

Geologically Speaking

A Michigan Section AIPG Publication



Inside This Issue:

Michigan Section Golf Outing: Save the Date

Feature Article: LUST Triage Program

Regulatory Roundup

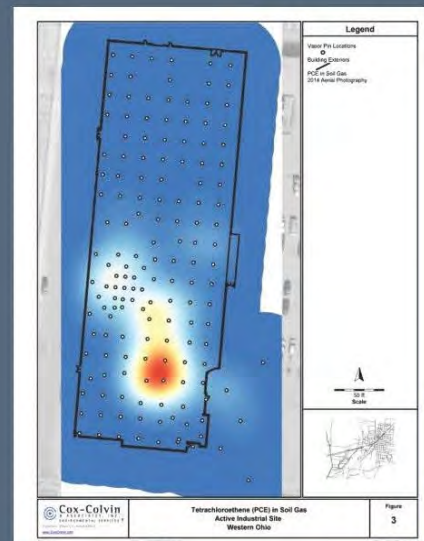
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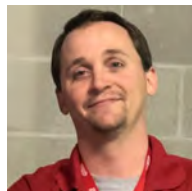
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Front Cover: The Osceola #13 shaft in Osceola, Michigan. This is one of the last surviving remnants of Michigan's copper mining heritage. Photo by Sara Pearson. The photo was taken in August 2024.

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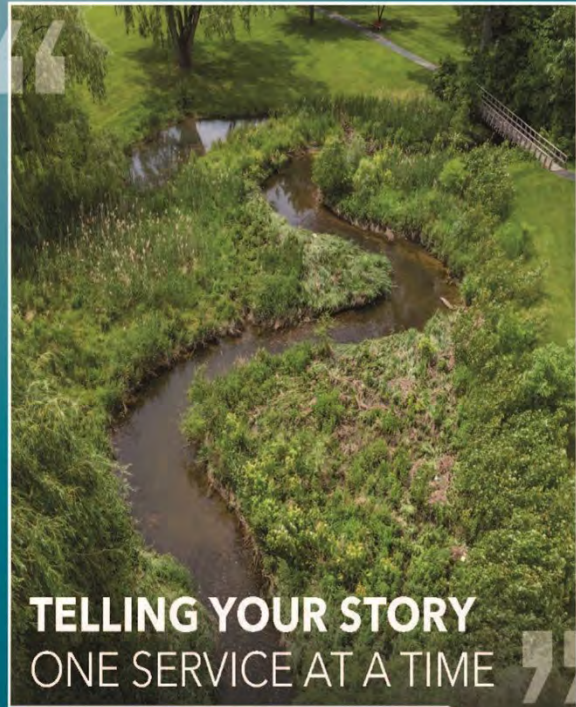
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Geology Crossword #17 Solution

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		E		E						R						N					

Across

1. Earliest life form
5. Has a shell matrix
6. Fourth Greek letter
8. Not used to cool oneself
9. Formed by recrystallization of lime mud
10. Can be physical or chemical
11. A type of potato chip
14. Planes, trains and autos are examples
20. Your name when in serious trouble
21. Deserving respect and worth its cost
22. Study of tracks and traces

Down

2. Repetitive turbidite sequence
3. Likely forms in arid environments
4. Process describing physical & chemical changes in sediments
7. Angular, poorly sorted rubble
12. Not a chocolaty cereal
13. The giving of sworn evidence
15. "Dry" gypsum
16. Jacobsville, as example
17. Not an aluminum foil
18. Antrim and Ellsworth
19. Not for wrapping babies

From the President's Desk

Have you read any good books lately? Leadership books are everywhere. I recently read *Power to the Middle* by Bill Schaninger, Bryan Hancock, and Emily Field. It is a thought-provoking book that challenges the traditional view of middle managers as mere cogs in the corporate machine. The authors of this book, argue that middle managers are, in fact, the linchpin of modern organizations especially in times of rapid and complex change. Through rich storytelling and cutting-edge research, *Power to the Middle* offers a new model for companies to optimize the performance of their most valuable asset: their managers. It provides practical ideas on how to support and celebrate the impact of mid-level managers, highlighting their role in maintaining momentum and driving sustained value creation within organizations.

I enjoy being a middle manager and have been for much of my career. There were opportunities for moving up but as I moved up, the work was not as rewarding for me; I truly enjoy working directly with staff to create a positive work environment and cultivate and attract top talent. It was interesting to read how companies have failed by cutting their middle managers in economic downturns, only to see that the middle managers are crucial to the success of the organization and act more like a bridge between strategy and execution. When that bridge is not there, a gap develops, and companies lose momentum and performance dwindles. I am sure many of you have seen this in your careers. Effective middle managers are not just enforcers of policies, but are innovators and influencers who can drive positive change within their organizations. They need to be compensated for their value and able to advance within their current position – that's what I'm telling my boss, LOL!

The next book I am just starting to read is *Extreme Ownership* by Jocko Willink and Leif Babin, two U.S. Navy Seals who apply the lessons learned from their military experiences to business and to life. The central premise is that leaders must fully own their decisions and their team's actions, embracing responsibility for both successes and failures. I have great respect for our military personnel so this should be a great read! The next book in the series is *Dichotomy of Leadership* that I am looking at reading after *Extreme Ownership*. Lots to do!!

In my opinion, I see extreme ownership as taking responsibility for your actions and their outcomes, that is, being accountable. Have you ever used a RACI chart when developing roles and responsibilities on projects? Mainly, what you do is list all the roles and define whether that role will be Responsible, Accountable, Consulted or Informed. The terms "responsible" and "accountable" are often used interchangeably, but they hold distinct meanings. Being responsible refers to having a duty to handle a task or role, focusing on the completion of assigned duties. On the other hand, being accountable goes a step further, encompassing not only the completion of tasks but also taking ownership of the outcomes, whether successful or not. While responsibility can be shared among

team members, accountability is personal and cannot be divided. In essence, responsibility is task-oriented, while accountability is result-oriented, with the latter involving a higher degree of ownership and often following the completion of a task to assess its success and address any consequences.

I believe that some people may think about accountability by looking through the lens of how accountable others are to them. It is important that we first need to look in the mirror and see how accountable we are to ourselves – who we are and how we act. Saying things like "I'm sorry, that's on me" or "you were right, that was the wrong call" versus pointing at the fault of others shows accountability. At the heart of accountability is honesty and humility. These should be our guiding principles that define who we are and guide who we become. Considering that and with full transparency and accountability, this newsletter is out so late because of me. Adam had it ready to publish, but was waiting for my column. "I'm sorry members, that is on me!"

I leave you with this, the accountability we seek in others begins with ourselves. It is only by embracing truthfulness and modesty that we can confidently declare, "No matter the result, I will accept it as my own."

Have a great rest of your summer and fall and if you have a favorite book, send me the title. I would love to hear about what others are reading!

See you at our next event!

Amy

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Secretary's Report

The Michigan section AIPG Executive Committee meets monthly on the first Friday with a few deviations due to schedules. During the monthly one-hour meetings, Executive Committee board members have discussed and planned various topics, highlighted by month below:

June 14, 2024

The Executive Committee had a quorum for this meeting. The meeting minutes from the May 10th virtual meeting were approved. Early Career Professional Sienna Meekhof reported that seven students attended the networking event that was hosted. Kalan Briggs also added that two students attended the AIPG workshop. Section finances were discussed by Treasurer Jason Lagowski and all accounts are in good standing. Jason had questions about deposits made for the workshop, he would verify with Sara and report back. Discussion was held about prior pending balances and needing receipts for reimbursements. Old Business included discussing the Section's website and reaching out to the vendor about when it will be finished. 275 attendees were registered for the Section's 2024 Environmental Risk Management Workshop, the weather was wonderful, and the presentations were amazing. 110 individuals from EGGLE attended; this was the most ever for EGGLE. Jason and Kalan will get together to work on outstanding fees. The Executive Committee will start to look into nominations for the Section Secretary for 2025. New business included trying to arrange a Michigan Section field trip, possibly during the

Section Website Reminders

The Michigan Section has created a database of geologic photographs on our website. Please submit photographs that you are willing to share to Adam Heft at adam.heft@wsp.com. Don't forget to include your name and a short explanation of what the photograph depicts. The photographs will be uploaded to the website periodically.

If you have suggestions on other items that should be included on the History page, please let a member of the Section Executive Committee know.

month of July. Also discussed the joint meeting with MAEP, during September; the date is yet to be determined. Section Vice President Ashley Miller is planning to attend the Annual Meeting in Durango, CO as our Section delegate to the Advisory Board.

July 19, 2024

No quorum - Meeting cancelled and rescheduled for August 6th, 2024.

I Want To Publish Your Articles!



Hey everyone, I would like to encourage you to submit your articles for publication! As the Michigan Section Editor, and also the 2021-24 National Editor, I am working to put together two top-quality publications for our members. This is not a one person job. This is where you come in. I welcome your technical articles, case

studies, opinion pieces, mini field guides, and letters to the Editor.

The guidelines are pretty simple for articles for *Geologically Speaking*. All submissions must be professional and may not violate the AIPG code of ethics. They also may not have been submitted for publication elsewhere.

While most submissions will be accepted, we do not accept articles that are a sales pitch for a product or company.

The deadline for submitting articles for *TPG* is two months before the start of the quarter for which the *TPG* edition is published. Thus, February 1 is the deadline for the Apr/May/June edition.

Please submit your articles of no more than 3,200 words in MS Word format directly to me or to Dorothy Combs at National Headquarters at aipg@aipg.org. All graphics (photos, figures, or tables) should be submitted in .jpg, .tiff or other standard format at 300 dpi. Please ensure your graphics are clean and easy to read to make things easier for the editorial staff. Complete information on submitting an article may be found on National's website at: <https://aipg.org/page/TPGInformation>.



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AIPG Michigan Section 20th Annual Golf Outing

September 10, 2024 Golf Outing
Fox Hills – Golden Fox Golf Course
***SAVE THE DATE**



Ready, Set, Go! Golf carts at Fox Hills; photo from Fox Hills Golf Course photo gallery.

Greetings everyone! I am pleased to announce that this year's golf outing is scheduled and will be held on September 10th once again at the beautiful Fox Hills club and will feature their championship Golden Fox course in Canton, Michigan! The Michigan Section is deep in the planning phases for our 20th Annual AIPG Golf Outing. Please spread the word to your suppliers and fellow colleagues, and plan to bring your A-game, drivers, polished irons, and fancy putters (or just be willing to play 18 holes and have a good time!). The rolling picturesque landscape and rolling topography paired with an excellence in design and construction will make the engagement suitable for the stiffest of competition and cozy enough for us humans to just enjoy.

Please also consider a sponsorship this year as we really could not have this event without our new and returning sponsors. There are several different levels of sponsorship listed on the event page and event flier. These sponsorship opportunities offer great exposure to some of the most influential professionals in our industry. Sponsors are also requested to include with their sponsorship a gift basket of at least \$30 in value that will be raffled off with the rest of the prizes. Last year we raised approximately \$300 from the gift baskets alone and we are ready to beat that amount with an even better event this year!

All money raised is put toward the Michigan Section's awards programs and helps support our student chapters.

To ensure continued success, please join us by; participating, sponsoring, soliciting sponsors, and/or donating prizes or items. Volunteers are also highly encouraged and very welcome!

This event is a great opportunity to spend time with colleagues and celebrate the closing end of a busy "summer field work" season here in our beautiful state of Michigan. It is open to everybody, so please come and take advantage of the opportunity as so many others have done in the past. You need not be an avid golfer to participate; all are welcome!

The registration is open and can be completed at the event website here: [American Institute of Professional Geologists - 20th Annual Golf Outing \(eventregisterpro.com\)](https://www.eventregisterpro.com). If necessary, a hard copy registration form, along with a check covering the registration costs, can also be submitted to Kalan Briggs at briggsk2@michigan.gov or mailed to 630 Piper Road, Haslett, MI 48840. Feel encouraged to take advantage of the "Early Bird" discount if you register/pay for golf by August 1, 2024.

We hope to see you on September 10, 2024!

Editor's Note: Registration and information flyer for the 2024 Michigan Section AIPG Golf Outing can be found at the end of this edition of *Geologically Speaking*...

Where in Michigan?

The May 2024 edition of *Geologically Speaking* featured a photograph of the 40 Mile Point lighthouse, which is northwest of Rogers City on the Shore of Lake Huron. It is situated on bedrock of the Middle Devonian age Detroit River Group. Rick McGregor of EGGLE correctly identified the photograph and has his choice of AIPG swag!

This edition of *Geologically Speaking* features a new photograph **at right** - not the photo on the cover page. The first person to correctly identify what the photograph depicts (feature name, location, and the name and age of the uppermost bedrock formation it sits on) will win AIPG swag! Submit your entry via email to the editor; only one per person per issue please.

Don't forget to check out the feature article "Geology in Michigan" in this issue (as well as the last several editions) that presents a geologic feature of interest as a mini field guide. One of the best parts about being a geologist is field trips, and we are hoping that in your travels around the state or country you include these featured spots as a stop. Why not incorporate them into a family vacation or bring friends who may not be geologists and share these locations that make Michigan unique? We hope you enjoy reading about it, and more importantly, go see it in person! We invite you to share unique geologic features that you know about and submit a "mini field guide" to share with our members in future editions.



Invitation to Our Members!

Do you have a case study to share?

The Michigan Section AIPG promotes knowledge sharing and would like to feature case studies from projects where others may benefit from successes as well as lessons learned. We feel as professionals that learning from each other is a great opportunity that AIPG offers our members. AIPG offers connection with other professionals and their experiences in the work we do every day. This case study represents what we would like to offer more to our members, not only as a way to solve problems, but unify us as professional geologists. Additionally, do you have a suggestion for other types of information to share that would be of interest to our membership?

Please send your case studies and suggestions for future publication in upcoming editions of *Geologically Speaking* to the Editor.

Update Your Information!

Please be sure that you continue to receive the Section's *Geologically Speaking* publication and other announcements. Submit an updated e-mail address to Adam Heft at adam.heft@wsp.com. If you move or change places of employment, don't forget to send your new contact information to both the Section and to National. If you are not receiving announcements directly from the Editor, it is because your email address is not up to date with the Michigan Section or because your IT group may classify it as junk or a bulk sending.

Please help the Editor by making sure that your email address doesn't bounce when the next announcement is sent. And be sure to cc Dorothy Combs, National AIPG Membership Director at aipg@aipg.org when you update your contact information. Thank you!

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Minerals for Sale!

Long-time Michigan mineral collector and dealer, Bill Micolis, is selling his lifetime collection of material. Bill is in Milford. For additional details, please see the full-page flyer on the following page.

Support our Sponsors!

The Section Executive Committee would like to remind its members to support the companies advertising in this publication. Consider working with these companies, and when you speak with their representatives, let them know that you saw their ad in the Michigan Section AIPG publication *Geologically Speaking*.

Interesting Geology Links

The Editor has received links to various interesting geology-related sites. Some of the more interesting links are included here. If you have any links to geology-related sites that you would like to share, please forward them (with a citation, if applicable) to the Editor.

Top 10 natural disasters caught on camera: <https://www.youtube.com/watch?v=scRUGRreKmY>.

Geology Professor Shawn Willsey YouTube Channel: <https://www.youtube.com/@shawnwillsey>.

The AIPG YouTube Channel: <https://www.youtube.com/channel/UCZJVHi1yAPLJe1AksLOV3pA>.

What Happens if Yellowstone Blows Up Tomorrow? <https://www.youtube.com/watch?v=RqrWejHHel>.

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Utilizing the Leaking Underground Storage Tank State-Wide Expanded Triage Program to achieve an Approved Project Completion for a former service station in Lake Orion, Michigan

By Ira Adolphues, CPG-12157

Site Background

The Site is located at 597 East Flint Street, Lake Orion, MI 48362-1751, north of the intersection of Flint Street, Miller Road, and Orion Road (roundabout). The Site consists of an approximately 0.457-acre parcel of land and currently a vacant lot (Figure 1).

L.S. Enterprises (facility identification number 00017595) was a former gas station that was in operation from 1961 until 1986. One confirmed release number was filed with the Michigan Department of Environmental Quality (MDEQ) (now Environment, Great Lakes, and Energy (EGLE)) on December 28, 1990. The release was discovered during removal of the underground storage tanks (USTs). The location of the former UST basin, former dispenser island, and former building can be seen in Figure 2. The source of the release was presumed to be from a rupture from a single UST. Following removal of the USTs, a total of 4,271 cubic yards of impacted soils were removed from the Site in May and June 1991. No Light Non-Aqueous Phase Liquid (LNAPL) was encountered during UST and soil removal.

An Initial Abatement Report was submitted on January 19, 1991, and a Final Assessment Report (FAR) was approved in 1997. The FAR Corrective Action Plan (CAP) was quarterly monitoring well sampling, natural attenuation, and to file a restrictive covenant (RC) with the Oakland County register of deeds to restrict groundwater usage. A Closure Report (CR) was submitted on April 7, 2008; however, EGLE conducted an audit of the closure report. An Audit of Corrective Actions letter dated August 26, 2008 stated, "the [Remediation and Redevelopment Division (RRD)] does not concur with the certification of the QC that corrective actions have been completed in accordance with Part 213 of Act 451."

On October 10, 2008, the former owner/operator's consultant responded to the August 2008 EGLE audit letter with comments to each decision, stating that they are willing to address the concerns. Unfortunately, L.S. Enterprises never submitted a revised closure report. L.S. Enterprises dissolved on August 28, 2018. In August 2018, three (3) monitoring wells were abandoned along the East Flint Street and Miller Road right-of-way (ROW) for road construction.

There is a RC placed on the property restricting groundwater use. L.S. Enterprises donated the property to Lake Orion Lions Club sometime after 2007, and the club sold the property in 2020.

2022 and 2023 Expanded Triage Investigation

In August 2021, the current property owner agreed to allow EGLE-RRD to conduct a limited subsurface investigation utilizing state funds. This program is known as the leaking underground storage tank state-wide expanded triage. The intent of the program is to gather current environmental data in a short period of time at properties where little subsurface information is known, or environmental cleanup work is inactive. Many of these locations are known as "orphan sites" as no liable party exists or the owner cannot financially be able to perform corrective actions to address contamination.

On August 12, 2022, EGLE contractor, ERG, conducted a geophysical survey of the Site using ground penetrating radar (GPR). The geophysical survey identified utilities and a large area of disturbed, potentially excavated soil, but did not identify any anomalies consistent with the presence of USTs or former UST cavities.

On January 9, 2023, ERG oversaw Laser-Induced

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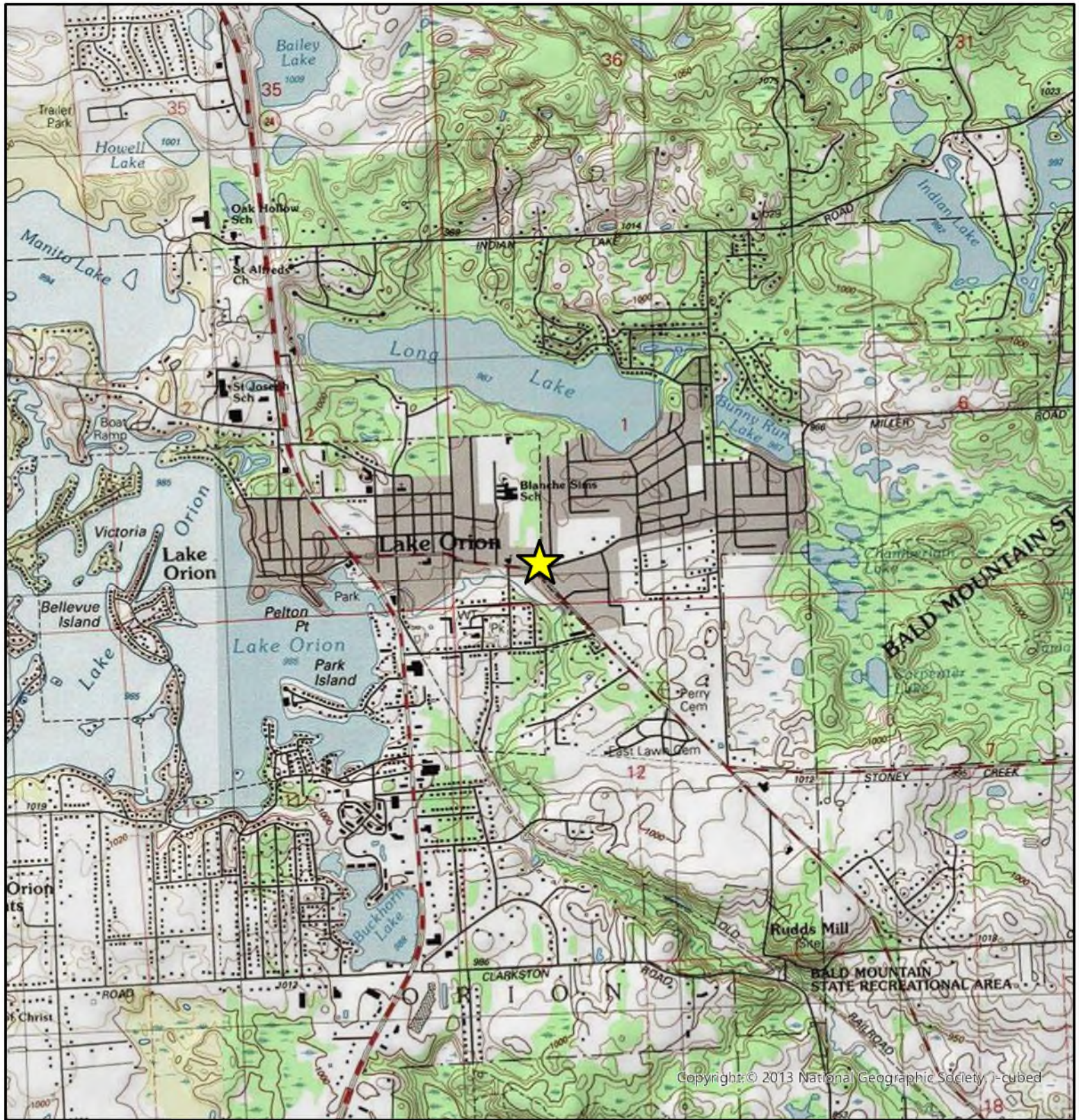
Soil



Water



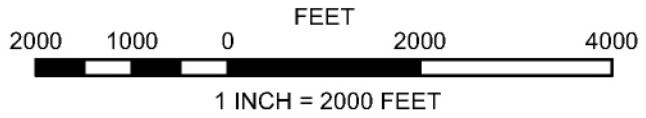
Air



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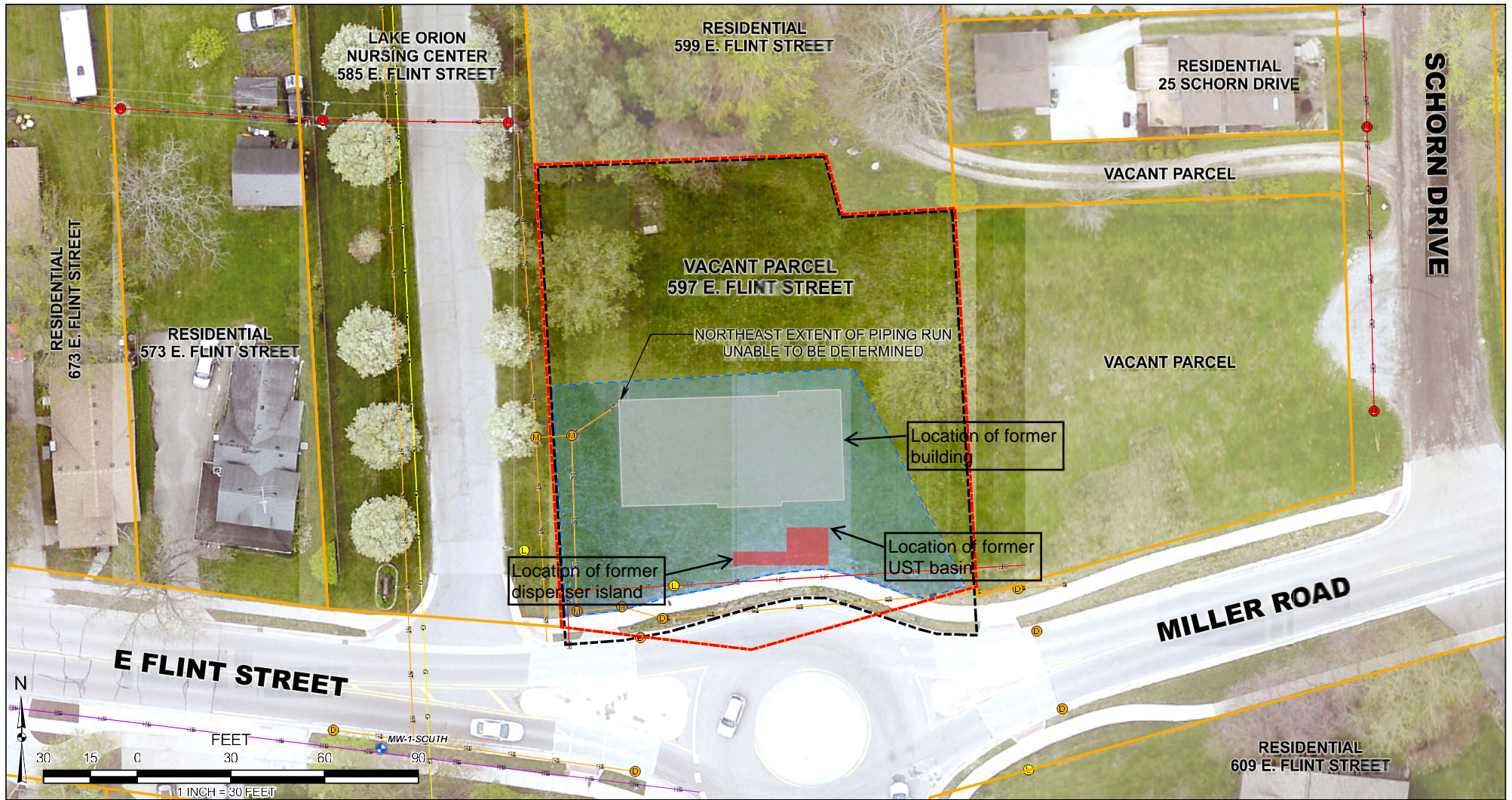
 Site Location



FORMER LS ENTERPRISES	
597 E. FLINT STREET, LAKE ORION, MICHIGAN	
SITE LOCATION MAP	
JOB NO.: 9339.004	
BY: TNV	DATE: 7/27/2022
FIGURE 1	



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LEGEND

- | | | |
|--|--|--|
| <ul style="list-style-type: none"> --- Site Boundary Appx. Parcel Boundary (Oakland County GIS) GPR Survey Boundary Area of Disturbed/Excavated Soil with Fill Material + Monitoring Well | <p>Utilities</p> <ul style="list-style-type: none"> ● Utility Poles ● Light Poles ● Storm Sewer Catch Basins ● Storm Sewer Manholes — Overhead Electric — Underground Electric — Natural Gas — Storm Sewer — Underground Fiber Optic | <ul style="list-style-type: none"> Approximate location of former dispenser and UST basin. |
|--|--|--|

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SITE LAYOUT MAP
JOB NO.: 9339.004
BY: TNV DATE: 8/15/2022
FIGURE 2



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Imagine the impossible
Create the enduring

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Fluorescence (LIF) investigation using the Ultra-Violet Optical Screening Tool (UVOST). Seven LIF borings were advanced to a maximum depth of 20 feet below ground surface (bgs). All borings demonstrated little to no signal, which indicate a lack of PAH compounds in the soil.

On March 28-29, 2023, ERG conducted subsurface investigation activities that included drilling, installation of temporary monitoring wells, soil and groundwater sampling. A total of 13 soil borings were advanced to 20 feet bgs onsite. Four borings (SB-7/TW-3, SB-15, SB-16/TW-5) were advanced in the ROW to seven to nine feet bgs. A Photoionization Detector (PID) was utilized to screen soil for Volatile Organic Compounds (VOCs). A total of five soil borings were converted into temporary monitoring wells. All soil and groundwater samples were analyzed for VOCs and PAHs.

On September 5, 2023, ERG conducted a second round of triage for delineation purposes. Four soil borings

(SB-17 through SB-20) were advanced in the ROW of Flint Street, and then three soil borings were converted into temporary monitoring wells (TMW-6 through TMW-8). Soil and groundwater samples were analyzed for VOCs and PAHs. The locations of LIF borings, soil borings and temporary monitoring wells from the 2023 March and September triage investigations are shown on Figure 3.

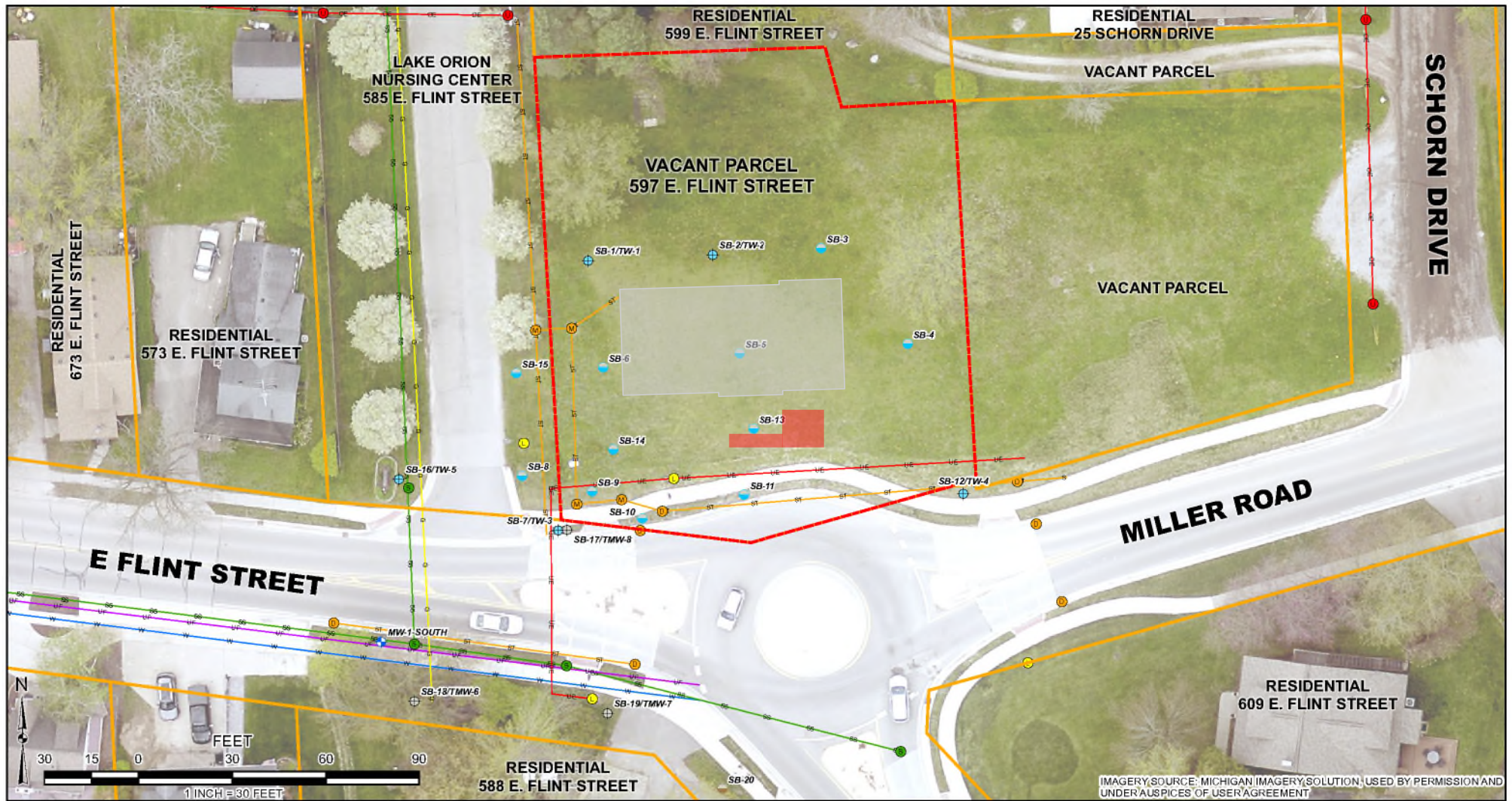
Conceptual Site Model (CSM)

Regional and Site Geology

The bedrock underneath the glacial drift consists of the Coldwater Shale, which is approximately 1,300ft thick, consists of thin lenticular siltstones, sandstones, limestones, and thin beds of limonite nodules, light greenish to bluish in color (Ellis 1979). According to the Quaternary Geology of Southern Michigan (Farrand and Bell, 1982), regional geology in the vicinity of the site consists of the following soil type:



Image 1: This photo was taken facing west. Glacial outwash exposure at Koenig Materials located at 1955 East Lakeville, MI. The upper unit is an approximately ten feet thick, gray and brown sand-rich diamicton. Beneath this unit is brown sand, fine to coarse grained, gravel is small to large and rich in igneous and metamorphic cobbles and boulders. This unit is well to poorly sorted, well stratified, in places cross-bedded sand lens. This unit is approximately 15 feet thick. The entire outcrop is approximately 25 feet. Photo taken by Ira Adolphues .

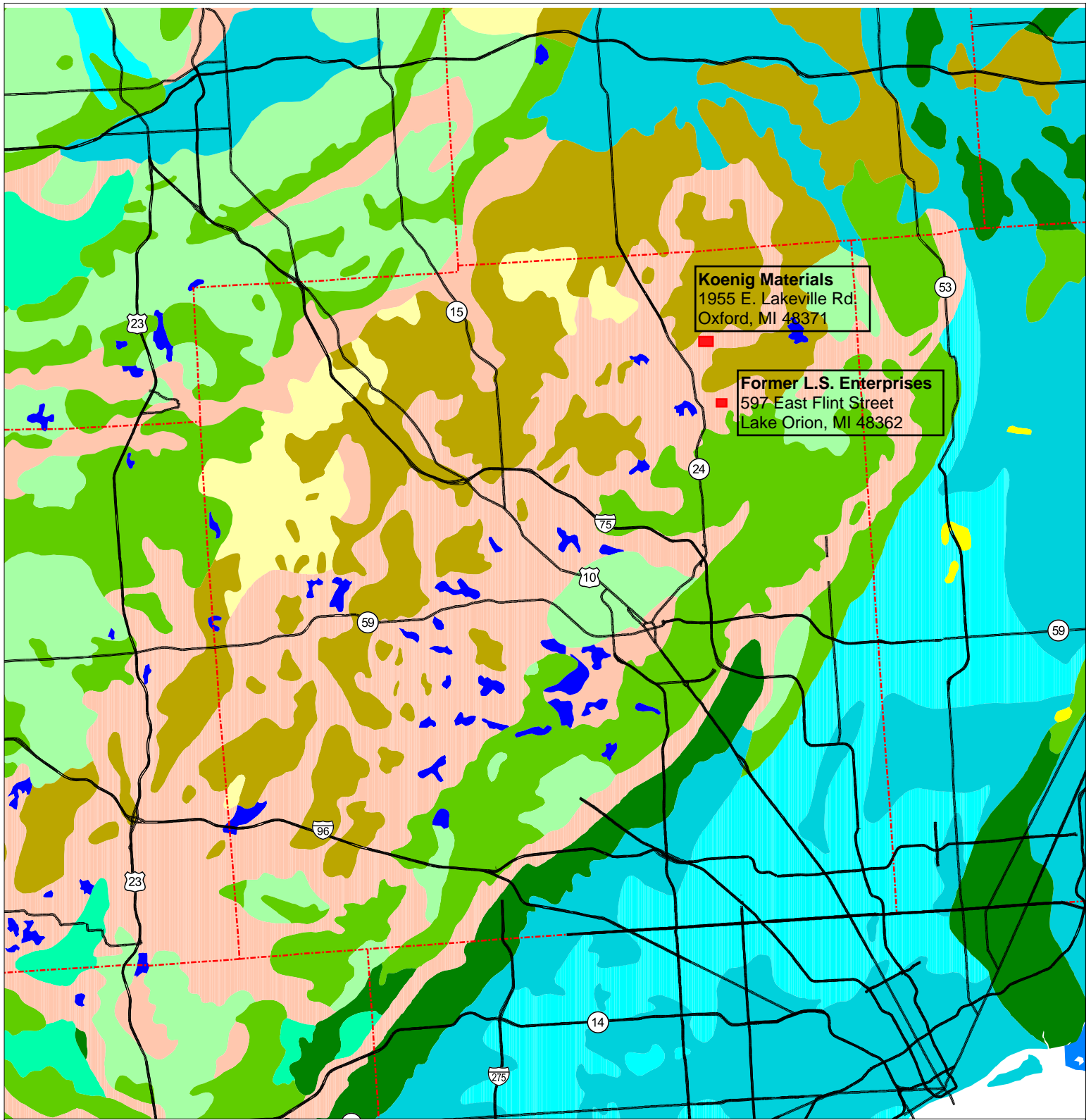


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LEGEND			
	Soil Boring		Site Boundary
	Soil Boring (Triage 2022)		Appx. Parcel Boundary (Oakland County GIS)
	Temporary Monitoring Well	Utilities	
	Temporary Monitoring Well (Triage 2022)		Utility Poles
	Monitoring Well		Light Poles
	Storm Sewer Catch Basins		Natural Gas
	Storm Sewer Manholes		Storm Sewer
	Sanitary Sewer Manhole		Underground Fiber Optic
	Overhead Electric		Sanitary Sewer
	Underground Electric		Water
	Approximate location of former dispenser and UST basin.		

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SOIL BORING AND MONITORING WELL LOCATION MAP
JOB NO.: 9339
BY: JEC DATE: 10/2/2023
FIGURE 3



Quaternary Geology

Oakland County



Data Source: Quaternary Geology of Michigan. 1998. Michigan Natural Features Inventory (MNFI) and Michigan Department of Natural Resources (MDNR). Digital version of the Quaternary Geology maps of Northern and Southern Michigan, at a scale of 1:500,000, from W.R. Farrand and D.L. Bell, 1982.

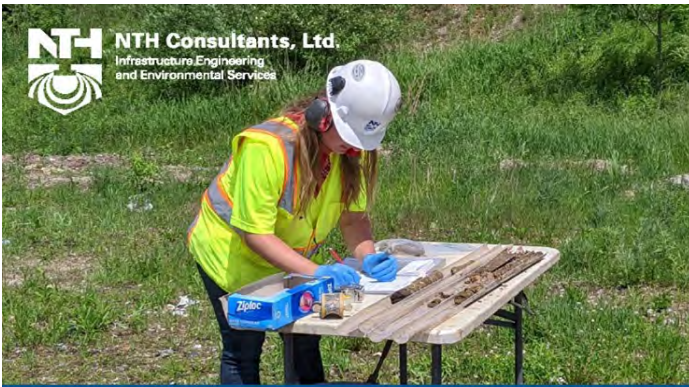
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Legend

- Major Roads
- County Lines

Geology class

- Water
- Peat and muck
- Postglacial alluvium
- Dune Sand
- Lacustrine clay and silt
- Lacustrine sand and gravel
- Glacial outwash sand and gravel and postglacial alluvium
- Ice-contact outwash sand and gravel
- Fine-textured glacial till
- End moraines of fine-textured till
- Medium-textured glacial till
- End moraines of medium-textured till
- Coarse-textured glacial till
- End moraines of coarse-textured till
- Thin to discontinuous glacial till over bedrock
- Exposed bedrock surfaces
- Artificial fill



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Glacial outwash sand and gravel and postglacial alluvium – Pale brown to pale reddish brown, fine to medium sand, commonly including beds or lenses of small gravel, chiefly quartz sand, but gravel is rich in igneous and metamorphic rocks, well to poorly sorted, well stratified, with crossbedding. After review of the drinking water wells in the vicinity of the Site, the subsurface was found to consist of clay to a depth between 15 and 30 feet bgs, underlain by sand & gravel to 90 feet bgs. Water bearing sand is typically encountered between 70 and 80 feet bgs.

This glacial outwash deposit was observed at Koenig Materials on June 21, 2024, a sand and gravel quarry located at 1955 East Lakeville Road, Oxford, MI 48371. Images of this glacial deposit are on the preceding page and below.

Site Hydrogeology

The depth of groundwater ranges from approximately six to eight feet bgs. The water-bearing unit consists of fine to coarse grained sand with an estimated porosity of $0.30 \text{ cm}^3/1 \text{ cm}^3$. The hydraulic conductivity is estimated to be 4.64×10^{-3} , while the directional flow of the groundwater appears to be to the south-southwest at a rate of $3.1 \times 10^{-3} \text{ cm/second}$.

Triage Investigation results

All soil and groundwater samples were analyzed for VOCs and PAHs. Soil and groundwater analytical results were compared to the Part 213 Risk-Based Screening levels (RBSLs). Analytical results did not identify VOCs or PAHs at concentrations above RBSLs in any of the soil



Image 2: This photo was taken facing south. The upper unit is sand and gravel, brown, medium to fine grained, with cross beds. This upper unit exhibits some weathering. The lower unit is sand, brown, fine to medium grained, and contains cross beds. Photo by taken Ira Adolphues .

For the Site geology, which is based on review of soil boring logs, the lithology consists of brown to gray sand that overlies a native clay layer that transitions to silt from 14' to 20' bgs.

and groundwater samples, excluding SB-7/TMW-3 and TMW-8. This one soil boring and two temporary monitoring wells are located in the ROW of Flint Street (see figures 5, 6, and 7). Both SB-7 and SB-17 contained high



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PID readings between six and ten feet bgs. PID readings ranged from 340.8 ppm to 380.6 ppm at SB-7, and 194.8 ppm to 460.1 ppm at SB-17. OIL-N-SOIL™ shake tests were conducted at SB-7 (7-8') and SB-17 (7-8'), and both were positive results; however, SB-17 (7-8') analytical results were below RSBLs and SB-17 (19-20') was non detect (ND). Residual LNAPL is only present in the soil and groundwater in the southwest portion of the ROW.

SB-14 (13') detected 2,2,4-Trimethylbenzene at 6,400 ug/kg; however, this was an isolated detection of this VOC. The PID reading was 2.0 ppm and the OIL-N-SOIL™ shake test was negative. SB-8 (11'-13'), SB-9 (14'-16'), and SB-10 (9'-11') were ND for 2,2,4-Trimethylbenzene.

Soil analytical results for MW-1, SB-18/TMW-6, SB-19/TMW-7, and SB-20 were either ND or below RBSLs. Groundwater analytical results for TMW-6 and TMW-7 were ND. Soil and groundwater analytical results are shown on Figures 5, 6, and 7.

Gasoline Range Organics (GRO) was not analyzed during the triage investigation; however, multiple lines of evidence were used to verify the presence of LNAPL such as PID screening, OIL-N-SOIL™ shake tests, visual and olfactory observations, and analytical results.

Permanent monitoring wells were destroyed during roundabout installation in 2018, and the rest were abandoned by a consultant prior to construction activities. This area is now part of the ROW and East Flint and Miller roads.

Exposure Pathway Evaluation

Volatilization to Indoor Air Pathway (VIAP)

The Site is now a vacant lot. Since there is no structure, there is no VIAP exposure risk. High VOC concentrations were detected in the ROW; however, SB-7/TW-3 and TMW-8 were the only locations whose contaminant concentrations exceeded the screening levels. Since this area is part of the road and ROW, it is not likely to be occupied by a structure in the future.

Groundwater Surface Water Interface (GSI)

This pathway is complete. SB-7/TMW-3 and TMW-8 detected high VOCs in soil and groundwater at concentrations exceeding GSI RBSLs; however, this contamination has not migrated south. No VOCs or PAHs were detected in MW-1, SB-18/TMW-6, SB-19/TMW-7, or SB-20. The storm sewer flows south into the Paint Creek that discharges into the Clinton River.

Due to the presence of contamination in the ROW, and the fact that groundwater is shallow, a storm sewer inspection was conducted on December 11, 2023. EGLE project manager Ira Adolphues collected measurements

of storm sewer pipes including depth to water and depth to bottom in all manholes. The storm sewer lines are in contact with groundwater. In 2020 during the construction of the roundabout, Oakland County Road Commission (according to Lake Orion DPW) installed a system called AquaShield Stormwater Treatment Solutions (image 3). This system is a hydrodynamic separator, which removes sediment, floating debris, and petroleum products (an oil and water separator). Based on the age of the storm sewer system and given the fact that there is an environmental treatment system onsite, the GSI pathway was considered incomplete. There is no exposure risk. Figure 7 has storm sewer measurements and flow direction.



Image 3: Photo of AquaShield Stormwater Treatment Solutions manhole cover. Photo by taken Ira Adolphues .

Drinking Water Protection pathway (DWP)

This exposure pathway is complete. Nearby residents have potable drinking water wells in the vicinity of the Site. After review of well logs, an aquifer was identified between 70 and 80 feet bgs. Many area drinking water wells are set between 60 and 90 feet bgs. Groundwater flow is to the south to southwest.

The use of groundwater has been eliminated onsite by a RC recorded by the previous owner with the Oakland County Register of Deeds prohibiting potable groundwater use at the Site. Additionally, the Site and surrounding area are serviced by the municipal drinking water supply.

Based on this information, there is no exposure risk to drinking water.

Volatile Soil Inhalation Criteria and Particulate Soil Inhalation Criteria (VSIC and PSIC)

These two pathways are complete, but there is no exposure risk. All concentrations in soil samples are below residential VSIC and PSIC RBSLs.

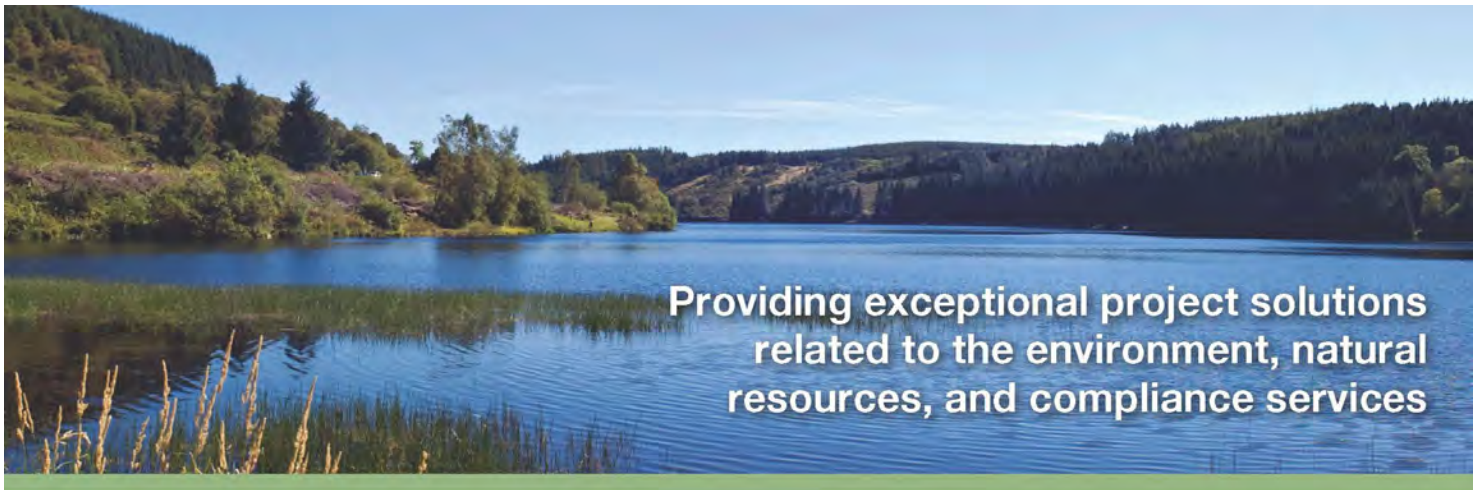
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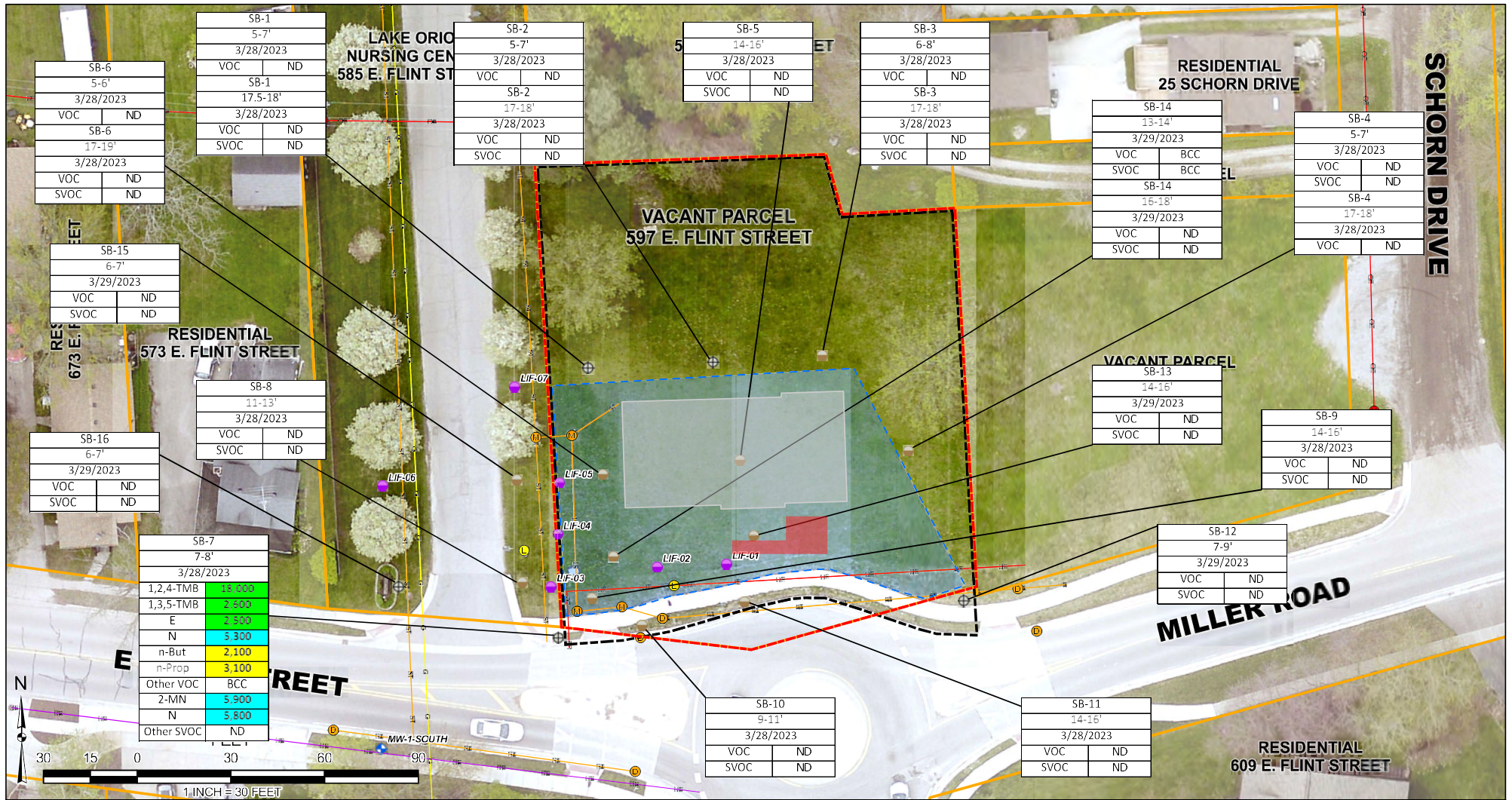
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SB-7	
7-8'	
3/28/2023	
1,2,4-TMB	13,200
1,3,5-TMB	2,500
E	2,500
N	5,300
n-But	2,100
n-Prop	3,100
Other VOC	BCC
2-MN	5,900
N	5,800
Other SVOC	ND

LEGEND

- Monitoring Well
- Soil Boring
- Temporary Monitoring Well
- LIF Soil Boring
- Site Boundary
- Appx. Parcel Boundary (Oakland County GIS)
- GPR Survey Boundary
- Area of Disturbed/Excavated Soil with Fill Material
- Utilities**
- Utility Poles
- Light Poles
- Storm Sewer Catch Basins
- Storm Sewer Manholes
- Overhead Electric
- Underground Electric
- Natural Gas
- Storm Sewer
- Underground Fiber Optic

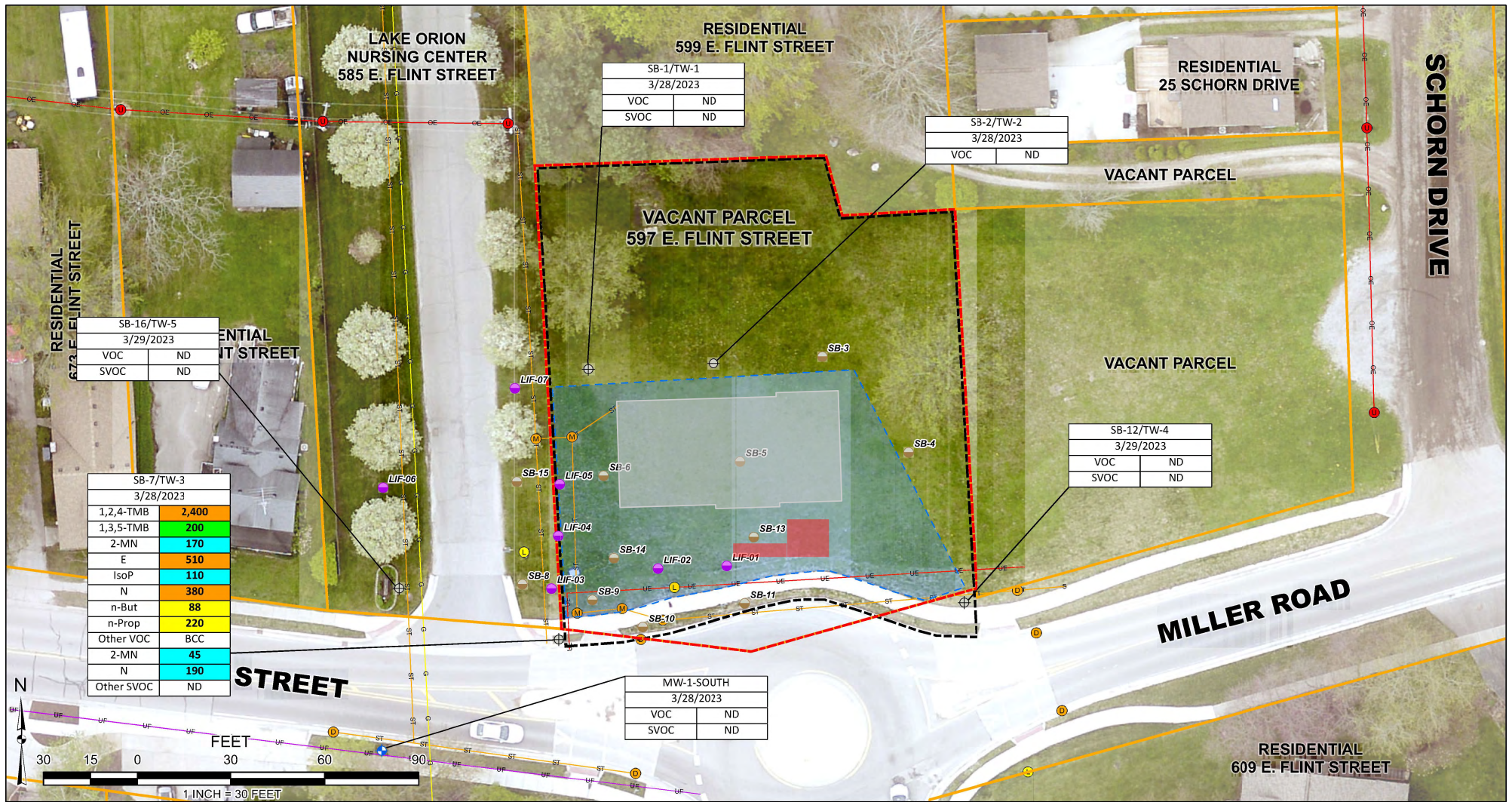
DATA LEGEND:

- Yellow indicates contaminant exceeds DWPC.
- Blue indicates contaminant exceeds DNPC.
- Green indicates contaminant exceeds BCC or ND.
- 1,2,4-TMB= 1,2,4-Trimethylbenzene
- 1,3,5-TMB= 1,3,5-Trimethylbenzene
- E= Ethylbenzene
- N= Naphthalene
- n-But = n-Butylbenzene
- n-Prop = n-Propylbenzene
- 2-MN= 2-Methylnaphthalene
- VOC= Volatile Organic Compounds
- SVOC= Semi-Volatile Organic Compounds
- BCC= Below Cleanup Criteria
- ND= Non Detect



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SOIL ANALYTICAL MAP	
JOB NO.:	9339.004
BY:	JEC
DATE:	4/25/2023
FIGURE 4	



LEGEND

Monitoring Well	GPR Survey Boundary	Storm Sewer Manholes
Soil Boring	Area of Disturbed/Excavated Soil with Fill Material	Overhead Electric
Temporary Monitoring Well	Utilities	Underground Electric
LIF Soil Boring	Utility Poles	Natural Gas
Site Boundary	Light Poles	Storm Sewer
Appx. Parcel Boundary (Oakland County GIS)	Storm Sewer Catch Basins	Underground Fiber Optic

DATA LEGEND:

Yellow indicates contaminant exceeds DWC.	Blue indicates contaminant exceeds GSIC.	Green indicates contaminant exceeds both DWC and GSIC.
Orange indicates contaminant exceeds one or more criteria; GVLC and/or FAV.		

1,2,4-TMB= 1,2,4-Trimethylbenzene IsoP= Isopropylbenzene VOC= Volatile Organic Compounds
1,3,5-TMB= 1,3,5-Trimethylbenzene N= Naphthalene SVOC= Semi-Volatile Organic Compounds
2-MN= 2-Methylnaphthalene n-But= n-Butylbenzene BCC= Below Cleanup Criteria
E= Ethylbenzene n-Prop= n-Propylbenzene ND= Non Detect

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GROUNDWATER ANALYTICAL MAP
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FIGURE 5

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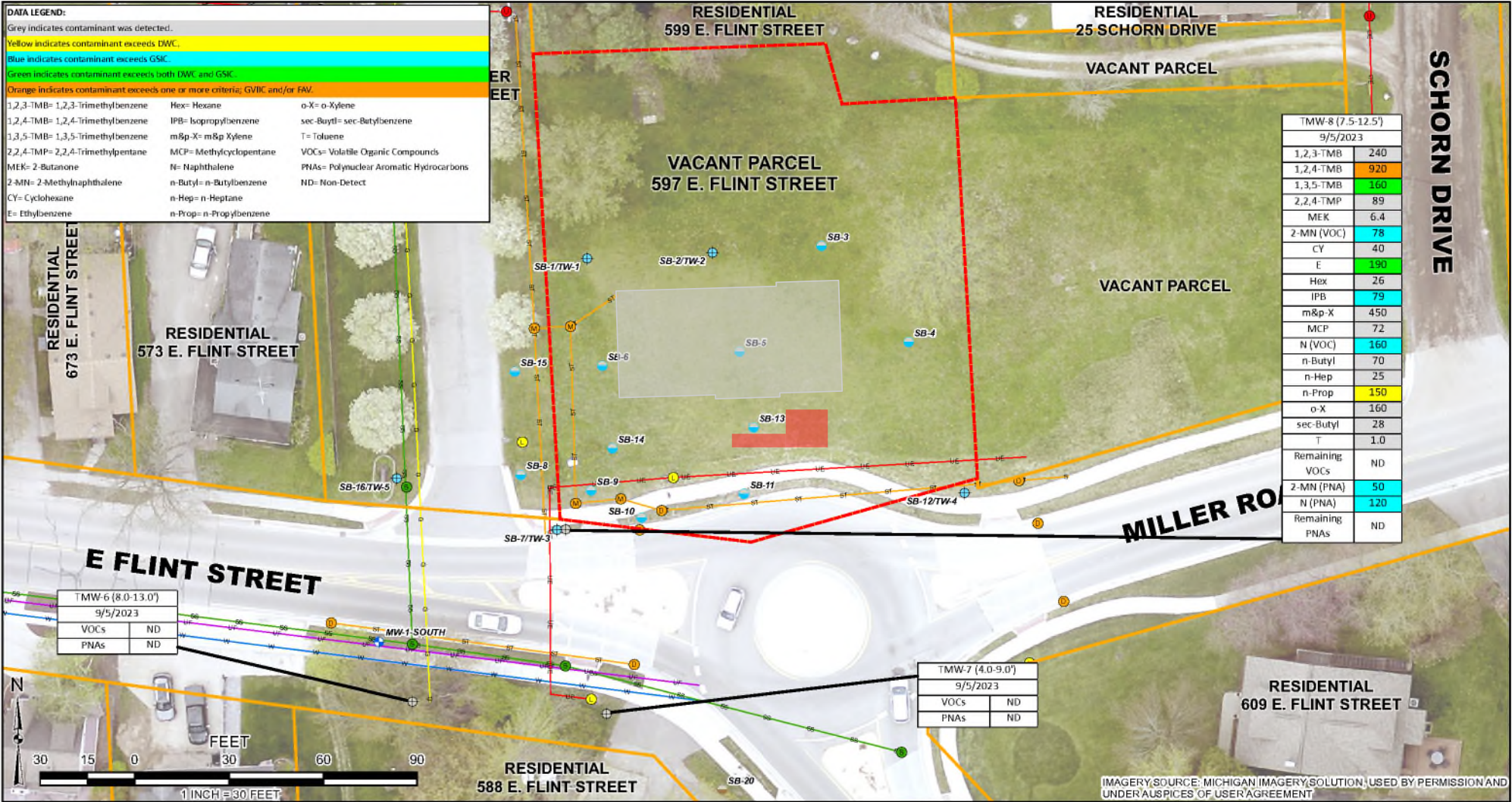
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DATA LEGEND:

Grey indicates contaminant was detected.
 Yellow indicates contaminant exceeds DWQ.
 Blue indicates contaminant exceeds GSK.
 Green indicates contaminant exceeds both DWQ and GSK.
 Orange indicates contaminant exceeds one or more criteria, GVOC and/or FAV.

1,2,3-TMB= 1,2,3-Trimethylbenzene	Hex= Hexane	o-X= o-Xylene
1,2,4-TMB= 1,2,4-Trimethylbenzene	IPB= Isopropylbenzene	sec-Butyl= sec-Butylbenzene
1,3,5-TMB= 1,3,5-Trimethylbenzene	m&p-X= m&p Xylene	T= Toluene
2,2,4-TMP= 2,2,4-Trimethylpentane	MCP= Methylcyclopentane	VOCs= Volatile Organic Compounds
MEK= 2-Butanone	N= Naphthalene	PNAs= Polynuclear Aromatic Hydrocarbons
2-MN= 2-Methylnaphthalene	n-Butyl= n-Butylbenzene	ND= Non-Detect
CY= Cyclohexane	n-Hep= n-Heptane	
E= Ethylbenzene	n-Prop= n-Propylbenzene	



TMW-8 (7.5-12.5')	
9/5/2023	
1,2,3-TMB	240
1,2,4-TMB	920
1,3,5-TMB	160
2,2,4-TMP	89
MEK	6.4
2-MN (VOC)	78
CY	40
E	190
Hex	26
IPB	79
m&p-X	450
MCP	72
N (VOC)	160
n-Butyl	70
n-Hep	25
n-Prop	150
o-X	160
sec-Butyl	28
T	1.0
Remaining VOCs	ND
2-MN (PNA)	50
N (PNA)	120
Remaining PNAs	ND

TMW-6 (8.0-13.0')	
9/5/2023	
VOCs	ND
PNAs	ND

TMW-7 (4.0-9.0')	
9/5/2023	
VOCs	ND
PNAs	ND

LEGEND

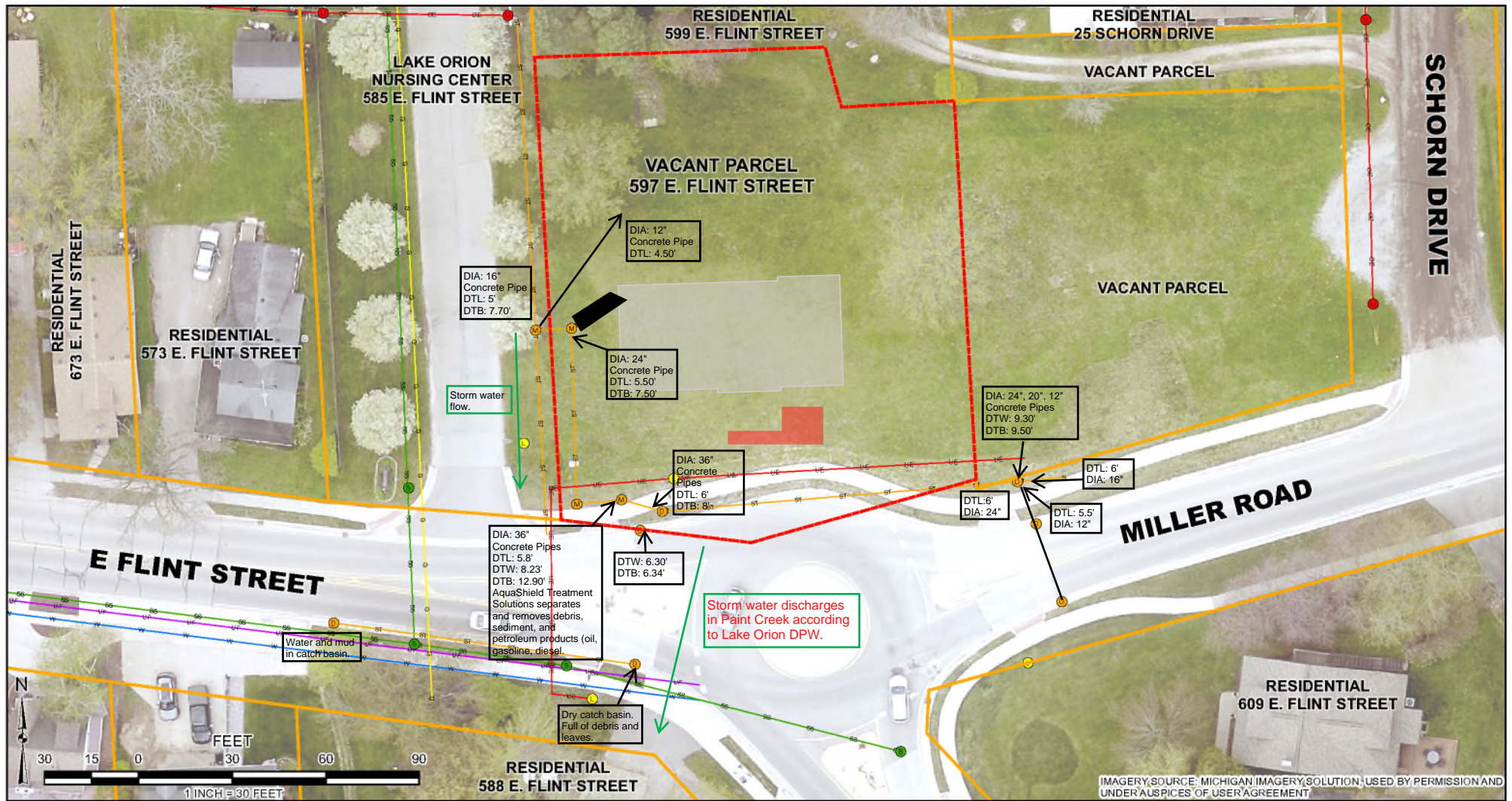
Soil Boring	Site Boundary	Storm Sewer Catch Basins	Natural Gas
Soil Boring (Triage 2022)	Appx. Parcel Boundary (Oakland County GIS)	Storm Sewer Manholes	Storm Sewer
Temporary Monitoring Well	Utilities	Sanitary Sewer Manhole	Underground Fiber Optic
Temporary Monitoring Well (Triage 2022)	Utility Poles	Overhead Electric	Sanitary Sewer
Monitoring Well	Light Poles	Underground Electric	Water

Approximate location of former dispenser and UST basin.

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FORMER LS ENTERPRISES
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GROUNDWATER ANALYTICAL MAP
JOB NO.: 9339
BY: JEC DATE: 10/2/2023
FIGURE 5

IMAGERY SOURCE: MICHIGAN IMAGERY SOLUTION, USED BY PERMISSION AND UNDER AUSPICES OF USER AGREEMENT



IMAGERY SOURCE: MICHIGAN IMAGERY SOLUTION, USED BY PERMISSION AND UNDER AUSPICES OF USER AGREEMENT

LEGEND

- Site Boundary
- Appx. Parcel Boundary (Oakland County GIS)
- Light Poles
- Storm Sewer Catch Basins
- Storm Sewer Manholes
- Sanitary Sewer Manhole
- Overhead Electric
- Underground Electric
- Natural Gas
- Storm Sewer
- Underground Fiber Optic
- Sanitary Sewer
- Water
- Approximate location of former dispenser and UST basin.

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597 E. FLINT STREET, LAKE ORION, MICHIGAN	
SITE LAYOUT MAP	
JOB NO.:	9339
BY:	JEC DATE: 10/2/2023
FIGURE 2	

Direct Contact (DC)

Analytical results of soil samples for VOCs indicates no detections onsite at depths ranging from five to 20 feet bgs. The vacant lot and ROW are not covered with asphalt nor concrete; however, this pathway is not complete. PID readings within the upper soils onsite are between 0.0 ppm to 2.0 ppm. This pathway does not require any further evaluation. Although SB-7 (7-8') has high detections of VOCs, these concentrations do not exceed DC criteria.

Conclusions

The 2008 CR was denied due to several insufficiencies with the report, including deficiencies with the RC. The triage investigation consisted of an LIF and subsurface investigation of 20 soil borings and eight temporary monitoring wells. Soil borings were advanced to depths between 15 and 20 feet bgs. Soil and groundwater analytical results were compared to Part 213 RBSLs. Analytical results did not identify VOCs or PAHs at concentrations above RBSLs in any of the soil and groundwater samples, excluding SB-7/TMW-3 and SB-17/TMW-8. These locations are in a small section of the southeast corner of East Flint Street ROW. All other ROW soil borings and temporary wells were ND or below RBSLs. Data concludes that there is no current exposure risk.

A District Peer Review (DPR) was held on December 12, 2023, to determine if an Approved Project Completion (APC) was achievable. The objective of an APC is to demonstrate that no unacceptable exposure risks are occurring or state-funded activities have resulted in a reduction of risk to human health and the environment to low levels where activities are no longer necessary. The overall presentation of the Site's background, CSM, and exposure pathway evaluation concluded that this Site was eligible for an Approved Project Completion (APC) and was granted approval. An APC was completed in February 2024.

References

Elli, G., 1979, The Mississippian and Pennsylvanian (Carboniferous) Systems in the United States-Michigan, Geological Survey Division, Michigan Department of Natural Resources.

Farrand, W.R., and Bell, D.L., 1982, Quaternary Geology of Southern Michigan: Michigan Department of Natural Resources, Michigan Geological Survey, Geological Publication QG-01, scale 1:500,000.

Michigan State University, Michigan Natural Features Inventory, <https://mnfi.anr.msu.edu/resources/quaternary-geology>.

Special Thanks

Special thanks to Daniel Rodgers, who is the site manager for Koenig Materials in Oxford, MI. Mr. Rogers allowed me access to view glacial exposures in the quarry and I appreciate his time.

Special thanks to Dr. Nathan R. Erber, who is a senior research associate at Michigan Geological Survey at Western Michigan University in Kalamazoo, MI. Dr. Erber specializes in glacial geology. I wanted to confirm that my glacial geology descriptions were correct, so I contacted Dr. Erber because this is his area of study. Although my descriptions were right, Dr. Erber brushed up for better accuracy.

Special thanks to Emily Bertolini, who is an assistant district supervisor at EGLE-RRD Warren District Office in Warren, MI. I expressed interest writing an article about this Site to Emily a few months ago, and she supported me 100%.

Special thanks to Rebecca DeGracia, who is an Environmental Quality Analyst at EGLE-RRD Warren District Office in Warren, MI. She handed this Site to me in early 2023 with the intention of obtaining subsurface data for an APC. Thankfully, we were able to achieve this goal.



Sara Pearson receiving the 2024 Martin VanCouvering award in Durango from President Shanna Schmitt.

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Coming Events

September 19, 2024: Joint Michigan Section AIPG/MAEP meeting. Date, speaker, and location to be announced.

September 20, 2024: AIPG National Executive Committee Meeting (Virtual). For details and an invite, email Cathy Duran at cld@aipg.org.

September 25-26, 2024: Great Lakes Drinking Water Conference. Suburban Collection Showplace, Novi.

October 11-13, 2024: 79th Greater Detroit Gem, Mineral, & Fossil Show. Macomb Community College, 14500 E. 12 Mile Road, Warren. Details at: <https://www.michmin.org/show-info>.

October 2024: Central Michigan's Annual Gem, Mineral, Fossil, Lapidary & Jewelry Show, Ingham County Fairgrounds, 700 East Ash Street, Mason.

December 5, 2024: Michigan Section AIPG Annual Meeting. Crystal Gardens, Howell, speaker and presentation TBA.

February 13-16, 2025: 70th Anniversary Tucson Gem & Mineral Show, Tucson, Arizona. "Shades of Green—Experience the Magic!"

May 2025: Kalamazoo Rock, Gem, Fossil & Mineral Show. Kalamazoo County Expo Center, 2900 Lake Street, Kalamazoo.

October, 2025: 62nd AIPG Annual Meeting, St. Louis, Missouri.



Welcome New Members!

The Michigan Section is continuing to grow. Please welcome the following new CPGs, Professional Members, Early Career Professionals, Associate Members, and Students:

Christopher Carew, CPG-12195; Joshua Bridges, ECP-1114; Spencer Sienkiewicz, ECP-1115; Janelle Myers, MEM-3590; Mary Sherwood, MEM-3579; Grace Babiarz, SA-12090; Sydney Bussineau, SA-12052; Andrew Chiles, SA-12091; Casey Dolen, SA-12086; Lili Faulkner, SA-12104; Sofia Foreman, SA-12075; Kristen Hasbrouck, SA-12100; Collin Houston, SA-12089; Ryan John, SA-12087; Ruth Kanipiau, SA-12105; Sara Kavousi, SA-12106; Joseph Kock, SA-12101; Stephanie List, SA-12069; Sydney Lockhart, SA-12092; Timothy McNamara, SA-12053; Chris Mitchell, SA-12040; Ashley Popko,

SA-12088; Ryan Schwiderson, SA-12067; Parker Shukwit, SA-12103; Lee Simmons, SA-12102; Erika Snell, SA-12085; Loren Solomon, SA-12042; and Stephen Udot, SA-12048.

To each of our new members, welcome to our Section! We encourage you to attend Section meetings and other events. You are also invited to provide information for the Member's Corner articles so that our members can get to know you.

Regulatory Roundup

During the summer months, legislative activity in Michigan slows down, with lawmakers convening in June, followed by only two sessions at the end of July and three in August. Despite this lighter schedule, one significant accomplishment this summer was the passage of the Fiscal Year 2025 budget, which takes effect on October 1, 2024. This budget outlines funding for the State of Michigan over the next year and includes the Michigan Geological Survey's \$3 million in base funding within the Department of Environment, Great Lakes, and Energy's (EGLE) budget. This allocation ensures stable funding for critical mapping projects, staffing, and operations.

Bills of interest were introduced during this period:

- Senate Bill 938 (2024), introduced on June 25, 2024, proposes an amendment to Section 62506a of the Natural Resources and Environmental Protection Act (1994 PA 451) to establish an injection well disposal fee for hazardous waste.
- Senate Bill 966 (2024), introduced on July 30, 2024, seeks to amend Part 615 of the same act to mandate the control or capture of methane emissions from oil or gas wells.

Bills of interest proposed earlier in the session:

- House Bills 4479 and 4480, introduced in April 2024, propose amendments to the Public Health Code (1978 PA 368) to create a statewide sanitary code. Currently, while local sanitary codes exist, Michigan remains the only state without a standardized statewide requirement.
- House Bills 5241-5247 and Senate Bills 605-611, introduced in October 2023, aim to amend 1994 PA 451 to require environmental cleanups to meet residential and safe drinking water standards unless technically infeasible. These bills also propose revisions to the statute of limitations for groundwater contamination cases, new requirements for pollution prevention plans, and other environmental safeguards.

As a reminder, December 31, 2024, marks the end of the 2023-2024 legislative session. Any bills not enacted into law by that date will expire and must be reintroduced in the next legislative session to be considered again.

We encourage you to stay informed about these bills and to engage with lawmakers, sharing your scientific knowledge and professional expertise to help shape policy in Michigan and beyond. For more detailed information on these bills and other legislative activities, we recom-

mend utilizing the available search tools.



Michigan legislative bill [search](#)



Michigan Administrative Code Rulemaking System [search](#).

Check Out the AIPG Mentoring Program

Mentoring is an experience that promotes personal growth, creates meaningful connections, and sparks creative innovations. AIPG offers an opportunity to connect mentees with mentors. To sign up for the program is easy and can be done when paying your annual dues or updating your online profile. You may check the box on your paper dues renewal form that you send in via mail or log into your account at www.aipg.org and update your member profile. Be sure to check whether you would like to be a mentor or mentee and the fields of expertise. The system allows individuals to search for people with similar interests and connect via email. Check it out today!

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Member's Corner

The Member's Corner includes information about the Section's membership. This is your chance to provide information on where you are and what you are doing. Simply send the information to the Editor for inclusion in this section.

Meet our New Early Career Professional!

Hello all, I'm excited and honored to introduce myself as the current Early Career Professional (ECP) Student Liaison for AIPG's Michigan Section. As a recent graduate myself, I am well aware of the impact this position has on MI AIPG's student chapters and look forward to making my contribution. I believe the previous ECP committee members did an excellent job of cultivating a strong connection between the student chapters and AIPG as a whole. As a way to thank them for their efforts, I've agreed to ensure these connections are maintained and revered.

If you've read the last several issues of *Geologically Speaking*, and have a keen eye, you may recognize my name and/or face. That would be thanks to my appearances in Western Michigan Universities (WMU) student article contributions. I joined WMU's AIPG chapter during my undergraduate Geology program, sometime in 2018. However, the COVID-19 pandemic nearly snuffed out WMU's Geology Club and it wasn't until sometime in 2020, during my M.S. Geoscience program, that I became fully involved. WMU faculty and MI AIPG member Tom Howe recruited me to help resuscitate Western's student chapter, as I was the sole member still enrolled. Over the two years that followed, I served as the Treasurer for the chapter and did what I could to help the club accomplish some significant feats (see *Geologically Speaking* Q2 2024 and Q3 2023). I'm very proud to see what WMU's student chapter has, and continues to, accomplish and I'm eager to learn more about the other great student chapters throughout Michigan.

As I previously mentioned, I received both my undergraduate and graduate degrees from Western Michigan University. Throughout the course of my education, I took as many opportunities to gain experience as a working geologist as I could afford. These included heeding the Michigan Geological Survey's call for field and data assistance; serving as a teaching assistant for WMU's field, introductory geology, and hydrogeology courses; as well as working as an intern consultant with Tetra Tech at the Kalamazoo Superfund site. Above all, I value the time I spent researching and writing my master's thesis, which I



would continue to work on even after graduation. My advisor, Dr. Matt Reeves, and I were committed to preparing and submitting a manuscript of my research to a journal. Ultimately, the work Per- and polyfluoroalkyl substances (PFAS) in final treated solids (Biosolids) from 190 Michigan wastewater treatment plants, was published in the *Journal of Hazardous Materials* in February 2024.

After graduating, and despite my sincere love for the beautiful landscape of west Michigan – its dunes, moraines, bluffs, and the like – I moved to Metro-Detroit to assume a position as a geologist with Arcadis in Novi, MI. I currently work on a broad spectrum of sites in the environmental remediation sector; however, I'm most passionate about hydrogeological fate and transport studies. As an early career professional, I still have plenty of opportunity to develop my career skills and aspirations. I'm sure many of MI AIPG members have invaluable advice to share regarding career development and I look forward to interacting with you all at upcoming events. I would also like to encourage members of all levels to reach out if they have any ideas for furthering the connection and involvement between the state and student sections of AIPG.

Kindest regards,

Garrett W. Link

Student Chapter of the Year!

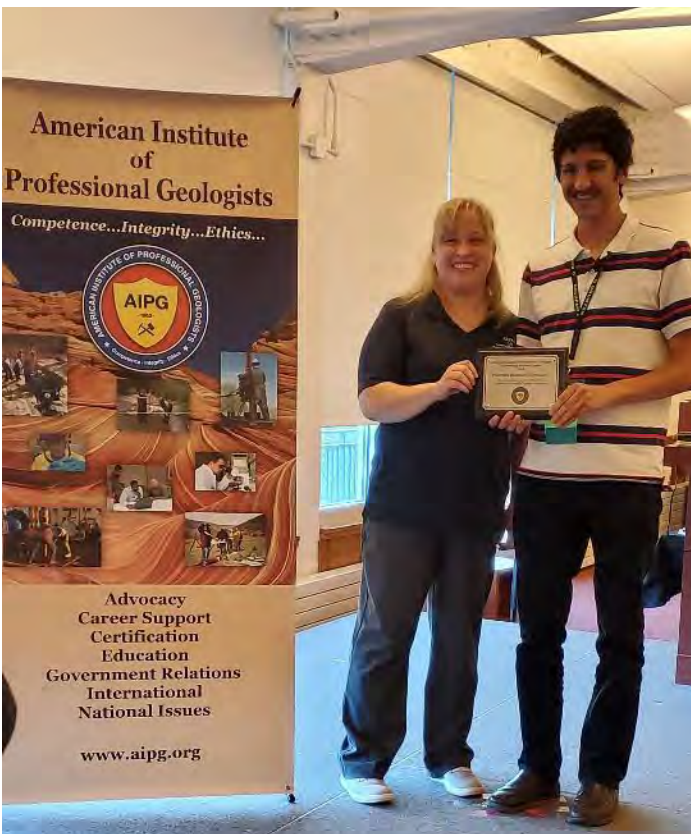
Michigan Student Chapters Sweep the Honors!

For the first time, Michigan Section Student Chapters have swept the honors for the Student Chapter of the Year Award. This year, Western Michigan University took top honors, while Eastern Michigan University and Wayne State University were runners up.

Donovan Vitale, President of the WMU Student Chapter accepted the award from National President Shanna Schmitt at the Annual Meeting in Durango on behalf of the chapter. As an added bonus, he had first choice of Estwing rock hammers and a hat, compliments of our exhibitor Estwing. The WMU chapter faculty sponsor is Tom Howe.

Michigan Section student chapters have done extremely well in the Student Chapter of the Year category, as for the 10 years that the contest has been running, Michigan Section student chapters have taken the top spot six out of the 10 times!

Please be sure to congratulate our students for their level of activity and participation in AIPG events!

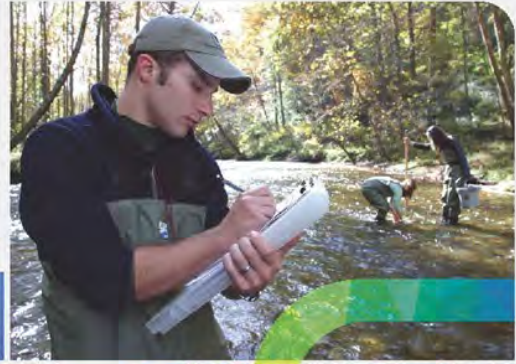


Donovan Vitale and National President Shanna Schmitt (left) with the 2024 Student Chapter of the Year Award. The WMU student chapter at the Cliffs of Moher in Ireland earlier this year (top).



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Students - Reminder

Don't Forget: Each Student Chapter must submit two articles for publication in *Geologically Speaking* each year to qualify for Section funding. Send the articles to Adam Heft at [ad-am.heft@wsp.com](mailto:adam.heft@wsp.com).



Larry Austin receiving the 2024 Ben Parker Medal in Durango.

Did You Know?

This article is intended to remind members of various aspects of AIPG and benefits of membership. If there is something you would like to see featured in this column, please contact the Editor...

AIPG is among many member societies under the **American Geosciences Institute (AGI)**. The National Academy of Sciences issued a directive in 1948 to create AGI to establish a geoscience network of associations with a wide range of expertise and knowledge about our planet. AIPG's goals align with the mission of AGI in providing information services to geoscientists, promoting and strengthening geoscience education, and increasing public awareness of the importance of geosciences in society.

Additionally, from AGI's website:
AGI provides:

- [Scholarly Information](#) aggregating research vital to geoscientists' work
- [Education and Outreach](#) for schools and the public
- [Public Policy](#) facilitating the flow of information between geoscientists and decision makers
- [Workforce Development](#) research and analysis of career paths
- [Publications](#) that inform on a range of geoscience topics and news
- [AGI's Center for Geoscience and Society News](#) on what's happening now in the geoscience community
- [Recognition of excellence](#) in the geosciences

The benefit of being a member society of AGI is that we can pool resources and connect with an even broader network of geoscientists. In addition to

member societies like AIPG, international associates, trade associates, liaison organizations, and regional associates are also part of the AGI Federation.

Source: <https://www.americangeosciences.org/about>

AIPG Bylaws

Section 10.1 of the National Bylaws reads:

10.1 Associated Societies

The Institute may, by affirmative vote of the Executive Committee, associate or ally with duly organized groups or societies that serve the needs of Members and Adjuncts of the Institute in topically and/or geographically defined areas; and that by objects, aims, constitutions, bylaws, or practice are functioning in harmony with the purposes of the Institute. Such association or alliance shall not place the Institute or any of its Sections in a subservient or subordinate relationship to the groups or societies which thereby become associated or allied, nor shall it create a financial liability for the Institute or any of its Sections.¹

1. For example, AIPG has entered into Associated Society relationships with the American Geosciences Institute, the Association of American State Geologists, and the Geological Society of America.



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ASBOG Exams

The ASBOG Fundamentals of Geology (FG) and Practice of Geology (PG) examinations are now administered using Computer Based Testing (CBT). Both exams are given on the third Friday in March and the first Friday in October each year. All examinees must be certified to take the examination at an approved Prometric/Iso-Quality Testing (IQT) testing facility. There are multiple testing centers located throughout Michigan.

Central Michigan University qualifies candidates to take the FG examination in Michigan and surrounding states. The next scheduled examination date is Thursday, October 3 and Friday, October 4, 2024. (Two days will be available to accommodate anticipated demand.)

There are three fees for taking the FG examination: \$50 CMU administration fee, \$200 ASBOG examination fee, and \$75 Prometric testing center seat fee. **For October, the deadline to apply through CMU is August 15th.**

Complete information on applying to take the FG exam is available at se.cmich.edu/asbog. Useful information to help prepare for the FG Exam can be found in the ASBOG Candidate Handbook, which is accessible on the [ASBOG website](#).

Member Input Sought

The Section Executive Committee is seeking input from members on a variety of topics. Do you have any suggestions regarding speakers/presentation topics that you would like to hear? What about field trips or other events? Some place you'd like to see us go, or something you think the membership would enjoy doing? Then

make your voice heard; please send your suggestions to one of the members of the Executive Committee; any of the seven members would be glad to hear from you. AIPG is your organization. Please help keep it relevant and interesting for all by participating.



Pace

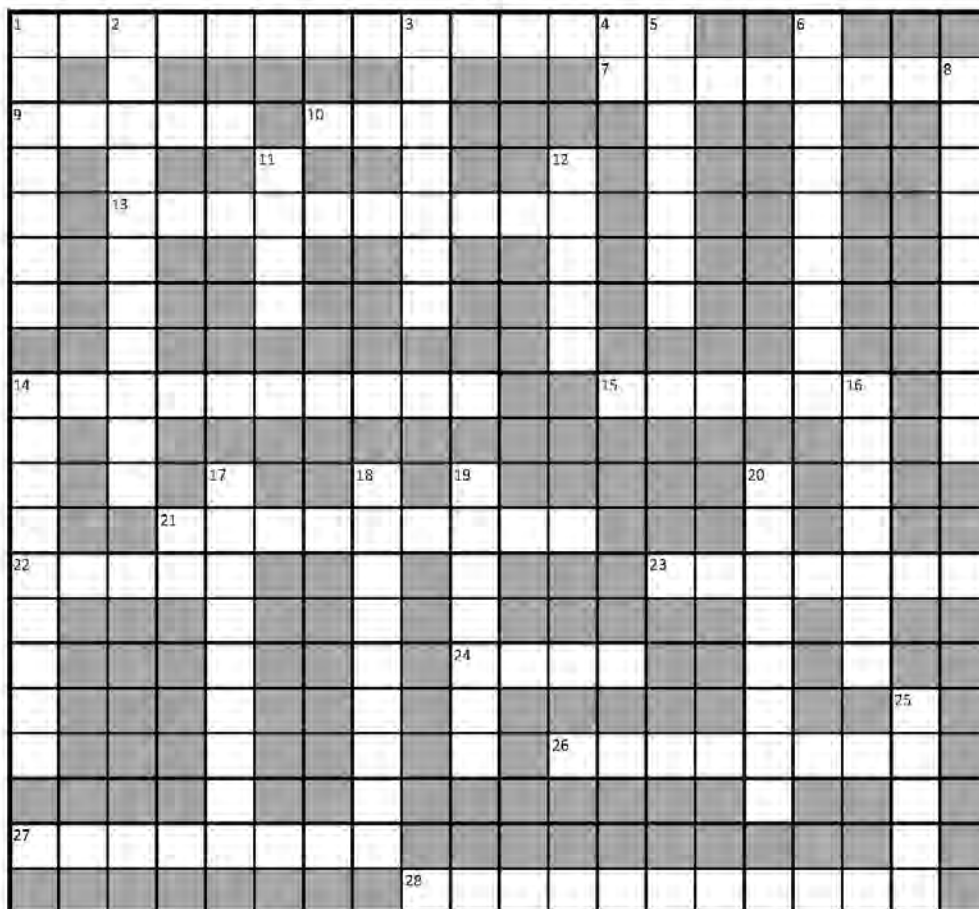
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Geology Crossword #18



Across

1. Michigan state gem
7. February birthstone
9. November birthstone
10. Very black
13. Twinned varieties are "fairy crosses"
14. "Watermelon" is a variety
15. Common semiprecious stone
21. "Cinnamon Stone"
22. Chronicles by Roger Zelazney
23. Not the stone of a barrel maker
24. Most prized when on fire
26. Commonly a double pyramid shape
27. Rare, iridescent shell material
28. "Cat's Eye" varieties are prized

Down

1. Not a fruit
2. Bluish mineral, two words
3. Often an impurity in quartz
4. Element 73
5. Popular green stone from Columbia
6. Fowlerite is a variety
8. December birthstone
11. July birthstone
12. The rarest of these are black
14. Also Zoisite
16. Glass ejected from meteorite impact
17. August birthstone
18. Not of ET origin
19. They are forever
20. The rarest blues are from Kashmir
21. An increasingly rare gas
25. Popular Be,Al,Si stone

*The solution to this geology crossword will be included in the next edition of *Geologically Speaking*.

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20th Annual AIPG Michigan Section Golf Outing Tuesday September 10, 2024

The 20th Annual AIPG Michigan Section Golf Outing promises to be another successful event. Proceeds generated from the outing benefit the AIPG Michigan Section Student Chapters and educational awards, which provides thousands of dollars to a variety of worthy projects every year. Your generosity has been and will continue to be the key to enabling organizations and schools to provide meaningful educational programs and activities in the Geosciences.

This event also offers our sponsors exposure to many of the most influential professionals in our industry. **Registration will be open on February 1, 2024.**

This year's outing will be once again at the beautiful Fox Hills and specifically their world class Golden Fox course in Plymouth, Michigan.

**Place: Fox Hills – Golden Fox
8768 N. Territorial
Plymouth, MI 48170**

Event: 18-Hole Scramble

Date: September 10, 2024

Registration: 7:45 to 8:45 am

Shotgun Start: 9:00 am

Registration

Register/Pay by **August 1**, \$700/foursome, \$200/Individual

Register/Pay after **August 1**, \$800/foursome, \$225/Individual

Golfer 1: _____

Golfer 2: _____

Golfer 3: _____

Golfer 4: _____

Registration and payments can be completed at the link below

[American Institute of Professional Geologists - 20th Annual Golf Outing \(eventregisterpro.com\)](https://eventregisterpro.com)

Additionally, registration can be done manually by completing this form and mailing it and a check to the information below. Please make sure to provide the point of contact for your foursome and the names of all golfers:

Make Checks to:

Michigan AIPG

630 Piper Road

Haslett, Michigan 48840

Attn: Kalan Briggs briggsk2@michigan.gov

Call 248-635-4576, or e-mail Kalan to reserve your place!

The AIPG-MI Section is a nonprofit 501(c)(6) Organization

Company: _____

Contact: _____

E-mail: _____

Phone: _____

Registration Includes: Continental Breakfast, green fees, range balls, lunch at turn, networking opportunities, and dinner. Also includes: 50-50 drawing, raffle prize baskets, and Grand Prize raffles along with other prizes including, Putt-4 Dough for \$2,500, men's and women's Longest Drive and Closest-to-Pin contests, and goodie bags for all participants!

20th Annual AIPG Michigan Section Golf Outing

Tuesday September 10, 2024

Sponsor Package Information

Sponsorship pricing levels are detailed below. We would like to humbly request that all sponsors assemble and donate a charity basket for raffling. Charity baskets can be of any theme and requested to be of minimum \$35 value (or more). Raffles tickets will be sold throughout the event with winners being drawn at the end of the event immediately following event ceremony and announcements.

Executive Sponsor - \$2,000 (2 available)

- 1 foursome and 33% discount for additional golfers
- Highest visibility signage at the event, including at dinner
- Corporate recognition at the awards presentation

Beverage Sponsor - \$800

Investment includes:

- Signage at the club house and on the beverage cart.
- Corporate recognition

Breakfast/Luncheon Sponsor - \$600

Investment includes:

- Signage at the breakfast and at the turn grill/tent.
- Corporate recognition

Hole-in-one Sponsor - \$600 (2 available)

- Signage on all Par 3 Holes.

If a golfer hits a hole-in-one, the prize will be, either \$10,000, a golf vacation or a deluxe set of irons.

Tee Box or Hole/Flag Sponsor - \$250 (25 available)

Investment includes:

- Choice of tee box or green signage

Skill Sponsor – \$300 (4 available)

Investment includes:

- Tee box signage
 - Corporate recognition
- “Longest Drive”, “Closest to Pin” awards to Male/female for each.

Putt-4-Dough Sponsor – \$400

Investment includes:

- Signage on the putting contest area, corporate recognition during the event (includes contest coordination at the turn and following golf provided by you). Provides interaction with all participants.

Team Photo Sponsor: - \$400

Investment includes:

- Signage and option to provide a photographer from your organization.

Goodie Bag Sponsor - Give-away items for 100 or more golfers (open and encouraged for all sponsors!)