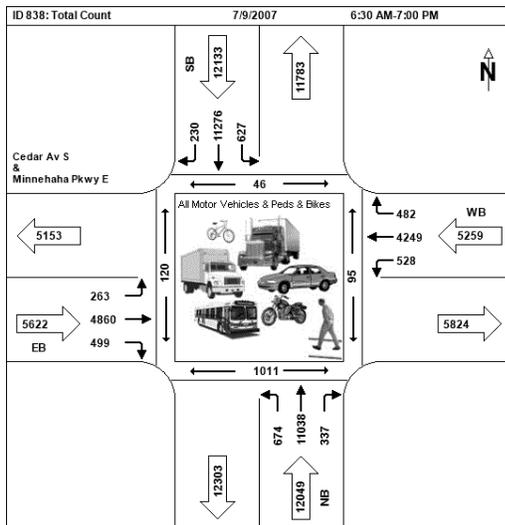


Figure 13: Turning movements of Minnehaha Pkwy and Cedar Ave (2007)

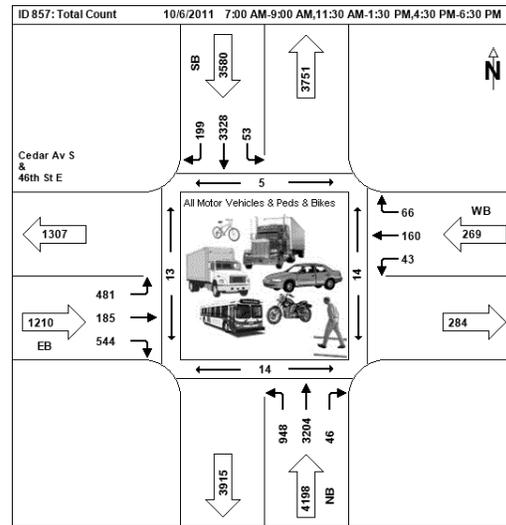


Figure 14: Turning movements at Cedar Ave and 46th St (2011)

5.4 Proposed Conditions

The following sections outline the estimated traffic impacts and the proposed parking needs for Alternatives A and B for the Hiawatha Golf Course area.

Table 13 summarizes the estimated increase in the AADT in the area from existing conditions for the two alternatives based the proposed facilities and annual user estimates, further discussed below.

Table 13: Estimated Increase in AADT for Alternatives A and B from Existing Conditions

| | Alternative A | Alternative B |
|---|---------------|---------------|
| Increase in Total Annual Park Vehicle Arrivals (vehicles per day) | 107 | 126 |
| Increase in Clubhouse Annual Park Vehicle Arrivals (vehicles per day) | 107 | 84 |
| Increase in Clubhouse Annual Park Vehicle Arrivals (vehicles per day) | 0 | 21 |
| Increase in Clubhouse Annual Park Vehicle Arrivals (vehicles per day) | 0 | 22 |

Table 14 summarizes the estimated off-street parking requirements per City of Minneapolis zoning code 541.170 for the two proposed alternatives along with the proposed off-street parking, further discussed below.

Table 14: Estimated Off-Street Parking Requirements for Alternatives A and B

| Location | Alternative A | | | Alternative B | | |
|---|---|-------------------------------|---------------------------------|---|--|---|
| | Proposed Peak Facility Capacity (Users) | Required Parking ¹ | Proposed Parking in Alternative | Proposed Peak Facility Capacity (Users) | Required Parking | Proposed Parking in Alternative |
| Hiawatha Golf Course Clubhouse Area/Central Area of Park | 550 | 225 stalls | 1 lot / 225 stalls | 600 | 150 | 1 lot / 225 stalls |
| North End of Park | 0 | N/A | N/A | 174 | 0 – zoning code does not require any stalls for park area | 2 lots / 30 stalls each |
| South End of Park | 0 | N/A | N/A | 1300 | As determined by the zoning administrator | 2 lots / 80 stalls each |
| Total Off-Street Parking | N/A | 225 | 225 | | 150 (not including the south end of the park which will be determined by zoning administrator) | 445 |
| Total Existing Off-Street Parking Available | 121 (clubhouse area) | | | 121 (clubhouse area) / 105 (south of Minnehaha Parkway) | | |
| Proposed Additional Off-Street Parking Required (# of Parking Stalls) | | 104 | 104 | | 29 (clubhouse area)/ 0 (north Area) | 324 total (104 clubhouse area, 60 north area, |

| | | | | | | |
|---|--|--------|--------|--|---------------------------------------|------------------------------|
| | | | | | | 160 south area) ¹ |
| Proposed Additional Off-Street Parking Required (Square Footage of Parking Lot) | | 40,000 | 40,000 | | 29,200 (not including the south area) | 125,000 |

1 – The estimated minimum off-street required parking were based on Table 541-1 in Chapter 541.170 of the Minneapolis Code of Ordinances for Alternative A, assuming the Clubhouse Area included golf course (5 spaces per hole) and restaurant with general entertainment (parking equal to 30% of facility capacity) – for the restaurant and banquet space.

2 – The estimated minimum off-street required parking were based on Table 541-1 in Chapter 541.170 of the Minneapolis Code of Ordinances for Alternative B, assuming the Clubhouse Area included restaurant with general entertainment (parking equal to 30% capacity) – for the restaurant and banquet space, and place of assembly (parking equal to 10% capacity) – for the retreat and ceremony space. The picnic pavilions in the North Area of the park was assumed to be Park (no minimum requirement). The outdoor gathering space in the South Area of the park is assumed to be Outdoor Recreation Facility (As determined by zoning administrator).

5.4.1 Alternative A

Alternative A assumes that the existing pumping rates will continue and the area will be maintained as an 18-hole golf course and driving range. However, the clubhouse area will be improved with the addition of a neighborhood restaurant with indoor and outdoor seating along with a banquet facility. The proposed modifications to the clubhouse area will have more visitors than it currently does in order to service the proposed restaurant, banquet hall and its employees, and these improvements will increase the need for off-street parking.

Using the estimated annual number of annual visitors for Alternative A and vehicle occupancy assumptions based on Bureau of Transportation Statistics, we have estimated an increase in traffic by 107 vehicles per day from existing conditions. Assuming all arrivals to the golf course are along 46th Street, this would increase the amount of traffic on 46th Street by ~2 percent.

The estimated number of peak users will increase to 550. Table 541-1 in the city’s Code of Ordinances says that the minimum off-street parking requirements for the golf course (5 spaces per hole) and a restaurant with general entertainment (parking equal to 30% capacity) shall end up to be a total of 225 stalls. Since the minimum requirement of stalls is 225, it is recommended that the estimated number of off-street parking stalls be increased to 225. Because the existing parking lot only has 121 parking stalls, 104 stalls are recommended to be added, meaning that the parking lot will have to be increased by approximately 40,000 square feet. However, it is also assumed that some of the anticipated users will bike

or walk due to the number of pedestrian and bike trails in the area (e.g. the Grand Rounds) and bike parking should also be considered.

There is low anticipated growth in the area around the Hiawatha Golf Course. The City of Minneapolis projects a 0% to 0.5% growth due to the area of interest being fully-developed and being surrounded on all sides by other areas which are fully-developed. No changes in traffic controls would be anticipated as a result of Alternative A.

5.4.2 Alternative B

Alternative B, the reduced-pumping scenario, will result in a park area with more open water and wetland areas and a change in the types of recreational uses (no longer an 18-hole golf course). The recreational concept for Alternative B has evaluated potential uses for three locations in the park area that will influence user numbers and parking needs: the Clubhouse Area, a North Area, and a South Area.

Using the estimated annual number of users for Alternative B and vehicle occupancy assumptions based on Bureau of Transportation Statistics, we have estimated an increase in traffic by 126 vehicles per day from existing conditions. Based on the proposed facilities and users in the different areas of the park, we have broken down the total increase in traffic to each area of the park, with 84 vehicles per day arriving at the existing clubhouse area, 21 vehicles per day to the north end of the park and 22 vehicles per day to the south end of the park. Assuming arrivals to the clubhouse area along 46th Street, this would increase the amount of traffic on 46th Street by ~2-3 percent. The estimated increase in the arrivals to the north and south parking areas represent less than 1 percent of the average annual daily traffic numbers for 42nd Street, 28th Avenue S, and Minnehaha Parkway.

The proposed modifications to the clubhouse area will have more users than it currently does in order to service the proposed restaurant, banquet hall and its employees. It is suggested that this area also serves as the main parking lot for the flexible interior space for events and gatherings such as retreats, meeting, and ceremonial space. The peak capacity of the proposed clubhouse improvements along with the proposed flexible space is 600 users. Per Table 541-1 in the city's Code of Ordinances, the minimum off-street parking requirements for a restaurant with general entertainment (parking equal to 30% capacity) and a place of assembly for the ceremonial space (parking equal to 10% capacity) is a total of 150 stalls. However, with these proposed changes, the project team recommends that the parking lot at least provide 30% of the facility capacity (180 stalls), if not the equivalent of the parking provided in Alternative A (225 stalls). To provide 225 stalls in the clubhouse area means the addition of about 40,000 square feet of bituminous paving or permeable pavers to be added to the existing parking lot.

It is also recommended that sidewalk should be placed on the east side of Longfellow Avenue near the clubhouse area to serve pedestrians along with bicycle parking near the parking lot due to the high volume of bicycle and pedestrian traffic in the Hiawatha area that will likely be accessing the site. During

peak periods police flaggers may be needed at large gatherings that are anticipated to guests arriving and leaving at the same time.

The North area of the park will include the addition of several picnic pavilions, including 2-3 picnic shelters along with one large reservable pavilion with seasonal restrooms. The peak capacity of these pavilions is estimated to be 174 users. Table 541-1 in the city's Code of Ordinances says that there are no minimum off-street parking requirements for a park. Discussions with MPRB staff suggested the addition of 2-3 separate parking lots with 20-30 stalls each could be constructed in order to serve the pavilions. To reduce maintenance costs and preserve on-street parking, the MPRB could also consider reducing the number of parking lots while providing the same number of off-street parking stalls. It is recommended that two 2 lots of 30 stalls each (23,000 square feet of new pavement/permeable pavers area) be provided to accommodate a little over 30% capacity of the proposed picnic areas. Additionally, the entrances of the parking lots should be located at any of the intersections on 43rd Street to minimize impacts to on-street parking restrictions. Ideally, parking entrances would be located at the intersections of 21st Avenue and 23rd Avenue in order to eliminate the need for additional stop signs along 43rd Street.

Finally, the concept for Alternative B includes the creation of a minimally-developed festival grounds on the South End of the park that will host a limited number of events per year, with an estimated peak capacity of the festival grounds is to be 1,300 users. Table 541-1 in the city's Code of Ordinances says that the minimum off-street parking for an outdoor recreation facility is to be determined by a zoning administrator. Discussions with MPRB staff originally included the development of two (2) parking lots with 60-70 stalls each on the south end of the park area. Since Minnehaha Parkway does not offer on-street parking, it is suggested that the size of these parking lots be increased to about 80 stalls each (62,000 total square feet of new pavement/permeable pavers). These lots would supplement the existing parking lots on the south side of Minnehaha Parkway, benefitting the activities at Lake Nokomis also. Pedestrian and bicycle traffic numbers are expected to be large during the festival activities, therefore additional bicycle parking will also need to be installed. The MPRB staff acknowledged they would consider looking at shuttling opportunities for events at this location as well as the promotion of pedestrian and bicycle traffic. Further study of the area in the future is recommended.

Similar to Alternative A, as there is low anticipated growth in the area due to the fully-developed nature of the area, no real changes in traffic controls would be anticipated as a result.

6.0 Applicable Environmental Regulations

Alternatives A and B were evaluated for potential permits and approvals that would be required prior to construction of either alternative, as documented in Table 15. Overall, Alternative B would be subject to a higher level of regulatory oversight than Alternative A, resulting in a longer anticipated permitting timeline (and higher costs). The permits and approvals included in Table 15 are based on agency rules and regulations in place at the time of this planning study. During final design of the selected alternative, the

identified permits and approvals would need to be reassessed to ensure compliance with rules and regulations that may be in place at that time.

Permitting applicability and submittal requirements were also reviewed and discussed as part of two agency engagement meetings held on April 14, 2017 and May 3, 2017. Agencies invited to participate included:

- U.S. Army Corps of Engineers
- Minnesota Department of Natural Resources
- Minnesota Pollution Control Agency
- City of Minneapolis
- MetCouncil
- Minnehaha Creek Watershed District

6.1 MnDNR Appropriations Permitting

The Minnesota Department of Natural Resources (MnDNR) is responsible for the implementation of Minnesota Statute 103G.271 that directs appropriation and use of waters, and is responsible for the permitting of surface water and ground water appropriations. Appropriations permits are required for a proposed use of surface or groundwater at rates exceeding 10,000 gallons per day or 1 million gallons per year. The MPRB currently has an existing MnDNR appropriations permit that only allows for the pumping of 36.5 million gallons per year from the surface ponds for irrigation. The MPRB also has a 2.0 million gallons per year appropriations permit to pull from the deep irrigation well in the Prairie du Chien aquifer; however, the golf course has historically not pumped from this well.

The current pumping rate at the Hiawatha golf course exceeds the pumping allowed from the golf course ponds by nearly eight times its permit, and this volume of water pumped is not used for the permitted purpose (irrigation). When the magnitude of pumping was identified, the MPRB staff were in contact with the MnDNR regarding the permit exceedances. Since the pumping is protecting nearby homes, the MPRB was instructed to continue pumping until a long-term solution has been identified, resulting in this study and assessment. Currently the MPRB is operating on temporary appropriations permit (with a pending status, based on direction to be determined by the MPRB commissioners).

MnDNR staff have been engaged through this assessment process. In general, from the standpoint of the review of an appropriations permit application, the MnDNR review the applications in accordance with MN Administrative Rule 6115.06. The application for appropriations permits are reviewed in accordance with 6115.0670 and there are additional requirements and conditions for the following likely reasons for the appropriations permit: water level maintenance (6115.0690) and/or dewatering (6115.0710).

In general, the MnDNR reviews the appropriations permit applications in the context of the following:

- the impact of the type of appropriation and its impact on the availability, distribution, and condition of water and related land resources in the area involved,
- the hydrology and hydraulics of the water resources involved and the capability of the resources to sustain the proposed appropriation based on existing and probable future use,
- the probable effects on the environment including anticipated changes in the resources, unavoidable detrimental effects, and alternatives to the proposed appropriation
- the relationship, consistency, and compliance with existing federal, state, and local laws, rules, legal requirements, and water management plans
- the public health, safety, and welfare served or impacted by the proposed appropriation
- the comments of local and regional units of government, federal and state agencies, private persons, and other affected or interested parties
- the adequacy of state water resources availability when diversions of any waters of the state to any place outside of the state are proposed
- the economic benefits of the proposed appropriation based on supporting data when supplied by the applicant

From a dewatering standpoint, the application would also need to demonstrate that:

- there is a reasonable necessity for such dewatering and the proposal is practical
- the excess water can be discharged without adversely affecting the public interest in the receiving waters, and that the carrying capacity of the outlet to which waters are discharged is adequate
- not prohibited by any existing law

From a water level maintenance standpoint, the application would need to demonstrate the:

- effects on public welfare of the proposed appropriation
- the proposed appropriation is reasonable, practical, technically feasible, and effectively accomplishes its purpose
- the proposed appropriation will have minimal or no detrimental effect on the basin, the proposed source of supply, or the receiving water and property of riparian owners
- the proposed facilities are "reasonably consistent with natural conditions"

When asked if the MnDNR reviews the specific use of the land (golf/other) or number of users is typically considered in their review, staff indicated that it is typically not, and that in the case of the Hiawatha golf course owned by the MPRB (a public entity), they would put their trust in the local agency to make the best decision about how the land should be used.

Although monitoring at the golf course has demonstrated that the existing pumping does not have an impact on the deep aquifers below the golf course, based on the MnDNR staff's understanding of the existing conditions at the golf course, and the two proposed alternatives, their preferred alternative from a groundwater appropriations and water management standpoint would be Alternative B. MnDNR staff do not view Alternative A, which maintains the existing pumping rates, as a viable, long-term solution as the decomposition and consolidation of the peat below the golf course will continue to result in course settlement and continued water management and pumping issues. Climate change, resulting in more frequent, intense storm events, increases the potential risk of the berm overtopping and flooding the golf course.

Although Alternative B does not fully-eliminate the need for pumping (to protect homes), there is a significant reduction in pumping, along with potential other benefits such as reduction in flooding in the nearby watersheds, increases in the potential for water quality treatment of local watershed runoff and flows from Minnehaha Creek to Lake Hiawatha (an impaired water), and the opportunity to increase ecological benefits and create habitat through wetland and stream channel creation and restoration of upland/turf areas.

MnDNR staff were asked how they would view the recirculation of the lake/creek seepage (the cycle of seepage into the golf course and pumping back into the lake). Seepage is typically considered as ground water. However, staff did not specifically respond to how the MnDNR would review the recirculation at Hiawatha golf course, but concluded that even if the estimated seepage volume were not considered, the amount of shallow, regional groundwater being pumped (approximately 100 million gallons per year) would still significantly exceed the MnDNR appropriations threshold of 10,000 gallons per day or 1 million gallons per year, requiring an appropriations permit.

If the MPRB were to select Alternative B, the MPRB would finalize and submit their revised permit application (the process has already been started) for the temporary pumping until the park project would be constructed, when the permit would be revised to reflect the anticipated pumping conditions at final design. Also, in accordance with Minnesota Statute 103G.271, the MPRB would need to pay the "after the fact" water use fees for the past 7 years, for the estimated amount of annual pumping exceeding their existing appropriations permit.

If the MPRB were to select Alternative A, the MnDNR would question the selection of this alternative, but would consider a permit application for Alternative A. However, the permit would likely have many conditions (that may be hard to demonstrate are attainable in the long-term). Correspondence with MnDNR staff indicate that the following two conditions would be placed on a water appropriations permit for continued operation at existing pumping rates to maintain the golf course:

- When Hiawatha Golf Course is flooded again, then reclamation of the site must be for the reduced-pumping scenario.

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- When the levels of Lake Hiawatha exceed the 10-year flood elevation, then Lake Hiawatha Golf Course must be closed as a means of protecting users of the golf course from the possibility of the dike failing and flooding the golf course.

From a permitting/process standpoint, the MPRB would need to finalize and submit their revised permit application (the process has already been started). Also, in accordance with Minnesota Statute 103G.271, the MPRB would need to pay the "after the fact" water use fees for the past 7 years, for the estimated amount of annual pumping exceeding their existing appropriations permit.

Table 15: Summary of Regulatory Requirements for Alternatives A and B

| Agency | Permit/Approval ¹ | Rationale | Applicability to: | | Notes | Anticipated Timeline for Approval ² | |
|--|-------------------------------------|---|-------------------|---------------|---|--|---------------|
| | | | Alternative A | Alternative B | | Alternative A | Alternative B |
| U.S. Army Corps of Engineers | Section 404 Permit | For impacts to USACE Jurisdictional Wetlands | X | X | <p>Wetland impacts associated with Alternative A are assumed to be small enough (less than 0.5 acres) to qualify for a Nationwide Section 404 Permit.</p> <p>Wetland impacts associated with Alternative B are assumed to be large enough (greater than 3 acres) to qualify for an Individual Section 404 Permit.</p> <p>It is assumed that project activities will be self-mitigating and that separate, off-site wetland mitigation would not be required. As such, mitigation is excluded from the planning-level cost estimate.</p> | 3 months | 6 months |
| U.S. Fish and Wildlife Service | Section 7 concurrence | Concurrence regarding the project's potential to affect federally-listed threatened/endangered species. | X | X | <p>Required as part of Section 404 Permitting; review occurs concurrent to this permitting process.</p> <p>Communication for concurrence occurs directly between USACE and USFWS, though consultant-prepared documentation can help the USACE facilitate communication more efficiently.</p> <p>Planning-level cost estimate assumes field surveys for threatened and endangered species are not required.</p> | 3 months | 6 months |
| Minnesota Department of Natural Resources | Work in Public Waters Permit | For work below OHWL in identified public waters and wetlands. | X | X | It is assumed that project activities will be self-mitigating and that separate, off-site wetland mitigation would not be required. As such, mitigation is excluded from the planning-level cost estimate. | 3 months | 3 months |
| | Water Appropriations Permit | Required for withdrawing more than 10,000 gallons of water per day or 1 million gallons per year | X | X | Coordination with MNDNR staff has been ongoing as part of this planning study. MNDNR questions the long-term viability of Alternative A due to decomposition and consolidation of peat underlying the golf course perpetuating water management and pumping issues. MNDNR has indicated preference for Alternative B from a water appropriations permitting standpoint | 6 months | 3 months |
| | NHIS Database Review | Required to determine potential for project to impact state-listed species. | X | X | Required as part of MNDNR Work in Public Waters Permit; review occurs concurrent to this permitting process. | 3 months | 3 months |
| | Dam Safety Permit | May be required for modifications to berm separating lake from golf course | X | | Though the berm between Lake Hiawatha and the golf course does not appear to be a permitted dam, it meets the height (>6 ft) and impoundment storage (>50 ac-ft) to be subject to MNDNR's Dam Safety Regulations. Dam Safety Permitting occurs through the MNDNR's Work in Public Waters Permit process and would be required if modifications to the berm are proposed as they need engineering assurance that those activities would not cause the berm to fail. | 3 months | N/A |
| Minnesota Board of Soil and Water Resources | Wetland Conservation Act TEP Member | WCA approval required for impacts to wetlands that are not under USACE or MNDNR jurisdiction. | | X | <p>Reviewing party, not responsible for issuing approval.</p> <p>Impacts associated with Alternative A are anticipated to occur in wetlands/waterbodies that are under the jurisdiction of the USACE and/or MNDNR only; WCA approval would not be required.</p> | N/A | N/A |

| | | | | | | | |
|---|--|--|---|---|--|----------|----------|
| | | | | | Alternative B may impact wetlands that are under the jurisdiction of the USACE, MNDNR, and WCA. | | |
| Minnesota Pollution Control Agency | Section 401 Water Quality Certification | Certifies that project will not violate established water quality standards. | | X | Required as part of Section 404 Permitting; review occurs concurrent to this permitting process. It is assumed that Alternative A qualifies for a Nationwide Section 404 Permit. Section 401 Certification is issued as part of the Nationwide Permit approval based on an agreement between the USACE and MPCA. It is assumed that Alternative B qualifies for an Individual Section 404 Permit. Section 401 Certification must be coordinated independently of the Individual Permit and must be acquired before the Section 404 Permit can be issued. | 3 months | 6 months |
| | NPDES/SDS Construction Stormwater General Permit | Required if construction will disturb more than 1 acre of soil or if MPCA determines that construction activity poses a risk to water resources. | X | X | Both alternatives would require the NPDES Construction Stormwater portion of this permit. Alternative B may include dredging to alter contours in existing site wetlands. The State Disposal System (SDS) portion of the permit is triggered for management of dredged materials that are not disposed of at a landfill. It is assumed that MPRB may want the options for how dredged materials are managed. As such, the SDS permit is included in the planning-level cost estimate. | 3 months | 3 months |
| | Anti-degradation Rule Compliance | Compliance is triggered by the need for independent Section 401 Water Quality Certification. | | X | Since it is assumed that Alternative A qualifies for a Nationwide Section 404 Permit, which includes Section 401 certification, Anti-degradation Rule Compliance is not anticipated. Since Alternative B is assumed to require and Individual Section 404 Permit and independent Section 401 certification, Anti-degradation Rule Compliance would be required. | N/A | 4 months |
| State Historic Preservation Office | Section 106 concurrence | Required to determine if project will affect historic resources. | X | X | Required as part of Section 404 Permitting; review occurs concurrent to this permitting process. Communication for concurrence occurs directly between USACE and SHPO, though consultant-prepared documentation can help the USACE facilitate communication more efficiently. Planning-level cost estimate do not account for additional cultural resources inventories. | 3 months | 6 months |
| MN Office of the State Archaeologist | Project approval | Required to determine if project affects archaeological or historic resources located on public land. | X | X | | 1 month | 1 month |
| City of Minneapolis | Wetland Conservation Act TEP Member | Required for impacts to wetlands that are not under USACE or MNDNR jurisdiction. | | X | Reviewing party, not responsible for issuing approval. Impacts associated with Alternative A are anticipated to occur in wetlands/waterbodies that are under the jurisdiction of the USACE and/or MNDNR; WCA approval would not be required. Alternative B may impact wetlands that are under the jurisdiction of the USACE, MNDNR, and WCA. | N/A | N/A |

| | | | | | | | |
|--|--|--|---|---|--|--------------------|---------------------|
| | Preliminary Development Review | City's review of proposed development and site plans for adherence with City standards. | X | X | | 3 months | 3 months |
| | No Rise Certificate | Certifies that the project will not result in a rise in 100-year flood elevations | X | X | Review would take place as part of Conditional Use Permit review. | 4 months | 4 months |
| | Conditional Use Permit | A conditional use permit would be required due to the project's location within City of Minneapolis shoreland and floodplain overlay districts. | X | X | It is recommended that more complex project proposals are presented at the Committee of the Whole prior to the Planning Commission meeting. It is expected that City staff may advise Alternative B be taken to the Committee of the Whole. | 4 months | 4 months |
| | Temporary Groundwater Dewatering Permit | Required for dewatering during construction. | X | X | | 2 months | 2 months |
| Minnehaha Creek Watershed District | Wetland Conservation Act Approval (LGU) | Required for impacts to wetlands that are not under USACE or MNDNR jurisdiction. | | X | Impacts associated with Alternative A are anticipated to occur in wetlands/waterbodies that are under the jurisdiction of the USACE and/or MNDNR only; WCA approval would not be required. Alternative B may impact wetlands that are under the jurisdiction of the USACE, MNDNR, and WCA. | N/A | 3 months |
| | Water Resource Permit Application Form | Required for projects that affect water resources within District boundaries. | X | X | Alternatives are expected to trigger several District rules, including: erosion control, floodplain alteration, wetland protection, stormwater management, and streambank stabilization Activities proposed within the floodplain will need to result in no net fill in the floodplain and no rise in the flood elevations along Minnehaha Creek. | 3 months | 3 months |
| Minneapolis Park & Recreation Board | Environmental Assessment Worksheet | Required by Minnesota Rules Chapter 4410, Subpart 27 for projects that will change the course, current, or cross section of 1 acre or more of any public water or public waters wetland. | | X | The realignment of Minnehaha Creek and potential modifications to the Lake Hiawatha shoreline associated with Alternative B would result in the need for an EAW. The anticipated timeline assumes the EAW would begin upon completion of 60% design. | N/A | 6 months |
| | Construction Permit | Required for projects that impact MPRB parkland. | X | X | | 2 months | 2 months |
| | Nokomis Hiawatha Regional Park Master Plan Amendment | Required for change in recreational use of golf course | | X | Plan update to be completed in coordination with Met Council. | N/A | 3 months |
| Met Council | Nokomis Hiawatha Regional Park Master Plan Amendment | Required for change in recreational use of golf course | | X | Plan update to be completed in coordination with MPRB. | N/A | 3 months |
| Project Total | | | | | | 9-12 months | 15-18 months |

1 – The permits and approvals included in this regulatory matrix are based on agency rules and regulations in place at the time of this planning study. During final design of the selected alternative, the identified permits and approvals would need to be reassessed to ensure compliance with rules and regulations that may be in place at that time.

2 – Anticipated timelines based on Barr Engineering permitting experience for previous projects of similar scale.

7.0 Cultural Resource Review

Barr submitted a data request to the State Historic Preservation Office (SHPO) for information related to known historic and archaeological resources in the vicinity of the project on April 10, 2017. The request encompassed all land associated with the Hiawatha Golf Course, a reach of Minnehaha Creek extending approximately 2,000 downstream of Lake Hiawatha, as well as a one-mile buffer in all directions.

SHPO responded to the data request on April 11, 2017 with information indicating that there are numerous recorded historic and archaeological resources within the evaluated area. However, only two are located in the potential project area: the 28th Avenue South and Nokomis Avenue South bridges over Minnehaha Creek.

The Hiawatha Golf Course clubhouse, the golf course itself, and the adjacent Grand Rounds trail network were not identified in SHPO's database review. This could be because these resources have not yet been evaluated for historic significance in this particular setting.

Additionally, the larger region around the Hiawatha Golf Course area, including the Minneapolis Chain of Lakes and the confluence of the Mississippi Rivers were the spiritual center and home of the Dakota Sioux tribe.

Further cultural resources evaluation may be required as part of future design and permitting efforts to ensure that the project develops in a way that avoids and minimizes impacts to cultural resources, especially if the MPRB were to move in the direction of the reduced pumping alternative.

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