Oscoda Area and Former Wurtsmith Air Force Base PFAS Update Meeting

The Webinar will Begin Shortly

September 20, 2022

MPART

Webinar Housekeeping

All lines are muted during the webinar.

We are recording this webinar

How to ask a question in Zoom

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Click the "hand" icon at the bottom of your screen.

Type #2 to raise your hand.

#2

Welcome

Abigail Hendershott

MPART Executive Director

Michigan Department of Environment, Great Lakes and Energy

Introductions, Logistics and Agenda

- Introductions
- Agenda:
  - Michigan Department of Environment, Great Lakes, and Energy (EGLE) Update
  - Michigan Department of Health and Human Services (MDHHS) Update
  - Comments, Questions, and Answers
  - Meeting Conclusion

*** This meeting is being recorded.***

MICHIGAN DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY

Former Wurtsmith Air Force Base

Beth Place, Project Manager
Remediation and Redevelopment Division
517-899-7924| placeb1@michigan.gov

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Former Wurtsmith Air Force Base

- 1923 Established
- 1993 Officially closed under the Base Realignment and Closure decision, 1991
- Most Acreage has been transferred for reuse.
- Air Force is the lead
- Comprehensive Environmental Response, and Liability Act (CERCLA)

Source: Bay West 4th Five Year Review Work Plan, 2019, https://www.afcec.af.mil/Home/BRAC/Wurtsmith.aspx

Wurtsmith

‘Historical’ Environmental Response

NAD 1983 StatePlane Michigan Central FIPS 2112 Feet Intl

0 1,000 2,000 3,000 4,000

Feet

Approximate Location of Original IRP Site Included in 4th Five-Year Review

Treatment System

Source: Bay West 4th Five Year Review Work Plan, 2019

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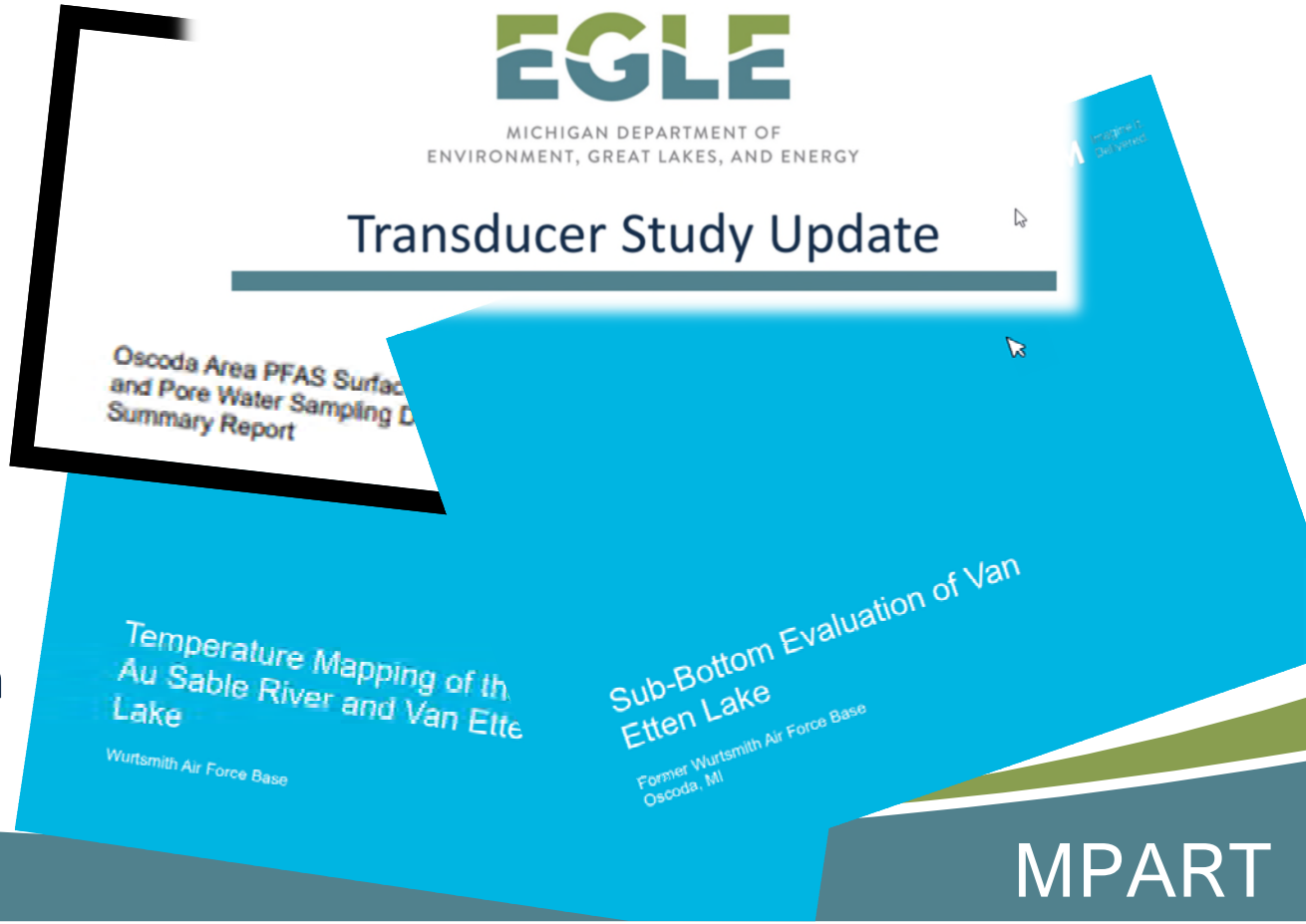
EGLE PFAS Response

- Groundwater
- Surface Water
- Soil
- Fish
- Wildlife
- Residential Wells
- Research
- Michigan.gov/Wurtsmith



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Air Force PFAS Response

Preliminary Assessment

Site Inspection

Remedial Investigation

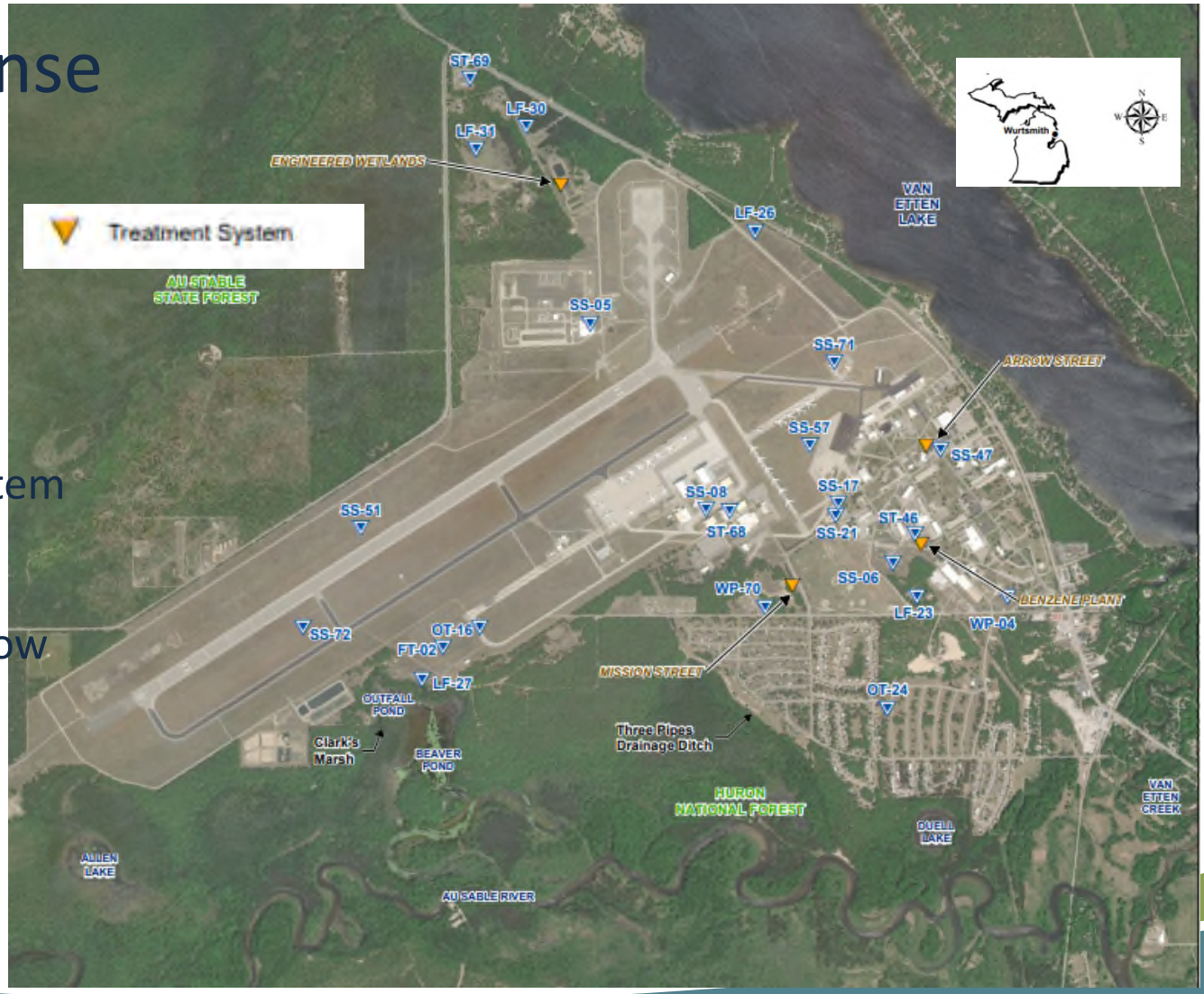
Other/Removal Actions

- FT02 Pump and Treatment System (PTS)

Removal Actions

- Central Treatment System (Arrow and Benzene PTSs)
- Mission Street PTS
- Soil Removal at FT02

Interim Remedial Actions



Source: Bay West 4th Five Year Review Work Plan, 2019

https://ar.afcec-cloud.af.mil/

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Interim Remedial Actions

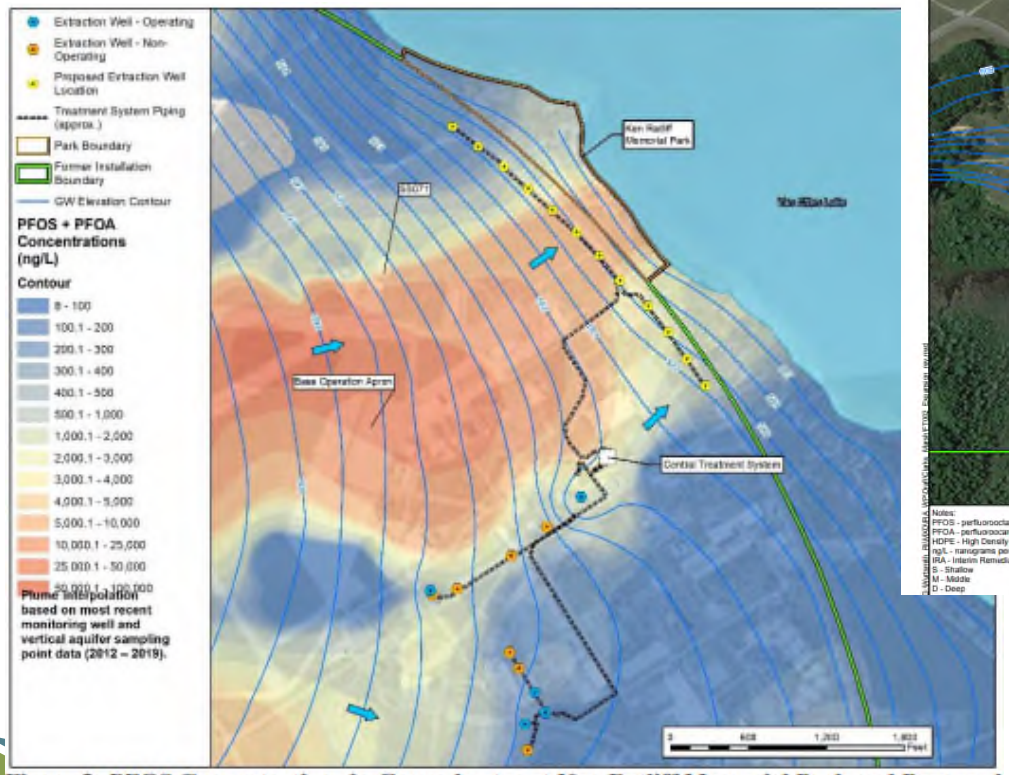
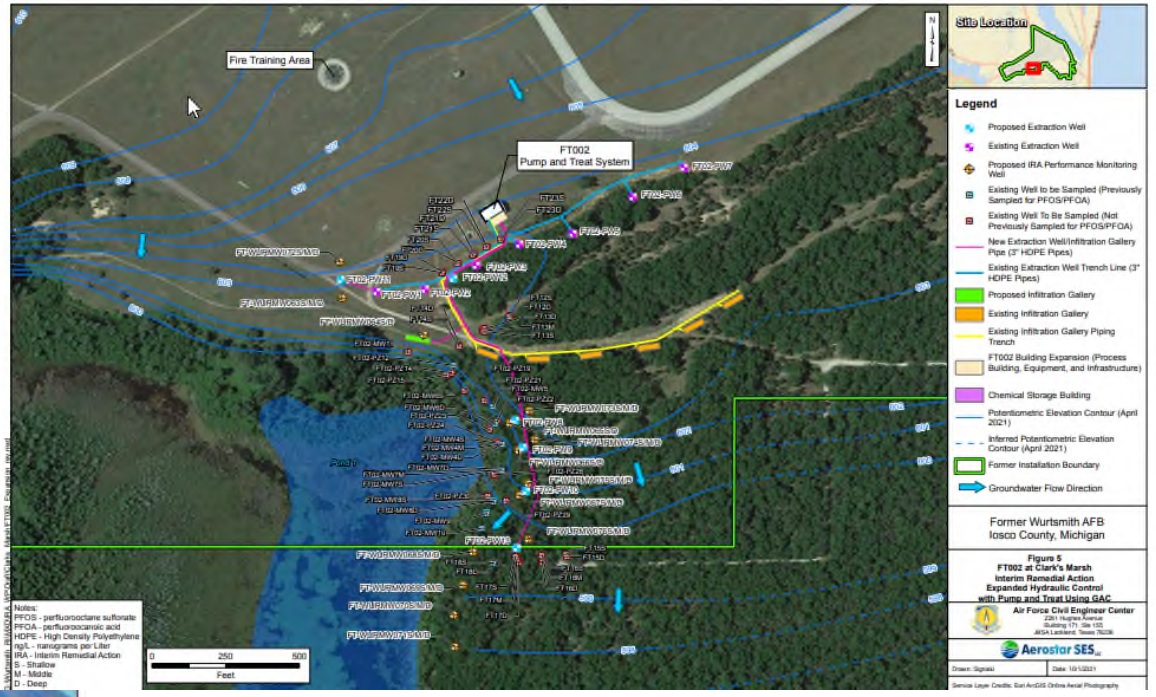


Figure 2: PFOS Concentrations in Groundwater at Ken Ratliff Memorial Park and Proposed Location of Hydraulic Control System for Alternatives 2 and 3

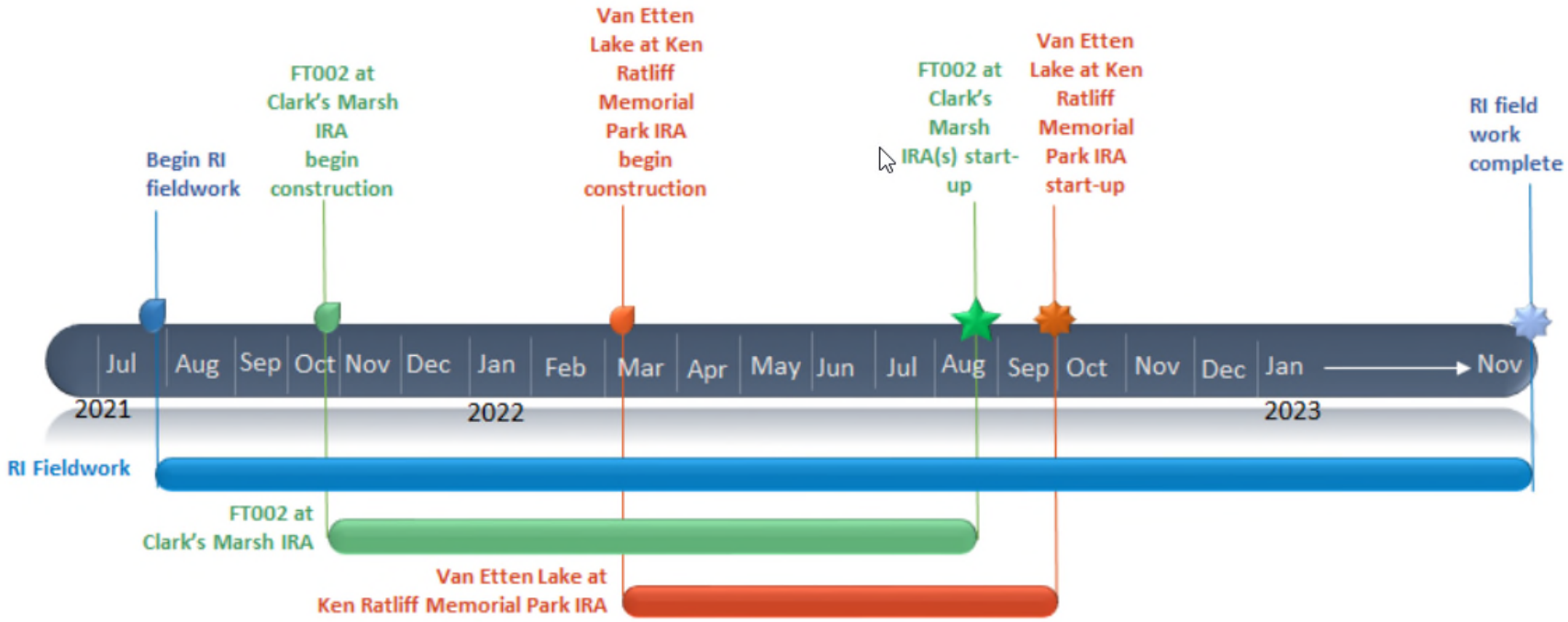


- Clarks Marsh at FT002
- Van Etten Lake @ Ken Ratliff Memorial Park

Source: https://ar.afcec-cloud.af.mil/

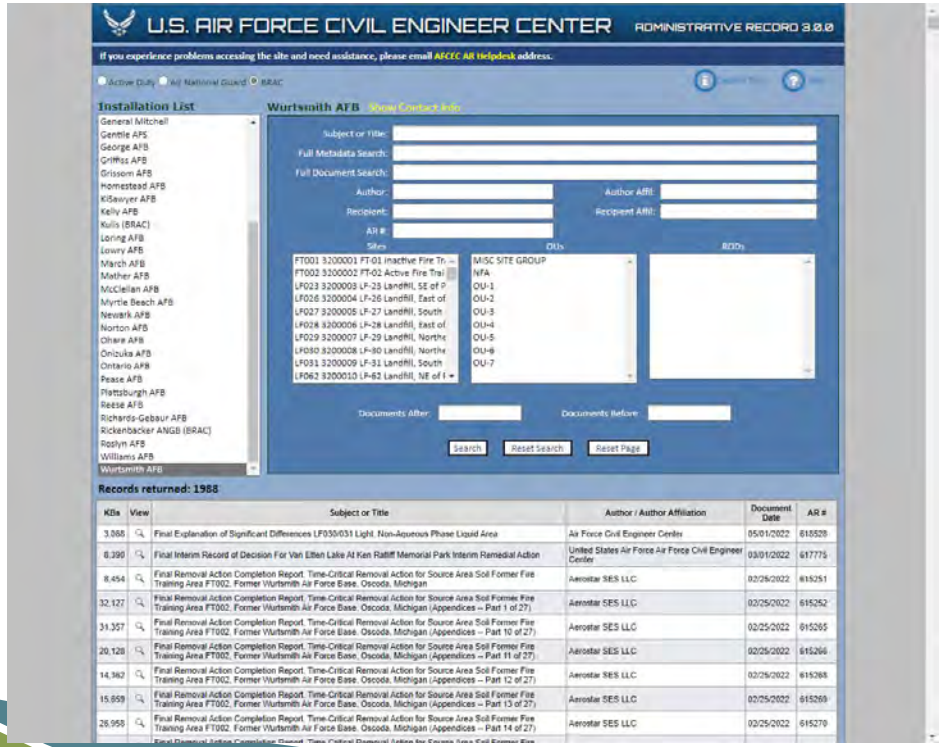
August 17, 2022

Project Timeline



Air Force Information

Source: https://ar.afcec-cloud.af.mil/



https://www.afcec.af.mil/Home/BRAC/Wurtsmith/RAB.aspx

AIR FORCE CIVIL ENGINEER CENTER

WURTSMITH RAB DOCUMENTS

RAB Documents

RAB Member Application
RAB Operating Procedures

Info Posters

GW Plume	Existing Wells	IRA Design Approach	Hydraulic Control System	Existing Central Treatment System	

RAB Meeting Date	Notices	Agenda	Presentation	Minutes	Other
August 17, 2022	Public Notice		Presentation		Meeting Video Recording PFHXS (Poster) PFNA (Poster) PFOA (Poster) PFOS (Poster) RAB Acronym List Wurtsmith IRA Sites (Poster)
May 18, 2022	Public Notice	Agenda	Presentation	Minutes	Meeting Video Recording PFHXS (Poster) PFNA (Poster) PFOA (Poster) PFOS (Poster)

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Oscoda Area Sites

Lynn Gosson | 989-225-0161 | gossonl1@michigan.gov
Remediation and Redevelopment Division

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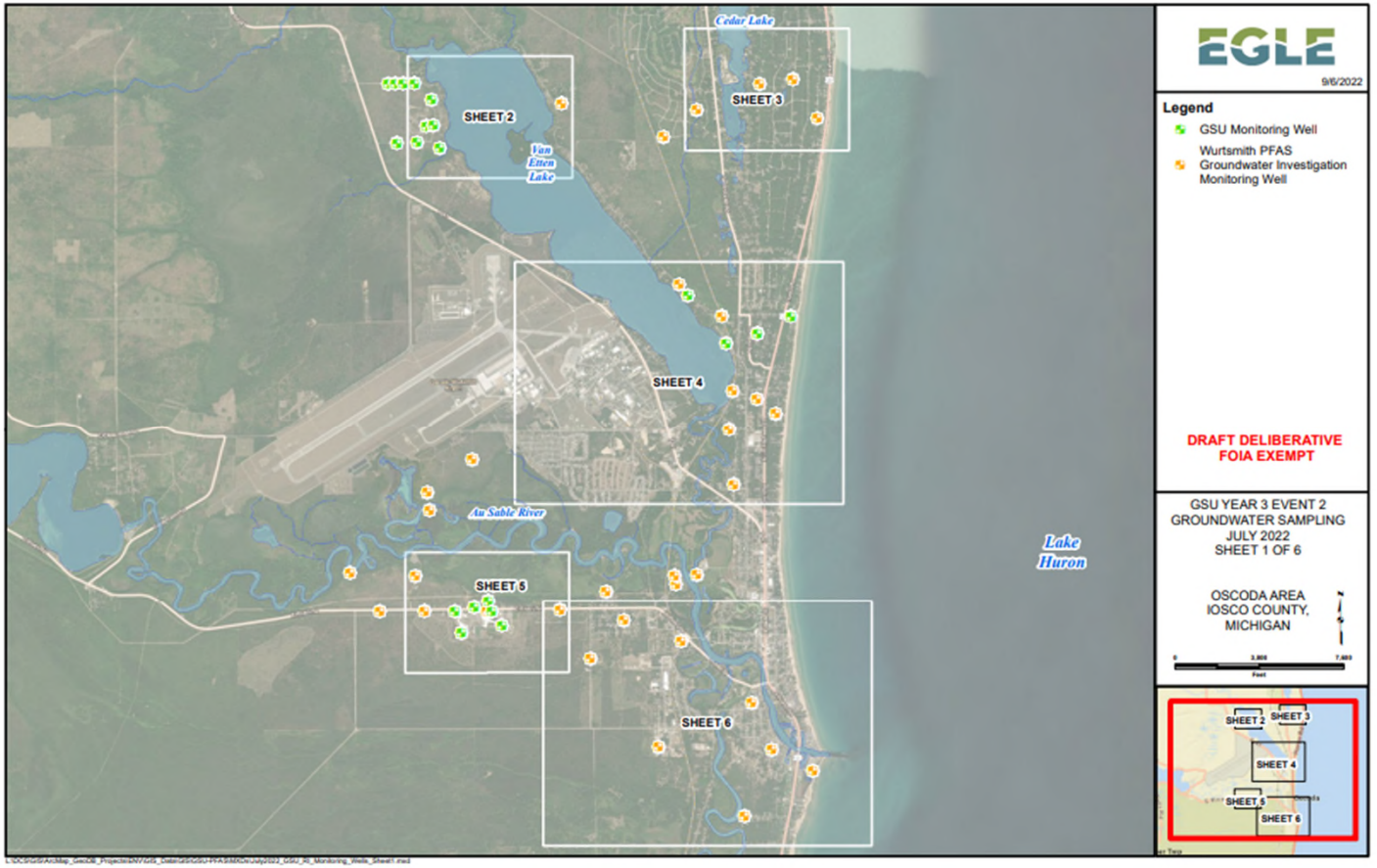
Oscoda Township & Au Sable Township
EGLE Groundwater Monitoring Well Locations



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Colbath Road Area

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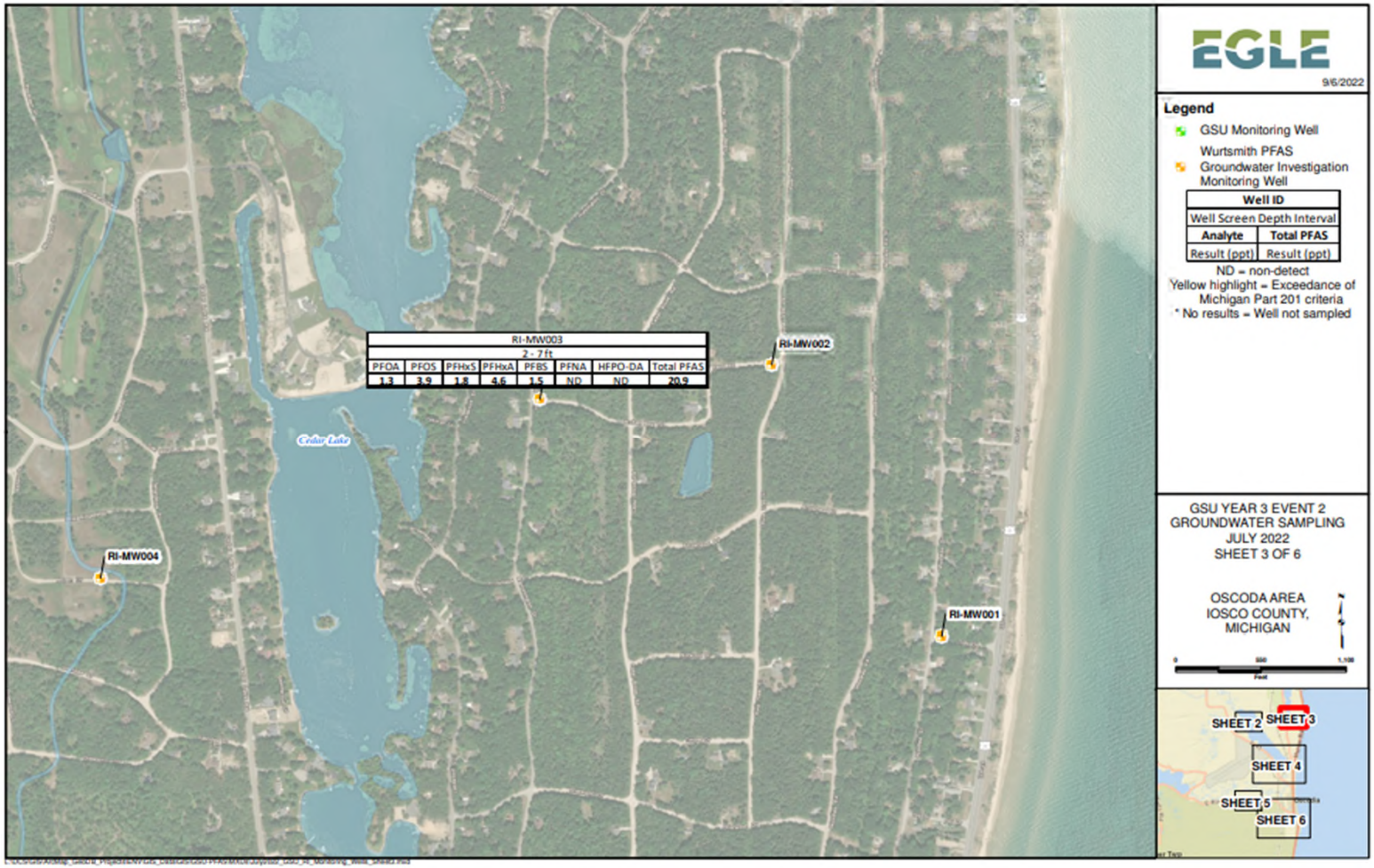
Cedar Lake Area



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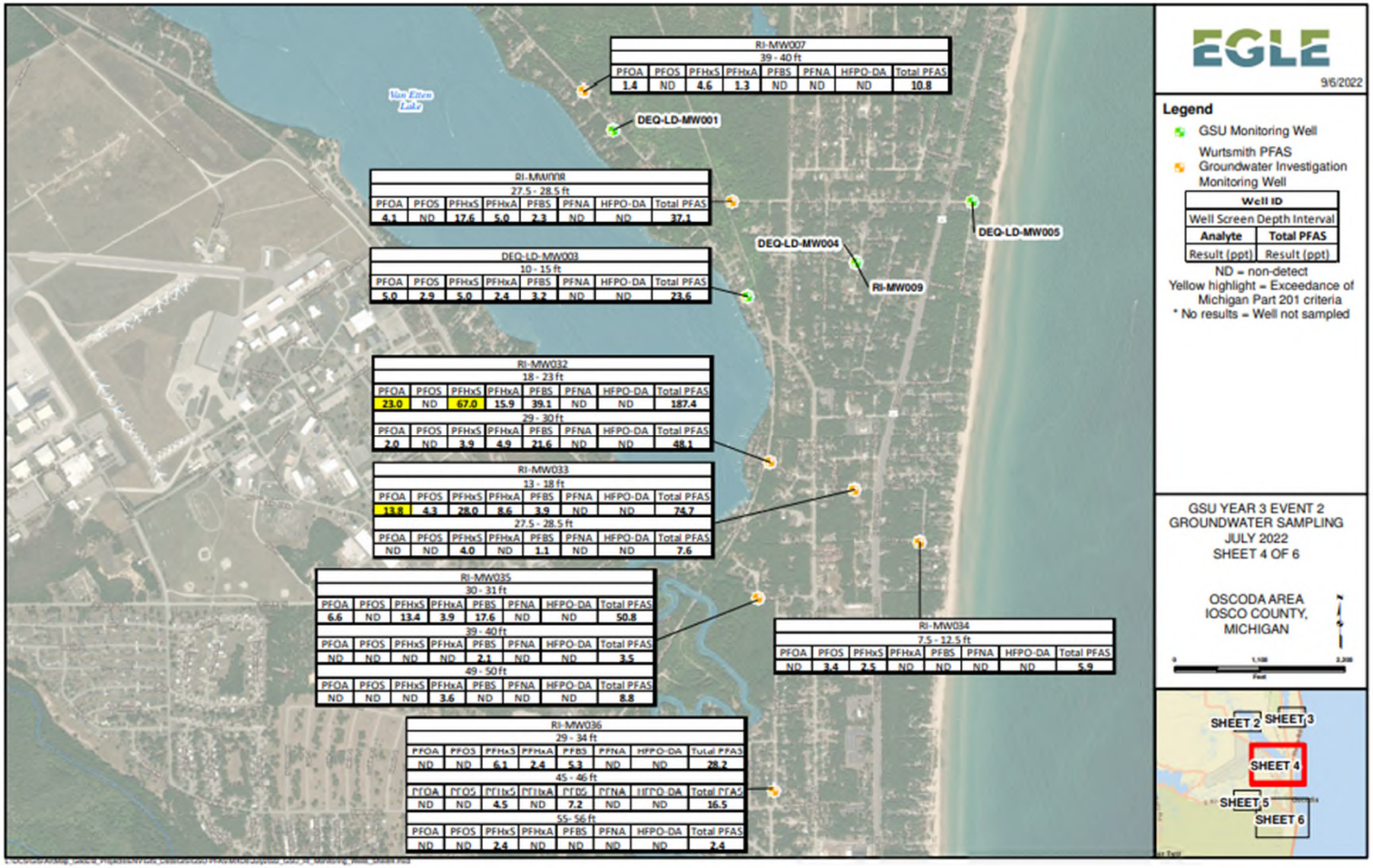
Loud Drive Area



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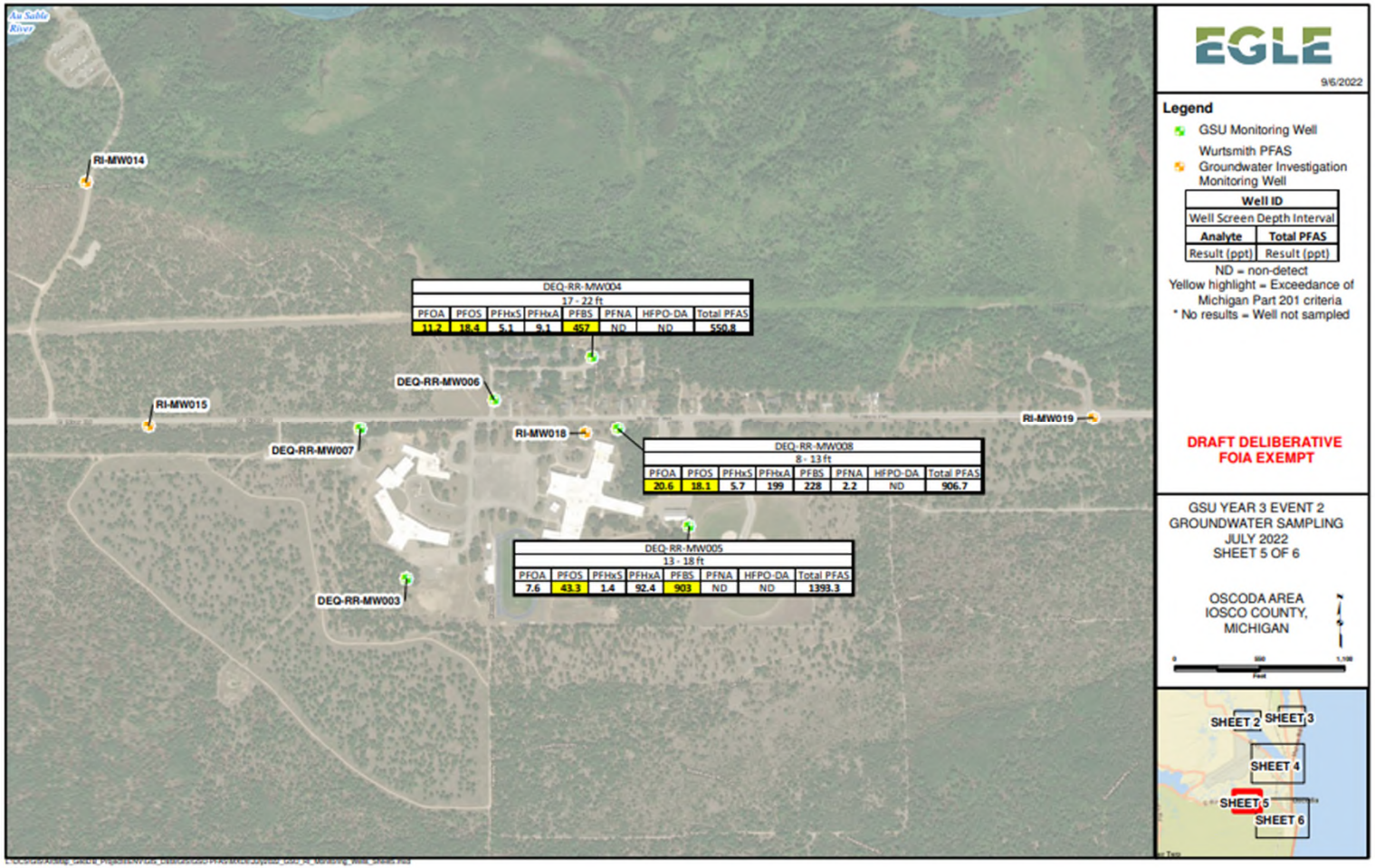
River Road Oscoda Schools Area



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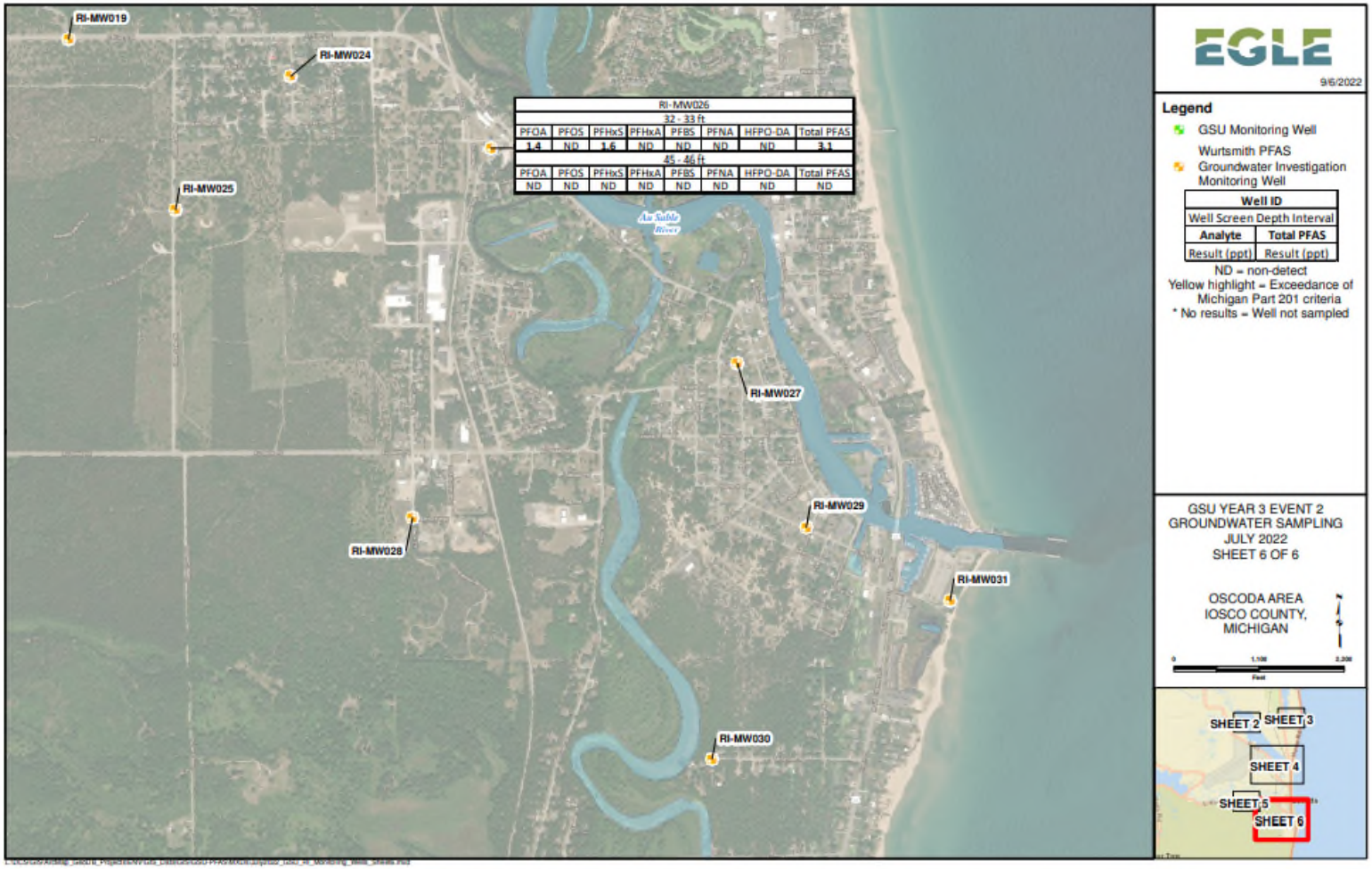
Au Sable Township



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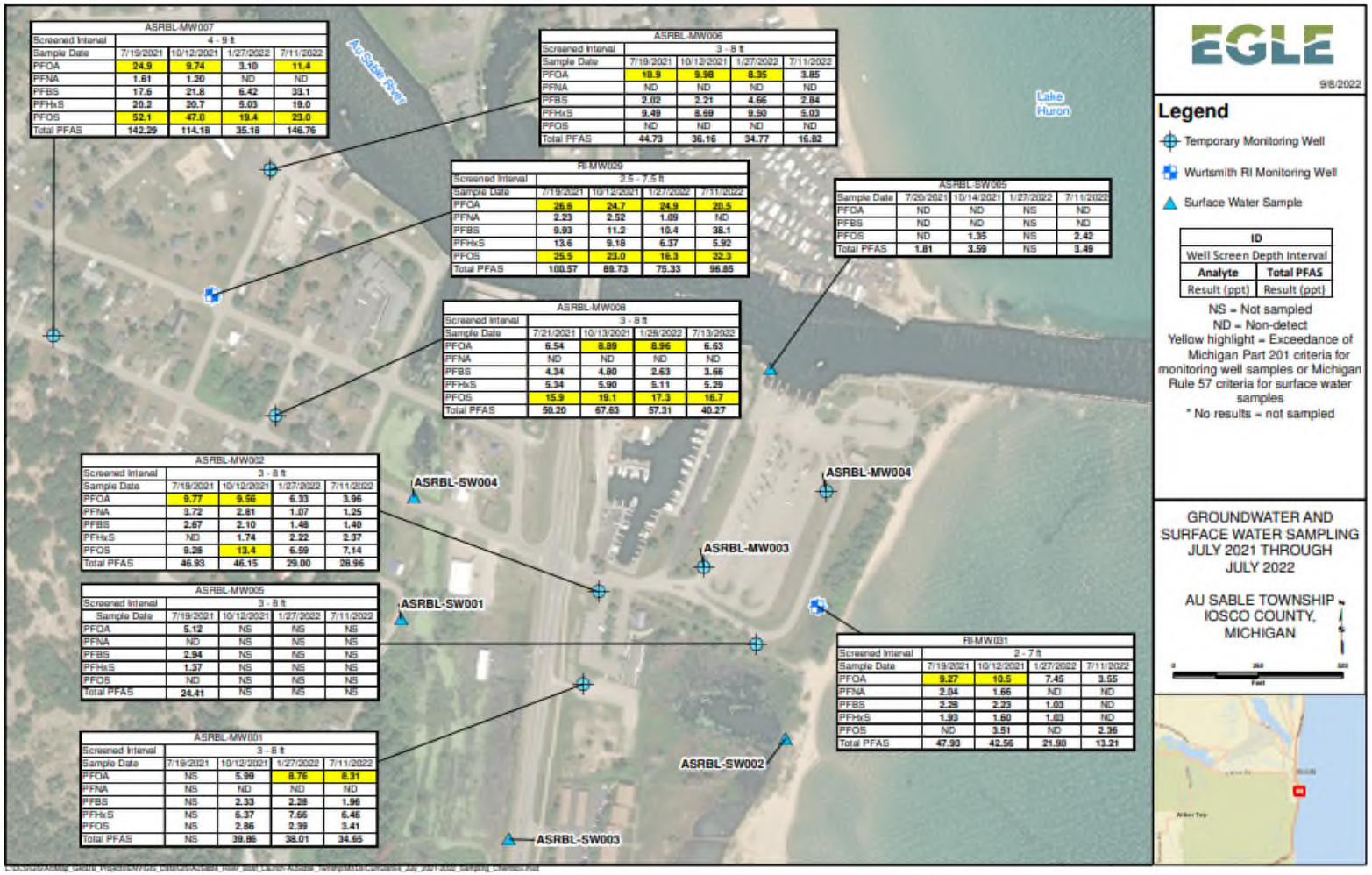
Au Sable Township – Smith Street Area



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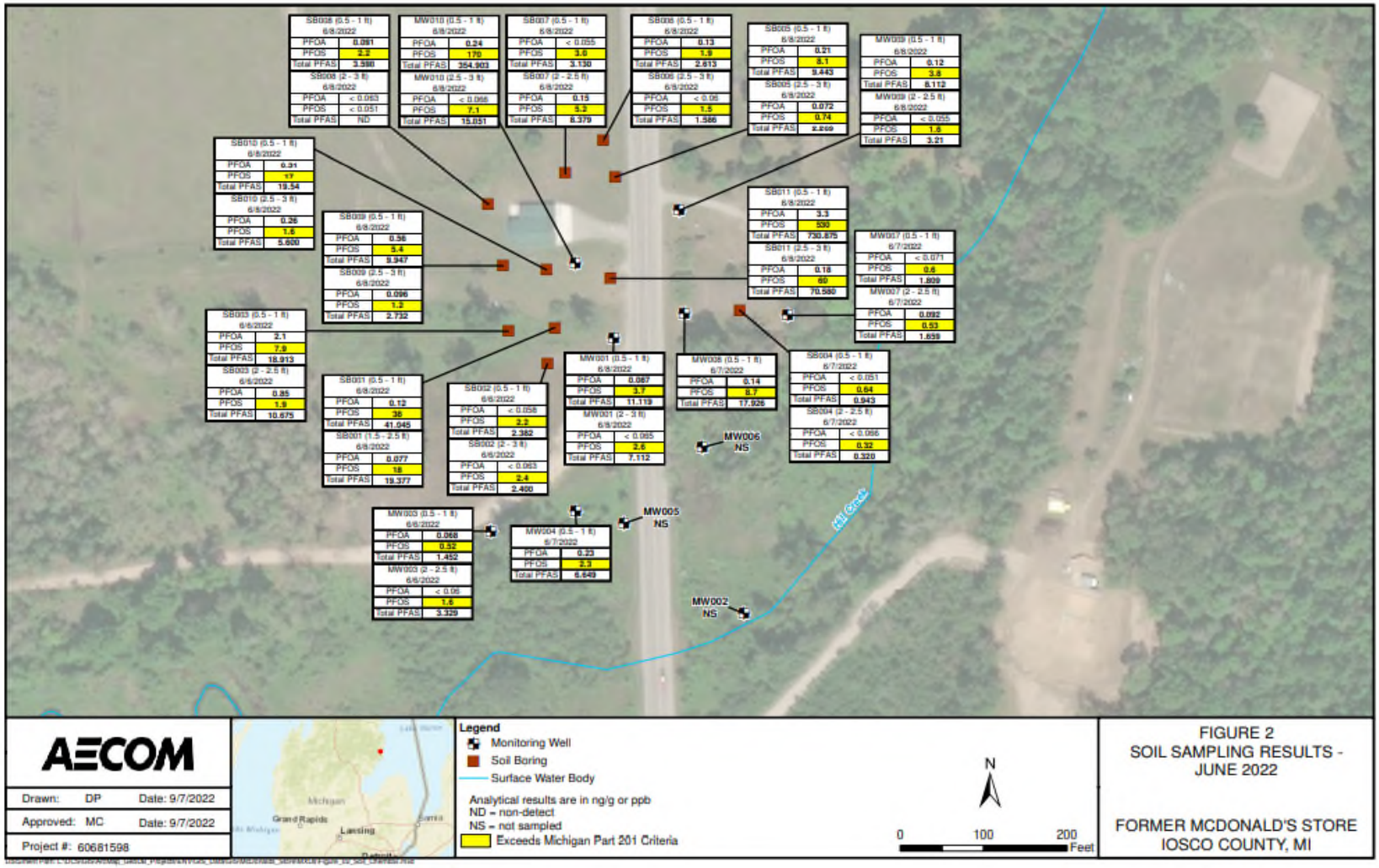
McDonald's Store



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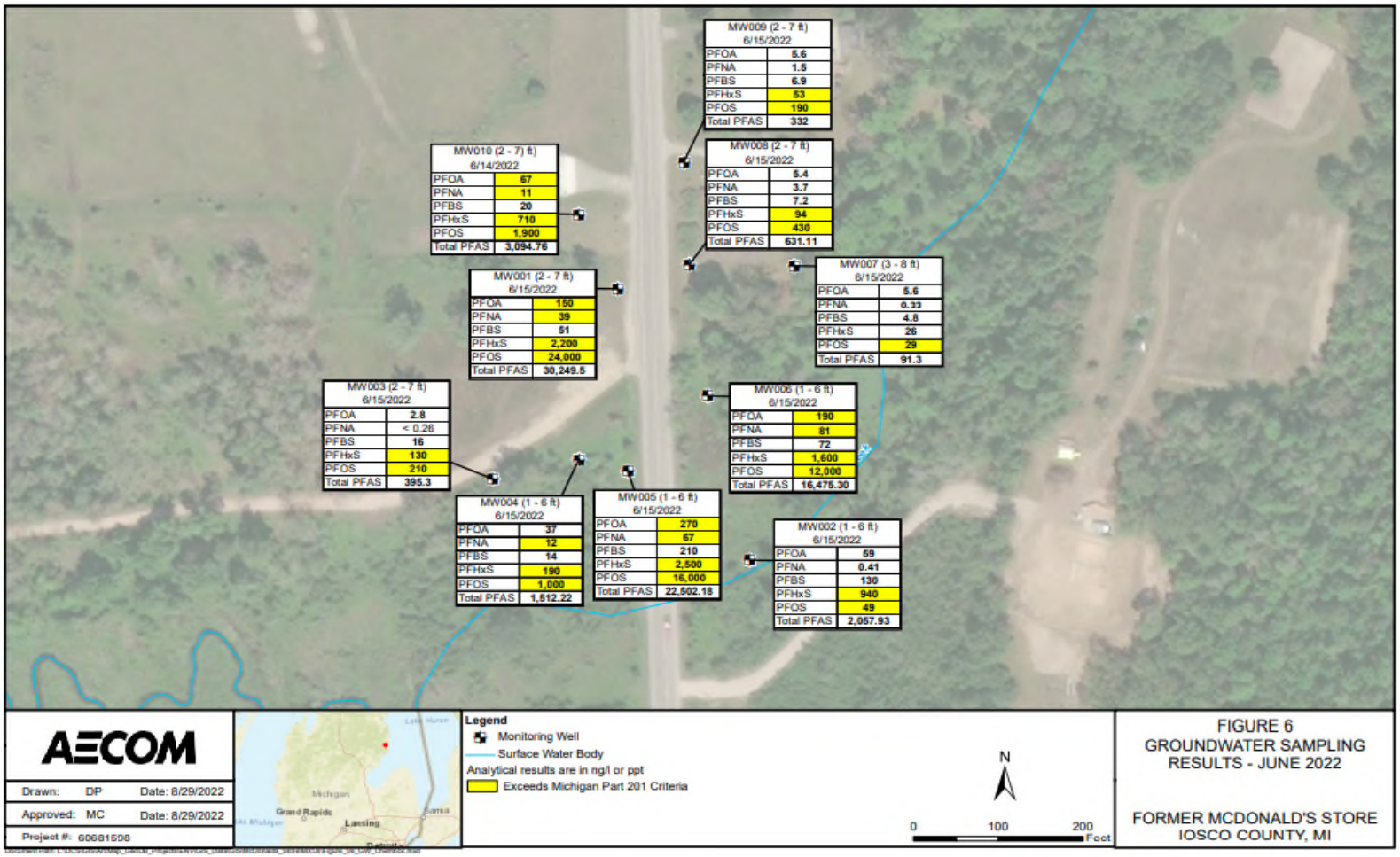

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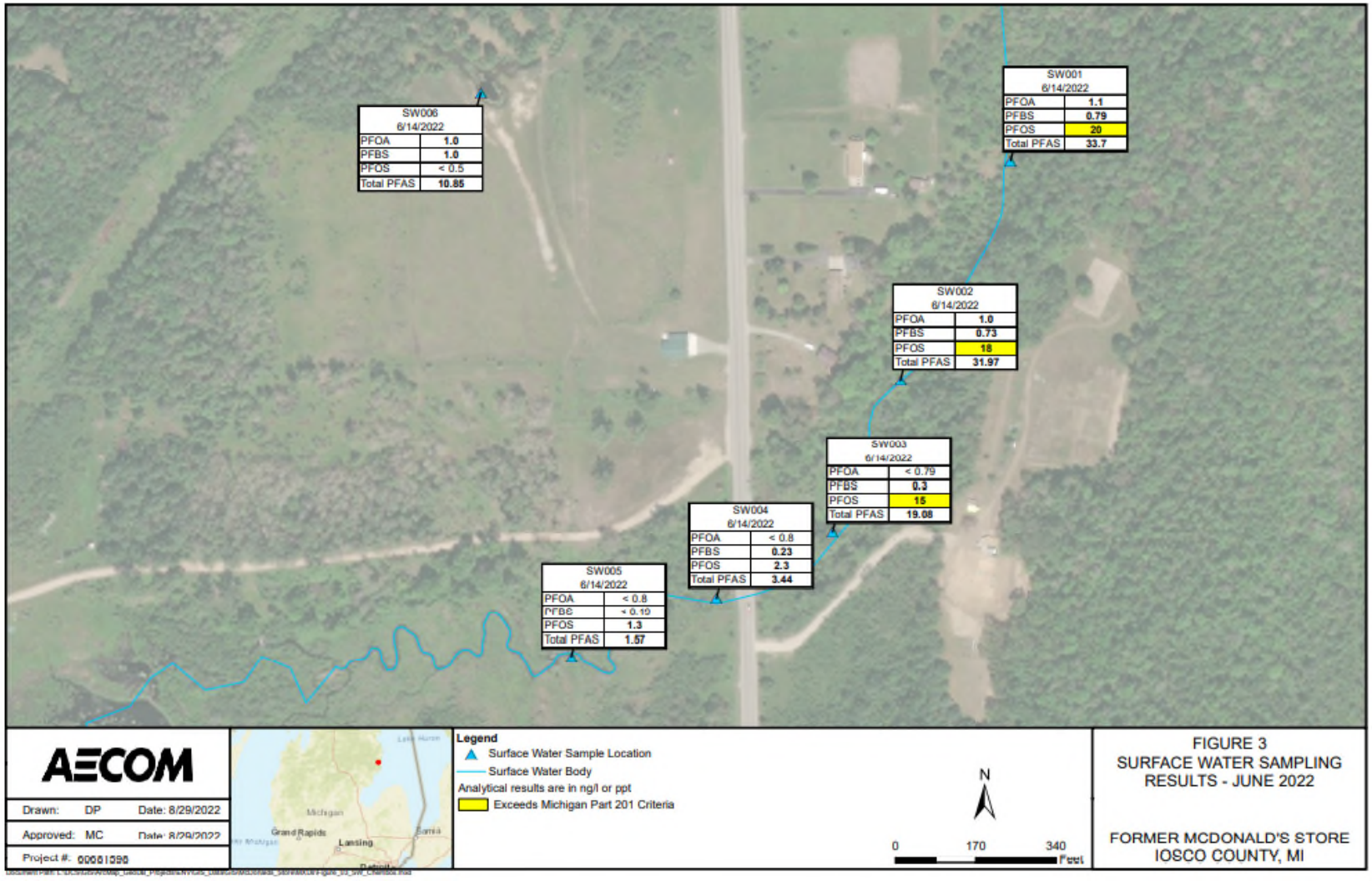

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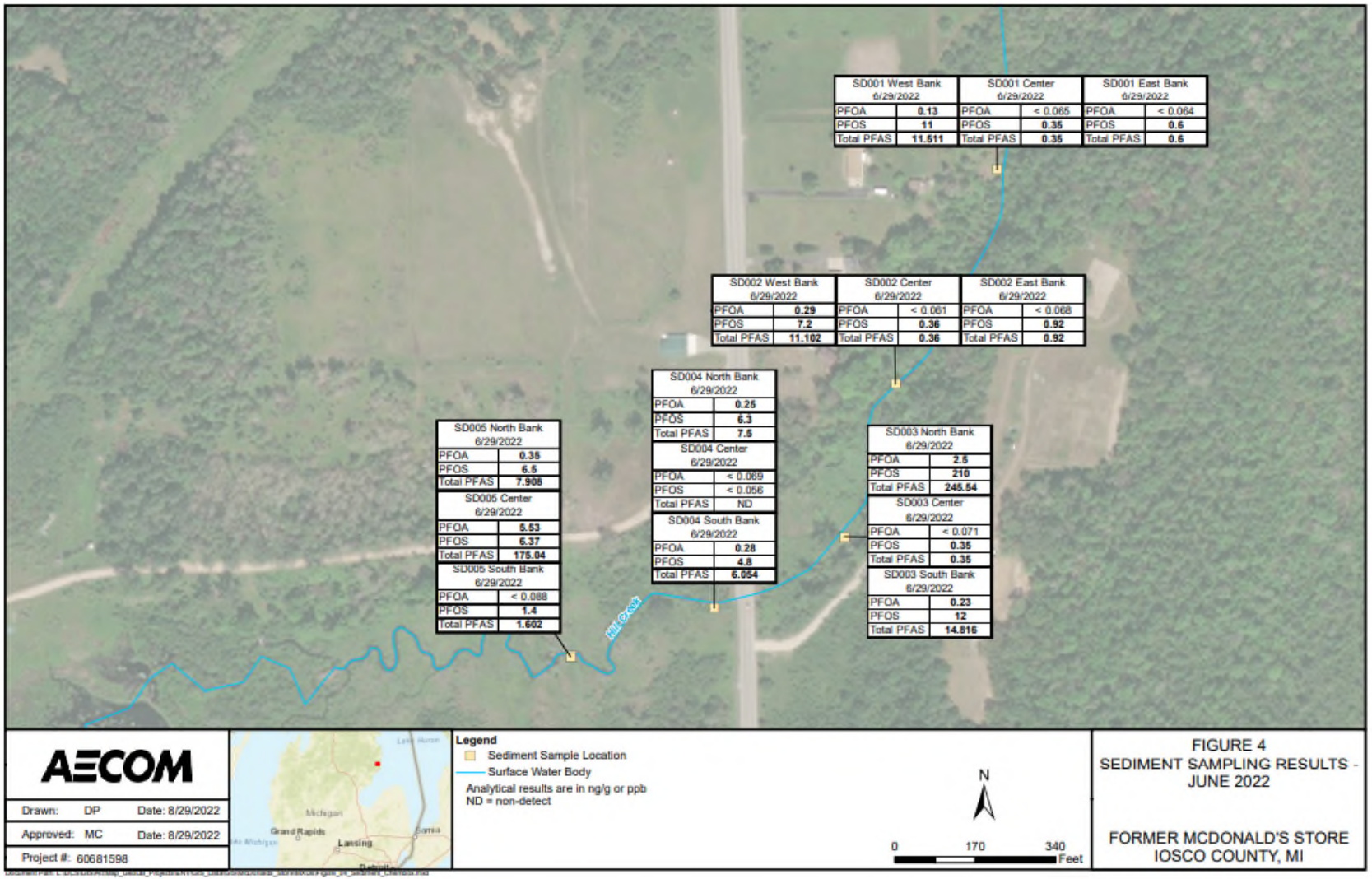

PFAS and Health

Puneet Vij| 517-582-4104 | vijp@michigan.gov
Toxicologist, ATSDR Unit
Toxicology and Assessment Section
Division of Environmental Health

Overview

- Health effects associated with PFAS
- Private Residential Well Resampling Effort
  - Round 3 (Ongoing)
- Fish sampling updates

Associated Human Health Outcomes PFOA and/or PFOS

- Reduced fertility
- High blood pressure or pre-eclampsia in pregnant women
- Small decreases in infant birth weight
- Higher cholesterol
  - Especially total cholesterol and LDL cholesterol

Associated Human Health Outcomes PFOA and/or PFOS, continued

- Thyroid disease
- Liver damage
- Decreased immune system response to vaccines
- Developing certain types of cancer
  - In particular, kidney and testicular cancers*

* PFOA only

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Round 3: Residential Private Wells Resampling Effort Summary

	MDHHS Resampling Effort (Round 3)
Sampling Season	Summer 2022
# Homes Sampled	225
# Non-Detect	44 out of 70
# Detect below all CVs	23 out of 70
# Detect at or above one or more CV	3 out of 70
Range Total PFAS	2.1 to 143.9 ppt

Avoid Foam

- Foam may have high amounts of PFAS
- Rinse off foam after contact
- Bathe or shower after the day's outdoor activities
- Recreational use of **water** is *not a concern*
- Incidental swallowing of **foam** with high levels of PFAS *is a concern*
- Do not allow pets to drink foamy water
- Rinse pets with fresh water after contact with foam

Additional Resources

- Michigan PFAS Action Response Team (MPART) www.michigan.gov/pfasresponse
- More info about ESF guidelines → www.michigan.gov/EatSafeFish
- Agency for Toxic Substances and Disease Registry (ATSDR) https://www.atsdr.cdc.gov/pfas/

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Derivation of Water Quality Values for Perfluorooctanoic acid (PFOA) and Perfluorobutane sulfonic acid (PFBS)

Kevin Cox, MPH JD
Toxicologist Manager
Water Resources Division
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PFOA and PFBS Water Quality Values

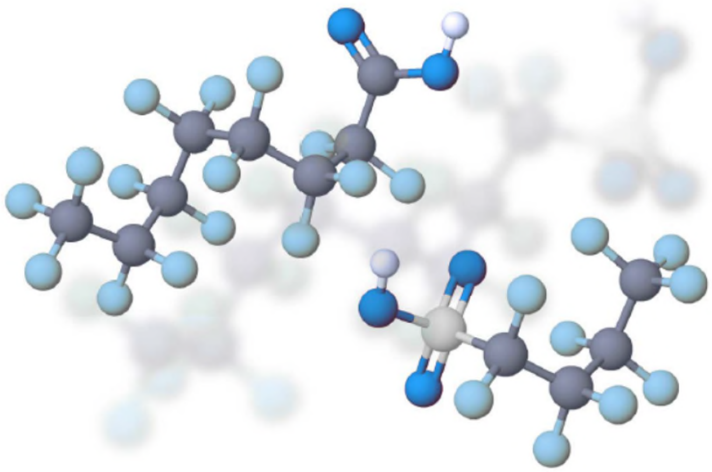
MI EGLE has established a new Water Quality Value (WQV) for perfluorobutane sulfonic acid (PFBS) and has revised the existing WQV for perfluorooctanoic acid (PFOA)

PFAS	HNV* (drinking) (ng/L)	HNV* (nondrinking) (ng/L)	FCV* (ng/L)	AMV* (ng/L)	FAV* (ng/L)
PFOA (Previous)	420	12,000	880,000	7,700,000	15,000,000
PFOA (Revised)	66	170	880,000	7,700,000	15,000,000
PFBS (New)	8,300	670,000	24,000,0000	120,000,000	240,000,000

*Human Noncancer Value (HNV), Final Chronic Value (FCV), Aquatic Maximum Value (AMV), Final Acute Value (FAV)

What are “Rule 57” Water Quality Values?

- Water Quality Values (WQVs) are promulgated under Michigan Rule 323.1057 within Part 4: Water Quality Standards
  - Narrative procedure for calculating WQVs to protect humans, wildlife, and aquatic life
  - WQVs are applicable to the Great Lakes, the connecting waters, and all other surface waters of the state
    - Unless site-specific values have been derived



How are “Rule 57” WQVs Used?

- Part 4 Water Quality Standards require that all Designated Uses of receiving water must be protected:
  - Agriculture, navigation, industrial water supply, public water supply at point of water intake, warmwater or coldwater fish, other indigenous aquatic life and wildlife, fish consumption, partial body contact water recreation and total body contact water recreation.

- Follow Michigan Part 8 Rules, WQVs are used to help determine limits for discharging pollutants from water treatment plants, industrial and commercial facilities, and other regulated entities

What are “Rule 57” values?

https://www.michigan.gov/egle/about/organization/water-resources/assessment-michigan-waters/rule-57-water-quality-values

Aquatic Life Values

Final Acute Value (FAV)

Final Chronic Value (FCV)

Aquatic Maximum Value (AMV)

Wildlife Values

Wildlife Value (WV)

Human Health Values

Human Noncancer Value (HNV)

-Drinking Water

-Non-Drinking Water

Human Cancer Value (HCV)

-Drinking Water

-Non-Drinking Water

Aquatic Toxicity Values

Final Chronic Value (FCV):
The level of a substance or a mixture of substances that does not allow injurious or debilitating effects in an aquatic organism resulting from repeated long-term exposure to a substance relative to the organism's lifespan

Final Acute Value (FAV):
The level of a chemical or mixture of chemicals that does not allow the mortality or other specified response of aquatic organisms to exceed 50% when exposed for 96 hours, except where a shorter time period is appropriate for certain species.

Aquatic Maximum Value (AMV):
The highest concentration of a material in the ambient water column to which an aquatic community can be exposed briefly without resulting in unacceptable effects. Set equal to one half of the FAV.

Human Health Values

Human Noncancer Value (HNV):
The maximum ambient water concentration at which adverse noncancer effects are not likely to occur from lifetime exposure through drinking water, fish, and water-related recreation activities

Human Cancer Value (HCV):
The maximum ambient water concentration at which a lifetime of exposure from either drinking water, fish, and water-related recreation activities will represent an extra risk of contracting cancer of 1 in 100,000

Drinking Water or Non-Drinking Water Values?

"Drinking Water" HNVs and HCVs are relevant for surface waters designated and protected as public water supply sources (The Great Lakes and Connecting Channels and other surface waters within 3000 feet of a point of water intake). Calculated using an assumed water consumption of 2 liters per day.

"Non-Drinking" values are calculated using an assumed incidental ingestion of 0.01 liters per day

Photo Credit: Mike McCauley winner of the 2022 Water Toxics Unit "Mr. Photogenic" award

Human Non-Cancer Value vs. Human Cancer Value

$$HNV = \frac{ADE \times BW \times RSC}{WC + [(FC_{TL3} \times BAF_3) + (FC_{TL4} \times BAF_4)]}$$

ADE = acceptable daily exposure (mg/kg-day) from key study

$$HCV = \frac{RAD \times BW}{WC + [(FC_{TL3} \times BAF_3) + (FC_{TL4} \times BAF_4)]}$$

RAD = risk associated dose (mg/kg-day) set at excess cancer risk of 1 in 100,000

Acceptable Daily Exposure

$$ADE\left(\frac{mg}{kg * day}\right) = \frac{Key\ Study\ NOAEL\ (or\ LOAEL)}{\sum Uncertainty\ Factor\ (UF)}$$

UF_A = Across species (1 to 10)

UF_H = Sensitive humans (1 to 10)

UF_S = Subchronic to chronic (1 to 10)

UF_A = Acute to subchronic (1 to 3)

UF_L = LOAEL to NOAEL (1 to 10)

UF_D = Database (1 to 10)

HNV Derivation: Consumption

$$WC + [(FC_{TL3} \times BAF_3) + (FC_{TL4} \times BAF_4)]$$

BAF = Human Health Bioaccumulation Factor for edible portion (L/kg)

- Compound specific information is utilized
- Is the compound lipophilic (compound concentration can be related to the amount of fat in fish)?
- Does the compound bio-magnify (concentrations within fish increase up the food chain)?

Guidance and preferred approaches for BAF development are promulgated within Rule 57

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Revised PFOA WQV

	Prior WQV (2011)	Revised WQV (2022)
Human Health Water Quality Values	**420 ng/L (drinking)** **12,000 ng/L (non-drinking)**	**66 ng/L (drinking)** **170 ng/L (non-drinking)**
Key Study	Butenhoff et al. (2002), 26-week oral capsule study in cynomolgus monkeys	Co-key studies, Onishchenko et al. (2011) and Koskela et al. (2016), developmental toxicity studies in C57Bl/6 mice
Critical Effect	Increased absolute liver weights reported at **LOAEL of 3 mg/kg-day**	Skeletal alteration (bone morphology and bone cell differentiation) in the femurs and tibias at **LOAEL of 0.3 mg/kg-day**
Toxicokinetic Parameters	Monkey body burden at LOAEL = 90.9 mg/kg Serum $T_{1/2}$ = 1378 days (Olsen et al., 2007) Human Equivalent LOAEL = **0.046**	V_d = 0.17 L/kg (Thompson et al., 2010) Serum $T_{1/2}$ = 840 days (Bartell et al., 2010) Human Equivalent LOAEL = **0.00116 mg/kg-day**
Uncertainty Factors	**3000x** (3x Interspecies, 10x Intraspecies, 10x LOAEL, 10x Duration)	**300x** (3x Interspecies, 10x Intraspecies, 3x LOAEL, 3x Database)
ADE	**0.0000153 mg/kg-day**	**0.0000039 mg/kg-day**
BAF Values	**4** (based on published data in Rainbow Trout)	**85** (based on Michigan FCMP data)

Revised PFOA WQV

Key Study / Critical Effect:
Onishchenko et al. (2011) and Koskela et al. (2016) developmental toxicity studies and the critical effect used in the revised WQV are the same as identified in the Michigan Drinking Water MCL.

Toxicokinetics:
2022 WQV approach adopted same toxicokinetic adjustment as identified in the Michigan Drinking Water MCL based on steady-state serum concentrations resulting in more conservative adjustment factor

Bioaccumulation Factors:
Prior WQV in 2011 relied on a BAF value of 4 identified in rainbow trout (Martin et al., 2003) as well as supporting field data from Minnesota Pollution Control Agency. Revised value used field data from Michigan FCMP using multiple trophic 3 and trophic 4 fish species.

Photo Credit: Mike McCauley winner of the 2022 Water Toxics Unit "Mr. Photogenic" award

PFBS WQV

	New WQV (2022)
Human Health Water Quality Values	**8,337 ng/L (drinking)** **672,000 ng/L (non-drinking)**
Key Study	Feng et al. (2017), developmental study in ICR mice exposed on gestation days 1 through 20
Critical Effect	Decreased serum total thyroxine (T_4) in newborn mice with a resulting **HED-BMDL$_{0.5SD}$ of 0.093 mg/kg-day**
Toxicokinetic Parameters	Human equivalent dose adjustment based on serum half-life (mouse $T_{1/2}$ = 4.5 hr, human $T_{1/2}$ = 1,050 hr)
Uncertainty Factors	**300x** (3x Interspecies, 10x Intraspecies, 10x Database)
ADE	**0.0003 mg/kg-day**
BAF Value	**1** (based on published data and lack of monitoring detections)

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Summary

Revised PFOA WQV

- The PFOA WQV have been updated to incorporate more recent toxicity, pharmacokinetic, and environmental fate data
- The key study and critical effect selected mirror those utilized in the development of the Michigan drinking water MCL for PFOA
- Revised BAF were developed based on FCMP data collected in multiple species
- Aquatic Toxicity Values did not change from 2011 assessment

New PFBS WQV

- Human health WQVs based on same key study and critical effect as Michigan drinking water MCL value for PFBS
- Updated point of departure reflective of the final U.S. EPA Human Health Toxicity Values published in 2021
- Tier II Aquatic Toxicity Values developed based on limited available data

PFAS Water Quality Values

The majority of surface water samples collected are compared to the Human Non-Cancer Values (HNV), non-drinking water:

PFOA	170 ppt
PFOS	12 ppt
PFBS	670,000 ppt

If surface water samples are collected directly from a waterbody that is also used as a source for drinking water, then surface water samples are compared to the Human Non-Cancer Values (HNV), drinking water:

PFOA	66 ppt
PFOS	11 ppt
PFBS	8,300 ppt

(ppt = parts per trillion)

Questions?

thank you
danke
謝謝
ngiyabonga
рахмат
teşekkür ederim
gracias
merci
obrigado
bedankt
dziękuję
спасибо
Баярлалаа
mersi
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Introduction

Kevin Cox, Toxicology Manager for the Water Toxics Unit with the Surface Water Assessment Section (SWAS)

- Started at EGLE in June 2022
- Prior role of Principal Research Toxicologist at **NSF International,** which focused on chemical risk and hazard assessment service offerings in support of internal and external clients
- Authored numerous chemical risk assessments evaluating exposure from unregulated drinking water contaminants, dietary supplement ingredients, toy product materials, and pool and spa treatment chemicals
- Part of the **Michigan PFAS Action Response Team Science Advisory Workgroup** tasked with reviewing existing and proposed health-based drinking water standards for PFAS for the State of Michigan

NSF International

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Thanks for listening!

Comments, Questions, and Answers

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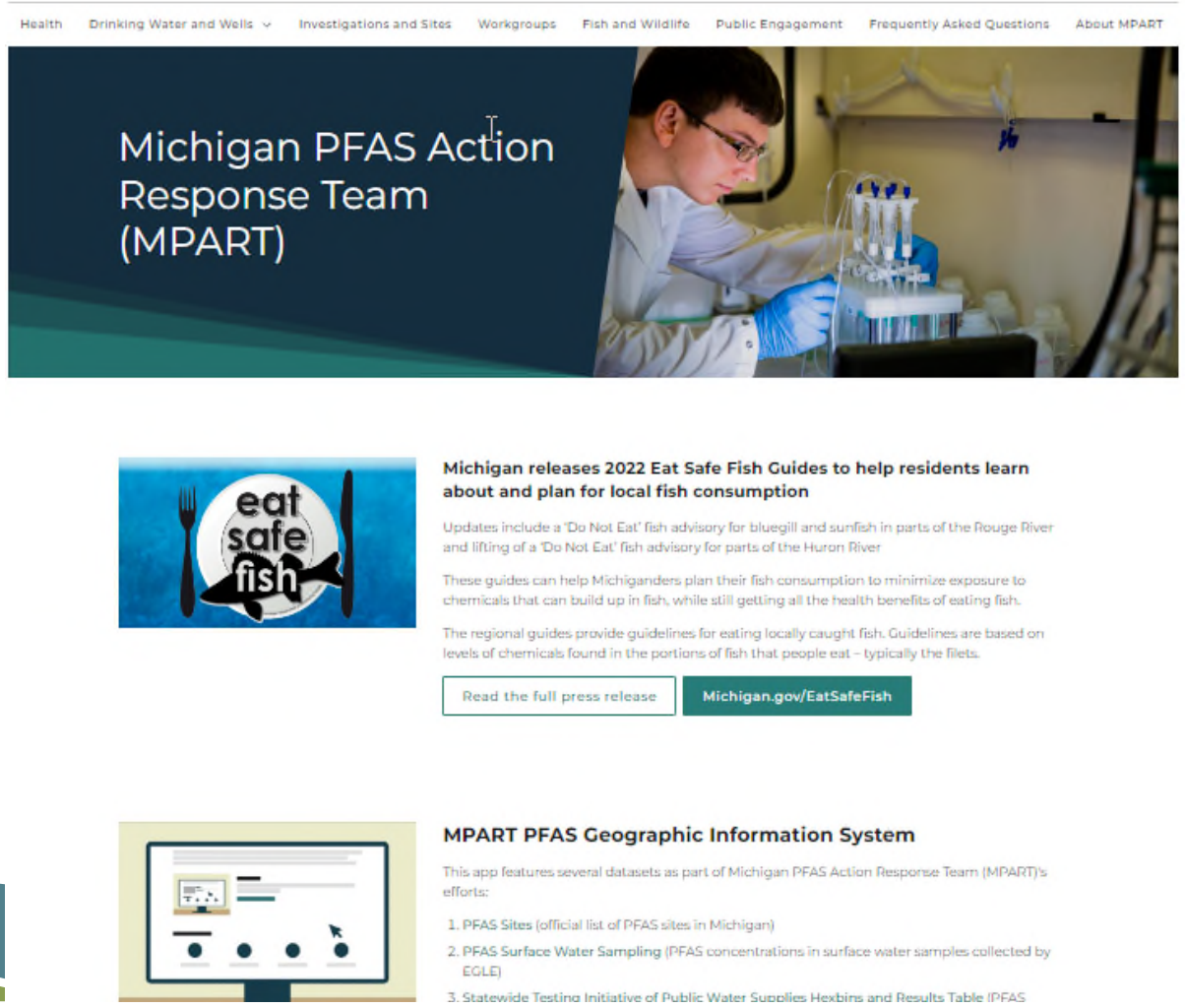
Michigan.gov/PFASResponse website



MICHIGAN PFAS ACTION RESPONSE TEAM (MPART)

Michigan.gov/PFASResponse

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MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

Michigan Department of AGRICULTURE & Rural Development

MDHHS
Michigan Department of Health & Human Services

MDOT
Michigan Department of Transportation

DEPARTMENT OF NATURAL RESOURCES DNR MICHIGAN

LARA
LICENSING AND REGULATORY AFFAIRS
CUSTOMER DRIVEN. BUSINESS MINDED.

DEPARTMENT OF MILITARY AND VETERANS AFFAIRS MICHIGAN

Thank you!

We will post a recording and closed-captioned copy of tonight's conversation on our website in the next few days.