



# Hiawatha Golf Course Pumping FAQ

## Minneapolis Park and Recreation Board

### 1. Who has jurisdiction over Lake Hiawatha and Minnehaha Creek?

Any alterations such as excavation, filling, or changing water levels of the lake, the creek, or their floodplains would require permits and approvals from some or all of the following regulatory agencies: the Minnesota Department of Natural Resources (DNR), Minnehaha Creek Watershed District, the Federal Emergency Management Agency (FEMA), and the Army Corps of Engineers. The Minneapolis Park and Recreation Board and City of Minneapolis do not have jurisdiction over these matters. Obtaining the necessary permits and approvals to alter lakes, streams, wetlands, and floodplains is difficult in Minnesota. Any proposed alterations to Lake Hiawatha and/or Minnehaha Creek may be denied by one or several of the agencies with jurisdiction.

### 2. Where is the water coming from that is being pumped into the lake?

Approximately 17 percent of the water is stormwater runoff, 33 percent is seepage directly from Lake Hiawatha, and 50 percent is shallow groundwater.

### 3. What would happen if the pumps were turned off?

Without pumping, the groundwater elevation underneath the golf course would rise by 4 feet. This would result in a significant portion of the golf course being underwater and unplayable.

### 4. Can the lake level be lowered to reduce the amount of pumping and reduce flooding?

A lower lake level would result in a lower groundwater elevation which would reduce the amount of pumping needed to keep the golf course playable. Lowering the lake would require permits and approvals from regulatory agencies (see #1 above). In order to lower the lake level, the outlet of the lake needs to be lowered. This could be accomplished by modifying an existing weir at 28th Street and another weir at Hiawatha Avenue. It may also be necessary to dredge the creek between the two weirs. Creek dredging will also require permits from regulatory agencies. Lowering the lake will also result in lower water elevations in the creek downstream of the lake.

Additional flood storage will lower flood elevations. Flood storage is the volume of the floodplain above the normal water level of the lake. In other words, when there is a large storm and the area around Lake Hiawatha floods, that's flood storage. The bigger the area and deeper the flood water, the more flood storage there is. A lower lake level will provide more flood storage and may lower flood elevations. This has

not been studied so the magnitude of the change is unknown. The results of other Lake Hiawatha studies indicate there would be a minimal reduction in flood elevations.

### 5. Would dredging Lake Hiawatha reduce the amount of pumping?

Dredging the lake makes it deeper but doesn't lower the level of the lake so it will not reduce pumping.

### 6. How was pumping identified as an issue?

The golf course has undergone many changes over the years. Holes have been redesigned and reconstructed. Ponds have been redesigned and dredged. New ponds have been added and drainage has been improved. Construction plans for some of these golf course modifications have been found and they indicate pumps were present back in the 1960s, and maybe sooner. In 1999 the pumps were replaced and upgraded. These are the same pumps in place today.

Recently, the City completed a study at the Hiawatha Golf Course to answer some stormwater questions related to a large storm event and subsequent flooding in July 2013. The study looked at the capacity of the golf course pumps to pump stormwater. During the course of the study, it was realized that the pumps were pumping both stormwater and a large amount of groundwater. While pumping has been happening at the golf course for many years, it wasn't until recently that the volume of groundwater pumping was determined.

### 7. Is there any evidence that the lake is higher than it used to be thereby making the golf course water issues worse?

The level of Lake Hiawatha is controlled by a high point in Minnehaha Creek downstream of the lake. This control point may have changed over time. The control point could be a downstream weir in the creek, a downstream bridge, culvert, or utility crossing or simply a downstream high point in the creek channel bottom. Since the golf course was built in the early 1930s, there have been many new creek crossings and at least one weir added at 28th Street. There may have also been modifications to the weir on the upstream side of Hiawatha Avenue during one of many road and LRT projects at this location. Accurate historical data is difficult to obtain. We do not have enough information to conclusively say whether or not the control point of the lake has been changed over time. We do know that if the lake is higher than it used to be, then groundwater is higher and more pumping is required to keep the golf course dry.



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The land use upstream of Lake Hiawatha has changed significantly in the last eight decades. About 176 square miles drain to Lake Hiawatha. This was nearly all forests, meadows, wetlands and agricultural land when the golf course was built. It is now fully developed. Wetlands have been filled. Pipes and drains have been installed to quickly drain the land. Roads, roofs, and parking lots shed nearly all the rain that falls on them as opposed to open space where rain infiltrates into the ground. All these changes to the watershed have resulted in significantly more runoff to Minnehaha Creek and Lake Hiawatha, causing the water elevations to rise more frequently, to higher elevations, and for longer periods of time.

## **8. Could the golf course be sinking thereby making the golf course water issues worse?**

We know that Lake Hiawatha was dredged in the late 1920s and the dredged material was used as fill to build the golf course on. Bottom sediments in shallow lakes, which Lake Hiawatha was before dredging, tend to be high in silts and organic material. Soil borings confirm the golf course was constructed on loose bottom sediments. It is not uncommon for these soils to settle and compress over time. Observations by golf course personnel indicate this is happening. There is no known survey data to quantify the actual amount of settlement but golf course staff say some parts of the course have settled a foot or more.

## **9. How much groundwater is being pumped into Lake Hiawatha**

Approximately 263,000,000 gallons of shallow groundwater is pumped into Lake Hiawatha from the golf course on an annual basis. This includes groundwater and lake seepage. When comparing the volume of pumped shallow groundwater to the volume of water entering the lake from Minnehaha Creek, the pumped groundwater accounts for approximately 1 percent of the total volume.

## **10. Is there a water quality impact on Lake Hiawatha from the pumped water?**

The water quality of Minnehaha Creek has a significantly larger impact on the water quality of Lake Hiawatha than the pumped water. Testing has demonstrated that levels of nutrients such as phosphorus were similar in the pumped groundwater and the lake.

## **11. Is pumping depleting the deep groundwater supply used for drinking water?**

No. Pumping tests show there is no connection between shallow groundwater at Hiawatha and the deep regional drinking water aquifer (the Prairie du Chien-Jordan aquifer).

## **12. Can the elevation of the golf course be raised to eliminate the need for pumping?**

Almost the entire golf course is within the FEMA 100-year flood plain. Filling the low areas of the golf course to raise tees, fairways, and greens would reduce the need for pumping groundwater. Pumping stormwater would still be required. However, raising the golf course will fill the floodplain which will reduce the flood storage which could raise flood elevations around the lake and upstream of the lake. This could increase the chances of roads, buildings, and houses flooding. Filling the low areas will also likely impact existing wetlands. Placing fill in the floodplain and impacting wetlands requires permits and approvals from several regulatory agencies.

## **13. Does the park board have permission to pump this water?**

The Park Board has a permit to pump water at this location; however the volume of water was underestimated. The DNR, the agency that permits groundwater appropriations, is aware of this and is working with the Park Board.