# Seeing Farther

A publication of Prein&Newhof

Spring 2017

www.preinnewhof.com


## New road saves city $200,000 annually on sewer bill

The City of Roosevelt Park struggled for decades with problems related to a high groundwater table. The high groundwater table was caused by a relatively shallow layer of clay close to the surface. After a rainfall, the City's roads drained poorly and were not connected to its storm sewer system. Inadequate road drainage accelerated road deterioration and added to the City's problems with high groundwater. Many residents had to take extra steps to alleviate basement flooding.

When Roosevelt Park built its sanitary sewer system in the 1940s and 50s, it installed drainage tiles on each side of the sewer pipes so groundwater could flow into the new sanitary manholes to control groundwater levels. Residents also connected footing drains and sump pumps to the new sanitary sewers to keep their basements dry. While these actions helped to lower the groundwater, they significantly increased the amount of water that had to be treated at the wastewater plant. Later on, the City installed four pumping stations to further alleviate its groundwater problem by redirecting it to the storm sewers. Unfortunately, this solution did not capture the majority of groundwater flow that regularly entered the sanitary sewer.

In addition, the groundwater that was entering its sanitary sewers was pumped to and treated at the Muskegon County Wastewater Plant. This process increased the volume of wastewater treated, resulting in higher sewer bills for the City's residents. The City's normal wastewater flow from residents and businesses to the treatment plant was about 250 gallons per minute (gpm), as observed during dry seasons when groundwater was low.

During high groundwater periods (rainfall and snowmelt), the City's volume increased up to 1,300 gpm (five times more than its normal flow).

Prein&Newhof designed several roads for Roosevelt Park in the past and during those projects often heard about its groundwater problems and high sewer bills. After reviewing studies conducted over the last 20 years, P&N Engineer Barbara Marczak, PE wondered if the groundwater could be directed to another location. She and other staff members developed an innovative way to lower the groundwater by installing a deep underdrain during a scheduled road reconstruction. The topographic map suggested the underdrain could work by gravity under Roosevelt Road (pictured), but it needed to cross into the neighboring City of Norton Shores to find an outlet.

After a survey and a hydrogeological study, P&N proposed an engineered groundwater drain under the roadbed. While many roads use underdrains, they typically only remove the water percolating through the roadbed. A drain used to lower a high groundwater table requires more thought. P&N designed the drain to handle an average flow of 350 gpm and a peak flow up to 1,000 gpm. The drain directs groundwater by gravity (eliminating the four pump stations) to a small stream in Norton Shores. Removing groundwater from its sanitary sewers reduces Roosevelt Park's energy, operational, and treatment costs.

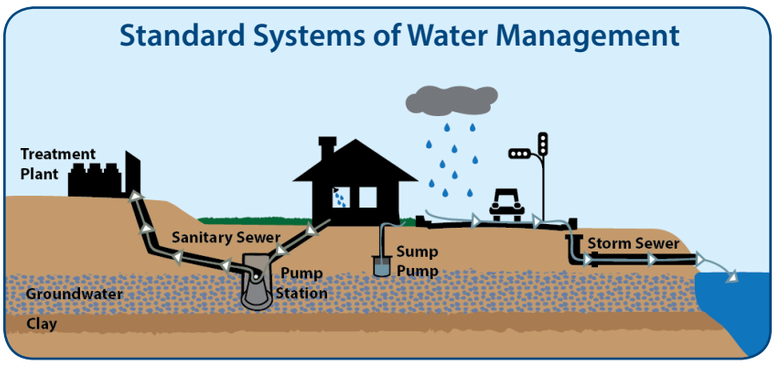
Roosevelt Park's council and citizens heard presentations explaining the road and groundwater problems, along with the proposed solution, before approving project funding. The City received one grant to help rebuild Roosevelt Road and an MDOT grant to improve safety and traffic flow on Greenwich Road around Campbell Elementary School, mitigating traffic flow during drop–off and pick–up periods.

see DRAIN, back page

Before (March 2015)

During (June 2016)

After (October 2016)




### MDEQ DEADLINE REMINDER

All water systems in Michigan serving more than 1,000 people are required to implement a Drinking Water Asset Management Program by January 1, 2018.

Are you prepared? If not, we can help you meet that deadline.

## GIS–Based Mobile App helps manage Street Lights

*"There's an App for that!"* How many times have you heard that phrase? In this digital age, the convenience of having information readily available can't be overstated. The City of Norton Shores turned to Prein&Newhof to simplify its street light utility management process, and the result is a more efficient and user–friendly system.

In the past, City field personnel would tie orange ribbons around faulty or broken street lights. Then they would verbally communicate the issue to City office staff, who documented and shared it with the electric provider. This process delayed both problem identification and response.

Prein&Newhof created a GPS data collection template specific to the City of Norton Shores' street light utility needs. After a brief GPS training session, City staff began collecting field inventory including the size of each street light, the nearest address to each utility, and a photo of each.

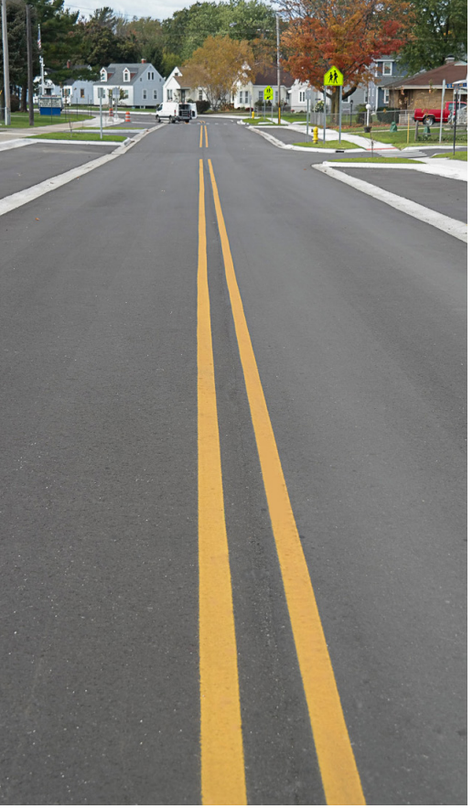
Prein&Newhof processed the GPS data and compiled a GIS database totaling 2,000 street lights. The data was then loaded into Esri's ArcGIS Online giving City staff the ability to update the status of each light from a smart phone or tablet via Esri's Collector App, or in the office through a desktop browser.

This solution allows real–time communication between City personnel, and can generate a report at any time for the electric provider to inform them of relevant street light issues.

For more information on how GIS can help your community, contact **Ed Dempsey** at 616–364–8491.

"The street light mapping application has significantly improved our ability to communicate accurate location information regarding light outages to our electric provider, while simultaneously reducing the time employees spend on these tasks."

Terry Sladick, Streets & Drainage Superintendent, City of Norton Shores



# Seeing Farther

Spring 2017

**Infrastructure for where you're going.**

Prein&Newhof

www.preinnewhof.com

Grand Rapids • Holland
Kalamazoo • Cadillac • Muskegon
Traverse City


Prein&Newhof
3355 Evergreen Drive NE Grand Rapids, MI 49525
Address Service Requested



PRSRT STD
U.S. POSTAGE
PAID
Grand Rapids, MI
Permit No. 552




DRAIN, continued

Traffic signs, electric crosswalk signals, a solar–powered speed radar sign, rapid flashing beacons, and dedicated drop–off and pick–up lanes now ease congestion and give order to chaos. In a parent survey taken after the road opened, 90% of parents said the project made traffic flow safer for students when arriving and leaving the school.

While Roosevelt Park's road reconstruction and safety improvements are significant, the results from its new groundwater collection sewer makes this project truly unique. In April 2017, wastewater flows ranged from 400,000 to 500,000 gallons per day (gpd) compared to 2011–2016 average of approximately 750,000 gpd at the same time of year. This 'road' project reduced total sanitary sewer flows from the City by 20 to 30% and is expected to save the City roughly $200,000 a year in wastewater bills.

If you have high groundwater or drainage challenges, contact **Barbara Marczak, PE** or **Peter Brink, PE** at 616–364–8491.

**Prein&Newhof specializes in:**

- Civil & Environmental Engineering
- Environmental Consulting
- Surveying
- Geographic Information Systems
- Laboratory Testing

## P&N Welcomes 6 More Professionals

**Erik Allore** joined Prein&Newhof in November, working as an Engineer–in–Training from our Muskegon office. Erik graduated from Michigan State University in 2015, with a bachelor's degree in civil engineering.

**Ryan Russell** joined Prein&Newhof in January, working from our Kalamazoo office as an Engineer–in–Training. Ryan graduated from Western Michigan University in 2010, with a bachelor's degree in civil engineering.

**Travis Eisen** joined us in February as a Laboratory Technician. Travis graduated from Grand Valley State University in 2010, with a bachelor's degree in biology.

**Kevin Koster, PE** joined Prein&Newhof in February, working from our Grand Rapids office as a Civil Engineer. Kevin graduated from Michigan Technological University in 2004, with a bachelor's degree in civil engineering.

**Nicholas Justice** joined our Kalamazoo team in March as a Survey Crew Assistant. Nicholas graduated from Michigan State University in 2016, with a bachelor's degree in environmental geoscience.

**Chase Schepke** joined Prein&Newhof in March, working as a Field Services Technician from our Grand Rapids office. Chase graduated from Western Michigan University in 2014, with a bachelor's degree in geophysics. He is currently working towards his master's degree in structural geology and hydrogeology.


**Seeing Farther** is published for clients and colleagues of Prein&Newhof.

Articles should not be reprinted without permission from Elizabeth Newhof, Editor, or Kayla Fournier, Associate Editor.

Please send comments and address corrections to: info@preinnewhof.com.


Stay connected with us on what we're doing and how we can help you:

@PreinNewhof

www.facebook.com/preinandnewhof