Meeting Notes

Nokomis Area Groundwater Technical Team Meeting #2
March 30th, 2018 1:00 – 2:30 pm

Attendees: Katrina Kessler (Minneapolis), Paul Hudalla (Minneapolis), Joe Richter (DNR), Jason Spiegel (DNR), Scott Pearson (DNR), Tiffany Schaufler (MCWD), Rachael Crabb (MPRB), Ray Wuolo (Barr), Perry Jones (USGS), Jim Stark (Legislative Water Commission), Tim Cowdery (USGS), Mark Brigham (USGS), BJ Bonin (DNR), Joe Richter (DNR), Hunter Smoak (Minneapolis), Lisa Fay (DNR)

- Introductions

- Revisit team structure and draft problem statement

MCES has decided not to participate in technical team meetings. Will provide information if/as needed.

MAC will provide information as needed.

DNR will provide project management (Lisa Fay).

Revised Definition of Draft Problem Statement

- Are surface water and groundwater levels in the vicinity of Lake Nokomis (with emphasis to the south and west) increasing?
- To what extent are groundwater levels interacting with surface water levels in this vicinity?
- What are the potential impacts to public and private infrastructure?
- If groundwater and/or surface water levels are rising, why and what can be done?

- Updates since last meeting; City, DNR, MCWD, MPRB, Barr, USGS

Paul Hudalla (City of Minneapolis) presented general graphic of known property impacts:

- Issue of failing watermains has been raised. The laterals that are failing were built in 1930s when the area was developed.
- This is a prior condition and not worse in this area than in other low lying areas (Bryn Mawr), peatlands.
- Graphic of impacts to basements and backyards.
    - Wet basements – water is seeping in, reports of sumps running when they did not before.
    - Backyards with standing water, primarily abutting Solomon Park. High peat soils in this location that could increase capillary action. Mature (30-inch diameter) hardwood trees dying. Strong evidence that something has shifted in the area.
- Shifting foundations near Park and Portland ponds are evidenced 15 years ago in City records. Likely cannot be attributed to changing groundwater levels.

Jason Spiegel (DNR) introduced appropriation permit summary BJ and Joe put together, and groundwater/surface water and geology report that Scott did, with potential areas to place wells. Jason noted that many of the homes on the map of reported problem areas shared by the city are more than 20 feet above the water level of Nokomis.

BJ Bonin (DNR) presentation on water appropriations:

- Appropriations by year by aquifer within three miles of Lake Nokomis. Peak time 2001-2006 related to Crosstown, LRT, MAC construction dewatering. Doesn't include bedrock wells (Richfield municipal). Does not include shallow wells on St. Paul side of the river as they are not hydrologically connected because of the gorge. High appropriation correlated with dry period. End of the construction dewatering correlated with wet period.
- Last four years have seen above average precipitation. "Average" has been relatively stable since early 1900s.
- Mpls Water puts valves in manholes with gravel bottoms. Propose using water manholes as piezometers. They are spaced every 300 feet. Spoke with Bill Doherty about it. Combine with sewer plats which contain geological information and groundwater levels. These two data sources can give us flow direction and a map of the potentiometric surface.

Scott Pearson (DNR) presentation:
Need to design a groundwater monitoring subnetwork to establish groundwater and surface water connectivity, vertical and horizontal.

- Six water table wells and two bedrock wells exist today.
- Need nested wells to determine vertical movement. Suggestion of adding deeper wells to existing Soloman, south Nokomis, and Hiawatha shallow well locations. Need to know exact locations of issues to refine well locations, this plan could be a starting point.
- Showed geology of the area.
    - There is karst in the area.
    - There are springs in the area.
- Reference Baseflow Report, Figure 17.
- Water table enters bedrock aquifer after lakes, before Minnehaha Falls.
- Rise in bedrock at north end of lake along Minnehaha Creek may be acting like a dam.
- Groundwater flow in the water table aquifer is from the west towards the east (Lake Minnetonka due east toward the Mississippi River)
- Thick peat deposits under Lake Nokomis.
- MGS working on revision of Geologic Atlas.

Theory: Groundwater flow is bumping into bedrock and peat, and groundwater is flowing up and around.

- Proposing new nested wells at four sites:
    - two at Hiawatha Golf Course,
    - two at Lake Nokomis.
- Also use existing six water table wells.

How long do we monitor?

Differences in permeability of different substrate materials could explain why we are seeing the problems in different pockets at different times.

Ray Wuollo (Barr) presentation:

- Recent changes to metro groundwater model that allow transport simulations though 2016.
- Precipitation has been going up in recent years.
- Except for past 3-4 years, Nokomis water level went down in winter. Water level is probably being buffered by groundwater.
- Recharge in the last 4-5 years is different than in the previous 25 years.
    - Average recharge in 1988-2011: 10.1 - 12.0 in/yr
    - Average recharge in 2012-2016: 14.1 - 16.0 in/yr
    - That's an increase of 45-60%. The increase in precipitation alone cannot explain it.
- Increased recharge is happening across South Minneapolis, not just in Nokomis watershed.
- 1 – 2 inches more is a big deal when water table is very shallow - get rejection of infiltration and ponding, can have a large effect in peat soils.
- Lake Nokomis is acting like a giant well.

Question of "why?" (why recharge has increased more than precipitation alone explains)

- Transpiration was a big factor in reducing recharge in the past. But the longer periods of time between the growing season and frozen ground during the last five years is allowing more recharge to occur because the plants are not taking up water so late in the year & the ground is not frozen and causing the water to runoff.
- Rainfall increase and period between ice out to growing season, and growing season to ice, so less evaporation corresponding to increased precipitation.

Supports putting in wells to verify model.

Discussion about weir. Previously observed winter declines in Nokomis waterlevels are not related to weir operation because the outlet elevation has been set at 815.10 since the early 1930s. When the lake drops below 815.10 ft it is due to other factors, as the lake physically cannot be lowered below 815.10 by the outlet.

Seems to have been more capacity in the soils to accept additional water in the past. The capacity may not be there now.

Is this the new normal?

Management of stormwater has not changed substantially. Ponds around Lake Nokomis were constructed for water quality purposes primarily, not stormwater management. Volume of stormwater flowing to Nokomis has not changed.

Mother and Taft Lakes are expressions of the water table.

Misinformation is out there. For example, the problems in the area are not because of the airport. MAC is not sending more water in the direction of Nokomis. How best address misconceptions?

How do wells get paid for? $25K could cover installation and electronic monitoring of wells, and a report. DNR has a need for more shallow wells in metro area.

City will continue to make sure its infrastructure is operating as it should be.

What can be done with weir? Keep it open? The weir was open for more than 100 days last year and that did not help the situation. Homes were experiencing problems when lake level was only six inches higher than the weir runout. Important to monitor flows and rates. USGS suggested automonitoring lake level to better quantify discharge through the weir. MPRB and MCWD will work on this. Suggestion of opening the Nokomis weir early, MPRB and MCWD will work together on this.

Next Steps

- Presenters will provide presentation materials to City for posting on project webpage. Keep current technical information and meeting minutes on the City's website and continue to meet with interested/concerned citizens: http://www.ci.minneapolis.mn.us/publicworks/stormwater/nokomisgroundwater
- Continue to map infrastructure impacts to help determine whether they are connected to potential water level changes.
- MCWD and MPRB will work on opening Nokomis weir ahead of ice-out and look at measuring flux/water level changes.
- Keep local residents and elected officials informed of progress.
- Review water elevation information on sewer plats and if needed supplement with measured water levels from City water manholes to gain a better understanding of groundwater levels. Reconvene to explore whether additional wells are needed and if changes can be made to existing infrastructure to alleviate challenges and if so, how to pay for projects.
- Develop a holistic plan for this process that includes additional funding if necessary.
- Develop a communication plan that includes scheduled public meetings for updates and progress tracking.