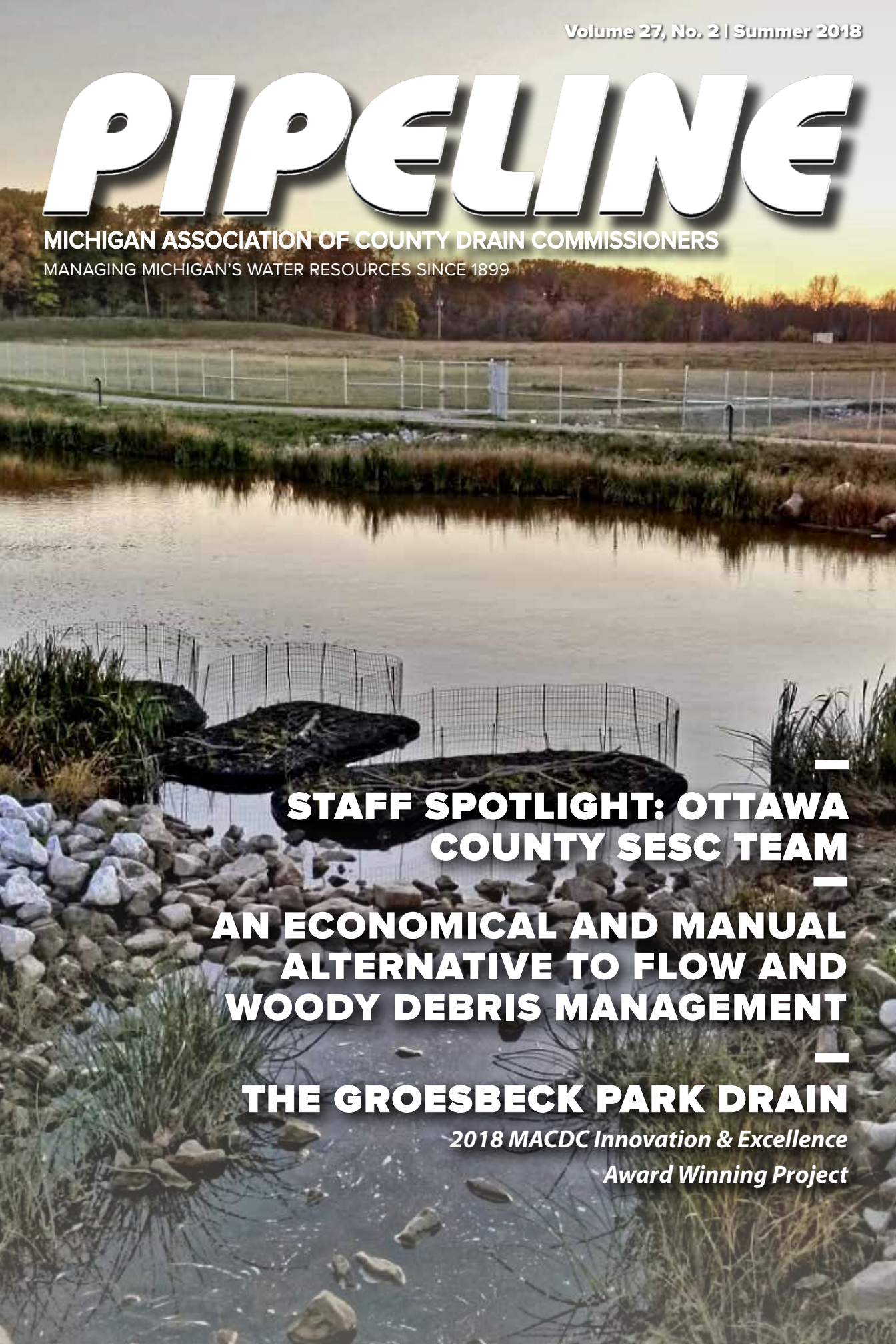
Volume 27, No. 2 | Summer 2018

PIPELINE

MICHIGAN ASSOCIATION OF COUNTY DRAIN COMMISSIONERS
MANAGING MICHIGAN'S WATER RESOURCES SINCE 1899



STAFF SPOTLIGHT: OTTAWA COUNTY SESC TEAM

AN ECONOMICAL AND MANUAL ALTERNATIVE TO FLOW AND WOODY DEBRIS MANAGEMENT

THE GROESBECK PARK DRAIN

2018 MACDC Innovation & Excellence Award Winning Project

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PRESIDENT'S MESSAGE

DAVID THOMPSON
Monroe County Drain Commissioner

The summer construction season is upon us again. Orange barrels line the streets and highways. This is our Big Show. This is the time when we do the most for our constituents. A very busy time for Commissioners to be sure. If you're like me, and I know most of you are, you also have family, friends, community service obligations, and hobbies. You are being pulled in several different directions and don't quite have time for all. We must do our jobs. We must serve our communities. We must alleviate some of the stress, or we will explode, so we have a hobby. Some do wood working, others play sports. As most of you know, I shoot competitively. The next thing you know, you are out of time.

I know what you are thinking. "David, you forgot the most important thing." You are right, I did. Family is the most important thing that I listed above. It is also the most common thing we take for granted. I love my family as do you. Sometimes I get lost in the job, or other obligations and knowing that the family is home, safe and functioning, I don't worry about them. They will always be there right?

I'm glad I haven't had to find out the answer to that last question yet. So what is Thompson trying to tell us you ask? Friends, stop and smell the roses. Time moves faster than we realize. I blinked my eyes the other day and my twins were 8 years old, my wife was graduating with her Master's degree and my golden retriever was 9. When did all this happen? Oh, I know! I was working, serving the community, or relieving stress with my hobby. Remember that song "Cats in the Cradle"? Listen to it and really let the story sink in. I've never met a person who on their death bed said, "I wish I would have put a few more hours at work." I for one am going to make my family more of a priority. I'm sure some of you already have this in balance, but for you that just answered the wakeup call.

"Life moves pretty fast. If you don't stop and look around once and a while, you could miss it," Ferris Bueller.

HP Storm HIGH PERFORMANCE

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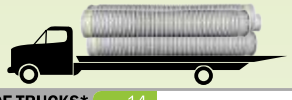
ADS SETS THE STANDARD FOR STORMWATER PIPE

ADS HP Storm and N-12® pipe utilize state-of-the-art lightweight materials. The pipe installs twice as fast, creates a safer working environment and saves money when compared to RCP.

DELIVERIES



OF TRUCKS* 14

- HP Storm uses less trucks
- Self unloading - no lifting required

OF TRUCKS* 49

- RCP uses more trucks
- Machinery required to unload

STAGING

- HP Storm is able to be stacked high
- Nest smaller diameters

- RCP stacks two high

STRINGING

- HP Storm can be moved quicker
- Handle safer

- RCP is moved two at a time
- Requires machinery

* Based on 5,000 feet of 30" diameter pipe.

INSTALLATION

A typical project with 5,000 ft specified on the plans will net you:

- **25 days using HP Storm (56 days with RCP)**
- **250 joints using HP Storm (625 joints with RCP)**

*Data compiled from RSMeans

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STAFF SPOTLIGHT

OTTAWA COUNTY WATER RESOURCES COMMISSIONER: SOIL EROSION AND SEDIMENTATION CONTROL (SESC) PROGRAM

The Ottawa County Water Resources Commissioner (OCWRC) is the County Enforcing Agency under Part 91 of NREPA, the Soil Erosion and Sedimentation Control Act. This means OCWRC is responsible for permit application and site plan reviews, issuing permits, site inspections, and enforcement for activities involving earth disturbance greater than one acre or within 500 feet of the water's edge.

Joe Bush, the Ottawa County Water Resources Commissioner, depends on two key staff to effectively manage the Part 91 program:

- **Jon Braxmaier, Erosion Control Agent**
  Jon has been with the OCWRC for 11 years. He has been the Erosion Control Agent for the last five years and was the Erosion Control Inspector prior to that. He has over 35 years of construction experience working with single family homes and large developments. He also serves on the Board of Directors for the West Michigan Soil Erosion Control Network and is actively involved in the Macatawa Watershed Advisory Committee.
- **Angela Walachovic, Erosion Control Inspector**
  Angela earned a Bachelor's Degree in Natural Resource Management from Grand Valley State University and has been the Erosion Control Inspector for Ottawa County for five years. She grew up on a farm and has gained valuable experience being involved with the family farming and construction businesses. She serves on the Public Engagement Committee for the Lower Grand River Organization of Watersheds (LGROW) and is actively involved in the Macatawa Watershed Advisory Committee.

Jon and Angela standing next to a map of Ottawa County and its 900+ drains.

Ottawa County, with a population of approximately 285,000 people, has on average about 1,200 active SESC permits at a given time. It is impressive what this team can accomplish with such limited resources. The workflow of Jon and Angela is similar to that of a well-oiled machine.

OCWRC has a multiple step process for Part 91 permits:

1. Permit application is submitted to the OCWRC
2. Fees are paid at the time of application
3. Application and site plan reviews are completed, which will include a site visit
4. Permit is issued
5. Inspections occur

Applicants can apply for permits at the counter or can submit applications by email. The review process does not begin until all required documents are submitted and fees are paid. Applications are reviewed and processed in the order they are received. Part 91 allows for a 30-day window from time of application to permit issuance. However, often the permits are issued within 7-10 days.

Commercial and residential projects are classified as high, medium, and low erosion potential, which is determined during the permit application review based on factors such as soil type and slope. The classification determines the frequency of inspections. For example, sites with a high erosion potential are inspected on average two times per month and after significant rain events.

When sites are found to be out of compliance, OCWRC will typically send a correction letter first, and a violation notice will follow if corrective measures are not implemented. Contractors are given a fair opportunity to correct a problem before violations are issued. This process works well in getting a response, and they don't often need to write violations. The MDEQ is contacted when there are impacts or unauthorized activity within wetlands.

Currently all permit and inspection activity is tracked in Microsoft Access, but they are moving towards developing a new tracking program that would utilize the ESRI ArcGIS software.

OCWRC is fortunate to have many good contractors working in their community. Nonetheless, with 1,200 active sites under construction, it is inevitable that erosion issues will occur. Ultimately, the success of the SESC program relies heavily on the common sense approach that Jon and Angela take with the contractors.

Michigan Association of County Drain Commissioners

119th Annual Summer Conference

SCHEDULE AT A GLANCE

Tuesday, July 17

1:30 - 3:00 PM	**Legislative Meeting** *Bellaire Ballroom North*
3:00 - 5:00 PM	**Board of Directors Meeting** *Bellaire Ballroom North*

Wednesday, July 18

10:00 AM	**Registration Opens** *Parlor A Foyer*
12:00 PM	**Lunch on your own**
1:00 - 1:15 PM	**Call to Order and Welcome** *Parlor A*
1:15 - 3:00 PM	**Educational Sessions** *Parlor A*
3:00 - 3:15 PM	**Break**
3:15 - 5:00 PM	**Educational Sessions** *Parlor A*
6:00 PM	**Reception** *Bellaire Terrace and Ballroom*
7:00 PM	**Dinner** *Bellaire Terrace and Ballroom*
9:00 PM	**Entertainment**

Thursday, July 19

7:00 – 9:00 AM	**Breakfast** *Parlor B*
9:00 - 10:30 AM	**Educational Sessions** *Parlor A*
10:30 - 10:45 AM	**Break**
10:45 AM - 12:00 PM	**Educational Sessions** *Parlor A*
12:00 - 1:00 PM	**Lunch** *Parlor B*
1:00 - 5:00 PM	**Networking Activities** *Various Locations*
6:00 PM	**Reception** *Bellaire Terrace and Ballroom*
7:00 PM	**Dinner** *Bellaire Terrace and Ballroom*

Friday, July 20

7:30 – 9:00 AM	**Breakfast** *Parlor B*
9:00 AM	**MACDC District Meetings** *Parlor A*
9:30 AM	**Business Meeting** *Parlor A*
10:30 AM	**Adjourn**

CONFERENCE SESSIONS

Wednesday, July 18

1:15 - 2:00 PM Ways to Reduce Nutrient Runoff in Tile Lines

Mike Cook, MLICA & SWMS INC

Water quality issues as it relates to tile drainage discharge is a growing concern. Mike will explain various methods and practices to help reduce the amount of nutrient discharge. His presentation will also review testing and results of various methods, along with NRCS funding for farmers to install certain practices.

2:00 - 2:30 PM Water quality farming, what does this mean?

Jim Isley, Palmyra Township

Ed Scheffler, Lenawee County Drain Commission

With the recent Western Basin of Lake Erie being declared impaired, farmers are facing challenges to meet demands for improved water quality. A farmer led water quality working group was formed to bring together farmers to discuss practices and promote water quality on a voluntary basis. Agriculture is the largest industry in Lenawee County and very dependent on County Drain infrastructure; it is important that the drain office works closely with farmers to provide adequate drainage as well as to promote and partner in the water quality practices being implemented.

2:30 - 3:00 PM Advanced Bathymetric Surveying Technologies

Lucas Hanson, P.S., Spicer Group, Inc.

Multibeam sonar technology is used to collect high-density underwater topography of rivers, lakes, streams, and other bodies of water. Bathymetric LiDAR is an airborne acquisition technology that collects topographic data in addition to shallow-water bathymetry. These two technologies can be combined to produce a seamless point cloud dataset that represents an entire floodplain or drainage basin area.

July 18 - 20, 2018

Shanty Creek Resort, Bellaire, Michigan

Continuing Education Credit Available!

CONFERENCE SESSIONS *continued*

3:15 - 3:45 PM Legislative Update and Political Landscape

Deena Bosworth, MACDC

Mid-term elections, the end of Governor Snyder's administration and lame duck. This session will cover the policy and politics this election year and what drain commissioners can expect during the lame duck session. We will also discuss MACDC legislative priorities and the recently enacted legislation that affects local governments.

3:45 - 4:15 PM Social Media and Your Employees: What to do, What to do?

Helen Lizzie Mills, Fahey Schultz Burzych Rhodes, PLC

Social media has done wonders for improving connections between folks of all types on every issue imaginable: from crowd source funding, to pictures of the new baby and beyond. But that has come with a price tag—and there is an up-charge on that cost for public employers who seek to regulate their employees' usage of social media on and off duty. This session will discuss the state of the law and provide some pointers on managing personnel and their use of social media.

4:15 - 5:00 PM Drain & Water Resources Workgroup (DWRW): Who we are, what we've done and what's ahead....

Brady Harrington, MDARD

Joe Bush, Ottawa County Water Resources Commission

Patrick Ertel, MDNR

Matt Kowalski, USFWS

Water quality issues as it related to tile drainage discharge, is a growing concern. I will explain various methods and practices to help reduce the amount of nutrient discharge. presentation will also review testing and results of various methods, along with NRCS funding for farmers to install certain practices.

Thursday, July 19

9:00 - 9:30 AM Tax Delinquency Plus

Eric A. Schertzing, Ingham County

Drain Commissioners and Treasurers benefit from a solid basic understanding of each others functions. Knowing the tax delinquency and tax foreclosure process can help Drain Commissioners serve the citizens and manage Drain Districts. The opportunity with Land Banks in this process is also useful to know.

9:30 - 10:00 AM Brown Bridge (Boardman River): 5 Years After Dam Removal

Steve Largent, Grand Traverse County Drain Commission

The 1310-acre Brown Bridge Quiet Area (Traverse City) is a popular area for hiking and wildlife viewing. Brown Bridge dam, originally constructed in 1922, was removed in 2012 as part of the largest dam removal effort in Michigan's history. Hear about and view a first-hand account of the the dramatic day when the de-watering structure failed flooding over 50 homes downstream and the incredible journey back to where it is today. You won't believe the part about the footbridge!

10:00 - 10:30 AM Protecting Streams from Development Impacts

Ryan C. McEnhill, P.E., Eng., Inc.

Rivers and stream connect our communities and the health and quality of those resources are significantly linked to the amount of impervious area in the watershed. The session will address the effects of development on our water resources including stream hydrology and morphology. It will also outline steps Drain Commissioner's and communities can implement to reduce those impacts through proper planning, site plan reviews and petition drain projects.

10:45 - 11:30 AM CEA and APA audits; What you need to know to succeed

Matt Konieczki, MDEQ

David Thompson, Monroe County Drain Commission

In this presentation, Matt and David will tell you what you need to know to prepare for an audit, what to expect during an audit, and what can be done after an audit to resolve any identified problems.

11:30 AM - 12:00 PM Controlling Invasive Species

Stu Kogge, PWS, GEI Consultants

This session will cover proper identification of invasive vs. native species, methods to use (tools in the toolbox) for eradicating and controlling invasive species, and the pros/cons of the various methods. Species covered will include, but not be limited to, common reed (Phragmites australis), Japaneese knotweed (Polygonum cuspidatum), reed canary grass (Phalaris arundinacea), garlic mustard (Alliaria petiolata), and common buckthorn (Alnus frangula). Examples of proper and improper use will be provided.

Register online at www.macdc.us

THE PRICE OF WIRELESS

Cole Hedrick, Fahey, Schultz, Burzych, Rhodes, PLC

As many MACDC members are aware from previous Legislative Updates at both this year's Winter Drain Conference and the more recent Legislative Spring Update from MACDC, Senate Bill 637 ("SB 637") was originally introduced by Senators Hune and Nofs in October of 2017. Since its introduction, this bill was amended through negotiations with many, including MACDC. The amended bill was passed by the Senate and is now before the House Committee on Energy Policy. If enacted, SB 637 would institute laws for regulating small cell wireless facilities in public rights-of-ways ("ROW"). Small cell wireless facilities are typically wireless antennas and nodes with relatively small footprints because they are usually placed on existing poles. If successful, the right of drainage districts to protect their drain easements from interfering by wireless providers will be circumscribed.

SB 637 would permit wireless providers to install facilities and work on poles in, along, across, upon, and under a ROW as long as the "Authority" (such as a drainage district) with jurisdiction over the ROW has approved the application. Because drainage districts already have this right, it might appear that SB 637 simply codifies what is already the law. But wait, there's more! SB 637 actually limits the Authority's power to control its ROW because the bill prohibits Authorities from placing any moratoriums on applications or issuing permits for small cell wireless facilities, and it requires that application denials be specific and based only on one of the reasons defined within the bill.

When first introduced, SB 637 did not include any language that would have allowed a drainage district to deny an application, regardless of the potential effect to a drain or drain ROW. To remedy this issue, MACDC worked with legislators to implement the addition of language that, if SB 637 passes, would allow drainage districts to deny an application if the proposed activity would:

A. Materially interfere with maintenance or full unobstructed use of the drainage infrastructure as it was originally designed; or

B. Not be located a reasonable distance from the drainage infrastructure to ensure maintenance under the drain code of 1956, 9 1956 PA 40, MCL 280.1 to 280.630, and access to the drainage infrastructure.

MACDC's work on this bill was significant. Without the amendments, the permits submitted by wireless providers would have done little more than provide notice of what the provider intended to do within the ROW; drainage districts would have to approve every application for small cell wireless facilities, regardless of the impact it would have on the drain.

But wait, there's more! Beyond restricting the reasons for an application's denial, SB 637 would also regulate the rates and fees that can be charged for the implementation of small cell wireless facilities in a ROW. The original language called for $100 each for up to 5 small cell wireless facilities and $50 for each additional facility within an Authority's jurisdiction. MACDC consulted with engineers, and determined the application fees at those figures would not even cover the review of the application, putting drainage districts that receive these applications in the hole right off the bat. Consequently, MACDC helped negotiate a slight increase in price, so that if the bill passes, drainage districts could charge a permit application fee of up to $200 for each small cell wireless facility or $300 if the permit included a new utility pole.

Another success for MACDC came when the timeline language was amended. Originally, SB 637 required that an Authority give notification of an incomplete application within 30 days of receiving the application, or else the application is deemed to be complete. Notification of an incomplete application would toll the statutory timeline. However, the supplemental submission would simply resume the timeline. If left unchanged, a drainage district that sent a notice of an incomplete application on the 29th day would only have a single day to review the supplemental submission for completion before the statute automatically deemed it complete. This explanation was successfully used to support another amendment. Now, if the bill passes, drainage districts have at least ten days after receiving a supplemental submission to notify the applicant if the documents received were still inadequate.

In an effort to further protect drains, MACDC also helped negotiate an amendment, providing that if work performed to install or maintain a wireless

facility damages the ROW, the drainage district could require the wireless provider to make necessary repairs. The language does not require that negligence be shown, only damage to the ROW. If repairs are not made within 60 days, the drainage district can make the repairs itself and charge the wireless provider for its reasonable and documented costs.

Some other notable changes adopted in the substitute version of SB 637 that the Senate passed include:

1. Language prioritizing colocation (installation on current poles already located in the ROW) over the installation of new poles, which will hopefully limit the impacts to public ROWs;
2. A requirement that the structures and facilities constructed and maintained under this act shall not obstruct the legal use of the Authority's ROW;
3. A requirement that notice be provided to all Authorities when a ROW is shared between multiple Authorities, which will help foster communication and ensure all necessary permissions for the proposed activity are obtained; and
4. An obligation that the small cell facilities be labeled with contact information so local units know who to call in case of an emergency.

Michigan law provides that all easement owners have the right to protect the uses under their easements from competing uses granted later in time that create an interference. SB 637 would limit that right where the competing use is a wireless provider. While MACDC has been successful in convincing the Senate to preserve many of those rights through amendments to the bill, there is much work to be done in the Michigan House. MACDC and its counsel will continue to work with legislators to promote our member's interests and those of the public that each Drain Commissioner helps represent. Additionally, we will continue to provide updates on this legislation as they become available. SB 637, as passed by the Senate, can be seen in its entirety on the Michigan Legislature website (http://www.legislature.mi.gov/).

AN ECONOMICAL AND MANUAL ALTERNATIVE TO FLOW AND WOODY DEBRIS MANAGEMENT

Stu Kogge, PWS, GEI Consultants

Do you remember the old legend of the famous steel driver John Henry? Henry worked for the C&O Railroad Company pounding steel drills into rock for dynamite holes and clearing rock for railroad rails and tunnels. While working at Big Bend Mountain in the Allegheny Mountain range of West Virginia, Henry challenged a salesman that he could beat his steam-powered drilling machine. In a battle of Man vs. Machine, John Henry smashed his way through Big Bend Mountain (creating a train tunnel) and beat the machine with true grit and sweat.

In today's society we are constantly looking for ways to improve efficiency, often through technology and mechanization. And while equipment can indeed provide efficient ways to accomplish a great deal of work, there is still a time and place for good old fashioned hard work. Doing things the old fashioned way can be preferred in many situations in life, including—believe it or not—drain maintenance.

INTRODUCTION

A common problem facing County Drain Commissioners is keeping up with removing obstructions to flow, which can cause drains to overflow banks and cause flooding, often precipitating numerous complaints. Types of obstructions can vary and come in all sizes and shapes. Most obstructions to flow are the result of downed woody material (i.e. dead trees and branches) falling into drains, which catch debris and leaves, thereby causing further blockages and diversions to flow.

Large woody debris is not the only culprit. Other offenders include undersized culverts, failed bridge crossings and wall abutments, shrubs and herbaceous vegetation, as well as more unusual items like cars, bikes, refrigerators, box springs, and garage doors. All of these can back up water and push it laterally out of the main drain channel and into adjacent floodplains, lands, fields, and yards.

County Drain and Water Resource Commissioners and their staff have evaluated and addressed these obstructions in many ways in the past. This article focuses attention on a method that is often overlooked and has been perceived by many as folklore or outdated that cannot be cost competitive with current mechanical technologies. There are, however, some old tools in the toolbox that still work effectively, and in many instances, can be a preferred and cost-effective alternative in ecologically sensitive areas.

TYPES OF OBSTRUCTIONS

The most common types of obstructions are vegetative, structures, and sedimentation. Each of these can slow or block drain flows in various ways. It is important to keep in mind, however, that some of these obstructions may have ecological or human benefits, and efforts to remove obstructions should always be considered in a broader context.

Vegetative obstructions usually consist of single to multiple large trees falling into and/or over a drain, multiple stems of shrubs growing out of drain banks and bottoms, or dense stands of herbaceous vegetation that can both overhang and choke off an entire drain channel. All of these obstruct flow, trap additional material, and further exacerbate the flow obstruction problem.

It is important to keep in mind, however, that these perceived obstructions in drains such as submerged and partially buried logs provide valuable habitat (i.e. shelter, cover, feeding sites) for fish and aquatic biota. Overhanging shrubs and tree canopies provide thermal shading and reduce growth of herbaceous plant species that could otherwise cause greater obstructions to flow. Removal of this "debris" can be detrimental to aquatic organisms, so removal should strike a balance between drain function and ecological considerations.

Structures can cause obstructions if improperly placed, positioned, or if they become damaged or merely exceed their life expectancy. Undersized culverts and crossings that cannot pass larger or frequent storm-events often lead to upstream flooding issues.

Sediments deposit within a drain when water velocities are insufficient to keep soil particles in suspension and moving downstream. Accumulation of sediment often leads to further obstructions to flow and perpetuates the cycle of more sedimentation and more blockages to flow (outside of natural drain channels). Sedimentation also can reduce water quality and impair habitat for aquatic organisms.

METHODS FOR REMOVING OBSTRUCTIONS

Methods used may vary depending on the type and severity of the obstruction, location, time of year, and environmental sensitivity of the drain and its surrounding resources. Typical methods include mechanical dredging and manual removal. Use of either method for removal of obstructions and sedimentation will have some level of impact (positive and negative) on a drain or stream's ecosystem and its physical characteristics, specifically with respect to:

- Effectiveness for short- and long-term removal of obstructions
- Sedimentation
- Vegetation
- Bank stabilization

Traditional: The most commonly used method is dredging. This method usually utilizes large mechanical equipment such as backhoes, excavators, drag-lines, and similar machines to remove sediment and vegetation that is present in the drain to restore the drain back to or near its original design dimensions. This method is typically the least environmentally sensitive since it often requires the removal of material from the banks of the drain to create access for equipment. Removed spoils are then disposed of within the drain right-of-way or trucked off-site. The cost for dredging and on-site spoiling of dredged material has historically ranged between $3 and $5 per linear foot but recent discussions with commissioners and their maintenance staff indicate those costs are rising in some instances to over $10 per linear foot.

Another form of dredging, mainly for removing sediment, is hydraulic dredging. It utilizes a high-powered pump to vacuum sediment from the bed of a drain up and into an upland dewatering basin or to transportable geo-tubes. Most hydraulic dredging systems have cutter heads at or near the intake ends to grind and reduce the size of material that is being drawn up in a water slurry to a receiving vehicle or constructed sediment basin. The cost for hydraulic dredging can vary widely depending on the distance and elevation material needs to be pumped to, the width and volume of material being removed and change in elevations and the size of the equipment needed.

Manual: The manual labor method has been used for years by drain commissioners through the use of prison crews, local contractors, and sometimes private interest groups wanting to help. The use of manual labor to clear blockages typically involves the use of chainsaws, handsaws, loppers, winches, and other hand tools. This method has the obvious advantage of being able to be more sensitive to tree and vegetation removal and reducing overall costs, by not having to clear out corridors for equipment access. The banks and bed of the drain are left intact with only woody material being removed, eliminating the need to re-grade, seed, blanket, and otherwise re-stabilize drain banks to reduce their erosion and sedimentation back into the drain. Material removed is taken out of drain channel, bankfull areas, and up and out of the floodplain (where practicable).

Over the years, we have learned much about properly clearing obstructions and the different techniques that can be used to extend the time between maintenance events. Each approach has its advantages and disadvantages. The remaining sections of this article will compare traditional dredging methods with manual labor methods. Recent manual removals of woody debris, overhanging and in-drain wood vegetation, and human refuse within Eaton County's Kettler Norris Drain will be used an example project.

KETTLER NORRIS DRAIN

The Kettler Norris Drain is a warm water, relatively low water quality drain in Eaton County, Michigan. The Eaton County Drain Commissioner's office received numerous complaints from land owners reporting significant flooding and loss of drain function. The drain and its associated right-of-way were assessed by GEI and ECDC staff. The assessment determined that the drain was overgrown with shrubs, had numerous downed trees and branches, had human refuse and debris dumped into the drain, and that there were several private drain crossings that were not working properly. These obstructions decreased flows, increased accumulation of sediment in the drain, reduced storage capacity within the drain channel, and lowered the water quality.

The Work: A team of five people using chainsaws, rope-wenches, loppers, handsaws, and hand tools removed obstructions from 3.5 miles of drain in three weeks' time. Trees, branches, shrubs, debris, and trash within and overhanging the drain were removed from the drains and their bankfull areas to restore their functionality within the dimensioned areas as shown in Figure 1.

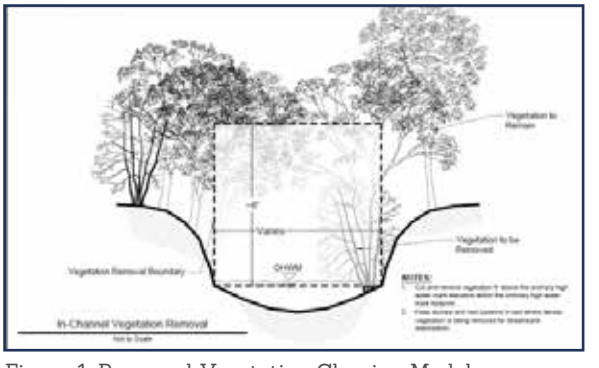

Figure 1: Proposed Vegetation Clearing Model

Removal of vegetation and obstructions from the "boxed" area (Figure 1) allowed the team to focus work/removal efforts to those areas of greatest potential to cause current and future obstructions to flow while keeping the shading and thermal cover provided by the larger tree and shrub branches that don't pose an imminent threat to the drains' functions. None of the drain banks or easement areas were denuded or destabilized by this work. This reduced the need for additional effort and cost to (1) clear trees out from the easement to get equipment access to the drain, (2) locate a place to put dredge spoils, and (3) seed and mulch all disturbed areas created by dredging, movement of equipment, and placement of spoils.

A typical blockage of shrubs growing within and overhanging the drain channel is shown in Figure 2.

Figure 2: Clearing Vegetation

Potential future blockages were also assessed. Dead trees and limbs were cut down to minimize the possibility of future log jams or blockages (Figure 3). Dead and dying trees were removed if they had the potential to fall into the drain and cause an obstruction.

Figure 3: Clearing future obstructions to flow

Culverts were evaluated for functionality and proper maintenance. Culverts were cleared of log jams that restricted water flow and impeded proper function (Figure 4).

Figure 4: Assessing Culverts

Human refuse and trash accumulated at points of obstruction and further exacerbated the accumulation of sediment and reduction of water quality and drain function. All human refuse and trash were removed from the drain and disposed of properly (Figure 5).

Figure 5: Cleaning out human refuse (garage door panel)

The debris was removed from the drain by dragging it up and out of the bankfull areas and floodplains (where possible). Removing the debris from the flood plain minimized the chance that it would be transported back to the stream and cause another obstruction (Figure 6).

Additional photographs of various reaches of the drain before the work started and after each section was completed are provided as Figures 7 and 8.

COST ANALYSIS

The story continues when we analyze and compare the cost and ecological benefits of the traditional dredging method vs. manual labor method.

Currently, commissioners only receive $5,000 per mile of drain for maintenance under Chapter 8 of

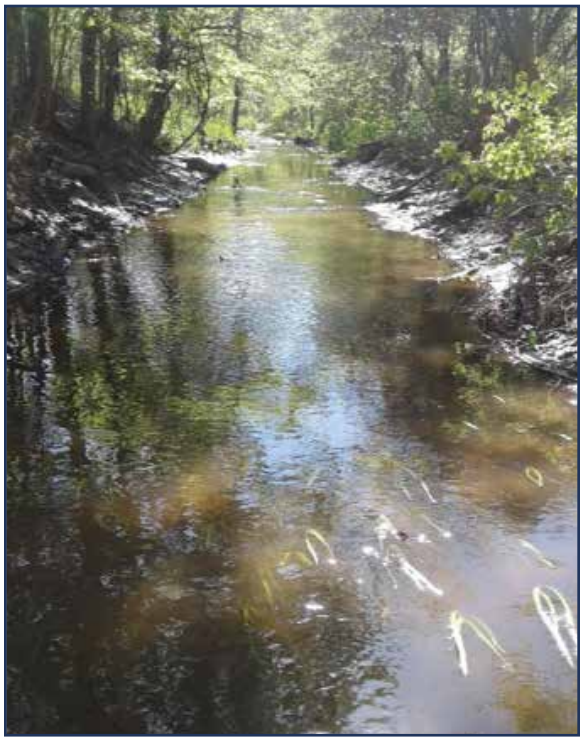

Figure 6: Debris Off Flood Plain

the Drain Code. Because of this tight budget, drain commissioners look for the most cost-efficient methods possible while still delivering the highest value when contracting out drain maintenance activities.

Traditional: The cost to remove obstructions such as those described above using mechanical methods would have conservatively ranged between $3 and $5 per linear foot. Using 3.5 miles of maintenance work for the Kettler Norris Drain, the cost to mechanically remove the obstructions would have been between $55,440 and $92,400.

Manual: The use of man power to complete the Kettler Norris Drain maintenance work was completed at a cost of $2.65/linear foot. The drain commissioner's office was billed less than $37,000 for our services since we had provided a not to exceed contract which we honored. This equated to only $2.00 per linear foot for this maintenance work.

Using either $2 or $2.65 per linear foot, the use of manual labor was a more cost effective and more environmentally sensitive means of conducting drain maintenance. No mature trees of interest to landowners were removed and no areas of earth were disturbed to require seeding, blanketing and other forms of stabilization.

Using the Kettler Norris Drain and several other drains and non-designated drains throughout Michigan where manual labor has been used to remove obstructions, an estimated range of cost

Figure 7: Typical results before and after vegetation removal.

Figure 8: Vegetation removal

for using manual labor is between $2.00 and $4.00 per linear foot. The range is dependent on the density and type of obstructions within the drain channel.

ECOLOGICAL ANALYSIS

A month after the Kettler Norris Drain project was completed, a quality assurance and quality control (QAQC) analysis was done to assess the effectiveness of the work. This required walking the full 3.5 miles to do a final clean-up to make sure we "left no stone unturned" (i.e. no blockages or potential blockages still in place).

A post-removal assessment of the drain showed that water levels had receded but more importantly, the stream channel was narrower, sediment deposition was less, and numerous

areas of gravel were now visible in the bed of drain where it had previously been sand and other detrital material.

The inspection also showed drain banks had not been nor showed any new signs of having been adversely impacted. There were no signs of bank erosion or sedimentation from the manual removal of the obstructions. During the walk-through, additional materials and shrub stumpage were removed that weren't visible during previous efforts when water and sediment depths were greater.

Sedimentation: The QAQC showed that removal of obstructions allowed for natural flows to return to the drain channel, and subsequently pick up and transport the previously deposited sediments downstream.

In drains where contaminated soils are suspected, use of the dredging method often requires spoils to be tested and under worst case scenarios may require disposal at a landfill. These additional steps add significant costs to a dredging project.

The manual labor method does not dredge or have spoil piles, so there are no testing requirements, on-site stabilization costs, or off-site disposal costs. The manual labor method showed that the movement of sediment is a natural one and does not occur all at once. The traditional dredging method uses a bucket to move sediment all at once, creating very turbid waters. It causes some level of shock and sedimentation by the nature of the dredging, and does cause direct adverse impacts on aquatic resources by their removal along with the bottom sediments (e.g. any benthic macroinvertebrates, mussels, and fish unable to escape). The manual labor method has a more gradual removal of the sediments, giving the ecosystem more time to adapt and prepare for that removal of sediment.

The gradual natural transport of sediment in the drain bed revealed a gravel bottom. Exposing gravel provides another bottom substrate that is favored by relatively higher water quality fish and macroinvertebrate biota, as compared to silt and muck (organic) substrates. The use of the traditional dredging method often removes not only the silt and organic material, but also the desired gravel bottom (personal observations from an intercounty drain project in southwest Michigan – on that project hundreds of freshwater mussels were also removed from the bottom of the drain).

Observations were made in lower muck levels due to the increased flow of the stream (Figure 9). Kettler Norris Drain had a high volume of muck settled out in the drain causing poor drainage and a lack of storm water seeping into the ground water.

Figure 9: Red lines show previous elevation of bottom substrates/sediment. Yellow lines show current elevation. Lower photo shows boulders that were buried under sediment and are now exposed.

Vegetation: Removing obstructions along the stream bank revealed bare ground where native seed could now flourish. Regrowth of native vegetation was observed where the obstructions and sediments had naturally been transported downstream.

Use of the traditional dredging method can remove vegetation from the bank of the drain and portions of the native seed bank if scraped too deep. The manual labor method does not disturb or cut into the bank and leaves the natural seed bank intact.

Stream Bank Stabilization: Another benefit with the manual labor method is that the roots are still left intact in the soil when there is vegetation to be removed from the drain. The roots will still be able to keep unwanted sediments from eroding into the drain and streams. The traditional dredging method removes most of these root structures, weakening the stability of the drain bank, and potentially leading to more erosion in the future.

WHERE TO USE THE MANUAL LABOR METHOD

Several locations where manual removal of obstructions will be of greater benefit than traditional methods include, but are not limited to, areas that are environmentally sensitive, trout

and high quality warm water streams for fish, and properties whose land owners have issues with heavy equipment operations.

Environmentally Sensitive Areas: Environmentally sensitive areas are areas of special concern due to their unique landscape, historical value, wildlife, or presence or potential to harbor threatened and endangered species. These areas have included drains which flow through nature preserves or protected areas by various organizations. These often times have restrictions on what type of equipment can and cannot be used, where spoils can be placed, and what time of year the work can be done.

Coldwater Trout Streams (and high quality warm water fisheries): There are numerous coldwater trout streams in Michigan that are also county designated drains. Exemptions for maintenance and other drain related activities are more limited in these waters; however, the manual maintenance methods can in most instances be utilized without consequences. The removal of submerged wood material may be restricted, but if its submerged it typically should not be the main issue with respect to flow obstructions.

A high-quality trout stream in northern Michigan was targeted for selective removal of vegetation and downed woody debris. This woody material was obstructing flow of not just itself but also an adjoining county designated drain. Only wood material that was causing flow blockages, excluding submerged woody material that was serving as fish/macroinvertebrate habitat, were removed. Shrubs on the outer banks that weren't obstructing flow and providing thermal cover to the cold-water stream were not removed. Natural flows and sediment transport were restored, while not adversely impacting aquatic habitats. Habitats were improved in several areas, wherein previous sandy bottom substrates were now gravel. A win-win for everyone.

The manual labor method avoids denuding the banks, therefore allowing sunlight to be blocked from the stream and resulting in a cooler, more sensitive environment for trout and other important cold and warm water species.

Riparian Land Owners: Some land owners within the drain easement may not want big equipment to remove trees or vegetation within their property if it is not necessary. Many landowners recognize the wildlife and aesthetic values associated with uncut and uncleared easements and may be concerned with clearing of those areas if not absolutely necessary. Presenting the options of the traditional dredging method or the manual labor method to these land owners might alleviate some concerns that the land owner might have. It gives the land owner a decision on what they feel is best while accomplishing the goal of drain maintenance.

SUMMARY

The use of manual vs. traditional methods of removing sediment and obstructions from drain corridors can be most beneficial to drain commissioners where budgets are limited and ecological sensitivity is needed. In the examples provided, manual removal has been shown to be of greater benefit and cost value when compared to traditional methods for some drain maintenance activities.

Manual methods can directly remove obstructions and then indirectly remove/transport sediments from the drain channel while also improving water conveyance, flood storage, water quality, and habitat for biota. The manual/ecological alternative can be cost competitive ranging from $2.00 to $4.00 a linear foot. It is prudent to utilize this method in environmentally sensitive areas, streams/drains where obstructions are causing sedimentation, access to the drain has grown over and would be costly to restore, areas of good water quality, where public land owner restrictions require a greater level of sensitivity to woody vegetation (tree) removal), and other situations we have yet to run across.

John Henry beat the steam-powered drilling machine. He busted through that mountain faster and more efficiently. He showed that man power still has its place. Same is true today; there are places where machines and heavy equipment are the most appropriate tool to use for various types of drain maintenance. This article was provided to hopefully remind us that there will be situations where manual work is the most prudent, feasible, and cost-effective alternative.

Should you have any further questions please contact Joseph Vander Yacht at jvanderyacht@geiconsultants.com or (616) 499-1371 or Stu Kogge at skogge@geiconsultants.com or (517) 525-3882.

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THE GROESBECK PARK DRAIN: MANAGING URBAN STORMWATER FOR ENVIRONMENTAL PROTECTION COLLAPSE

2018 MACDC INNOVATION & EXCELLENCE AWARD WINNER

Brian Cenci, P.E., Eng., Inc.

A highly contaminated EPA Superfund site, several other sites used for both active and closed landfills and a community's drinking water were on a collision course. After decades of highly industrial and large commercial/retail development in and around the north end of the City of Lansing, the continually more impervious landscape within the area was funneling ever greater volumes of stormwater into the eastern edge of the North Lansing Landfill (NLL) and the northern parts of the Groesbeck Golf Course. This further pressured pollution plumes from the Superfund site and 11 other identified nearby areas of contamination into the groundwater just below the surface and in close proximity to the Saginaw aquifer, the source of much of Lansing's drinking water.

THE DRAINAGE DISTRICT

The Groesbeck Park Drain Drainage District (GPDDD) is a roughly 300-acre urban watershed in Ingham County that hosts a blend of commercial, industrial, residential, and recreational uses. It is home to the Groesbeck Golf Course and Bancroft Park, both important recreational resources in the City of Lansing, and several industrial sites of current / former landfills and gravel mining operations.

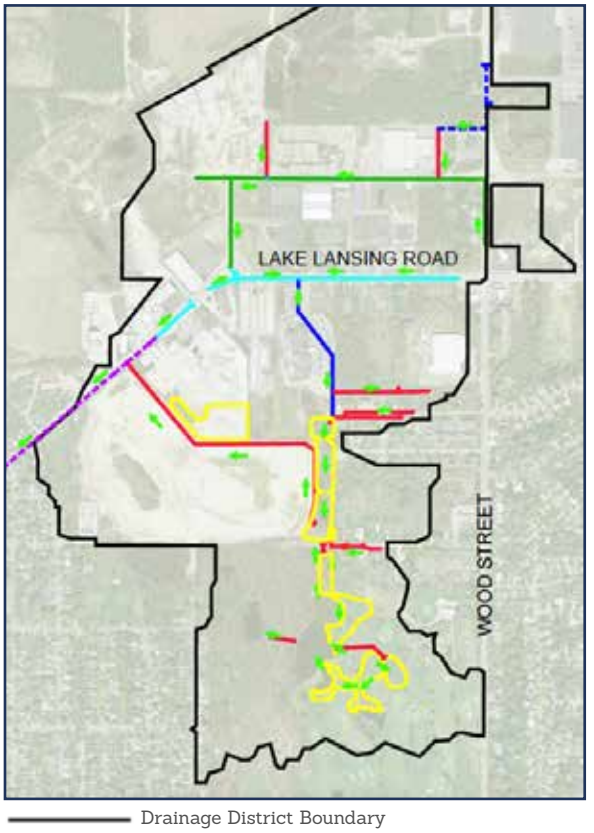
The Groesbeck Park Drain District was established in the mid-1980's. The first petition for creation of a Drain (Ch. 4) was filed in 1990 by Lansing Charter Township. A Board of Determination found it necessary, and in 1999 the ICDC began construction of $3-million project for the installation of an outlet pipe (36") from this District to the Grand River nearly two miles away.

Flooding in 2013

Before the 36-inch pipe was installed (under the first petition), the GPDDD contained no natural surface water outlet. The area is located within the Middle Grand River watershed and is relatively poorly drained. It is what is commonly called a "high-perched bowl", and has been the subject of several engineering studies and feasibility analyses by various engineers and municipalities. All these studies analyzed the problem and proposed solutions to address the stormwater challenges in the GPDDD. The fact that there were a number of studies completed and yet no construction solution implemented or even

started for almost 30 years underscores that the GPDDD faced complex stormwater challenges.

In 1999, Ingham County Drain Commissioner (ICDC) Patrick E. Lindemann received a second petition for drainage improvements from the Ingham County Road Commission. This petition was received as soon as plans for construction of the first petition were being finalized in design. The difficulties of addressing roads, recreation, stormwater, and drinking water were complicated by legal challenges. The Determination of Necessity by the second Board of Determination was appealed at the very beginning of the project and the Drain Commissioner's apportionment order was also separately appealed at the very end of the project. Eventually, both appeals were denied and the decisions were both upheld by the Michigan Supreme Court. The delays caused by these appeals (Necessity appeal from 1999 to 2003 and Apportionment appeal from 2013 to 2016) added years and millions of dollars to the cost of the project.



THE MASON ESKER

The District is unusual for its esker – a long ridge of gravel and sand left behind by receding glaciers. Ingham County's Mason Esker meanders about 23 miles from its northern end in Lansing/GPDDD to its southern terminus in the City of Mason. Prior to development, the area was characterized by extensive areas of wetlands and susceptibility to flooding. Eskers are valued commercially because their sorted layers of sediments and gravels are easy to mine. The Mason Esker in and around Bancroft Park was mined in the 1950s-60s-70s to build the City of Lansing and surrounding region's infrastructure. Portions along its 23 miles are still actively mined today.

What remains of the esker in the GPDDD neighbors the Groesbeck Golf Course, Bancroft Park, and 11 waste disposal sites of varying contamination, including solid waste landfills, industrial disposal sites, and chemical leaks. One of the worst, polluting the Saginaw Aquifer, is the Motor Wheel Superfund Site.

Excavations deep into the esker, at or below the water table, created a gateway through the porous sediments into the upper portions of the groundwater aquifer and concerns that it would reach the much deeper drinking water aquifer were heightened. Some of the excavated pits over the years were subsequently used as waste disposal sites (Motor Wheel site). At the same time, an increase in the glacial drift aquifer level reduced the vertical isolation distance, violating a State statute for landfills.

Stormwater from an increasingly impervious watershed rushed through the esker to the 1950s-era gravel pit in and near Bancroft Park, pushing dangerous plumes of pollution from the Motor Wheel Superfund site further into the community's drinking water supply. Nearly 70 different wells within a one-mile area draw from the Saginaw aquifer near the GPDDD.

DESIGNING THE SOLUTION

Due to the critical need to prevent stormwater from pressuring contaminants further into the groundwater aquifer, ICDC Lindemann asked the designers at Eng., Inc. (formerly Fitzgerald Henne & Associates, Inc.) to develop a plan to meet two important measures for the GPDDD:

1. The system must be capable of treating and storing the District's first half inch of stormwater – the "first flush" that carries with it concentrations of pollutants and debris.
2. All storm sewer infrastructure (pipes, culverts, structures, etc.) must be sufficient to convey flows from a 10-year, 24-hour storm event for the entire Drainage District as if it were fully

View of the overlook and maintenance paths surrounding the treatment basins on the old North Lansing Landfill property. This portion of the old landfill property (owned by LBWL) was once cordoned off completely with a 10-foot high chain link fence and original plans called for the same thing upon completion of the work, which wouldn't have allowed anybody to enjoy the vibrant aquatic and wetland ecosystems that now were their neighbors. Instead, ICDC worked with the LBWL regarding access and fencing, the Ingham Co. Dept. of Roads reg. some necessary turnarounds that could double as parking areas and the City of Lansing to connect to the trails through Bancroft Park. This intergovernmental cooperation turned these access and maintenance paths, which are necessary for long-term maintenance of the stormwater basins, into passive recreational opportunities for hundreds of nearby workers and residents to interact with on a daily basis.

developed to a maximum runoff co-efficient of 0.60. The stormwater detention should be designed as a regional stormwater detention system to accommodate a 100-year, 24-hour storm event, while allowing for a runoff co-efficient of 0.60 for each property.

Seventeen years elapsed between the Road Commission's petition of 1999 and commencement of construction in January of 2016. In addition to addressing legal challenges from the first necessity challenge and the apportionment of benefits, ICDC Lindemann, his staff and the design team met regularly with landowners, neighborhood groups, and municipal representatives to gain their perspectives and input on various design elements of the project and integrating them into their site plans.

The team reviewed commercial and industrial development plans with landowners in the District, and also drainage issues on their properties. Measures were taken to both accommodate a property's future development and fix existing drainage issues.

Builders Redi-Mix was one of the most involved landowners. Their site is lower than the three first-flush treatment basins, leading to continual flooding on their property. The ICDC considered their difficult problem and devised an on-site solution that improved the functionality and use of their business operations, while also storing and treating stormwater runoff on their site, before being discharged downstream.

The ICDC also carefully reviewed options to modify and stage construction activities and the team developed a schedule to accommodate landowners' seasonal business conflicts and other concerns.

PARKS AND RECREATION IN THE STORM WATER MANAGEMENT LANDSCAPE

Conversations with the City of Lansing Parks Department were key. Flooding solutions would require significant changes to the municipally owned Groesbeck Golf Course and Bancroft Park.

GPDDD paid $1 million for an easement to discharge stormwater to the park and golf course. The City's park policy requires that all parks be maintained and improved so as to encourage the largest number of visitors and users. The ICDC team had to balance the Parks Department requirement for paved paths that encourage use by persons with diverse abilities (ADA compliant), with the neighborhood group's desire to minimize tree removal and limit paving of walking trails in the park – always an emotionally charged issue.

Vocal critics challenged changes to Bancroft Park, heralding its natural beauty and rare plant species. Lindemann responded, "Being a good steward of the environment isn't accepting a hundred years of abuse at a site, calling it "natural" and leaving it to its own demise. We're going to interact with the park and we must do it in a way that rebuilds its beauty and function, while mitigating the affects of our activity around and in the park."

At least 12 perched wetlands are located in Bancroft Park. Most are vernal wetlands, seasonal depressional wetlands that vary in size and are ponded only during seasonal wet-weather (spring and fall). Vernal wetlands are essential as a breeding area for a number of herpetological species, such as frogs, turtles, and salamanders. In the spring, wildflowers often bloom in brilliant circles of colors that follow the receding shoreline of these pools. Among ICDC Lindemann's goals for the GPDDD project was the preservation and protection of these ecologically unique wetlands.

Kettle Lake – a lake in name only – is a perched wetland that is rarely without standing water. The MDEQ permit, under state law and in keeping with the federal Clean Water Act, required protections for this wetland, including continued water in-flow sufficient to maintain ponding. The project team designed and built a berm to preserve some of the flow from a nearby drainage pipe. Excess flows that previously passed through the park into the Esker, where polluted stormwater would recharge into the aquifer, were diverted to various wetland treatment basins.

The team installed structures to control the amount of water flowing into the wetland pond (Kettle Lake) and to keep water from flowing down to the aquifer. To assure proper installation and tie in of the existing 155 linear feet of 8-inch tile to the wetland pond, technicians performed a televised inspection of the mostly clay tile. Several roots intruding into the tile and several broken joints were found. The tile ran as deep as 24 feet through a heavily wooded area. To leave the Park as undisturbed as possible, the tile was first cleared of debris and roots. Then the tile was lined with Vipel Isophthalic Based Resin. This resin is a high molecular weight isophthalic /unsaturated polyester resin that provides the corrosion resistance and durability needed for Cured in Place Pipe (CIPP) applications. By using this lining material, the existing tile was rehabilitated to almost brand new condition without disturbances from deep excavating.

The team also partnered with the City's consulting golf course architect to redesign and reconstruct the 6th and 7th holes of the Groesbeck Golf Course. Additional improvements, such as building multiple tee boxes for each hole and filling low-lying areas in three fairways on the front 9, were made to the course using spoils from excavating the detention, wetland treatment and mitigation basins.

The contractor, Mead Bros. Excavating, Inc., agreed to do these golf course improvements at no additional cost to the project, since they would save significant money and time by not hauling the spoils off-site. Approximately 25,000 cubic yards of spoils were re-used to improve the front 9 of Groesbeck Golf Course. The creation of a 5-tee system for varying levels of play now perfectly matches the back 9 of the golf course, which was entirely redone in 1998 as part of ICDC Lindemann's Tollgate Drain project.

NUTS AND BOLTS, PUMPS AND PIPES

Improvements were designed and constructed in response to increased flooding in the District caused by significant development over time within the GPDDD. A series of collection systems constructed on Wood Street, Lake Lansing Road, Sam's Way and Chamberlin Drive that ultimately discharges through a 4'x8' box culvert underneath the Mid-Michigan Physicians Building. The box

GROESBECK PARK DRAIN PROJECT AT A GLANCE

TIMELINE

1985	Drainage District established
1999	Ingham County Road Commission petitioned for improvement
1999	Legal challenges to Necessity, all the way to the Michigan Supreme Court
2004	MDEQ permit granted, design begins
2008	LBWL began work to encapsulate fly ash on neighboring site
2012	ICDC requested bids in November
2013	Legal challenges to Apportionment, again to the Michigan Supreme Court
2016	Project commenced in January
2017	Project substantially complete in October

BY THE NUMBERS

- Approximately 300 acres in the Drainage District
- Approximately 13,000 feet of drain infrastructure
- Approximately 7.1 acres of treatment and detention systems
- Approximately 45 acres of earth disturbance
- Total cost $12.59 million; $8.1 million for infrastructure construction

PROJECT TEAM

- OWNER: Ingham County Drain Commissioner
- ENGINEER: Eng., Inc.
- CONTRACTOR: Mead Bros. Excavating, Inc.

STAKEHOLDERS

- Ingham County Department of Roads
- Ingham County Board of Commissioners
- City of Lansing
- City of Lansing Parks Department
- Lansing Charter Township
- Lansing Board of Water & Light
- Michigan Department of Environmental Quality

KEY CONSTITUENTS / LANDOWNERS

- Builders Redi-Mix
- Friends of Bancroft Park
- Goodyear / Motor Wheel
- Granger

OTHER CONSULTANTS AND SUB-CONTRACTORS

- Herpetological Resources and Management, LLC
- Northern Concrete Pipe
- PFM Financial Advisors, LLC
- Miller Canfield P.L.C.
- SME
- Water & Woods Ecology
- Woodworth Law Firm

Photo looking south at the 3 Treatment Basins on the east side of the BWL property

culvert outlets to a 3-step first flush treatment system on the east end of the North Lansing Landfill (NLL) property, owned by the Lansing Board of Water & Light (LBWL).

The tertiary treatment system on the LBWL property was designed with a first flush basin immediately downstream of the box culvert that is 0.95 acres in size. The second flush basin is 1.55 acres and the polishing basin near David Street is 1.2 acres. Each treatment pond was set at different crest and overflow levels to manage stormwater flows, while maximizing water quality benefits in their design holding times.

Stormwater flows are then conveyed to about 7.1 acres of stormwater ponds and wetland systems, used for treatment and detention, on the north end of Groesbeck Golf Course. A pump re-circulation system moves water from the lowest pond through a series of limestone spillways separating the wetland systems and open water treatment ponds. Limestone is used to neutralize acidity in polluted runoff.

If rainfall exceeds a 10-year, 24-hour event, water rises to a discharge point to the north of David Street: a 36-inch storm drain that was installed outside of the LBWL slurry wall. The slurry wall was constructed separately by the LBWL to prevent stormwater from entering the former gravel pit that was previously filled with fly ash. This discharge drain around the slurry wall is tied into the 36-inch pipe, constructed under the first petition, which travels under Lake Lansing Road and all the way to its outlet to the Grand River in Old Town Lansing.

Materials were selected for ease of maintenance, durability, and cost-effectiveness. Concrete manholes were selected for access and maintenance. Concrete pipes were specified for crossings under roadways; HDPE perforated pipes and structures were used outside the roadway areas of influence for drainage, instead of curb and gutter or road ditches and culverts.

GPDDD BUILT FOR ENVIRONMENTAL AND WATER QUALITY BENEFITS

The Groesbeck Park Drain regional detention system is a series of treatment ponds installed along the east end of the old NLL property, as indicated, which is owned by the LBWL. These treatment basins were designed with a baffle system and sheet piling of weirs to achieve specific staged residence time for varying storm events to help settle out pollutants.

Too often these systems only address treatment for one type of storm event or the first half-inch of rainfall. The staggered weir design employed at the GPDDD allows each pond to retain function for a wide variety of storm events. Pollutants expected to be removed and absorbed by this water filtration system include oils, greases, sand, silt, heavy metals and high nutrient loads that bind to the soil particles.

The constructed wetlands and open water systems on the golf course provide both stormwater detention storage and water quality improvement features. A pump intake draws water from the warmest and most stagnant pond on the golf course and pumps it up to a cascading limestone spillway. Storm water moves through a rock-lined channel that allows some seepage out into the adjacent wetland area. From there, water is collected in the next limestone outfall before discharging to the next set of stormwater treatment basins.

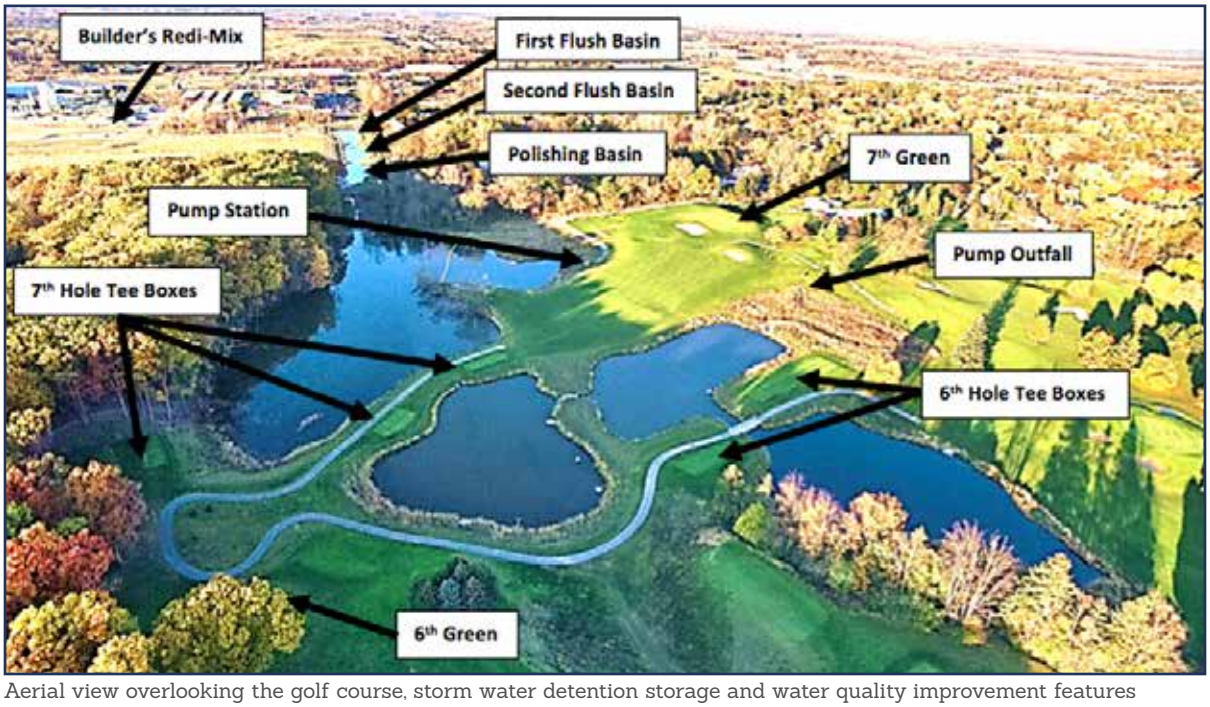
Vegetation in the treatment basins, detention basins and constructed wetlands on the golf course was carefully selected for each area. Considerations included the anticipated pH, salinity and pollutant load that these areas would receive daily and annually, as well as the type of wildlife that the vegetation could attract.

Vegetation was also selected to maximize each area's potential to filter and uptake pollutants, provide a greater diversity of wildlife habitat, and create an aesthetically attractive ecosystem within a highly urbanized environment that golfers would need to interact with on a daily basis. Seed, plugs, tubes and potted plants were all used to encourage a diverse habitat.

HABITAT STRUCTURES IN URBAN LANDSCAPES

Construction of the drainage infrastructure resulted in a significant loss of available habitat for various amphibians, reptiles, birds and hibernacula. ICDC Lindemann believes that the true measure of success on a Drain project is how it acts and functions as an entire Ecosystem.

To foster wildlife habitat in this highly urbanized



Aerial view overlooking the golf course, storm water detention storage and water quality improvement features

watershed, over 75 habitat mitigation structures were installed throughout the project area. The structures included: Basking Rock Piles, Sand Mounds, Hibernaculum Log Structures, Stumps, Whole Trees and Mulch Log Piles. These structures created invaluable places for wildlife to thrive as their normal habitat underwent nearly two years of construction work impacts.

Floating vegetated islands that mimic natural peat bogs and wetlands were installed in ponds, providing habitat for both aquatic and terrestrial wildlife. As the plants mature, their root systems will grow through the island's porous material into the water, which will provide a large surface area for nutrient and contaminant uptake of suspended solids, metals, and dissolved organic carbon. Biochemical reactions occurring within the biofilms on the surface of the plants' suspended roots are the main contributor toward contaminant reduction.

THE CONTRACTOR AS PARTNER

Mead Bros. Excavating, Inc. worked with the engineer, Eng., Inc., before and throughout construction to contribute to the project's ultimate success. The Contractor held its bid price for almost four years, while legal challenges wound through the courts. Opportunities for value engineering and collaboration were necessary as construction finally loomed.

The construction bid contained 347 separate bid items, with a wide variety of work. Beyond the typical storm drain work were: timber bridges and decks; sanitary sewer main, lead and force main work; watermain and water service installation work; pump station installation and construction; limestone channel stone outfall construction; HMA roads; concrete sidewalks; concrete and HMA parking lots; wood maintenance platform; wood observation deck; park pathway work; habitat structures and rebuilding two holes of an active golf course from scratch.

With earthwork impacts affecting over 45 acres and spread over two years, SESC was an ongoing concern. The ICDC and engineers developed a plan to install temporary storm drain pipes and catch basins to divert stormwater coming into the box culvert off of Lake Lansing Road and discharge it directly to the 36" pipe to the Grand River. This resulted in the entirety of GPDDD's upstream runoff being prevented from entering the site, so the Contractor did not have to contend with the remaining district's stormwater in any of the basins during construction. This staging strategy reduced costs by several hundred thousand dollars.

The plan for the DEQ-required wetland mitigation basins on the golf course and treatment basins on the LBWL property originally called for two feet of compacted clay on the bottoms that would limit infiltration to help keep consistent water elevations in this multi-dimensional and varied set of stormwater ecosystems. To speed construction and save costs, engineers sought and received permission from both the MDEQ and LBWL to use, instead of a clay liner, a 20-mil PVC liner on the golf course basins and 30 mil PVC liner on the LBWL basins. Ultimately these liners were necessary to maintain consistent water levels in all of the basins and wetland systems, while providing the ancillary benefit of limiting infiltration of stormwater down into the groundwater.

The Contractor used excavated spoils to create the ponds in other areas on the Groesbeck Golf Course. Two holes were reconstructed entirely; tee boxes were added throughout, giving each hole five tee selections. Low-lying areas of two fairways were amended using the spoils. The City got a better golf course and the Contractor saved time and money through this partnership.

FUNCTION, FORM AND AESTHETICS

The preeminent motivation for this project was the need to reduce flooding and eliminate groundwater recharge that was exacerbating existing pollution plumes potentially reaching the Saginaw aquifer – the source of Lansing's drinking water – and undermining extraction activities on the Motor Wheel and the many other nearby contaminated sites.

Concurrent with that goal was the desire to improve and protect the ecological function of wetland and upland areas in Bancroft Park. "There are dozens of active mining operations along the Mason Esker," said ICDC Patrick E. Lindemann. "The only visible and mostly un-mined portion of this formation is in Bancroft Park, making it one of the 'crown jewels' in Lansing's park system."

The project set aside a few acres of the 7.1-acre constructed pond system for mitigation required by MDEQ. The ICDC chose to mitigate at a more than 2 to 1 ratio for wetlands lost upstream as part of the enclosure of an old private drain.

After many starts and stops, engineering studies and feasibility analyses stretching back to the 1970s and 1980s, Bancroft Park and the Groesbeck Park Drain have been remade. "This site will serve as a Living Classroom, where students and adults can learn about urban pressures on ecosystems and how we use low-impact design for responsible storm water management," Lindemann said.

As a result of this project, rare plant species have been preserved and wildlife habitat encouraged. With habitat structures in place for over a year, the area has seen an explosion of numerous kinds of wildlife.

DRAIN COMMISSIONER RESPONSE

"I'm extremely honored to have received the 2018 Innovation & Excellence Award from the MACDC for the Groesbeck Park Drain project.

This project is a great example to show you that if you believe in the work you're doing and if you're using the current Drain Code as a resource, you can accomplish successful drain projects in many different ways. Since it was literally 17 years after the petition was filed that we began construction, we all had to adapt and work with several other municipal and private entities, all with their own plans and ideas for their particular utility upgrades or developments on their land. I think that type of cooperation and intergovernmental coordination is a testament to the dedication and commitment put forth from my staff and various consultants who worked on the project over the many years.

I'd especially like to thank Eng., Inc. (formerly Fitzgerald Henne & Associates, Inc.) for being the Engineer throughout this project and for sticking with this to see it through from beginning to end. I'd also like to personally congratulate both Eng., Inc. and the Project Engineer/Manager for this project, Brian Cenci, P.E., on receiving their 3rd straight Innovation & Excellence Award from the MACDC. That's quite an accomplishment to work with different counties with largely different sized projects and still turn out the quality of work that they have as a firm and he has as an engineer."

- Patrick E. Lindemann, Ingham County Drain Commissioner

CULVERT DESIGN
THINKING OUTSIDE THE BOX

Jim Washabaugh, Northern Concrete Pipe, Inc.

"You are not going to believe this one," is what I said to Chris Washabaugh, the Plant Manager at Northern Concrete Pipe's Bay City, Michigan site, when the plans came out for the Caine Road precast box culvert project in the early spring of 2017. We had many times manufactured box culvert segments with each end face tapered, but this project was something that none of us had ever even imagined. it was a 24' span box culvert with both faces of many of the sections tapered. "Yes, we can do it," Chris said, "but it's not going to be easy." "Yes, we can do it" is the part that I remember hearing, so we went to work bidding on the project and were notified by Marlette Excavating Company that we won the production of the culvert for this job, which was put out for bids during MDOT's April 2017 bid letting.

This whole project began with a series of phone calls from Casey J. Collings, P.E. the Bridge/Design Project Manager of Great Lakes Engineering Group, LLC (GLEG), from Lansing, Michigan. We had spoken several times about different options for a precast culvert crossing that he was working on with Michele Zawerucha P.E., the county highway engineer at the Tuscola County Road Commission, located in the "Thumb" of Michigan's lower peninsula. One of our discussions involved skewing the ends of our long span box culverts. We can taper an end section that is 8' long on one end and 2.5' long on the short side, but for a 24' span box, this will only result in an approximately 12-degree skew of the end face of the end sections, which was not adequate for this project. Our conversation then turned to tapered faces on box sections. I never dreamed what Casey had in the works, but here is his description of how this project came together.

This project was awarded funding through MDOT's Local Bridge Program. GLEG was awarded the design phase of the project. The project scope was for a full bridge replacement. During the initial design phase, it was determined that the potential for erosion in the southeast quadrant would control the geometry of the proposed replacement structure. There was a history of the stream eroding the roadway fill where the river turned to parallel the roadway and then turn again to go through the existing bridge. The first option was to provide a larger bridge to span over the eroded area, but was ruled out due to limited under clearance at the location. To raise the bridge enough to fit a beam/deck structure, additional right of way would be needed. At this point a three-sided culvert was analyzed. A 36-foot span three-sided flat top culvert was designed which would allow the stream to flow diagonally through the proposed structure. The structure could not be extended outside the road right of way or skewed enough to meet requirements, therefore the longer span was required. MDEQ did not object to this approach, but it was not their preferred method for the crossing.

The project proceeded through the preliminary plan phase and an estimated construction cost was determined. The three-sided culvert option required a substantial number of piles to resist the horizontal forces of this structure type given the long span and short rise. The additional span length and pile costs pushed the project costs well outside the project funding. At this point, GLEG and the Owner met to discuss the project and agreed to find a better solution.

GLEG contacted Northern Concrete Pipe, Inc. (NCPI) with a simple question of how far a 24' span box culvert section could be skewed on each face and remain constructible. NCPI stated that they could take 5 degrees of the face of a box culvert. At this point, NCPI had no idea of what could be eventually heading their way. Given that an approximately 45-degree crossing was needed, 5 degrees at each end would not be enough. After some other options were ruled out, the engineer decided that simple geometry could provide a solution. The engineer then drew box sections with 4-degree skews taken off both of the section faces, made CAD blocks and started copying and rotating the blocks to get from the existing inlet to the existing outlet. Moving the skew face to a joint would double the angle per joint allowing 8 degrees per joint. A 45-degree crossing could be achieved 8 degrees at a time and back. Eventually a box culvert with a reverse curve of sections was laid out which intercepted the channel at the upstream end before the curve in the stream which was causing the erosion and provided an outlet in line with the existing bridge outlet, all within the 66' road right of way. The engineer jokingly reviewed it with other staff engineers and the client as it looked

more like a snake than a box culvert. This concept in stick figure form was submitted informally to MDEQ to see if it was permittable. MDEQ agreed to try the concept on the project if it passed the hydraulics requirements. GLEG proceeded with hydraulic calculations, permitting, and design. The estimated project cost was reduced as compared with the three-sided culvert option and was within the funding authorized.

The project design was completed utilizing the reverse curve/snake concept and utilized precast footings, headwalls and wingwalls to allow for flexibility if any fit-up issues arose during construction. The project was constructed within awarded funding in the summer of 2017.

Aerial view of finished culvert

Casey's layout required 16 sections of 24' x 8' (inside dimensions) precast box culvert with only two straight pieces in the entire crossing. All of the tapered sections were manufactured with a 4-degree taper on each end face. The original design called for a 16" thick top slab and a 14" thick bottom slab to meet the loading requirements of MDOT's HL-93 Modified Loading. We decided to use a 16" thick top and bottom slab to make the production of these segments more efficient. By keeping the top and bottom slab the same thickness, we only needed to set the custom form up one time, which took 3 additional days from our normal set up time for our fabrication department to complete. A simple change to the orientation of the top and bottom reinforcing mats, then switch the lifting holes that get cast through the top slab for setting the sections into place, from one side to the other, allowed us to make the right and left hand turns of the radial sections. The fabrication time of each reinforcing cage was approximately 6 hours which included the efforts of 3 to 4 people working on it. The required steel reinforcing areas were significantly large due to the long span of the culvert, along with meeting the requirements of MDOT's HL-93 Modified loading. (This is based upon 1.2 times the current AASHTO LRFD bridge design specification HL-93 loading with the exception that the design tandem portion of the HL-93 load definition is replaced by a single 60 KIP axle load before application of this 1.2 factor). Assembling these extremely heavy reinforcing mats was a very time-consuming project in itself, but then the 4-degree taper on each face of the cage had to be laid out, then cut off of each end, while keeping all dimensions within the allowable ASTM tolerances, added to the difficulty of the task.

A 3' wide x 3' tall precast footing was provided at each end of the box run to prevent scour. They were manufactured in two sections per end, which ran from the center line of the end box sections out to the ends of the precast wingwalls. The precast wingwalls were manufactured with T shaped earth anchors attached to the back side of them. The top of each wingwall matched the top of the 12" x 12" precast headwalls which were attached to both end sections of the box run. The wingwalls were tie plated to the end box sections with 1" thick galvanized steel plates and bolted into threaded anchors which were cast into the end box sections as well as the back side of each wingwall. The wingwalls were installed and attached after all of the box sections were set in place.

Interior view of finished product

The contractor, Marlette Excavating Company, out of Marlette, Michigan, is a family business owned by Cindy Sulaty (CEO) and operated along with her husband Launce (Foreman) and their son Launce II (Project Supervisor). This family, with 100 years of construction experience between the three of them, have done many bridge and box culvert installations previous to this one, but this crossing offered a few more challenges than a typical straight crossing. A standard method of pulling the segments together is to use chains with come-alongs to draw the joints tight, while the crane holds up a good portion of the load. With the skewed sections, the come-alongs while pulling the sections together, would also want to pull/slide the sections to one side, which would cause

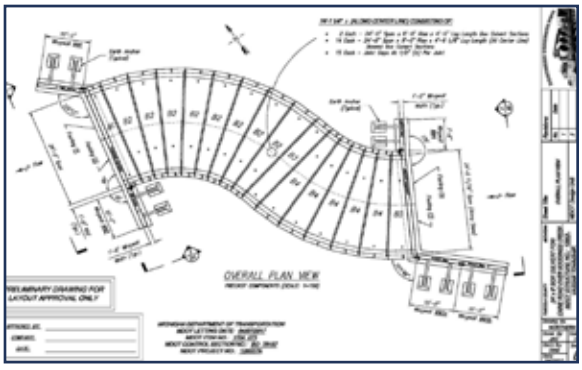
the joints of the already laid sections to separate. After a few trials and errors, they decided that the most effective method was to chain together the segments that had already been set, forming a large enough “anchor” to allow the pulling in place of the new section and to prevent the pulling apart of those already placed. Once this process was enacted, the sections started to go together much quicker while maintaining good joint connections.

All of the precast box sections were completely installed in only twelve hours. On Friday evening at the construction site, both Launce’s were exhausted, but also very pleased with the finished product that they had constructed, satisfied with a sense of accomplishment for the quality with which they had performed this unique, challenging box culvert installation.

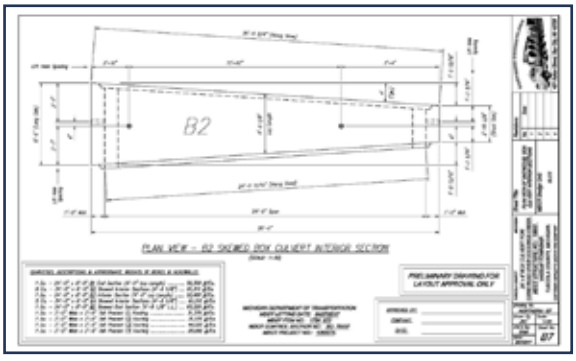
Mid-installation

Michele Zawerucha P.E., the highway engineer for Tuscola County, was very please with the project as well. She stated that “the only bad part about this project is that no one will really be able to see how nicely this culvert turned out”.

Paved finished product with culvert within restrictive right-of-way



The pictures above and below show the submittal. Please note: There’s only two standard sections throughout the entire length of the culvert



HOW AQUATIC PLANT MANAGEMENT IS CHANGING

David McLaughlin, Clarke Aquatics

No matter how well you plan, those in charge of waterways, lakes and ponds know all too well the frustration of executing the plan. Thankfully, technology and science are beginning to remove some of the stress typically associated with aquatic plant management. A variety of tools are now becoming mainstream in sound lake and pond management programs. Fading are the days of year to year, spray and pray, budget to budget aquatic plant management.

TOOLS THAT INFORM TOMORROW'S AQUATIC PLANT MANAGEMENT NEEDS

GPS: GPS accuracy is the single tool that has enabled so many of the advancements we're seeing in aquatic management today. Better intelligence and geo-located targeting are driving more effective solutions for maintaining the health of our waterways.

BioBase: BioBase mapping is being integrated into more and more service programs to ensure accuracy in the treatment planning. It is the basis for understanding plant growth density, locations of troubled areas, the average depth of treatment areas, and the size of the treatment area. BioBase mapping is also a great tool for tracking trends in a water body, such as whether the plants are expanding throughout the lake or your control measures are working. Ongoing monitoring through BioBase will ensure that invasive species are identified early so management plans can be implemented quickly to ensure proper control. Critical information that today's GIS databases can provide through BioBase include:

- Bathymetric mapping
- Surface acres and acre feet/water volume
- Density and percentage of area with submerged vegetation
- Bottom hardness

Water Quality Monitoring: There are many water quality factors that need to be monitored in an aquatic plant management program. Water quality parameters play a key role in understanding the chemistry of the water and how this impacts aquatic plant growth and algae issues. Some of the important measures for understanding and monitoring water quality include:

- Dissolved oxygen
- pH
- Phosphorus
- E.coli
- Alkalinity
- Turbidity
- Algal biomass
- Chlorophyll
- Sediment sampling

Reporting Simplicity: Another significant benefit associated with the expansion of technology platforms in water management today is related to reporting. Application data logs and other tools now make for easier, more accurate NPDES and other government reporting, reducing your compliance costs and headaches. Be sure to ask your service provider to assist you with the data needed.

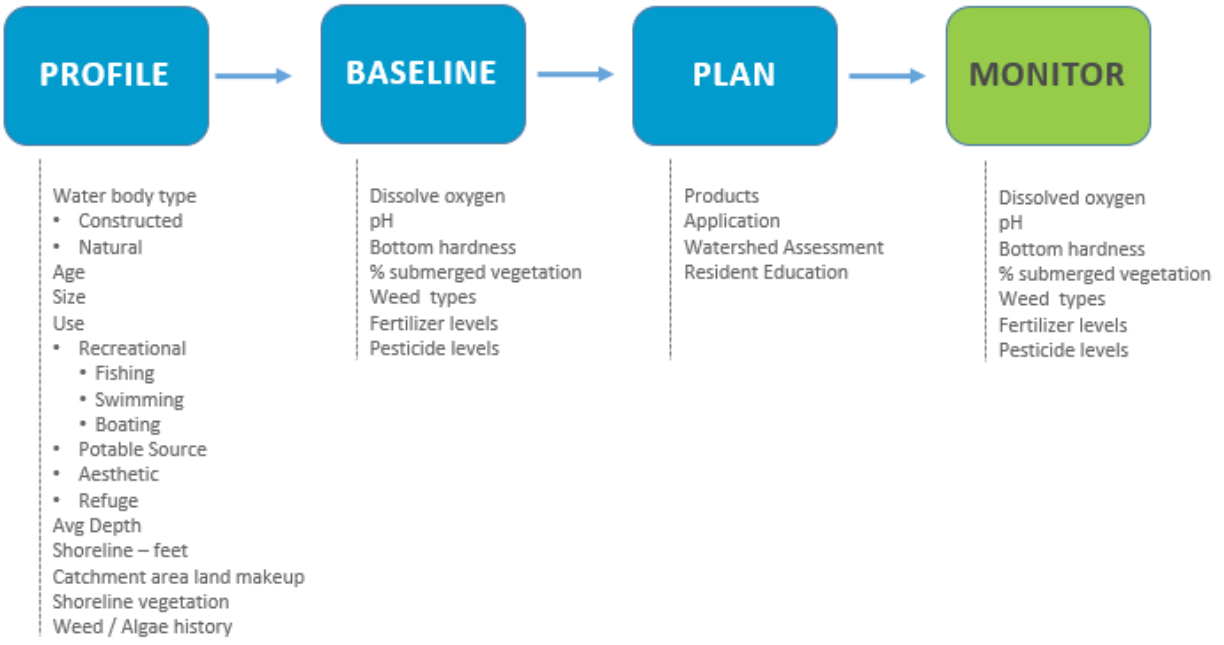
FORMULA FOR SUCCESS: HISTORY + SNAPSHOT + MULTI-YEAR VIEW

Technology offers us a variety of valuable tools to help understand a body of water. Yet the design of a treatment and management plan is a subjective decision based on an operator's expertise. In our experience, long-term program success requires consideration of three elements: history, a current snapshot of the metrics that define the lake or pond, and a plan for the future.

Looking back to look forward: In many ways, managing a lake or pond can, and should, be likened to a doctor seeing a patient for the first time. A good understanding of the water's history provides a wealth of information about how to manage it going forward. Here are the critical, "must know before treating" criteria:

- Water body type – constructed or man made
- Age
- Intended use or end goal – recreational (fishing, boating, swimming), potable water source, wildlife refuge, aesthetic only, etc.
- Watershed area, land makeup and development history
- Weed and algae treatment history

A snapshot in time: Before striking a new management plan for the year, an in-season "snapshot" of metrics is equally critical. Some of these are observational assessments, while others are quite calculated. But this is an important step in determining what products and amounts to use, and whether or not aeration or fountains of any



type should be part of the management plan. Key assessments include:

- Aquatic weeds and algae types submerged and emerged, and percentage presence in water
- Average depth
- Total acreage and treatment size of nuisance vegetation and algae
- Shoreline vegetation and landscape
- Water quality base measurements
- Bottom hardness

Gradual change, as in nature: Imagine your body of water with no developed land near it and no artificial uses. It exists strictly as part of the environment with no influences by man, and has a natural "aging" process. Within a responsible water health management program, the natural state appropriate for the water body's "age" becomes the treatment target. The treatment plan is designed to mitigate man's impact on its health. As such, treating a severe algae or weed problem in a "shocked" manner is not like nature's curative course. It's artificial, will most likely have undesirable tradeoffs, and not have lasting effects. Instead, incrementally rebalancing the body of water to its natural state will provide longer-term satisfaction and cost control.

Strike a balance: Ultimately, effective aquatic health management demands balance:

- Balancing technology solutions with operational expertise;
- Balancing short and long-term goals for your bodies of water;
- Balancing the aesthetic and recreational needs of the public;
- Balancing corrective actions and treatment with the natural state of your waterways.

The good news is that with an experienced service partner, a long-term strategy and all new tools at our fingertips, achieving this balance is very possible.

COUNTY, SELFRIDGE JOIN FORCES ON DRAIN WORK

Dan Heaton, Macomb County Public Works Office

County and military crews are working together this spring to enhance air field operations at Selfridge Air National Guard Base in Harrison Township.

The work, being performed and coordinated by the Macomb County Public Works Office, with assistance from the base's 127th Civil Engineer Squadron, is restoring a swampy area on the base, which, among other concerns, had been attracting birds to a spot near the base's runway.

"Getting this work done on Selfridge was a priority for us," said Macomb County Public Works Commissioner Candice S. Miller. "We all share the desire of ensuring a safe operating space for our local military air field and our Michigan Airmen. Plus, my team and I are in the drain business – we love to see our local drains functioning the way they are supposed to, so here's two more we can check off our list."

Over the years, the Gohl and Irwin drains on the west side of the base had become overgrown and partially blocked with trees, branches and other natural debris. Military and county crews are expected to spend up to three weeks working on drains either on or immediately adjacent to the base. Known internally as "cleaning drains," this work removes standing water and allows proper drainage. Over time, dead trees, accumulated leaves and other natural debris can clog drain grates and otherwise cause blockages that can hamper water flow.

A view of the Gohl drain on the west side of Selfridge Air National Guard Base.

The Air Traffic Control tower at Selfridge Air National Guard Base is seen in the background of this photo of the Irwin Drain.

"Partnerships are one of the core strengths of the National Guard," said Brig. Gen. John D. Slocum, 127th Wing commander at Selfridge. "Our partnership with Macomb County is mutually beneficial and is the envy of many."

The Macomb County Public Works Office has responsibility for about 900 drains across the county. These drains prevent local flooding, which allows for residential or business development to take place, or, in the case of Selfridge, safe operation of a military airfield.

Selfridge, like all military airfields, has a detailed "BASH" plan – Bird-Aircraft Strike Hazard. The plan outlines steps that the military takes to reduce the likelihood of birds coming in to contact with aircraft while in flight. The plan includes simple steps, like keeping grass cut to certain parameters near the airfield to discourage birds from landing near the runway, to more involved projects, such as the work being done on the two drains.

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HUBBELL, ROTH & CLARK, INC. (HRC) IS PLEASED TO ANNOUNCE THE APPOINTMENT OF SEVEN NEW ASSOCIATES


Coatta


Davies


Darga

Melissa A. Coatta, Michael P. Darga, Brian K. Davies, James E. Scholl, Matthew G. Slicker, James J. Surhigh, and Trevor S. Wagenmaker were all named Associates.

Melissa A. Coatta, P.E., began working for HRC as a field observer in 2001, while finalizing her engineering degree. She hired on full-time in 2002, and has been serving municipal and private clients.

Brian K. Davies, P.E., has been with HRC since 2009. As a Project Engineer, he has gained experience managing design and providing construction administration services for various regional projects.

Michael P. Darga, P.E., has been with HRC since 1998. He oversees the operations of HRC's Howell office, serving municipal and private clients.


Scholl

James E. Scholl, P.E., has 39 years within the industry. As a Senior Project Engineer, his experience covers water, wastewater, stormwater, and natural systems for municipal, industrial, and government agency clients.


Slicker

Matthew G. Slicker, P.E., began working for HRC in 1994. He has been a Senior Project Engineer for site/civil engineering services throughout Michigan.

James J. Surhigh, P.E., began working for HRC in 1997. He has been responsible for the design and management of municipal utility and road projects during his tenure.

Trevor S. Wagenmaker, P.E., began his journey with HRC in 2011. Mr. Wagenmaker has 27 years of experience in design of municipal wastewater and water treatment facilities, combined sewer overflow treatment facilities, pumping stations, elevated/ground water storage facilities, sanitary sewer, watermain and storm sewer utilities, raw water intakes, roadways, bridges, and dams.


Surhigh


Wagenmaker

MERSINO DEWATERING, INC MARKS ITS 30TH ANNIVERSARY THIS YEAR

Founded in 1988 by Rod Mersino, coming from an extensive background in specialized drilling and construction site dewatering, Mersino Inc. has evolved into a multi-faceted corporation able to engineer and deploy a full-service approach to groundwater control and pumping solutions. Mersino considers its people, the Mersino Team, as our most valuable asset and strives to maintain a culture that inspires dedication to customer service. Whether a planned project or an emergency response, Mersino, available globally, is positioned to meet client challenges with expertise, equipment, and service anytime, anywhere. Mersino's array of services is reflected in its slogan, "The Only Full-Service Solution."

Mersino is a single source for pumping services, contract dewatering, one-pass trenching, power generation and drilling. Mersino offers cost-effective dewatering solutions including deep well drilling, wellpoint dewatering, sock tile trenching, and eductor systems. A broad array of pumping applications include sewer bypass, industrial and oil field water supply, flooding and disaster relief pumping, remediation pump and treat, and wherever pumping water is required. Mersino is a sales distributor of Global Pump Company, manufacturer of portable trash pumps built for efficiency and dependability.

NORTHERN CONCRETE PIPE, QUALITY THAT STANDS THE TEST OF TIME

Established in 1958 in Bay City, Michigan, Northern Concrete Pipe (NCP) has been manufacturing quality infrastructure products in Michigan for 60

years. Ed, Pete and Bill Washabaugh Sr. were the founding fathers of Northern Concrete Pipe, and it is still a family-owned company today.

From humble beginnings, the Washabaugh family soon established themselves as innovators of the precast industry when they developed and produced the first precast box culverts in North America in 1967. These first box culverts are still in use throughout Michigan. Today, Northern Concrete Pipe is producing box culverts with spans up to 24 ft and rises of 12 ft. NCP also produces reinforced concrete pipe from 12-inch through 144-inch diameters and 3-sided bridges up to 48 ft spans. All products have been manufactured with American made steel, even before "Made In America" standards were implemented. They also use locally sourced sand, stone and cement for all of their products.

Through the years, in an effort to keep up with the demand for their quality precast products, NCP built a plant in Lansing, Michigan in 1965, and added their Clarkston and Grand Rapids plants to the fold in 2012. Most recently NCP purchased a plant in Sylvania, OH and will soon be producing out of that location. As NCP built and acquired their plants, their employee base grew as well, and they now employ 225 people throughout the state of Michigan and Ohio.

This year NCP is celebrating its 60th year providing quality precast concrete products to the infrastructure industry. Seven Washabaugh family members still run the operation today and as Bill Washabaugh, President of NCP will tell you, "Our company is about the people who work for us. We couldn't do what we do without them". This is evident in the tenure that many employees have with the company, some as long as 53 years.

As Northern Concrete Pipe enters its 60th year of business, the Washabaugh family would like to extend a "SINCERE THANK YOU" to everyone that helped to make this happen:

- All of our Valued Customers
- Design Engineers and Owners
- County and State Departments
- Suppliers
- Our founders, Ed and Beatrice Washabaugh, Bill Sr. and Norma Washabaugh, Pete and Gerry Washabaugh
- All of our Loyal and Dedicated NCP Employees, who work so hard to produce our Durable and Reliable Infrastructure Products.

Northern Concrete Pipe and the Washabaugh family thank you for your business and we look forward to providing Concrete Solutions for all of your infrastructure needs into the future.

60 YEARS OF BUILDING PRODUCTS DESIGNED TO LAST OVER 100 YEARS!

VLAHAKIS COLE LAW FIRM FORMED FOLLOWING WOODWORTH RETIREMENT


Vlahakis Cole

Alexis Vlahakis Cole is pleased to announce the formation of Vlahakis Cole Law Firm, P.C., a law firm dedicated to serving drain and water resources commissioners, as well as corporate and real estate clients. Vlahakis Cole Law Firm was formed upon the retirement of Alexis' mentor, Michael Woodworth of Woodworth Law Firm. Alexis is a graduate of Michigan State University and Michigan State University College of Law. She is also a licensed Realtor® with, and Chief Operating Officer of, Vlahakis Homes, LLC. Alexis serves on MACDC's Bylaws Committee. She is a lifelong resident of the mid-Michigan area, currently residing in East Lansing with her husband Jake and their infant son Boston.


Nodarse

Joining Alexis is Cheryl Nodarse, an Advanced Certified Paralegal. Cheryl is a graduate of Central Michigan University and has been a Certified Paralegal since 1990, gaining her Advanced Certification in Land Use and Municipal Law. Cheryl has specialized training in grant writing and administration, and completed the program developed by the Michigan State University Institute of Watershed Training. Cheryl is also a licensed Realtor® with Vlahakis Homes, LLC. She serves on MACDC's Audit/Budget, Communications, and Awards Committees; and serves on the Continuing Education Council for the National Association of Legal Assistants. Cheryl and her husband Ruben are empty-nesters residing in St. Johns.

The offices of Vlahakis Cole Law Firm are located at 246 East Saginaw Street, East Lansing, MI 48823.

NORTHEAST DISTRICT

On Friday, May 4th, the Northeast District held their spring meeting in Lapeer. The meeting began with a welcome and introductions, followed by the business meeting and presentation from Stacy Hissong, Fahey, Schultz, Burzych, Rhodes, PLC, and Anthony Morabito, DTE Energy.

Stacy spoke to the group about Natural Drainage Rights in Rural Areas and how to avoid disputes between neighbors over drainage issues. Her presentation included several explanations of terms, including natural flow doctrine and prescriptive easements.

After a quick presentation from Anthony about DTE Energy and solar energy, the group was able to take a tour of the Lapeer Solar Fields at Mirror Lake Drain. This park is the largest in Michigan with roughly 200,000 solar panels.

A closer look of one of the solar panels at the Lapeer Solar Field

SOUTHWEST DISTRICT

The Southwest District met on Friday, May 11th, at the Northern Concrete Pipe plant in Charlotte. The meeting began with the business meeting and a legislative update from John Brennan, Fahey, Schultz, Burzych, Rhodes, PLC. Following the business meeting the attendees broke into two groups for a tour of the plant.

John Washabaugh and Robin Denman led the tours which gave a start to finish look at how concrete pipes are constructed. Included were a look at the on-site steel rebar fabrication and the de-burring machine as completed pipes receive finishing touches before transport to the yard.

Inside the Northern Concrete Pipe plant in Charlotte

NORTHWEST DISTRICT

The Northwest District met on Wednesday, May 16th, at the Holland Energy Park. The meeting began with a presentation from Ted Siler, the Business Services Director at the Energy Park. Ted explained the transitition from the James De Young Coal Power Plant to the Holland Energy Park, including the studies, decisions and community involvement that led to the creation and construction. He also discussed the Visitors Center, which is an exhibit space that features interactive activities and views into the plant and the plant's control room.

After the presentation, the group was able to explore the Visitors Center and after a quick break was taken on a walking tour of the site to view the storm water management features. Dennis Cole, the Civil Engineer with the Ottawa County's Water Resources Commissioner's Office led the group around the trails to view the result of the environmental and urban renewal initiative.

The view from the Visitor Center into the plant

SOUTHEAST DISTRICT

On Monday, May 21st, the Southeast District held their spring meeting at Green Oak Township in Brighton. The meeting began with a welcome and introductions, followed by the business meeting and a presentation from Stacy Hissong, Fahey, Schultz, Burzych, Rhodes, PLC, on Private Drainage Rights. Stacy also gave a brief legislative update.

Following was a presentation by Livingston County Drain Commissioner, Brian Jonckheere, on the Livingston County Septage Receiving Station. The station was completed in 2007 and was intended to serve as an offloading site for haulers as the county banned the land application of septage.

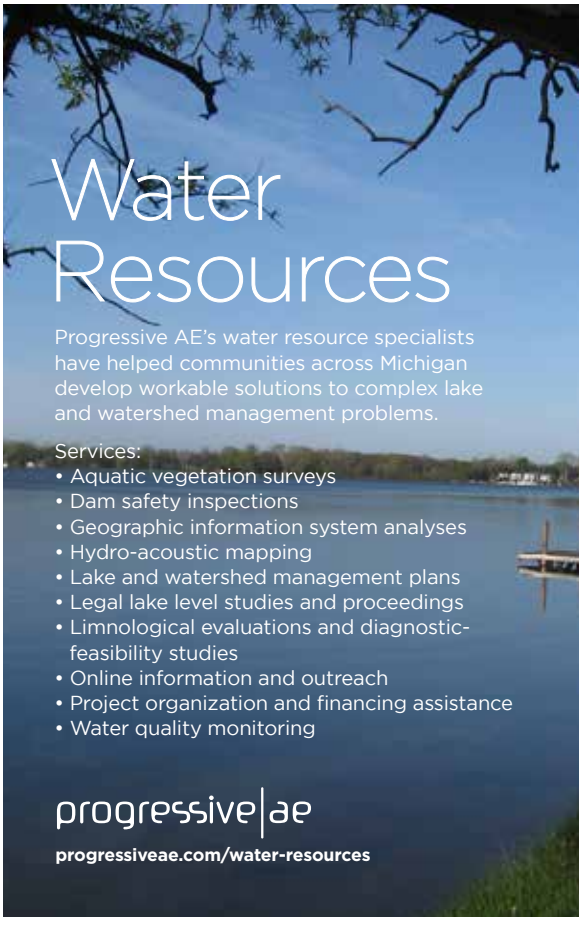
The station receives discharges of septage from haulers who register with the county and pre-purchase gallons. RFID and lasers recognize haulers as they enter the building where they then connect to a flexible hose to discharge. Samples are taken from each discharge and the system tracks the number of gallons against the hauler's account. Discharged flows are then sent to the Genesee County treatment facility.

While the station was initially intended to have a max intake per year of 12-13 million gallons it currently accepts over 20 million gallons annually.

FEBRUARY 13 – 15, 2019
MACDC Annual Winter Conference
Radisson Plaza Hotel, Kalamazoo

JULY 17 – 19, 2019
MACDC Annual Summer Conference
Shanty Creek Resort, Bellaire

Check our website www.macdc.us for a complete list of events. To place your event on this calendar, contact us at 517.484.9761 or admin@macdc.us.



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