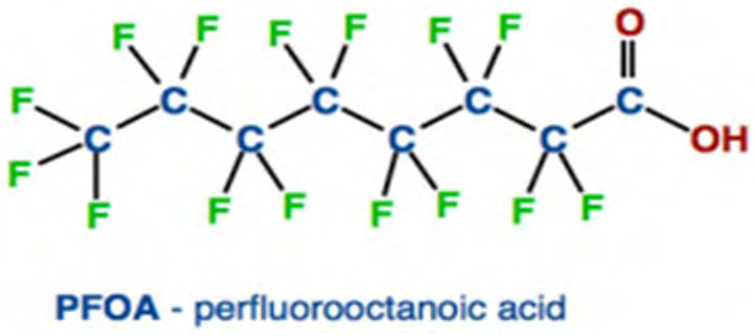
PFAS Town Hall

Steve Sliver, DEQ MPART Executive Director
Stephanie Kammer
Al Taylor
Jim Arduin
Paul Bucholtz
Deb MacKenzie-Taylor

March 8, 2019

Mott Community College

Per- and polyfluoroalkyl substances (PFAS)



PFOA - perfluorooctanoic acid

- **Strong carbon-fluorine bonds**
- Surfactants
- Hydrophobic (repels water) and oleophobic (repels oil, fat, grease)
- Began developing in 1940's
- 5,000+ compounds today

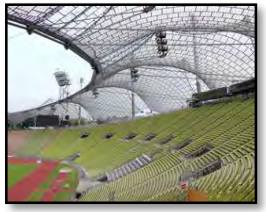
Common PFAS Abbreviations

- Perfluorooctanoic acid (PFOA)
- Perfluorooctane sulfonate (PFOS)
- Perfluorobutane sulfonic acid (PFBS)
- Perfluorohexane sulfonic acid (PFHxS)
- Perfluorononanoic acid (PFNA)
- GenX
- …

PFAS Uses

Aerospace

Apparel



Building and Construction

Chemicals and Pharmaceuticals

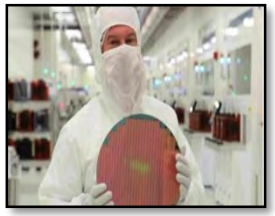
Electronics

Oil & Gas

Energy

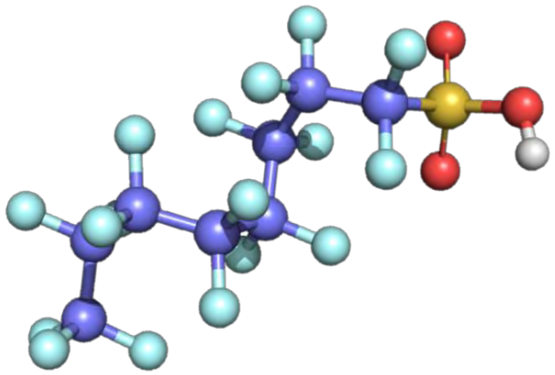
Healthcare and Hospitals

Aqueous Film Forming Foam



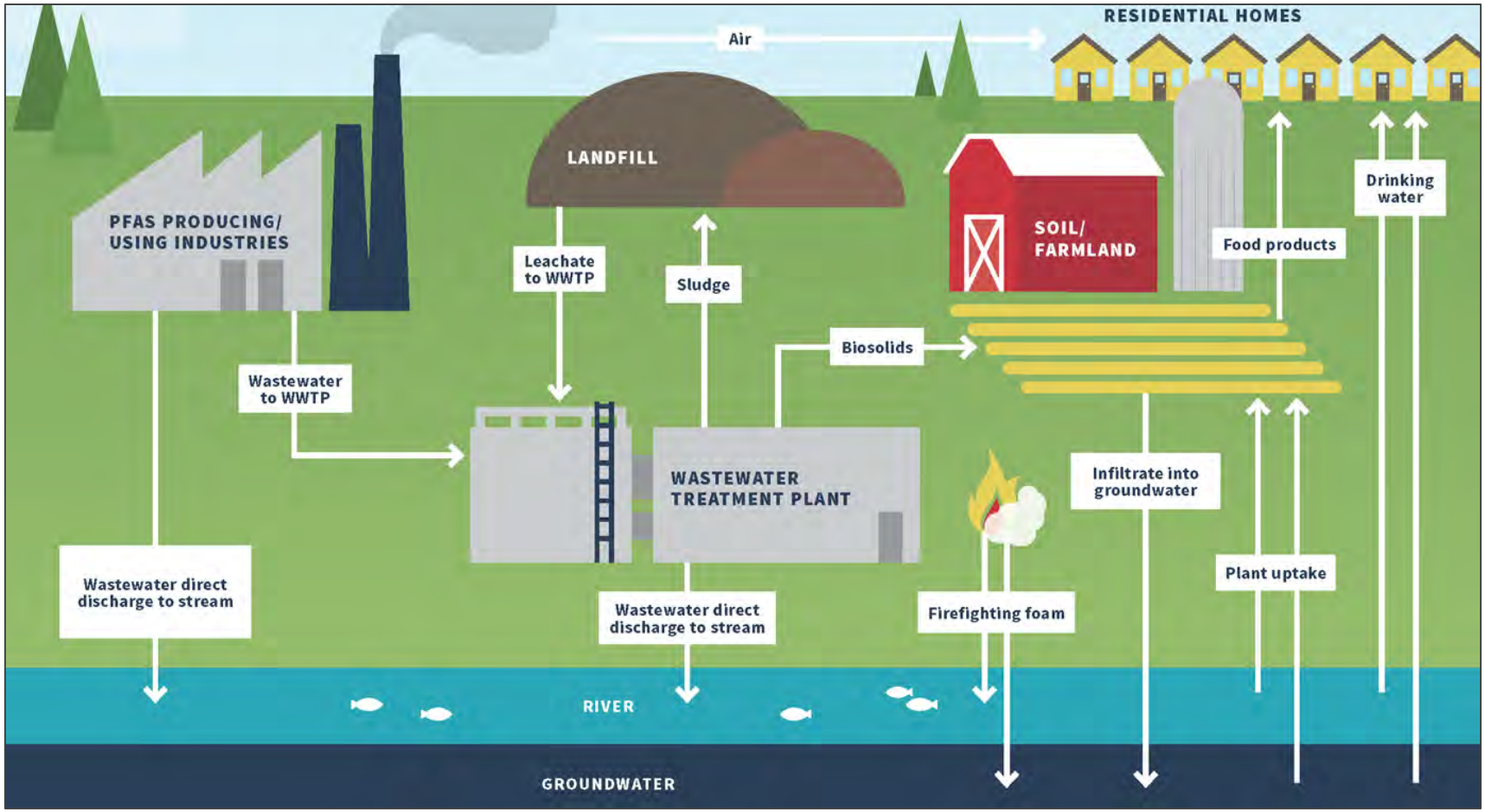
Semiconductors

Why the concern?



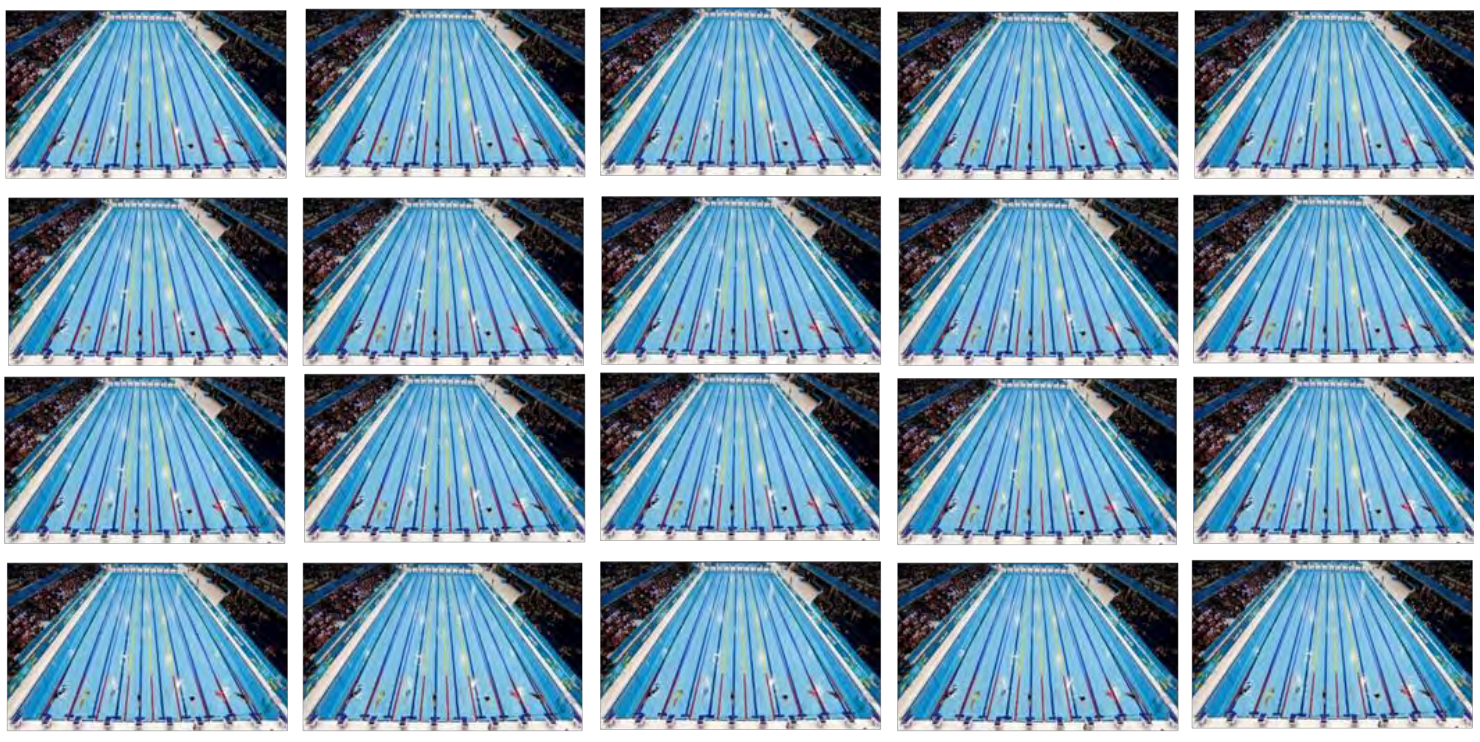
- Pervasive
- Persistent
- Bioaccumulative
- Associated with adverse health effects
- Scarcity of information in scientific literature
- Incomplete regulatory structure

PFAS Cycle


RESIDENTIAL HOMES
Air
LANDFILL
PFAS PRODUCING/
USING INDUSTRIES
SOIL/
FARMLAND
Drinking
water
Food products
Leachate
to WWTP
Sludge
Biosolids
Wastewater
to WWTP
WASTEWATER
TREATMENT PLANT
Infiltrate into
groundwater
Plant uptake
Wastewater direct
discharge to stream
Wastewater direct
discharge to stream
Firefighting foam
RIVER
GROUNDWATER

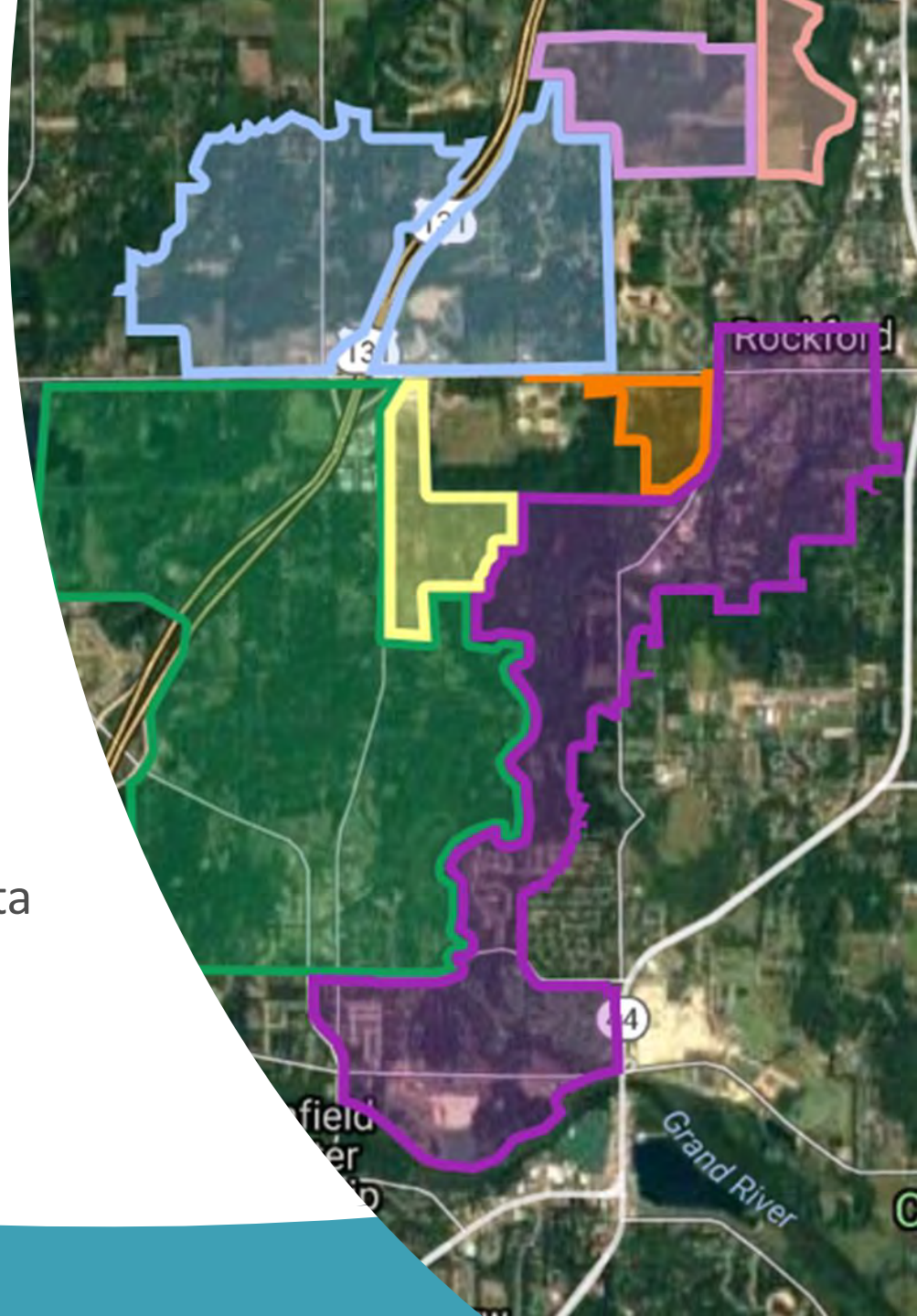
Part Per Trillion

1 drop in 20 Olympic Swimming Pools



PFAS Emerge in Michigan

- 2012 Wurtsmith “Do Not Eat” fish advisory
- 2013 surface water recon sampling
- 2017 connecting channels data
- 2017 Camp Grayling sample data
- 2017 North Kent sample data



Michigan PFAS Action Response Team (MPART)

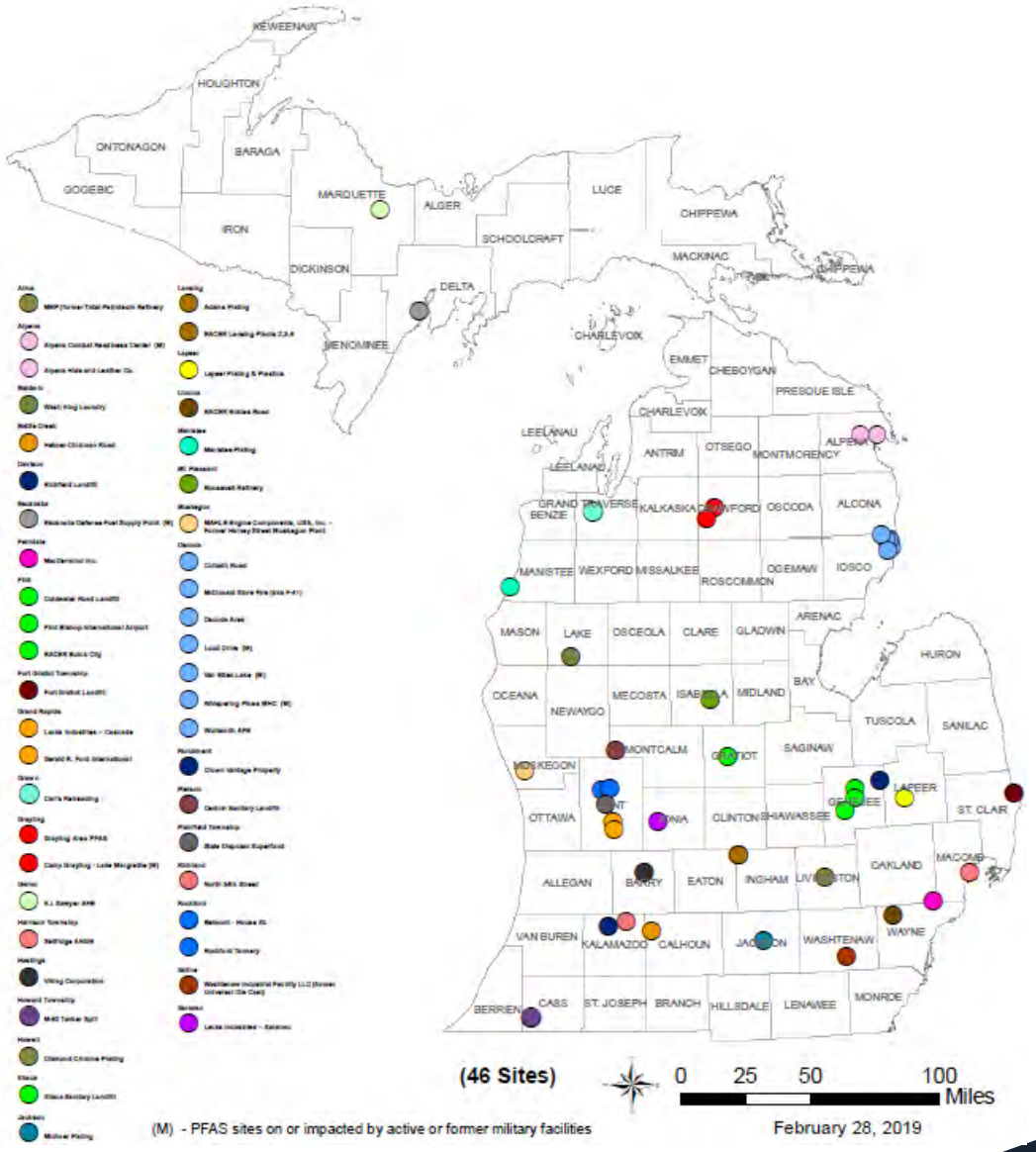
- Executive Order 2019-3
- Unique multi-agency approach
- Leads coordination and cooperation among all levels of government
- Directs implementation of state's action strategy

MPART

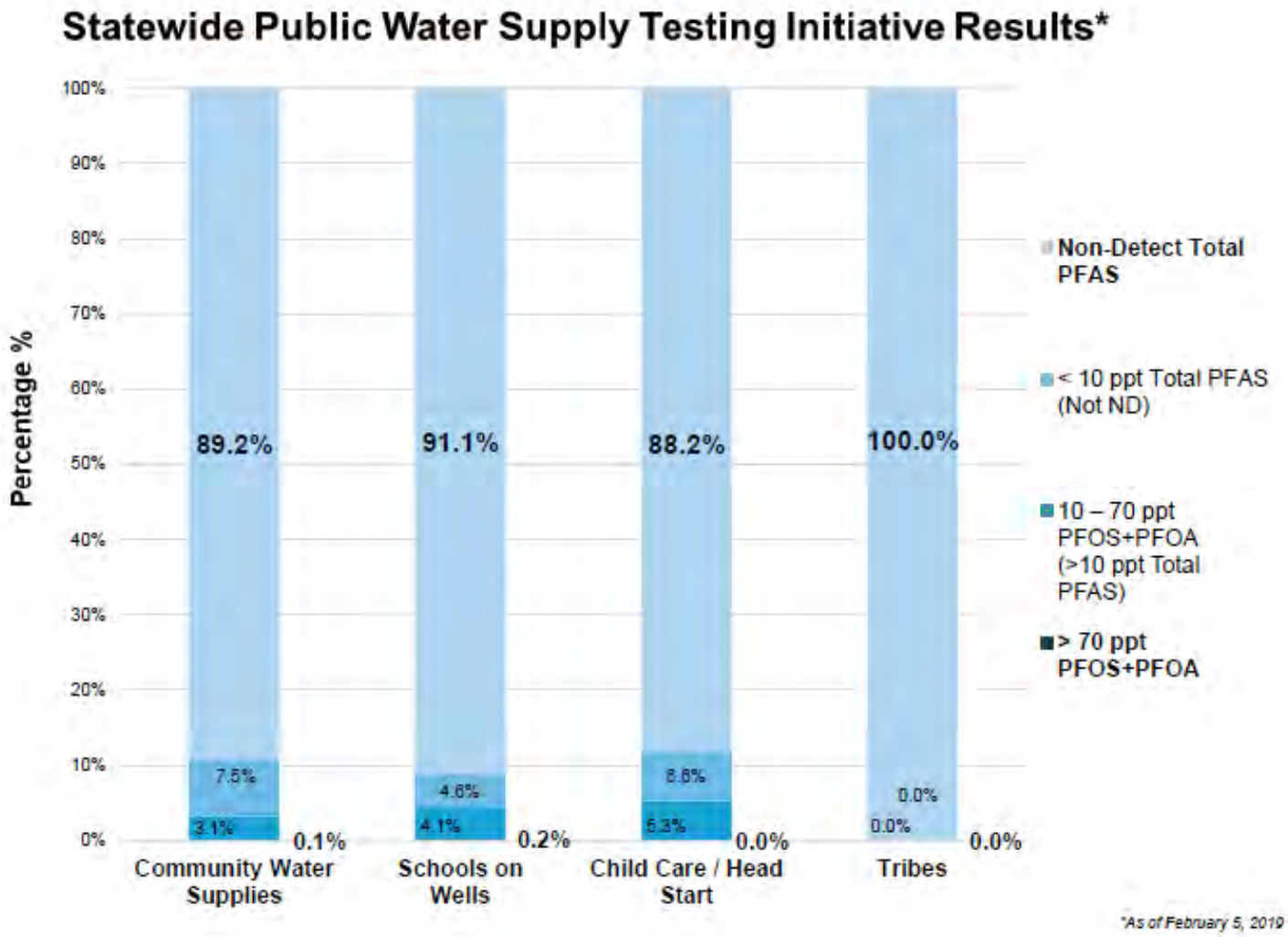
- Transparency and outreach
- Stakeholders
- Other states and associations
- Advisory workgroups

Sites being investigated

- Map represents sources of groundwater contamination over 70 ppt PFOS+PFOA
- Once a source is identified, it becomes an official site
- Multiple other investigations with no known source yet

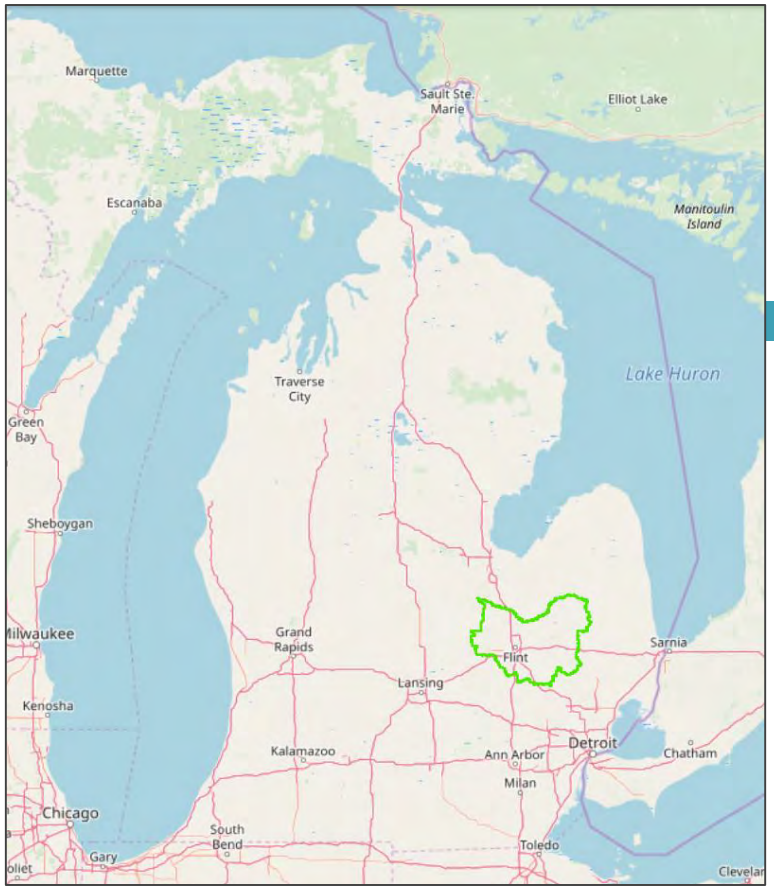


Statewide Public Water Supply Results



Surface Water Investigation

- Ambient monitoring
- Publicly owned treatment works (POTW)
  - Industrial Pretreatment Program (IPP)
  - Biosolids
- Industrial direct dischargers
- Fish
- Surface water foam



Flint River & Gilkey Creek

PFAS Sampling and Source Tracking Efforts

Stephanie Kammer,
Water Resources Division

DEQ Surface Water Quality Criteria for PFAS

- Michigan developed Rule 57 Human Noncancer Values (HNV) for both PFOS and PFOA in surface waters

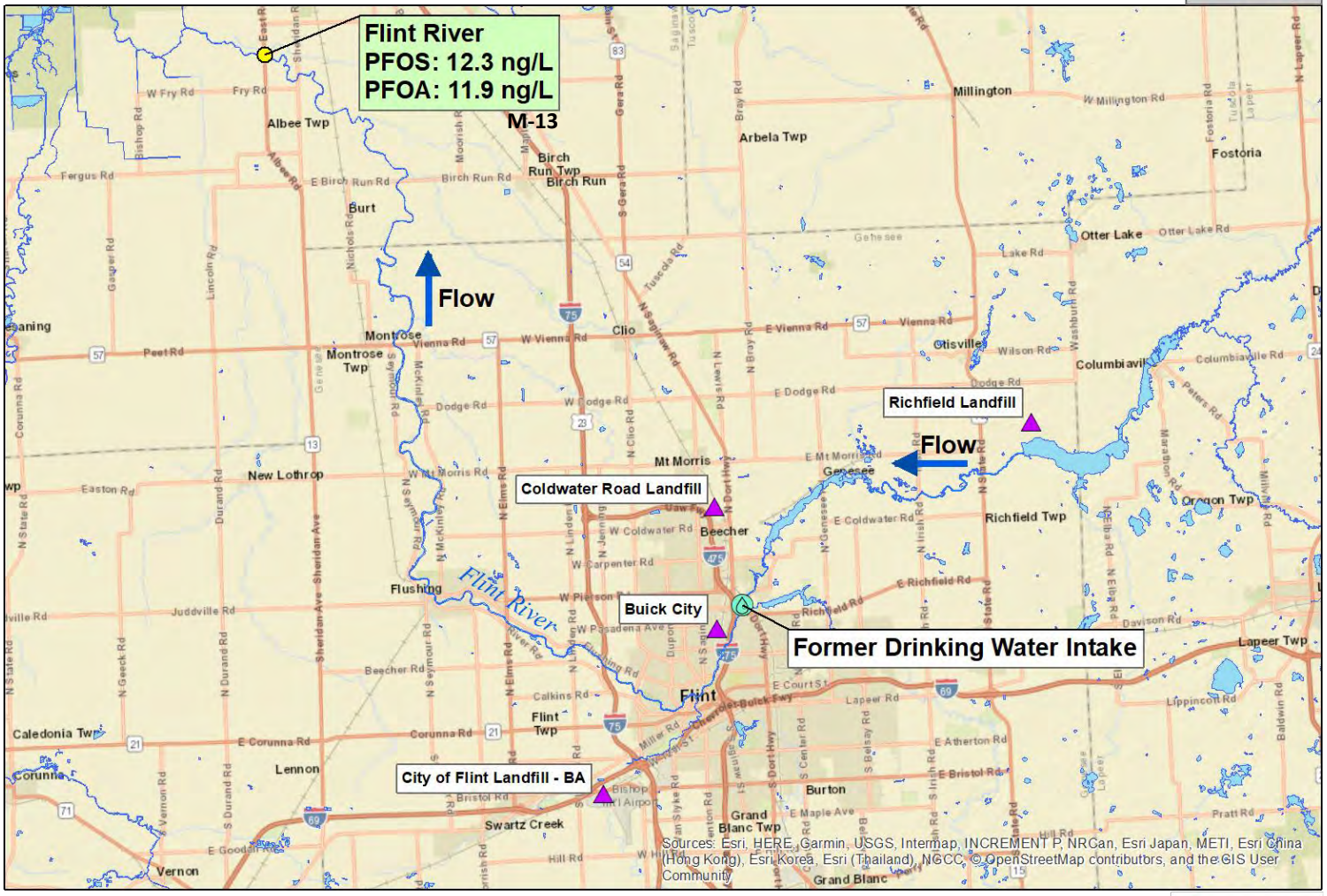
	HNV (nondrinking)	HNV (drinking)	FCV	FAV	AMV
PFOS (ng/L)	12	11	140,000	1,600,000	780,000
PFOA (ng/L)	12,000	420	880,000	15,000,000	7,700,000

Aquatic Life : Final Chronic Value (FCV), Final Acute Value (FAV), and Aquatic Maximum Value (AMV)

- PFOS builds up in fish tissue to a higher degree than PFOA

2001 PFAS Sampling - Flint River

DRAFT

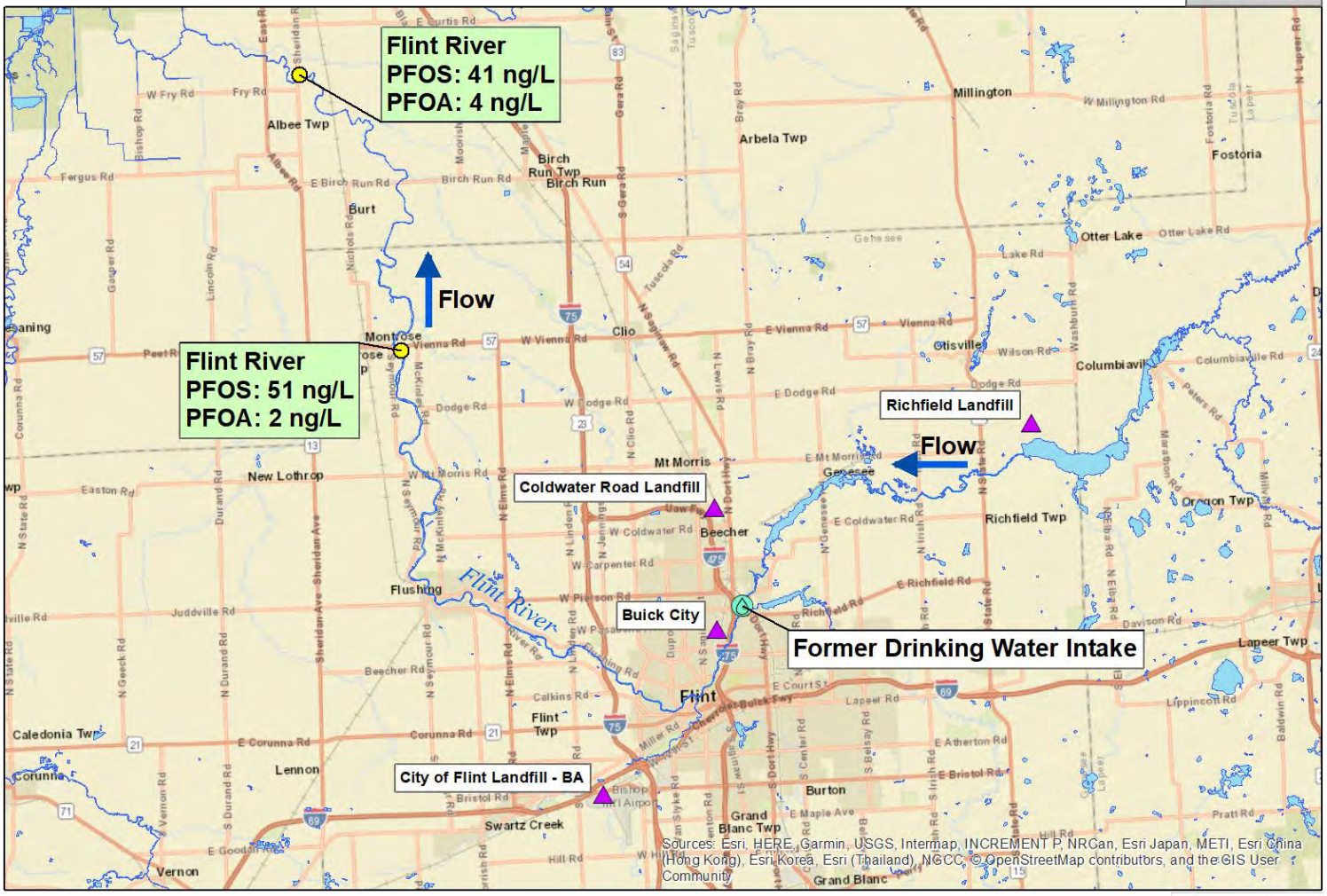


N W E S

0 2.5 5 10 Miles

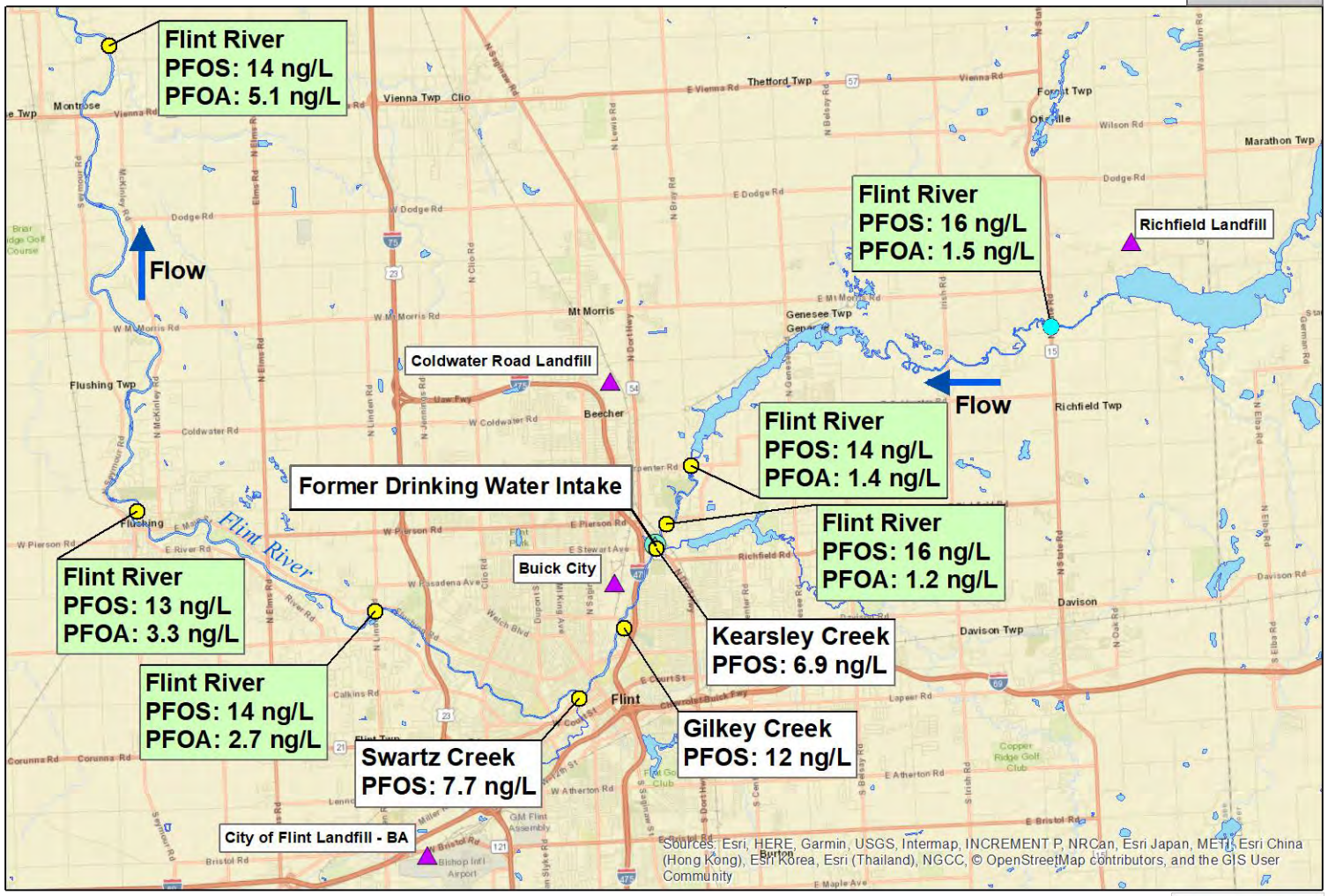
2013 PFAS Sampling - Flint River

DRAFT



2016 PFAS Sampling - Flint River

DRAFT

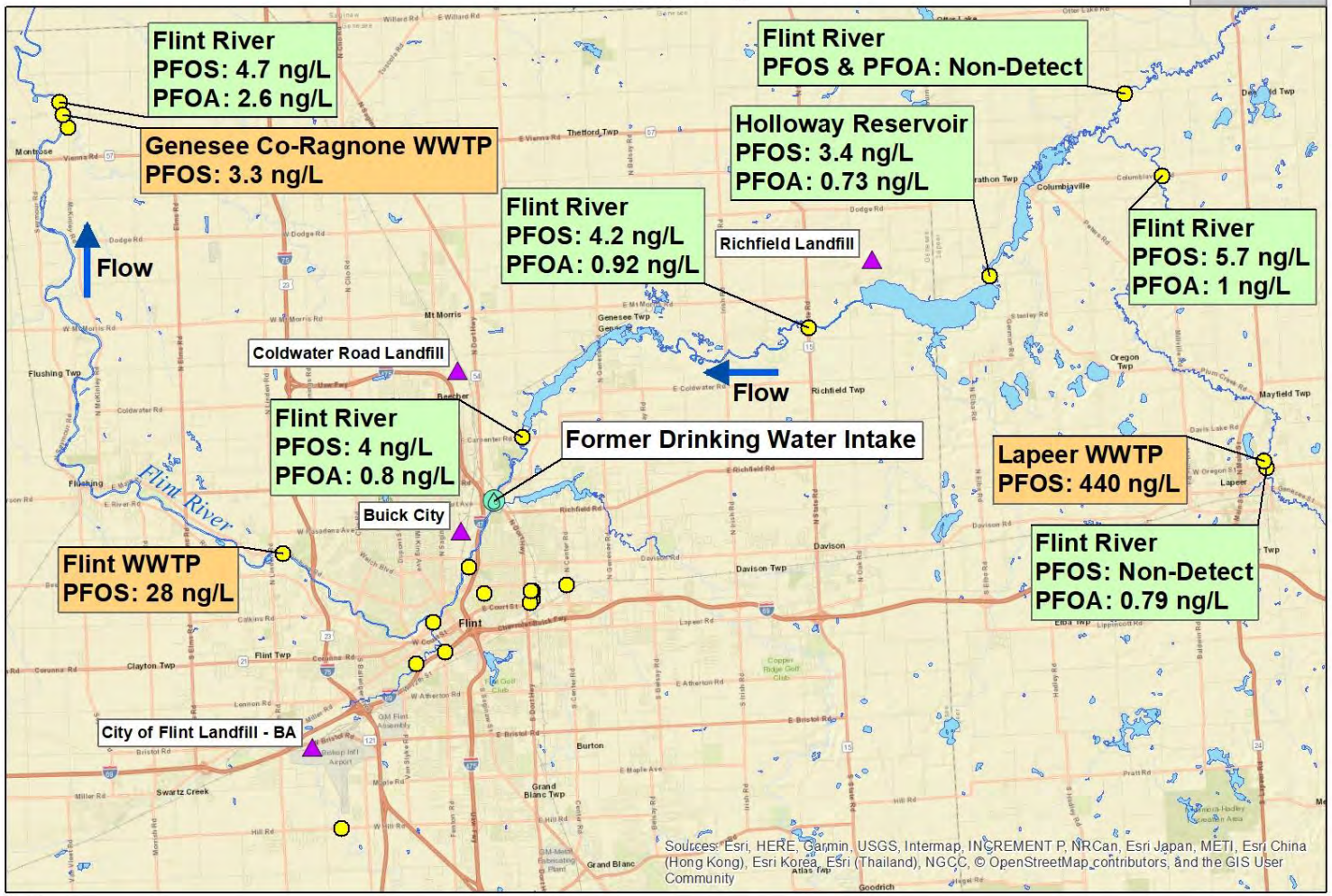


N W E S

0 2.5 5 10 Miles

2017 PFAS Sampling - Flint River

DRAFT

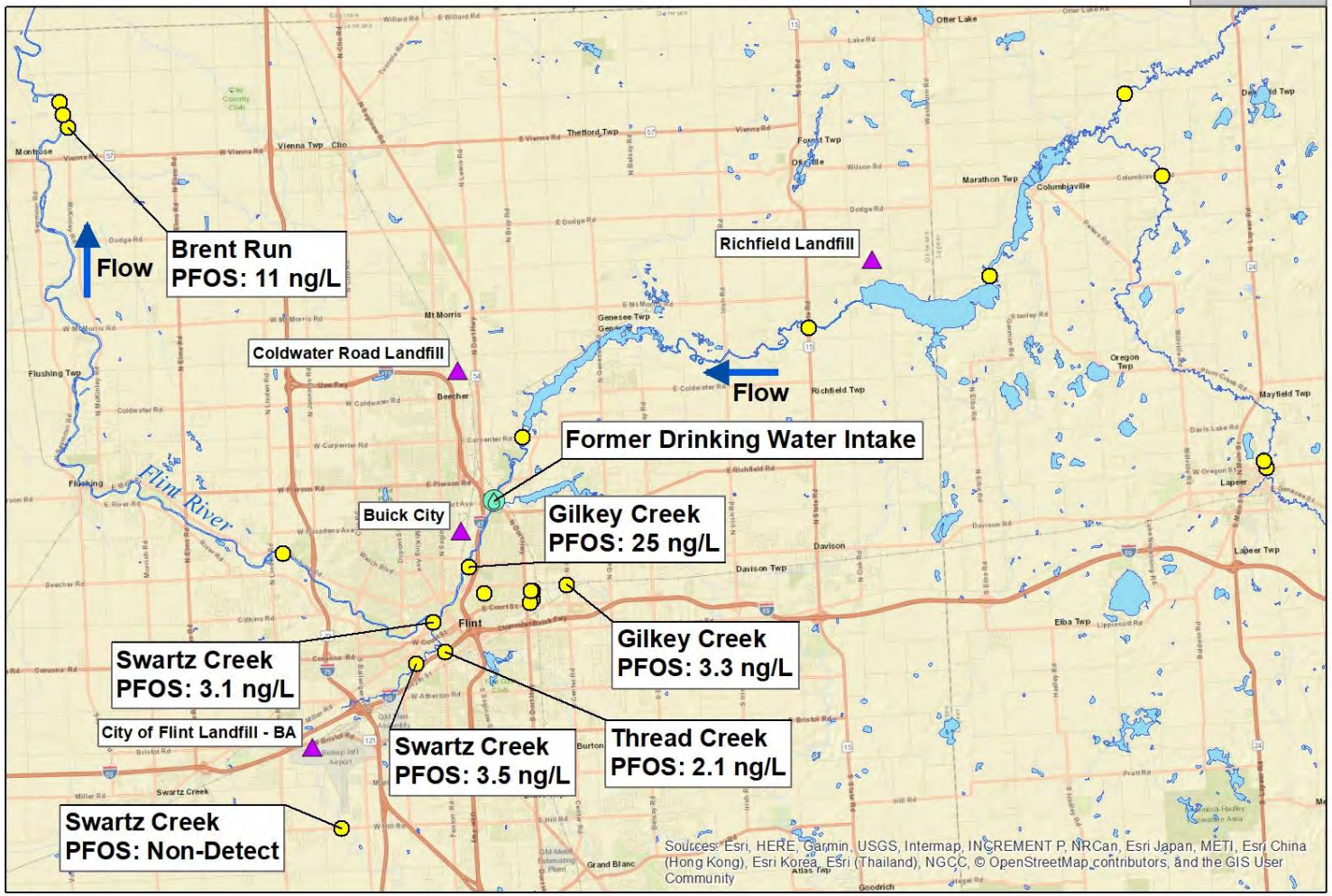


N W E S

0 2.5 5 10 Miles

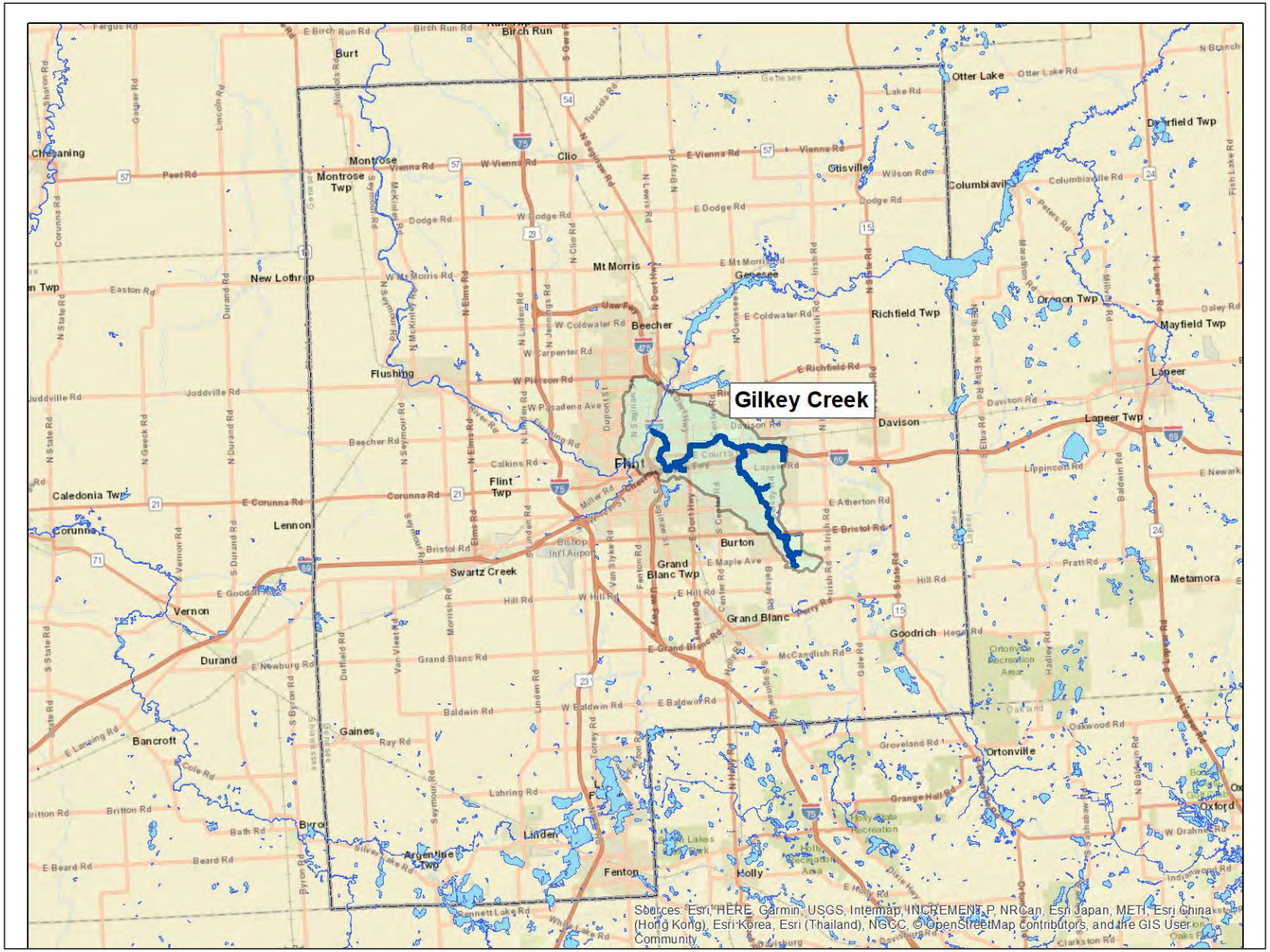
2017 PFAS Sampling - Flint River

DRAFT

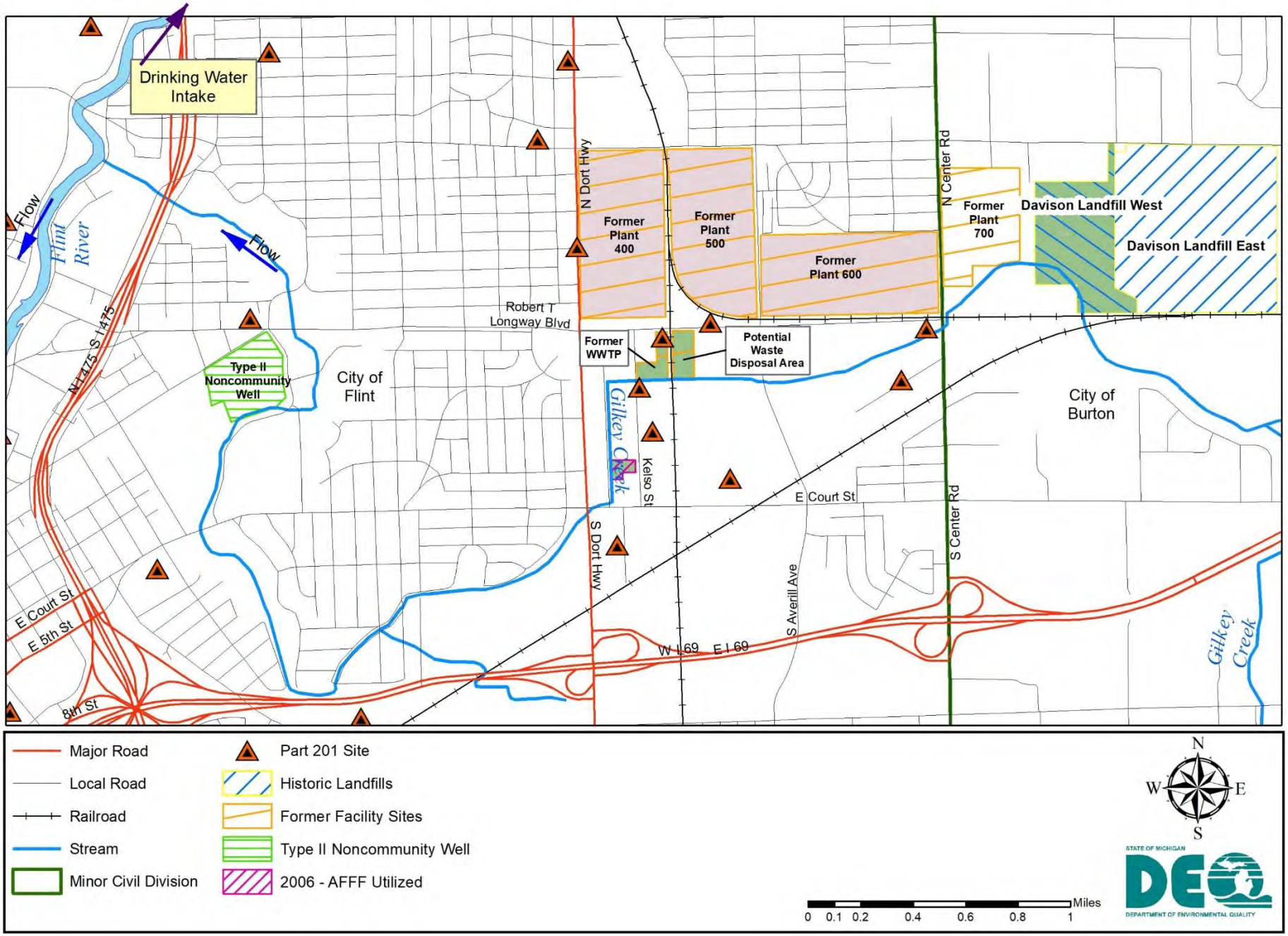


N W E S

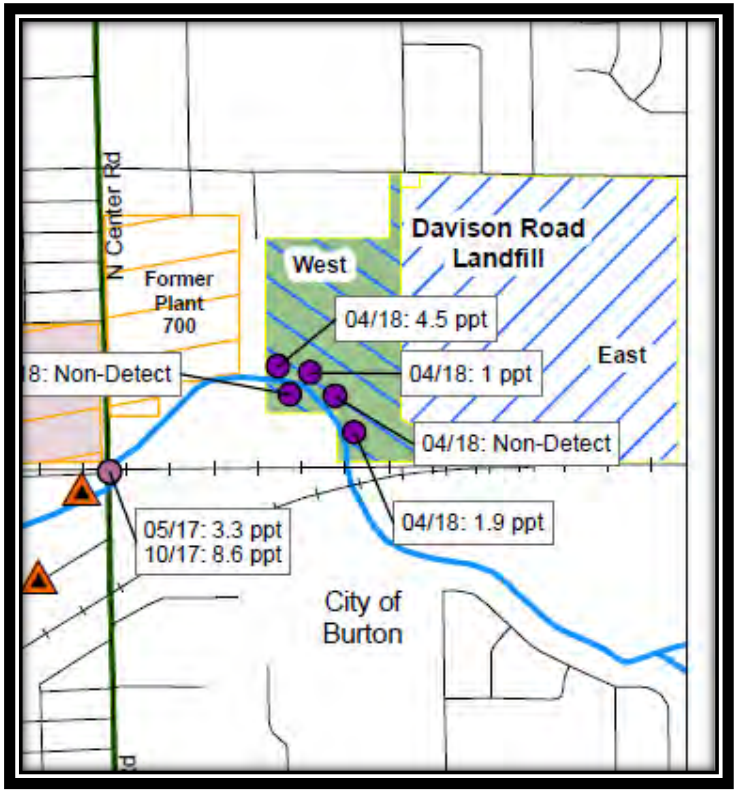
0 2.5 5 10 Miles


Gilkey Creek
Flint
Burton
Grand Blanc Twp
Grand Blanc
Davison
Lapeer
Lapeer Twp
Richfield Twp
Mt Morris
Clio
Beecher
Flushing
New Lothrop
Montrose
Montrose Twp
Otter Lake
Otisville
Columbiaville
Oregon Twp
Mayfield Twp
Metamora
Goodrich
Ortonville
Oxford
Swartz Creek
Flint Twp
Caledonia Twp
Corunna
Lennon
Vernon
Durand
Bancroft
Gaines
Linden
Fenton
Holly
Argentine Twp
Byron
Burt
Birch Run
Clayton
Genesee
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

Gilkey Creek – Source Investigation



Davison Road Landfill West
Racer Trust



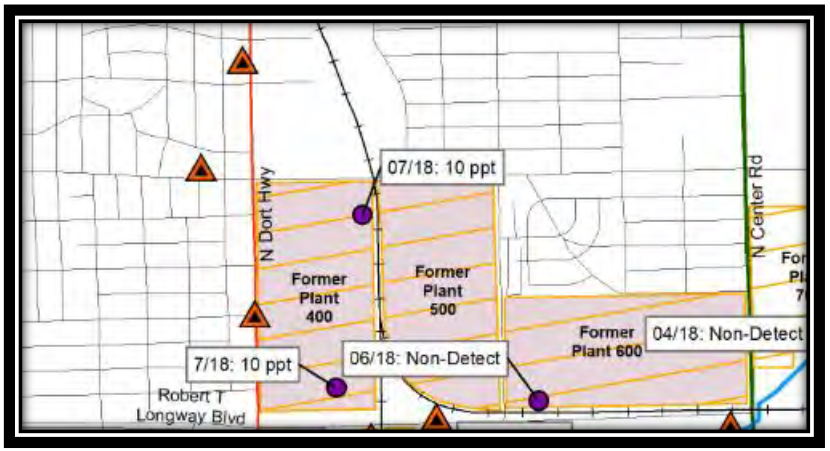
- April 2018 – Five Monitoring Wells Sampled

	PFOS (ppt)	PFOA (ppt)	PFOA/PFOS (ppt)
MW-7-12	0.44 J	0.94 J	1.38 J
SB/MW-15-14	1.9 J	5.5	7.4 J
SB/MW-16-14	4.5	6.7	11.2
TMW-1	1.0 J	6.3	7.3 J
TMW-8	0.45 J	0.71 J	1.16 J

J – Result is less than the Reporting Level (RL) but greater than or equal to the Method Detection Limit (MDL), and the concentration is an approximate value

Groundwater results are compared to the DEQ Part 201 Criteria of PFOS/PFOA combined 70 ppt for protection of drinking water and the GSI values of 12 ppt for PFOS and 12,000 ppt for PFOA. Detected levels were below 201 protection criteria.

Delphi – Former Plants 400 & 600



Former Plant No.	Sample Location	PFOS (ppt)	PFOA (ppt)	PFOA/PFOS (ppt)
400	MW	10	ND	10
400	MW	10	ND	10
400	Treated discharge	4.5	15	19.5
600	MW	ND	ND	ND

- **Plant 400** – Location of AFFF training and plating operations
- **Plant 600** - Location of chrome plating line for former automotive manufacturing facility (operated for 1 year).
- **Lead Division/Contact**: EPA, Region 5; WMRPD
- **June/July 2018** – Three MW and treated GW discharge sampled

Groundwater results are compared to the DEQ Part 201 Criteria of PFOS/PFOA combined 70 ppt for protection of drinking water and the GSI values of 12 ppt for PFOS and 12,000 ppt for PFOA. Detected levels were below 201 protection criteria.

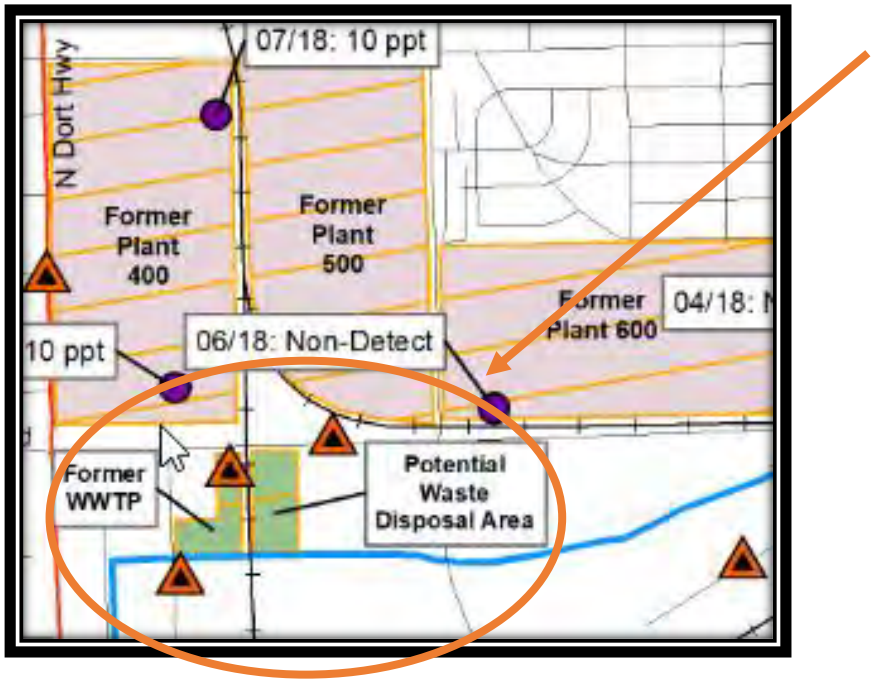
Industrial Steel Treating Facility

Date	Sample Type	PFOS	PFOA
12/17	Soils	30 ppb	0.38 ppb
12/17	Soils	2.6 ppb	0.11 ppb
11/18	Storm water	44 ppt	
10/17	Storm water	37	7.2

- August 2006 – City of Flint responded to structural fire
- 50 gallons of AR-AFFF used to put out the fire
- Storm water and soils samples above criteria

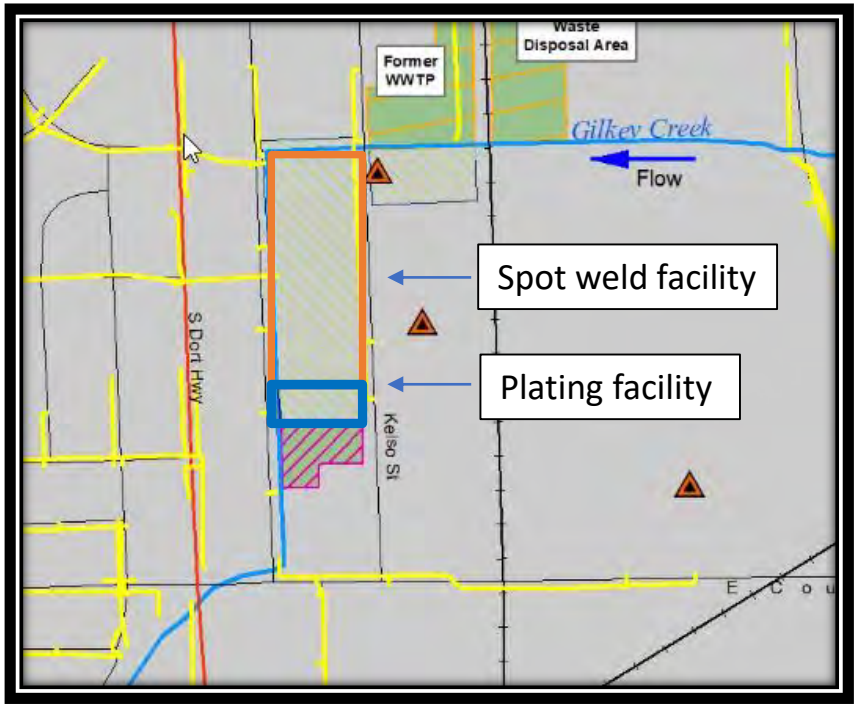
Soil results are compared to the DEQ Part 201 Criteria of PFOS 0.24 ppb and PFOS 10,000 ppb for protection of GSI. Storm water results are compared to DEQ Part 31 Criteria of 12 ppt for PFOS and 12,000 ppt for PFOA. Detected levels were above criteria for PFOS.

Former Delphi WWTP and Disposal Sites



- Former wastewater treatment plant and disposal areas for Delphi Operations
- June 2018 - DEQ-RRD-Geological Services Unit (GSU) contracted to obtain groundwater samples:
  - Disposal Area - Two macro-well borings (depth to 25 feet) where attempted and no groundwater was encountered.
  - Former WWTP – Site conditions did not allow for monitoring.
- Sites still considered potential sources

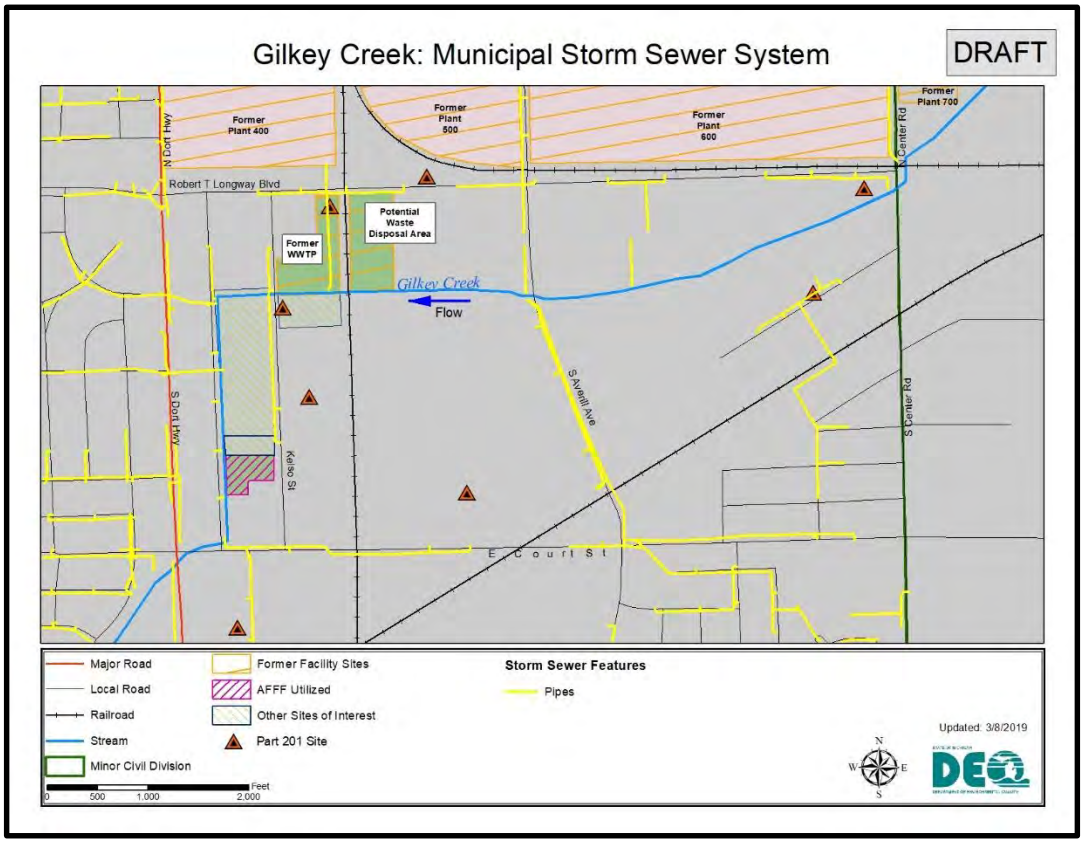
Other Sites Inspected



- December 2017 – Kelso Street DEQ conducted site inspections
- Tri-chrome plating facility – No PFAS history of PFAS use. Wastewater non-detect.
- Automotive spot weld and hem press facility – No PFAS used

Next Steps

- Gilkey Creek - Storm sewer monitoring with City to bracket PFAS concentrations. Work with Industrial Facility under storm water permit.
- S. Branch Flint River – surface water samples
- Kearsley Reservoir - Fish collection
- Follow-up with confirmed sources with discharges to surface waters on corrective actions



2013-2019 PFAS Fish Sampling - Flint River

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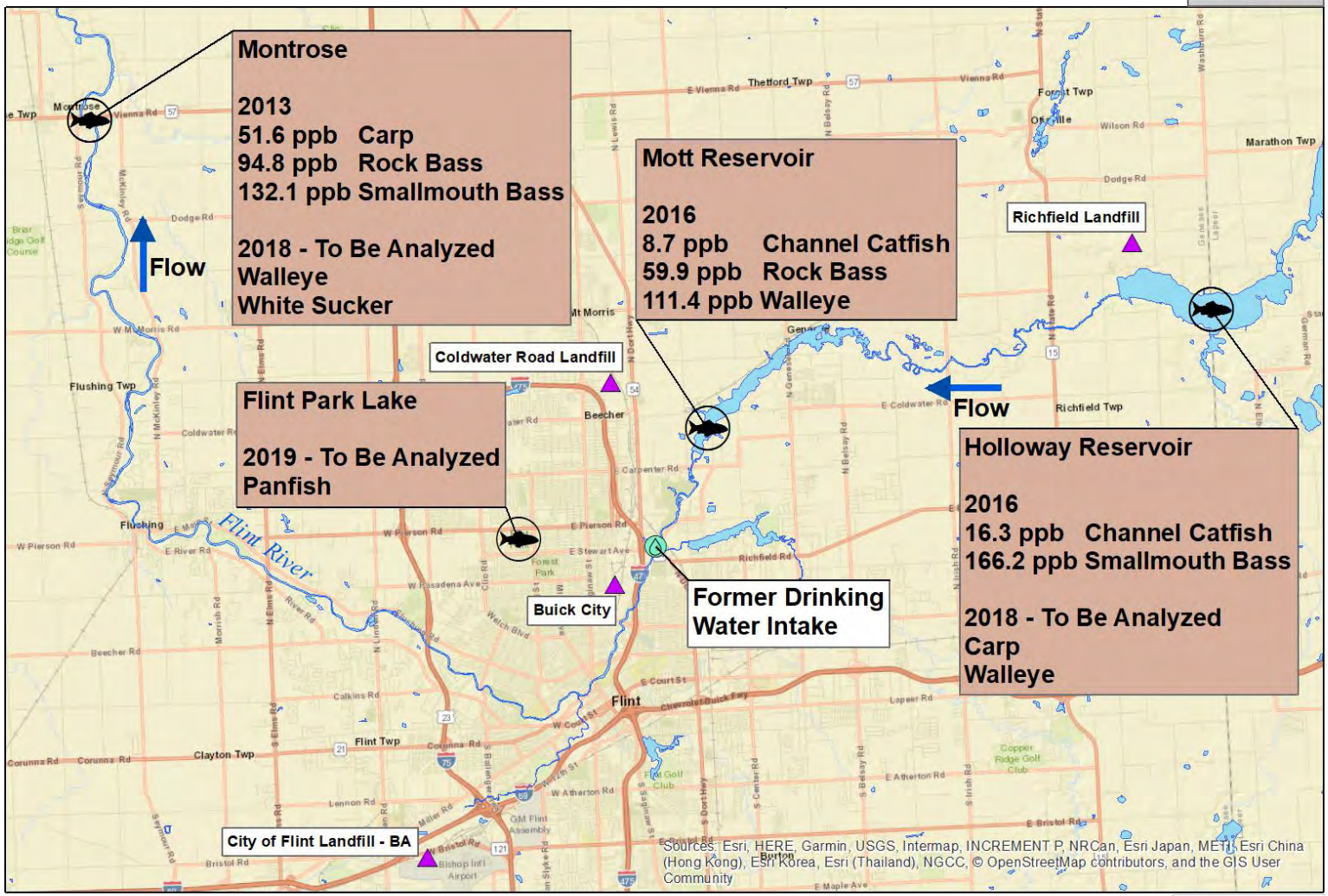


N W E S

0 2.5 5 10 Miles

RACER Buick City, RACER Coldwater Road, Richfield Landfill

Al Taylor – DEQ, Waste Management and Radiologic Protection Division, Hazardous Waste Section Manager

Nicole Sanabria – Hazardous Waste Program Geologist

- RACER Coldwater Road

Jim Arduin – Solid Waste Program Geologist Specialist

- Richfield Landfill

Four MPART Sites in Genesee County

Background

- RACER became operational on March 31, 2011 as a result of GM Bankruptcy settlement.
- RACER under oversight from U.S.EPA and DEQ is responsible for managing the RACER Buick City site, completing remediation related to former GM contamination, and marketing the Site for re-use.

Background

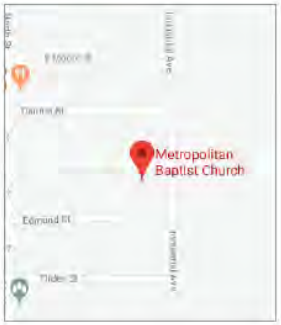
- U.S. EPA is the lead agency for RACER Buick City– Chris Black is the Project Manager
  - Chris will be at the RACER sponsored Public Meeting Next Thursday night at the Metropolitan Baptist Church on Murtle Street
  - This follows up on the Public Meeting held back in November
- MDEQ is the support agency – Kevin Lund is the Project Manager
  - Kevin is out of the office until March 18 at the GLLA
- We will capture any questions you have that we can't answer tonight and follow up

RACER

PUBLIC MEETING

Buick City Environmental Activities Update

Thursday, March 14, 6 to 8 p.m.
Metropolitan Baptist Tabernacle
930 E. Myrtle Avenue, Flint, MI



RACER Trust will hold a public information meeting from 6 p.m. to 8 p.m. Thursday, March 14, to provide the community with an update on our environmental activities at Buick City in Flint. This update will include discussion about its most recent test results for PFAS.

Get current information and speak with representatives of RACER Trust and the agencies that oversee its cleanup work — the U.S. EPA and Michigan Department of Environmental Quality — as well as state and local health officials.

Join our email list: To be notified of Buick City updates by email, please send a note to Bill Callen at bcallen@racertrust.org and ask to be included.

Project information: www.racertrust.org/buickcity18

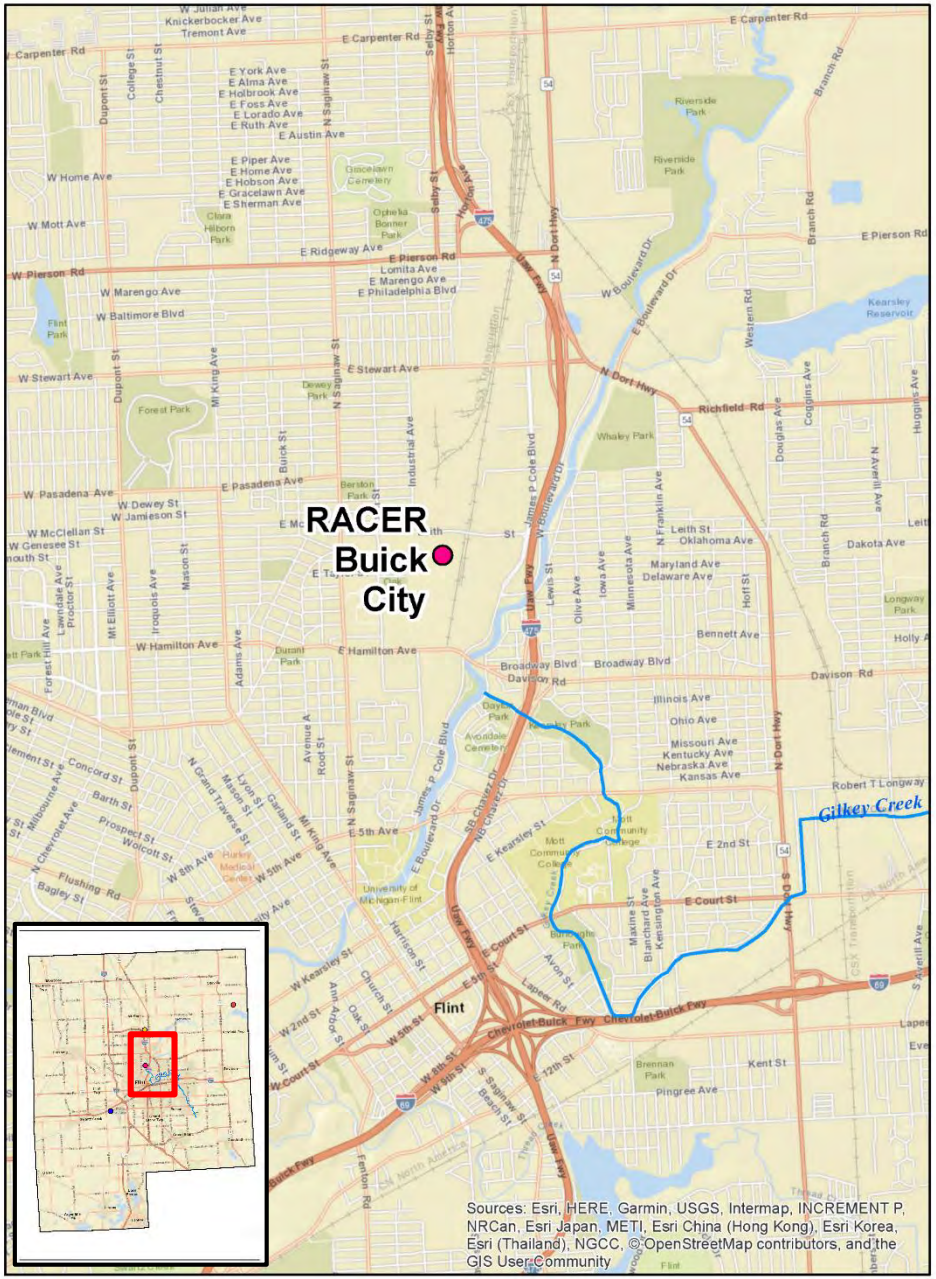
www.racertrust.org

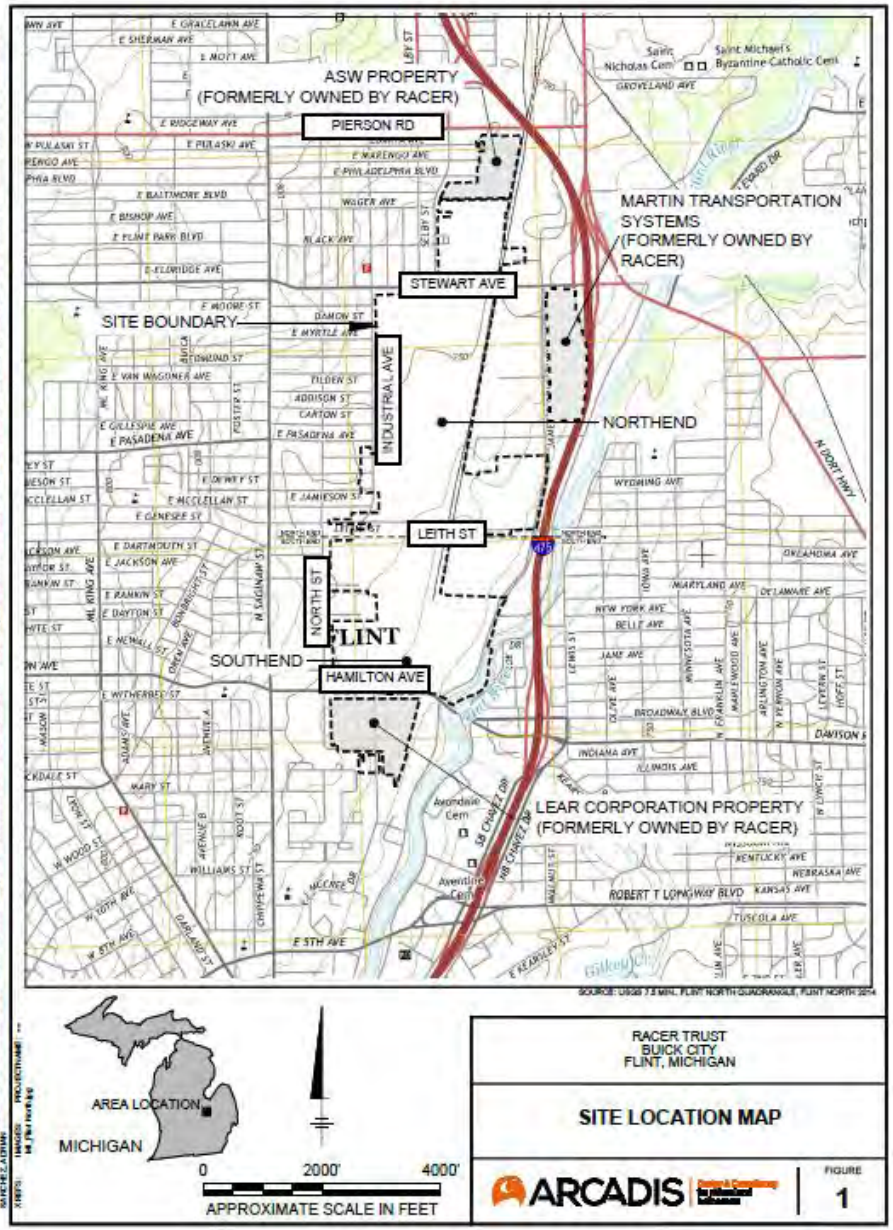
Background

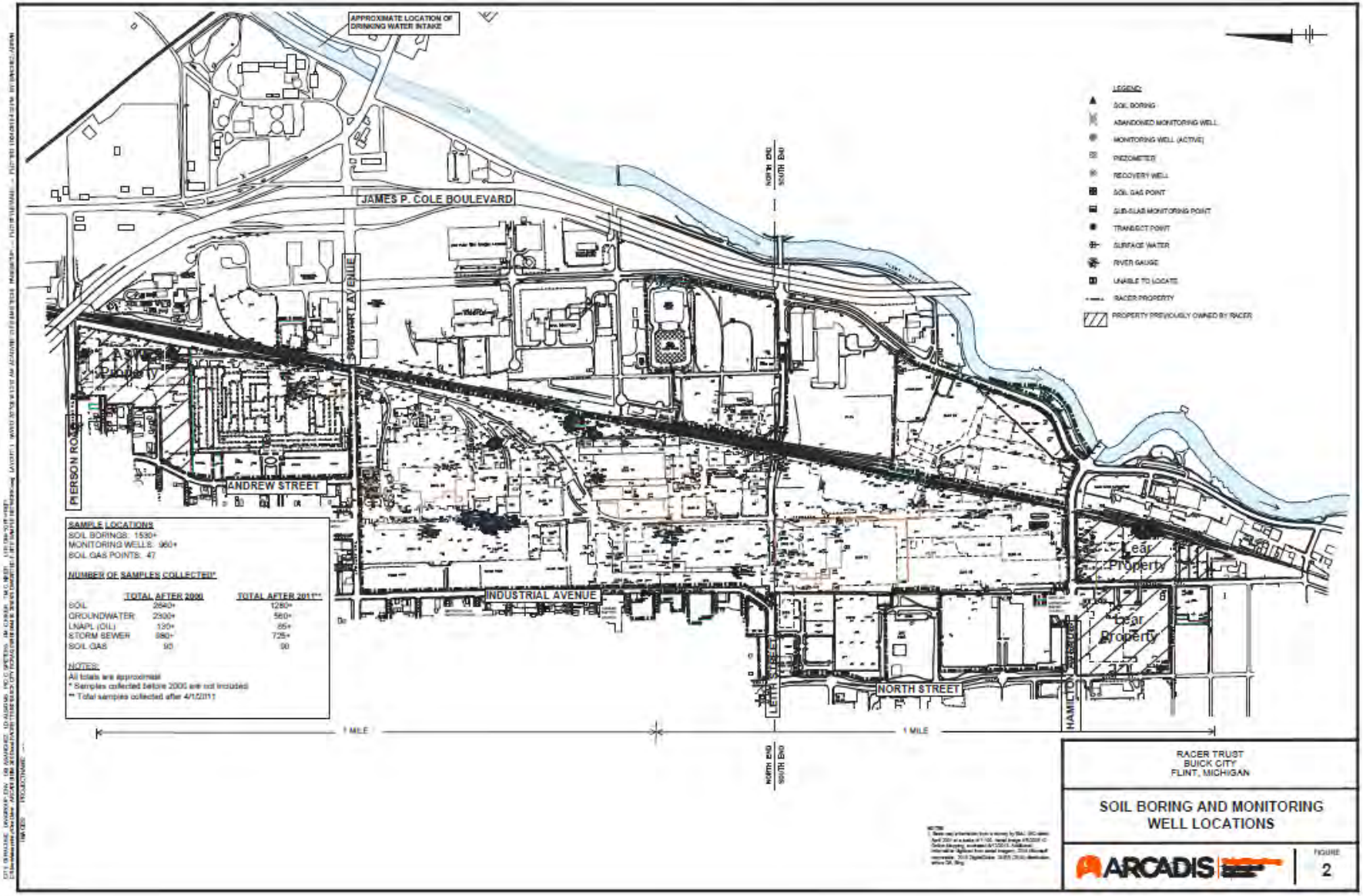
- How is work being prioritized?
  - Groundwater pathway
    - Make sure no one is drinking contaminated groundwater
  - Surface water pathway
    - Investigate what contamination is getting to the Flint River
      - Storm Sewers
      - Sanitary Sewers
    - Drinking water from river
    - Fish
  - Controlling the site until cleanup is completed to prevent people from coming in contact with contaminated soils
  - Air
    - Dust/vapors controlled during cleanup activities

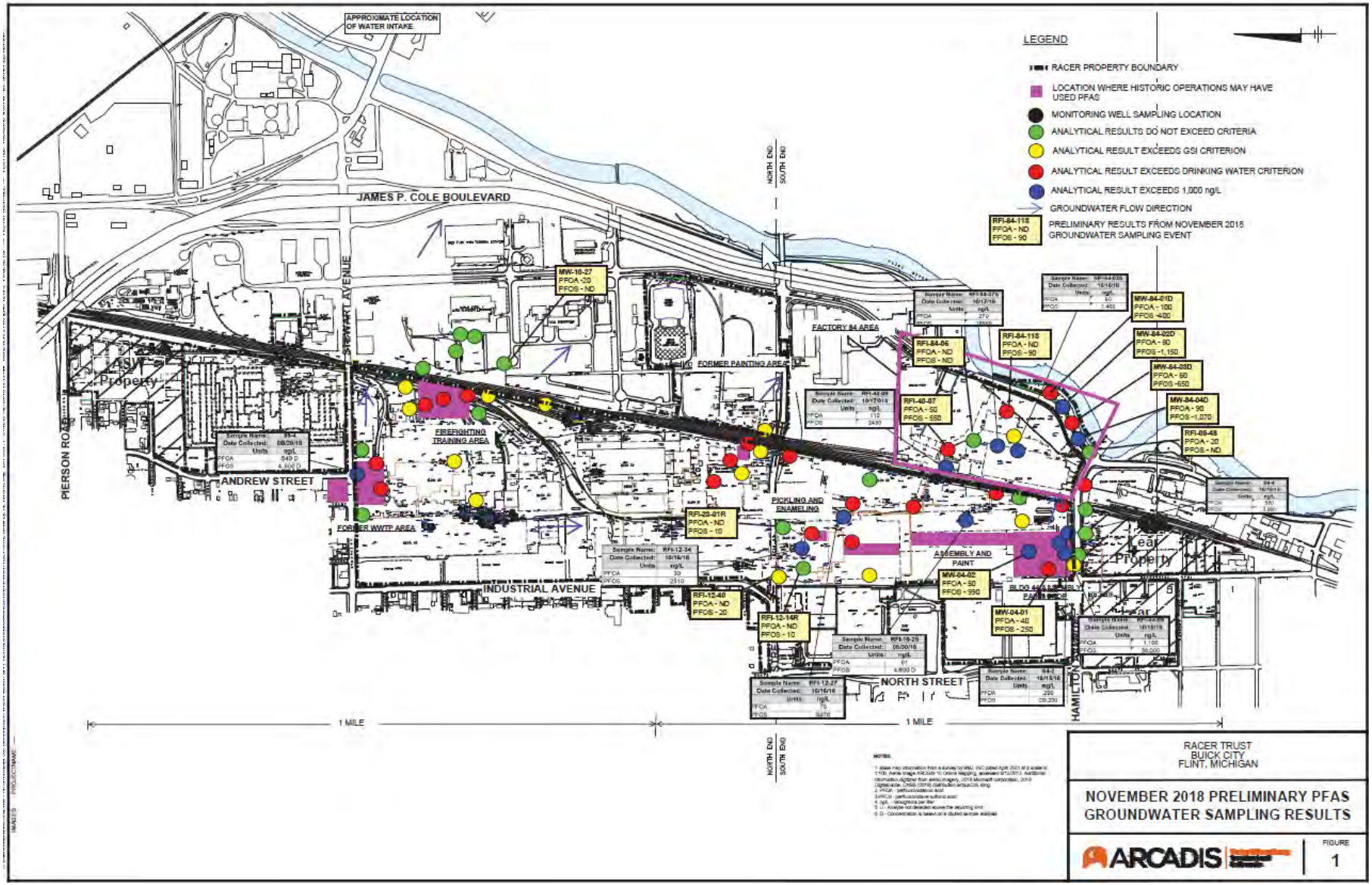
Background

- Overall mission
  - Protect public health and the environment
  - Put property safely back into productive use
- Team Approach
  - U.S. EPA lead with DEQ as support agency
    - Michigan Department of Health and Human Services
    - Genesee County Health Department
      - Coordinates periodic update meetings/calls with all local parties including Flint
  - Coordination of EPA/DEQ with RACER

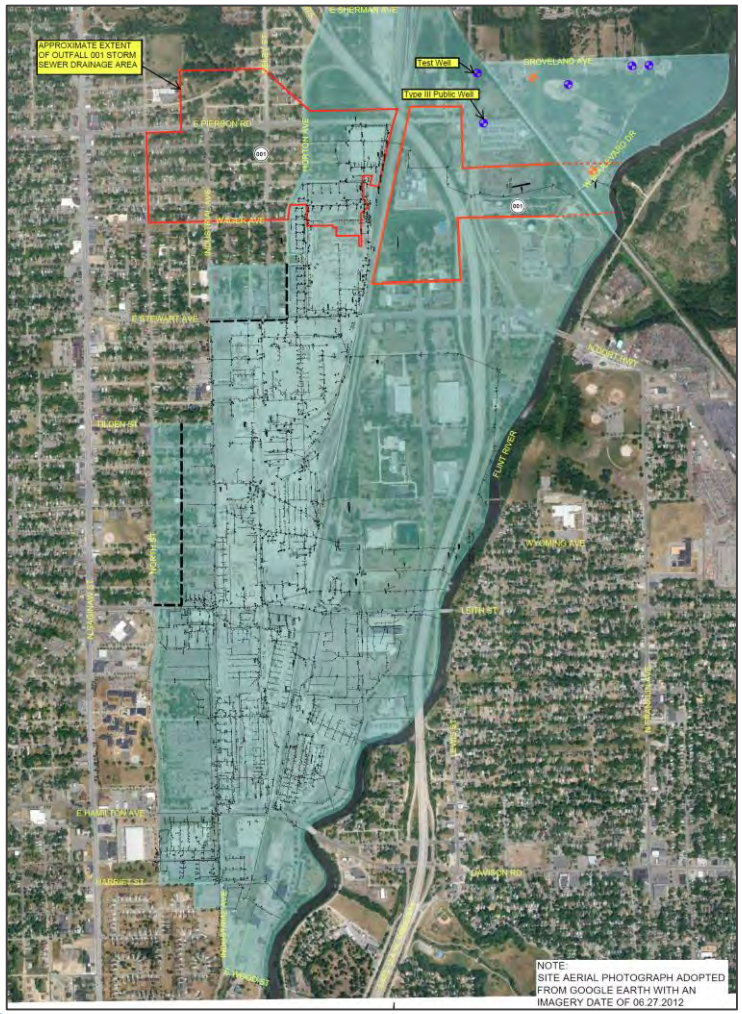

RACER
Buick
City
Flint
Gilkey Creek
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community


ASW PROPERTY
(FORMERLY OWNED BY RACER)
PIERSON RD
MARTIN TRANSPORTATION
SYSTEMS
(FORMERLY OWNED BY
RACER)
STEWART AVE
SITE BOUNDARY
INDUSTRIAL AVE
NORTHEND
LEITH ST
NORTH ST
FLINT
SOUTHEND
HAMILTON AVE
LEAR CORPORATION PROPERTY
(FORMERLY OWNED BY RACER)
Saint Nicholas Cem
Saint Michael's Byzantine Catholic Cem
Avondale Cem
Riverside Cem
AREA LOCATION
MICHIGAN
0
2000'
4000'
APPROXIMATE SCALE IN FEET
RACER TRUST
BUICK CITY
FLINT, MICHIGAN
SITE LOCATION MAP
ARCADIS
FIGURE
1

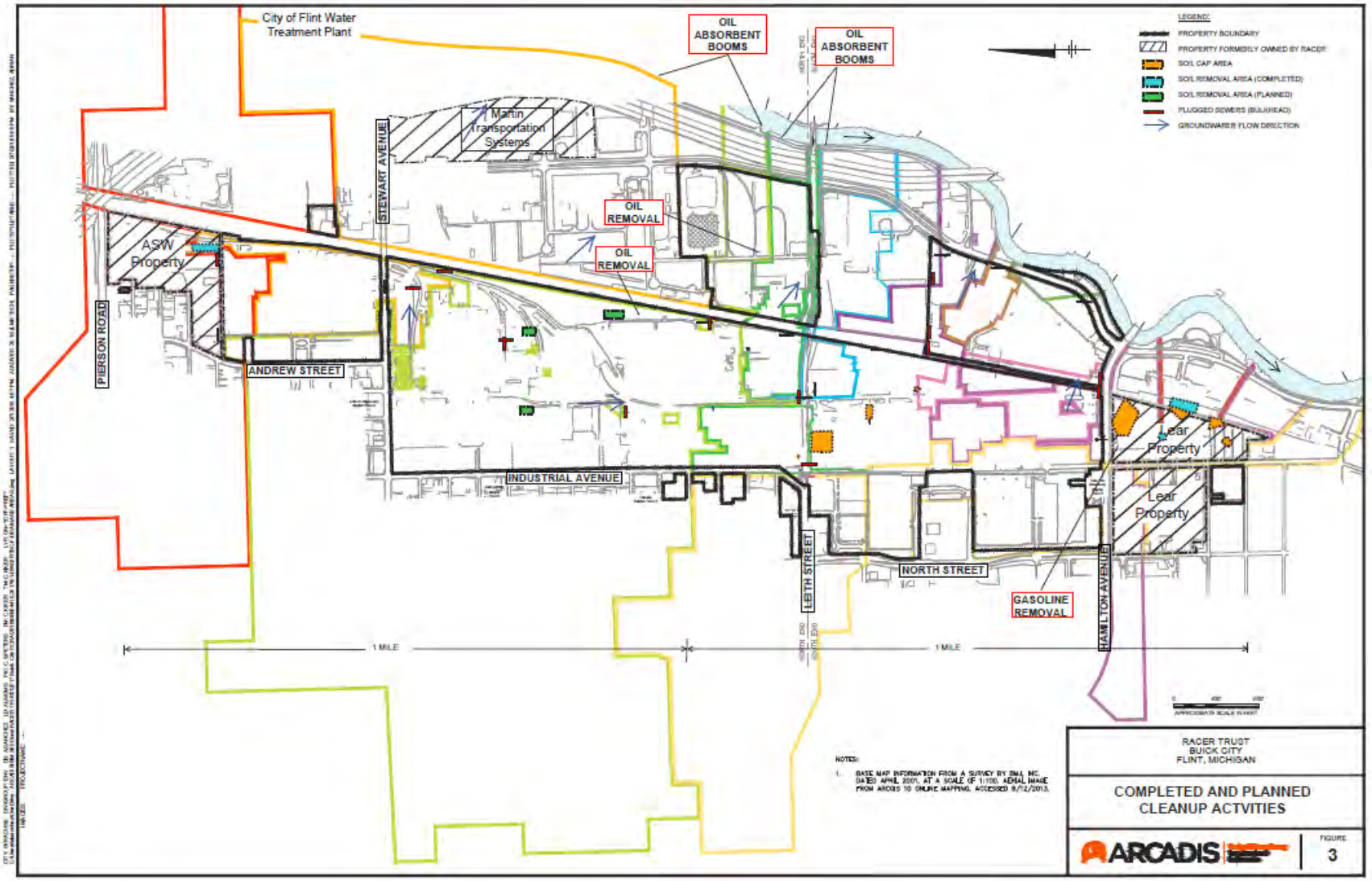

APPROXIMATE LOCATION OF DRINKING WATER INTAKE
JAMES P. COLE BOULEVARD
SAGINAW AVENUE
PIERSON ROAD
ANDREW STREET
INDUSTRIAL AVENUE
NORTH STREET
LEAR STREET
HAMILTON AVENUE
NORTH END
SOUTH END
Property
Lear Property
Lear Property
1 MILE
1 MILE
LEGEND:
SOIL BORING
ABANDONED MONITORING WELL
MONITORING WELL (ACTIVE)
PIEZOMETER
RECOVERY WELL
SOIL GAS POINT
SUB-SLAB MONITORING POINT
TRANSECT POINT
SURFACE WATER
RIVER GAUGE
UNABLE TO LOCATE
RACER PROPERTY
PROPERTY PREVIOUSLY OWNED BY RACER
SAMPLE LOCATIONS
SOIL BORINGS: 1530+
MONITORING WELLS: 960+
SOIL GAS POINTS: 47
NUMBER OF SAMPLES COLLECTED*
TOTAL AFTER 2000
TOTAL AFTER 2011**
SOIL 2640+ 1280+
GROUNDWATER 2300+ 560+
LNAPL (OIL) 120+ 65+
&STORM SEWER 980+ 725+
SOIL GAS 90 90
NOTES:
All totals are approximate
* Samples collected before 2000 are not included
** Total samples collected after 4/1/2011
RACER TRUST
BUICK CITY
FLINT, MICHIGAN
SOIL BORING AND MONITORING WELL LOCATIONS
ARCADIS
FIGURE
2

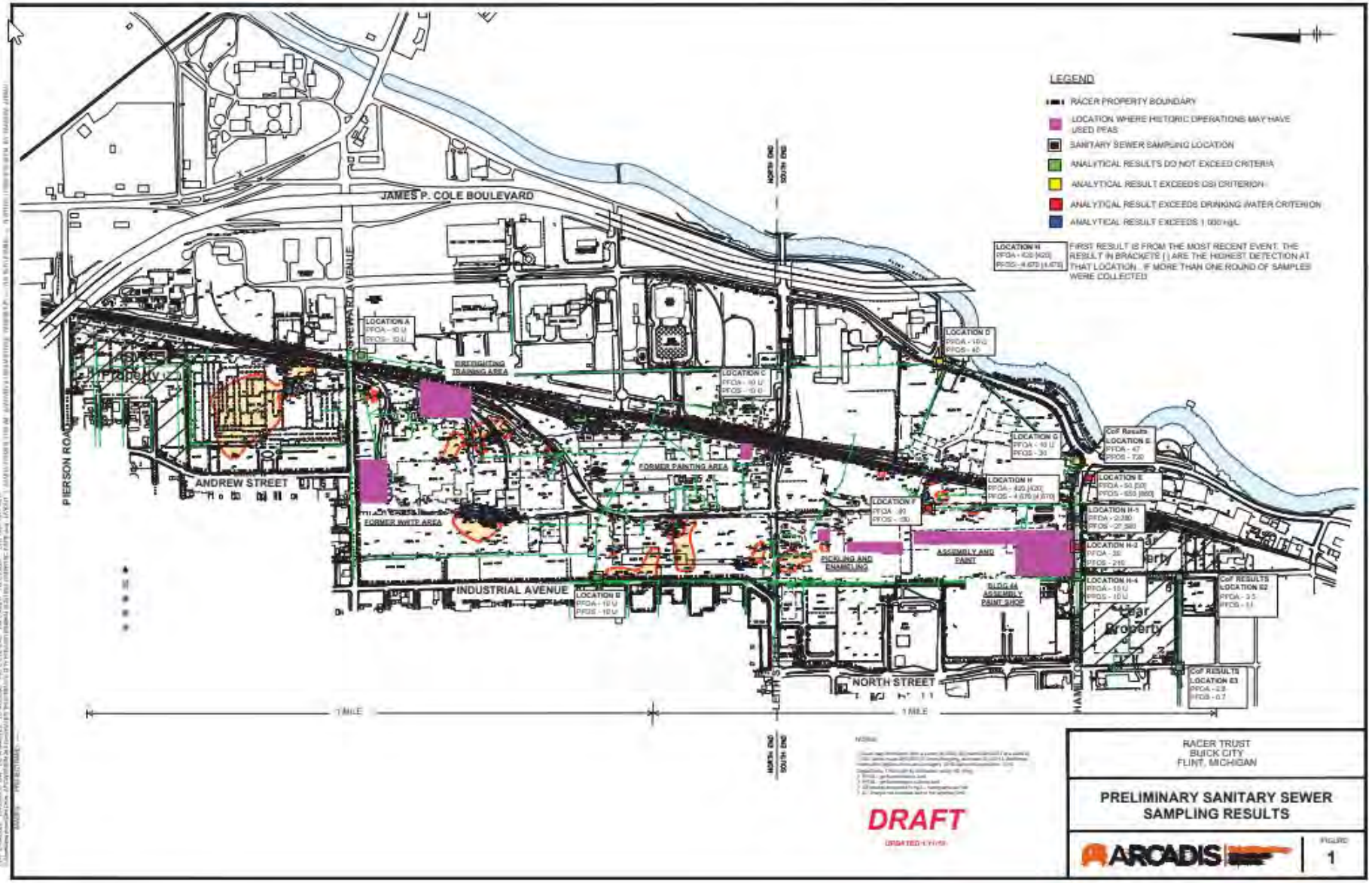

APPROXIMATE LOCATION OF WATER INTAKE
JAMES P. COLE BOULEVARD
STEWART AVENUE
PIERSON ROAD
ANDREW STREET
INDUSTRIAL AVENUE
NORTH STREET
HAMILTON
FACTORY 84 AREA
FORMER PAINTING AREA
FIREFIGHTING TRAINING AREA
FORMER WWTP AREA
PICKLING AND ENAMELING
ASSEMBLY AND PAINT
BLDG 44 ASSEMBLY PAINT SHOP
GSW Property
Lear Property
NORTH END
SOUTH END
1 MILE
1 MILE
LEGEND
RACER PROPERTY BOUNDARY
LOCATION WHERE HISTORIC OPERATIONS MAY HAVE USED PFAS
MONITORING WELL SAMPLING LOCATION
ANALYTICAL RESULTS DO NOT EXCEED CRITERIA
ANALYTICAL RESULT EXCEEDS GSI CRITERION
ANALYTICAL RESULT EXCEEDS DRINKING WATER CRITERION
ANALYTICAL RESULT EXCEEDS 1,000 ng/L
GROUNDWATER FLOW DIRECTION
RFI-84-11S PFOA - ND PFOS - 90
PRELIMINARY RESULTS FROM NOVEMBER 2018 GROUNDWATER SAMPLING EVENT
MW-16-27 PFOA -20 PFOS - ND
RFI-84-06 PFOA - ND PFOS - ND
RFI-84-11S PFOA - ND PFOS - 90
MW-84-01D PFOA - 100 PFOS -400
MW-84-02D PFOA - 80 PFOS -1,150
MW-84-03D PFOA - 50 PFOS -650
MW-84-04D PFOA - 90 PFOS -1,070
RFI-84-48 PFOA - 20 PFOS - ND
RFI-40-07 PFOA - 50 PFOS - 550
RFI-23-01R PFOA - ND PFOS - 10
RFI-12-40 PFOA - ND PFOS - 20
RFI-12-14R PFOA - ND PFOS - 10
MW-84-05 PFOA - 50 PFOS - 990
MW-04-01 PFOA - 40 PFOS - 250
RACER TRUST
BUICK CITY
FLINT, MICHIGAN
NOVEMBER 2018 PRELIMINARY PFAS GROUNDWATER SAMPLING RESULTS
ARCADIS
FIGURE 1

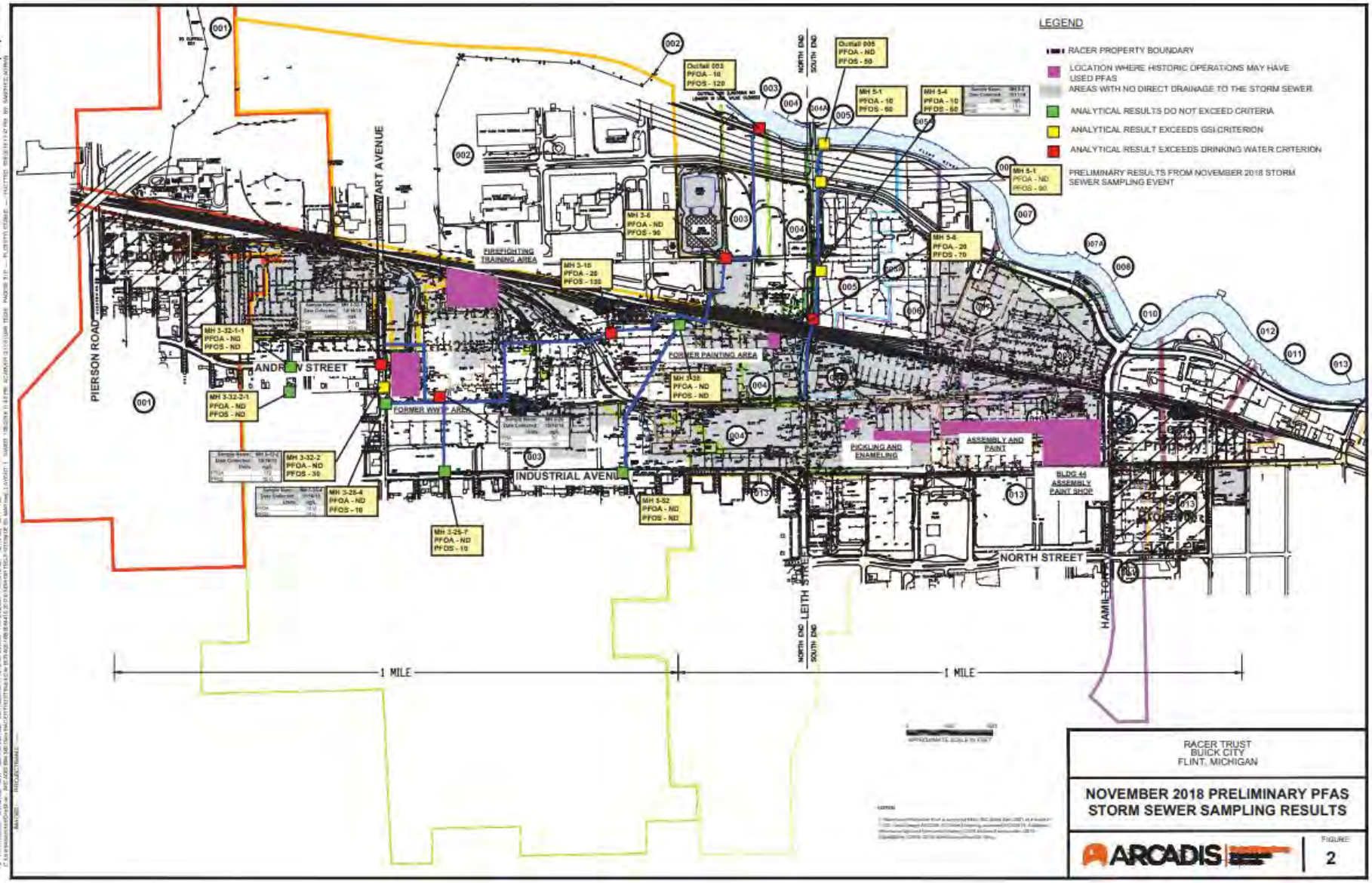
Drinking Water Pathway



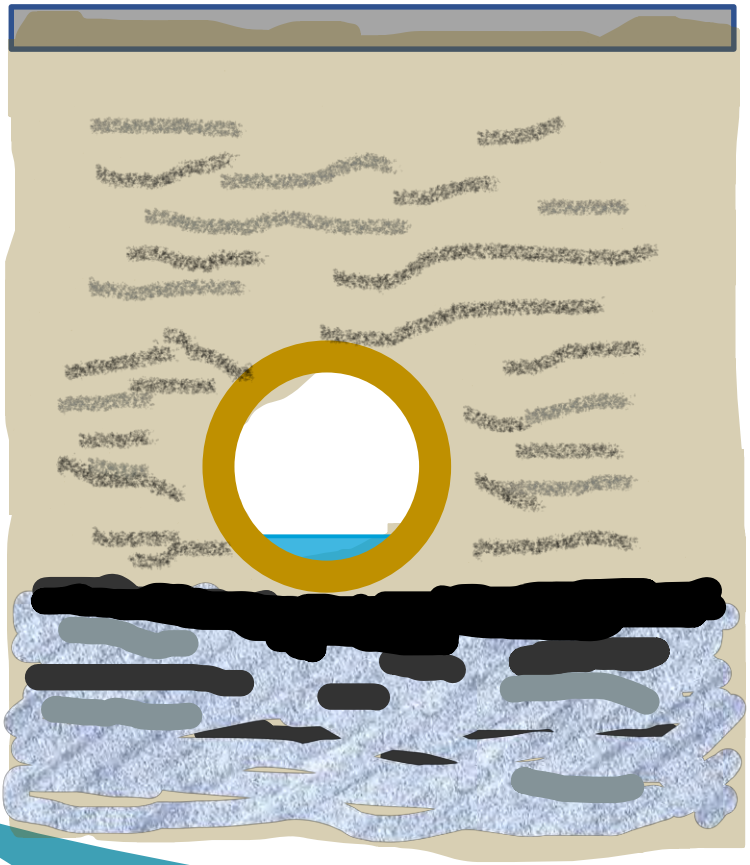
- The shaded area is a conservative estimate of the area that could potentially be affected by contaminated groundwater found on the Buick City property.
- RACER under DEQ and EPA oversight and assistance from Genesee County Health Department evaluated water well records and City of Flint active water connections.
- Field verification of the absence of wells at homes connected to the City of Flint Water.
- Based on the data sources reviewed and field verifications groundwater is not being used for drinking water in areas likely to be impacted by RACER.
- If you know of a well being used for drinking water in or around this area, please contact Mr. Kevin Lund, DEQ Project manager (517) 513-1846.


City of Flint Water Treatment Plant
OIL ABSORBENT BOOMS
OIL ABSORBENT BOOMS
Martin Transportation Systems
STEWART AVENUE
OIL REMOVAL
OIL REMOVAL
ASW Property
PIERSON ROAD
ANDREW STREET
INDUSTRIAL AVENUE
Lear Property
Lear Property
LEITH STREET
NORTH STREET
GASOLINE REMOVAL
HAMILTON AVENUE
1 MILE
1 MILE
LEGEND:
PROPERTY BOUNDARY
PROPERTY FORMERLY OWNED BY RACER
SOIL CAP AREA
SOIL REMOVAL AREA (COMPLETED)
SOIL REMOVAL AREA (PLANNED)
PLUGGED SEWERS (BULKHEAD)
GROUNDWATER FLOW DIRECTION
NOTES:
1. BASE MAP INFORMATION FROM A SURVEY BY EMI, INC. DATED APRIL 2001, AT A SCALE OF 1"=100'. AERIAL IMAGE FROM ARCGIS 10 ONLINE MAPPING, ACCESSED 8/12/2013.
RACER TRUST
BUICK CITY
FLINT, MICHIGAN
COMPLETED AND PLANNED CLEANUP ACTVITIES
ARCADIS
FIGURE
3

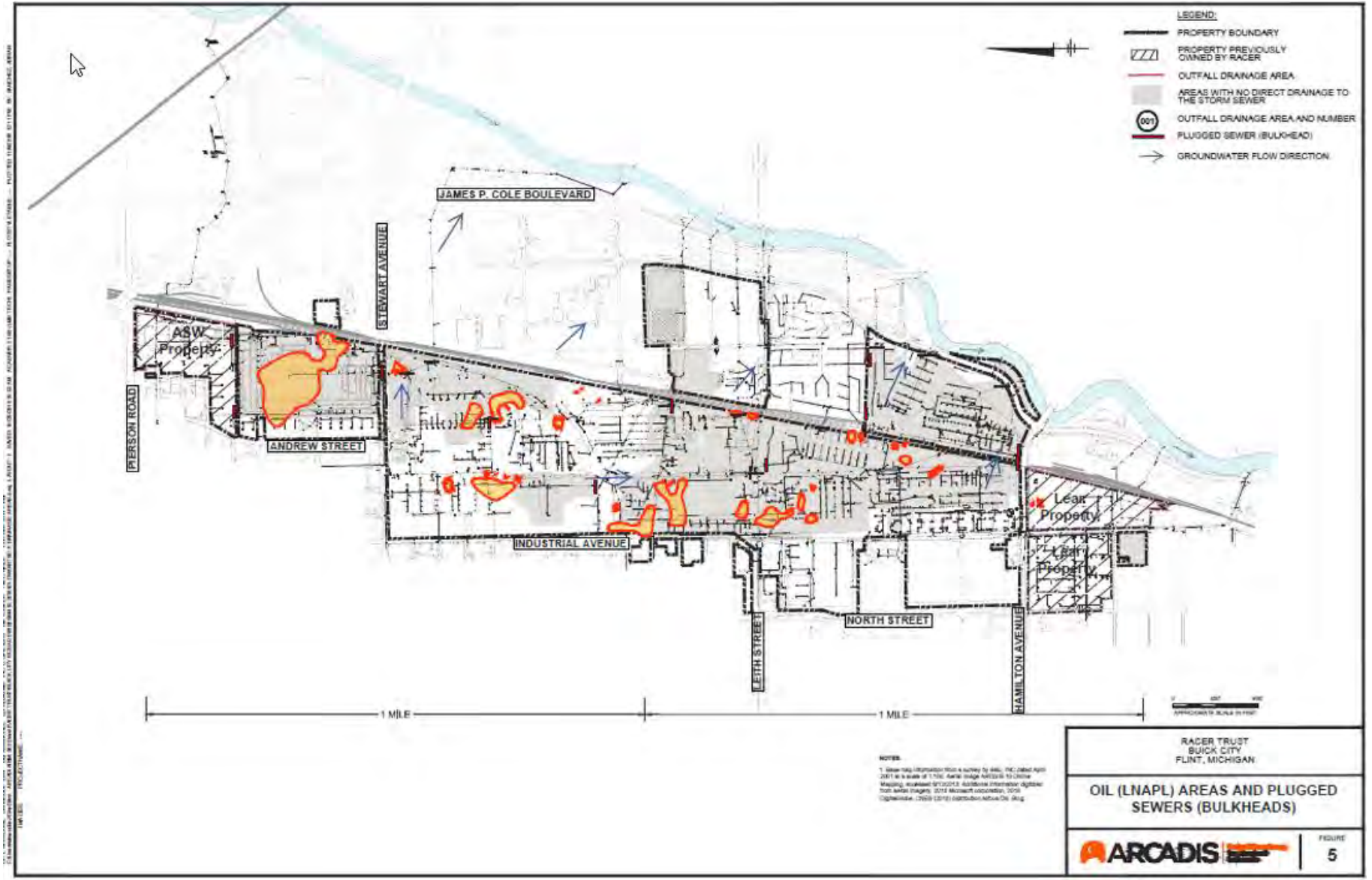

LEGEND
RACER PROPERTY BOUNDARY
LOCATION WHERE HISTORIC OPERATIONS MAY HAVE USED PFAS
SANITARY SEWER SAMPLING LOCATION
ANALYTICAL RESULTS DO NOT EXCEED CRITERIA
ANALYTICAL RESULT EXCEEDS DSI CRITERION
ANALYTICAL RESULT EXCEEDS DRINKING WATER CRITERION
ANALYTICAL RESULT EXCEEDS 1,000 ng/L
FIRST RESULT IS FROM THE MOST RECENT EVENT. THE RESULT IN BRACKETS ( ) ARE THE HIGHEST DETECTION AT THAT LOCATION. IF MORE THAN ONE ROUND OF SAMPLES WERE COLLECTED
JAMES P. COLE BOULEVARD
PIERSON ROAD
ANDREW STREET
INDUSTRIAL AVENUE
NORTH STREET
FIRE FIGHTING TRAINING AREA
FORMER PAINTING AREA
FORMER WHITE AREA
PICKLING AND ENAMELING
ASSEMBLY AND PAINT
BLDG 46 ASSEMBLY PAINT SHOP
Racer Property
1 MILE
1 MILE
DRAFT
RACER TRUST
BUICK CITY
FLINT, MICHIGAN
PRELIMINARY SANITARY SEWER SAMPLING RESULTS
ARCADIS
FIGURE
1


LEGEND
RACER PROPERTY BOUNDARY
LOCATION WHERE HISTORIC OPERATIONS MAY HAVE USED PFAS
AREAS WITH NO DIRECT DRAINAGE TO THE STORM SEWER
ANALYTICAL RESULTS DO NOT EXCEED CRITERIA
ANALYTICAL RESULT EXCEEDS GSI CRITERION
ANALYTICAL RESULT EXCEEDS DRINKING WATER CRITERION
PRELIMINARY RESULTS FROM NOVEMBER 2018 STORM SEWER SAMPLING EVENT
PIERSON ROAD
ANDREW STREET
STEWART AVENUE
INDUSTRIAL AVENUE
NORTH STREET
LEITH STREET
HAMILTON
NORTH END
SOUTH END
FIREFIGHTING TRAINING AREA
FORMER WWTP AREA
FORMER PAINTING AREA
PICKLING AND ENAMELING
ASSEMBLY AND PAINT
BLDG 44 ASSEMBLY PAINT SHOP
Outfall 002 PFOA - 10 PFOS - 120
Outfall 005 PFOA - ND PFOS - 50
MH 3-32-1-1 PFOA - ND PFOS - ND
MH 3-32-1-2 PFOA - ND PFOS - ND
MH 3-32-2 PFOA - ND PFOS - 30
MH 3-25-4 PFOA - ND PFOS - 10
MH 3-25-7 PFOA - ND PFOS - 10
MH 3-52 PFOA - ND PFOS - ND
MH 3-35 PFOA - ND PFOS - ND
MH 3-6 PFOA - ND PFOS - 90
MH 3-10 PFOA - 20 PFOS - 130
MH 5-1 PFOA - 10 PFOS - 60
MH 5-4 PFOA - 10 PFOS - 60
MH 5-1 PFOA - ND PFOS - 90
MH 5-6 PFOA - 20 PFOS - 70
1 MILE
1 MILE
RACER TRUST
BUICK CITY
FLINT, MICHIGAN
NOVEMBER 2018 PRELIMINARY PFAS STORM SEWER SAMPLING RESULTS
ARCADIS
FIGURE
2

Storm Sewer installed **above** the groundwater prevents contamination from seeping into the storm or sanitary sewer.

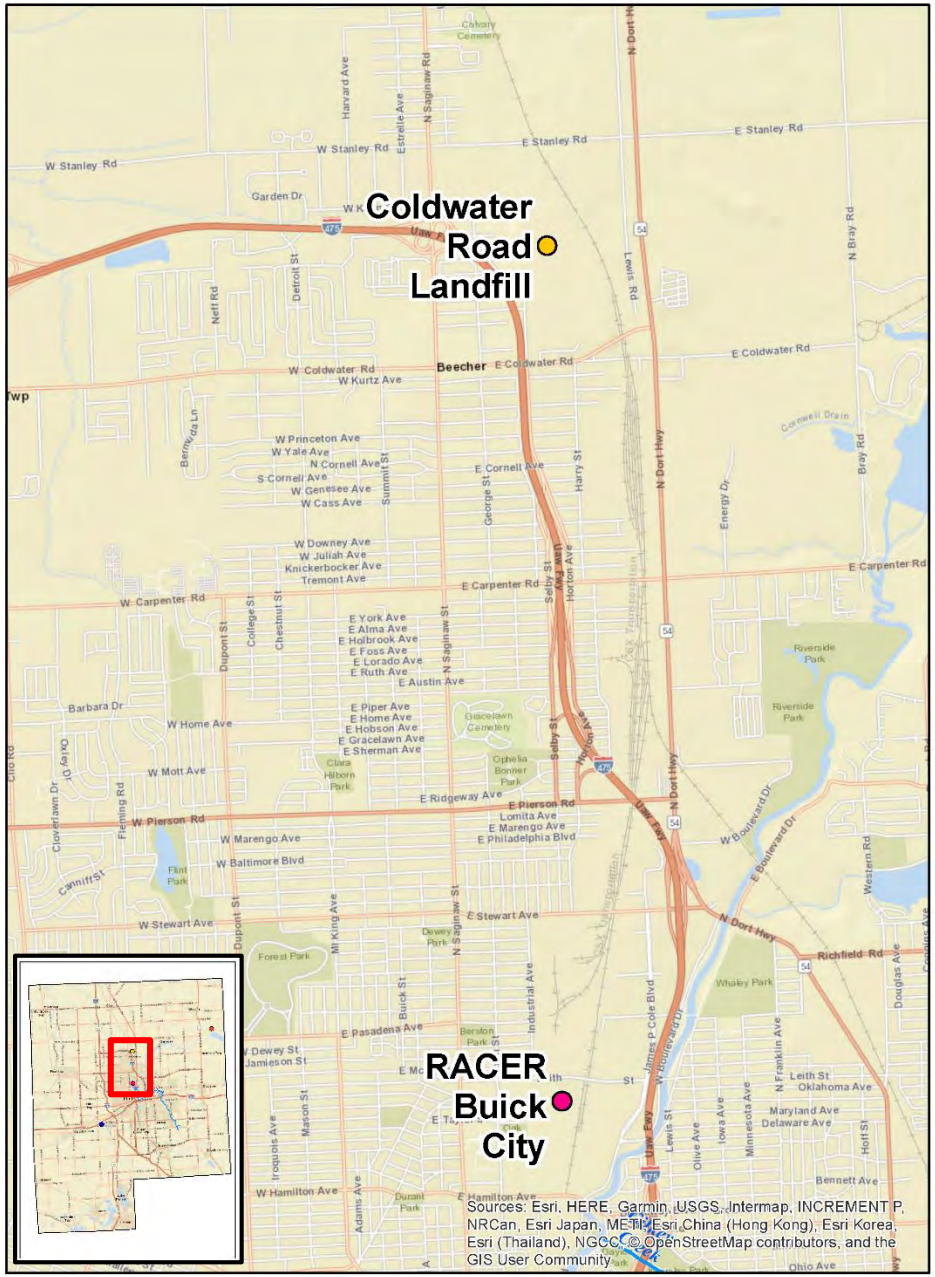


Storm Sewer installed **below** the groundwater can allow contamination to seep into the storm or sanitary sewer.

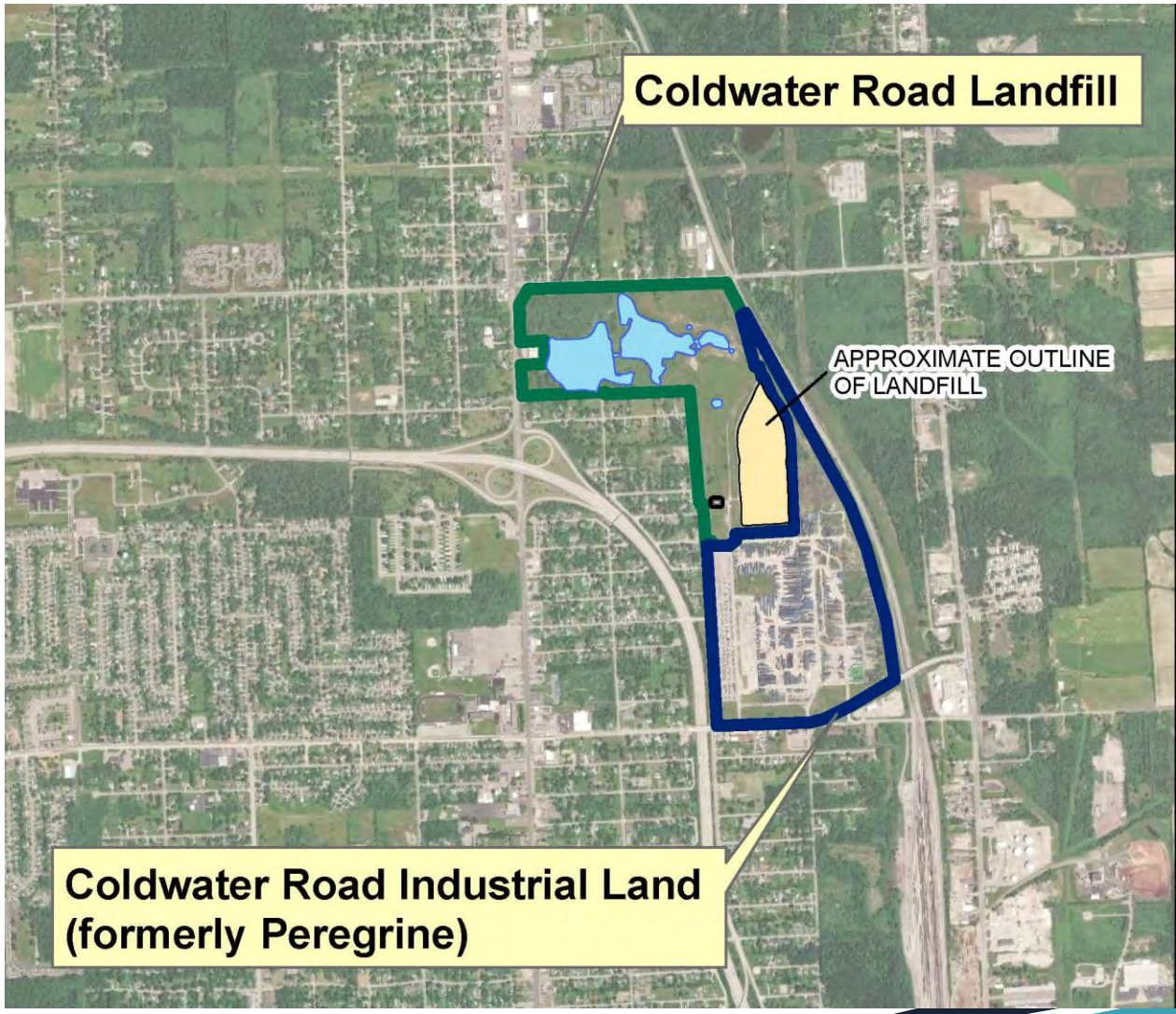

LEGEND:
PROPERTY BOUNDARY
PROPERTY PREVIOUSLY OWNED BY RACER
OUTFALL DRAINAGE AREA
AREAS WITH NO DIRECT DRAINAGE TO THE STORM SEWER
001 OUTFALL DRAINAGE AREA AND NUMBER
PLUGGED SEWER (BULKHEAD)
GROUNDWATER FLOW DIRECTION
JAMES P. COLE BOULEVARD
STEWART AVENUE
PIERSON ROAD
ANDREW STREET
INDUSTRIAL AVENUE
NORTH STREET
LEITH STREET
HAMILTON AVENUE
ASW Property
Lear Property
Lear Property
1 MILE
1 MILE
RACER TRUST
BUICK CITY
FLINT, MICHIGAN
OIL (LNAPL) AREAS AND PLUGGED SEWERS (BULKHEADS)
ARCADIS
FIGURE
5

Next Steps

- Complete additional groundwater investigation.
- Complete storm water sewer investigations.
  - Monitoring at outfalls to river
- Conduct additional soil investigation.
- EPA to hold public hearing on Cleanup Options (called Statement of Basis)
  - Late spring or summer 2019
- Further evaluate potential exposure pathways to determine what additional work is necessary
- Interim Responses as necessary


Coldwater Road Landfill
RACER Buick City
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

RACER COLDWATER ROAD SITE



Background

- The Site is approximately 230 acres in size, with Coldwater Road along the southern boundary and Stanley Road along the northern boundary.
- The Plant was constructed in 1951 by the former GM Corporation (GMC) and was operated by several different divisions of GMC from 1953 to 1997, and by Peregrine from 1997 to 1998.
- Various auto parts were manufactured in the plant over the years. During the last few years of operation door hinges, door modules, window regulators and seat adjustors were produced. Prior to 1995 operations included electroplating and likely plating mist suppressants containing PFAS.
- **Prior to 1995 plating wastes were treated in onsite wastewater treatment plant (WWTP) that had several associated features including settling ponds, dewatering lagoons and a sludge land application area.**
- Decommissioning and demolition of the Plant began in 1999 and was completed in 2001.

Background

- RACER became operational on March 31, 2011 as a result of GM Bankruptcy settlement.
- RACER with oversight from DEQ is responsible for managing the Site, completing remediation related to former GM contamination, and marketing the Site for re-use.
- DEQ is the lead agency for Coldwater Road Landfill – Rich Conforti of the Hazardous Waste Section is the Project Manager
- We will capture any questions you have that we can’t answer tonight and follow up.

Remediation

- Several remedial investigations and actions were began in 1990 and was substantially complete in 2001.
- **Approximately 800,000 tons of contaminated soil and sludges were removed and either disposed offsite or in newly constructed state of the art on-site landfill, which was completed in 1994.**
- RACER continues to implement the Post-Closure Care Plan for the landfill and the landfill is functioning as designed.
- Since 2011 RACER has completed several investigations that brought remediation closer to one hundred percent complete, until PFAS was analyzed and detected in late 2016.
- **Since late 2016 several rounds of groundwater, surface and storm water investigations, including: approximately 45 borings, 20 new monitoring wells, and the following samples: 108 groundwater, 15 residential well water, 8 surface water, 8 storm water, 3 sediment, 15 landfill fluids.**

Remediation

- Landfill leachate contains PFAS and is now treated to remove PFAS before being discharged to the sanitary sewer system.
  - Approximately 20,000 gallons per year of fluids are generated from the landfill and discharged.
- A total of 11 residential wells were sampled and there were two wells with PFAS detections; one above the PFOS Drinking Water Cleanup Criteria (water in the area is primarily obtained from bedrock over 200 feet below ground surface).
- RACER is in process of replacing the impacted well.

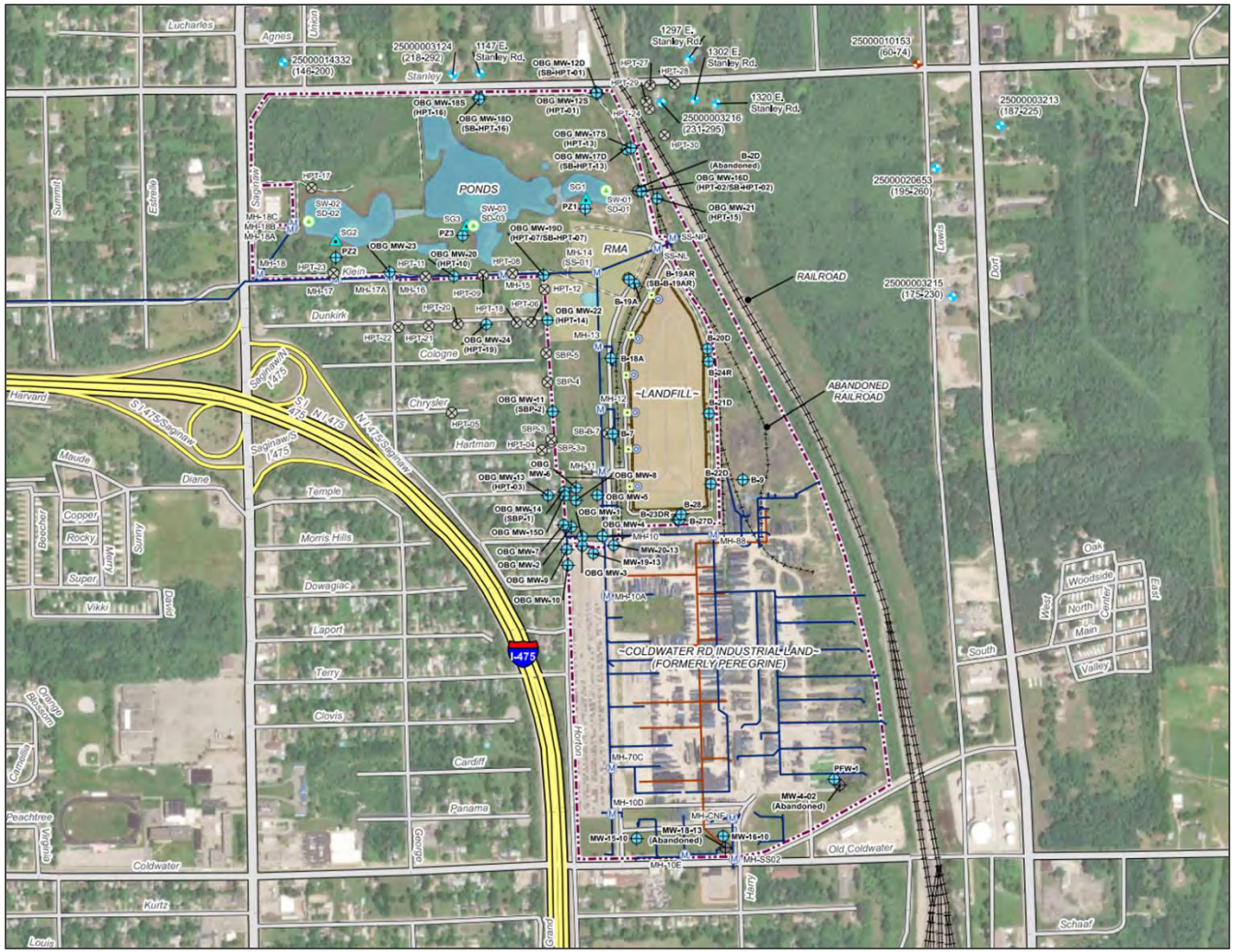
Remediation

- PFAS groundwater impacts appear to be related to the former wastewater treatment ponds, lagoons and land application area.
- The extent of PFAS migration in groundwater is being investigated.
- Concentrations of PFOS have been detected in groundwater up to approximately 3,000 ppt.

Remediation

- Storm water draining off-site to the west through a 72” diameter line was found to contain PFOS above its Surface Water Quality Standard. The discharge has been almost entirely stopped.
- On-site ponds were also found contain PFOS above its Surface Water Quality Standard. Initial efforts to prevent off-site discharge from the ponds through a storm water line have been completed and additional steps are being evaluated.

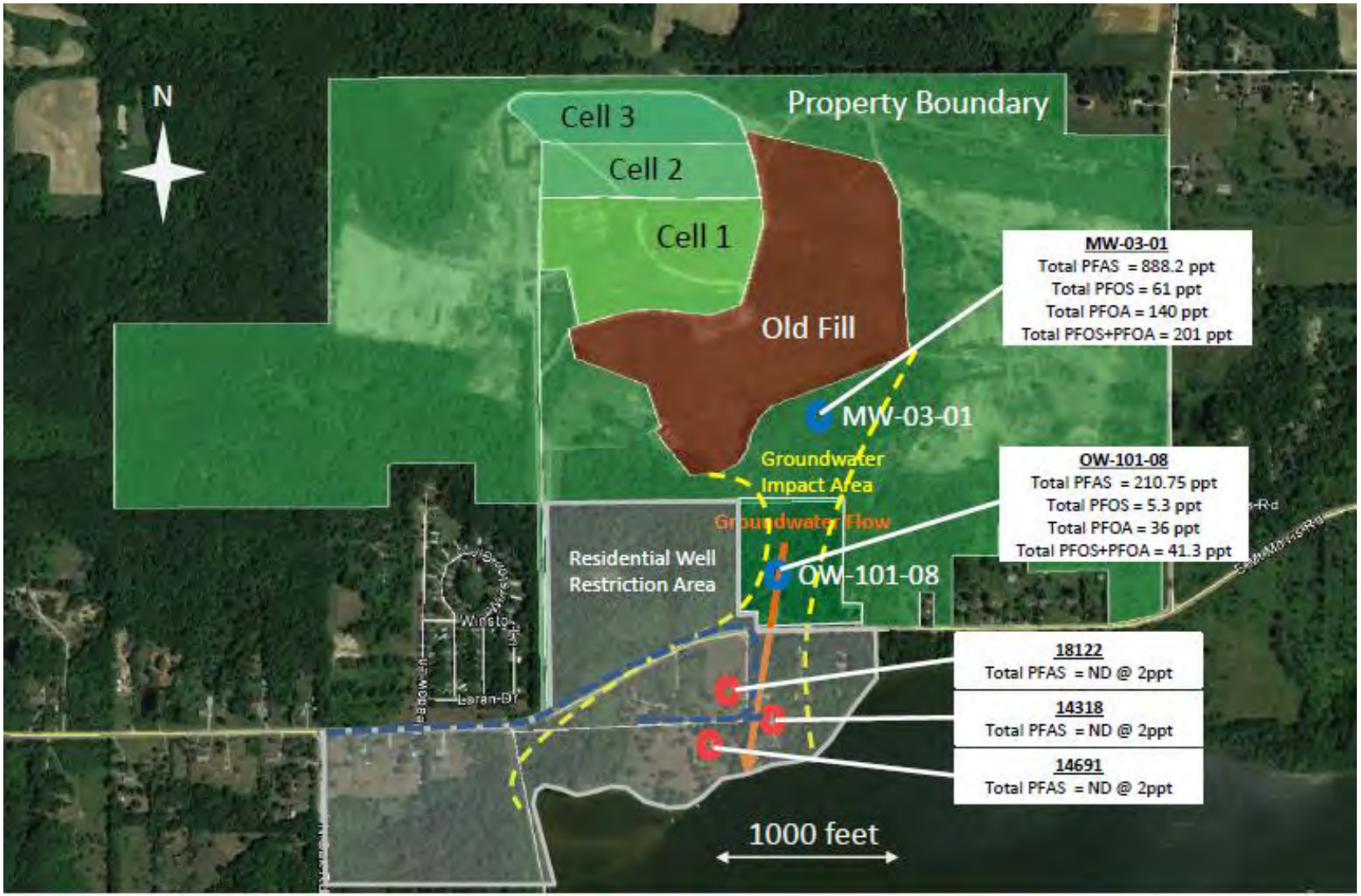
Site Layout & Sampling Locations



Next Steps

- Replace impacted residential water well.
- Complete additional groundwater investigation.
- Complete additional investigation of on-site ponds and evaluate ways to prevent or manage off-site discharges.
- Monitor groundwater and storm water.
- Further evaluate potential exposure pathways to determine what additional work is necessary.


Forest Twp
Hammil Rd
Ortonville
W Main St
E Main St
Wilson Rd
Oak Rd
Irish Rd
S State Rd
Cemetery Rd
Dodge Rd
N State Rd
Olds Rd
Castle Ct
Gale Rd
Frances Rd
Richfield
Landfill
E Mt Morris Rd
N Oak Rd
Carr Rd
E Stanley Rd
N Gale Rd
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community



DW Well Sampling Locations

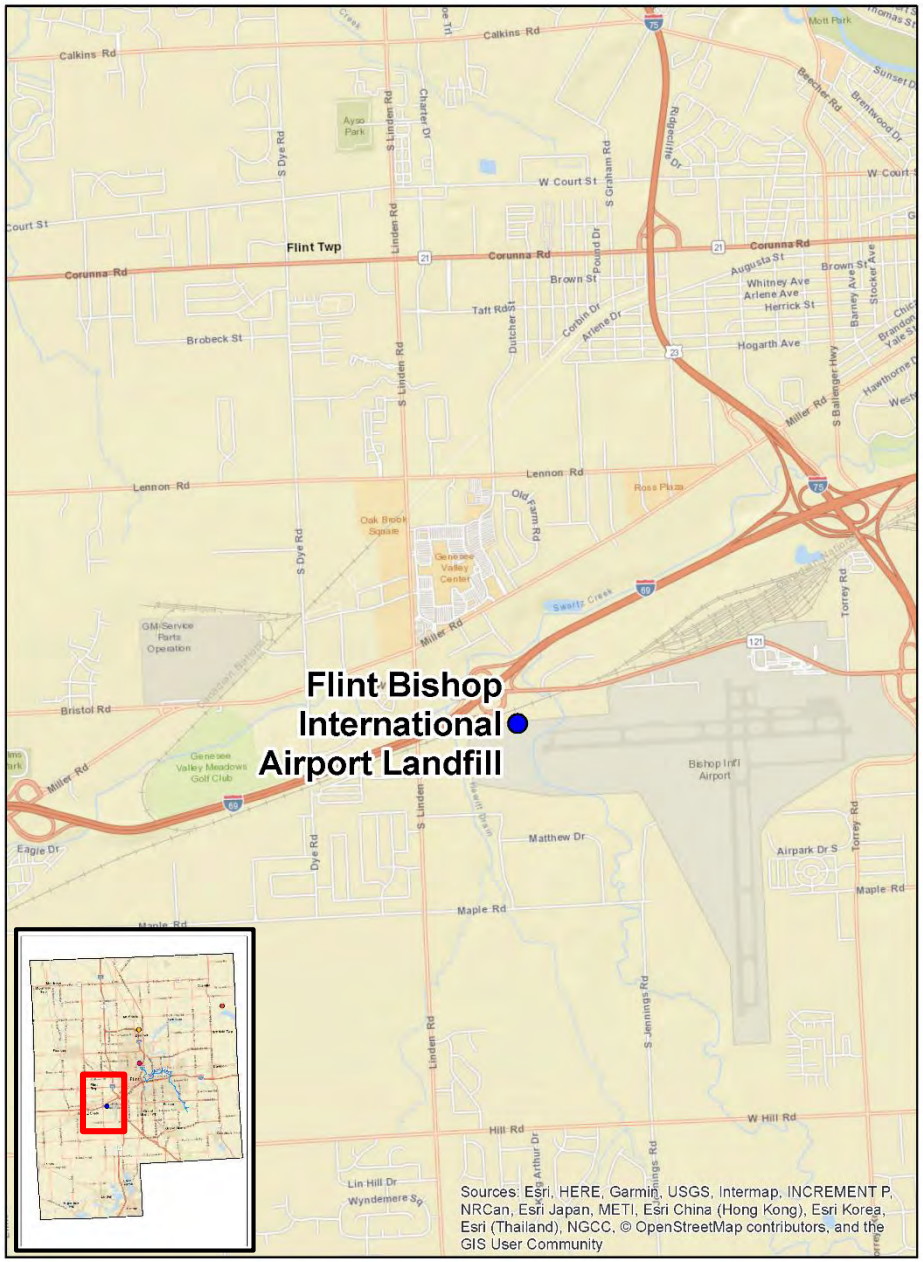
Municipal Water Line

GW Well Sample Locations

ND – Non Detect

City of Flint Landfill, at Bishop Airport

Paul Bucholtz, DEQ


Flint Bishop
International
Airport Landfill
Calkins Rd
Flint Twp
Corunna Rd
W Court St
Brobeck St
Lennon Rd
Miller Rd
Bristol Rd
Eagle Dr
Matthew Dr
Maple Rd
Hill Rd
W Hill Rd
Hogarth Ave
Brown St
Taft Rd
Linden Rd
S Dye Rd
S Graham Rd
S Jennings Rd
Torrey Rd
Airpark Dr S
Bishop Intl Airport
Genesee Valley Center
Oak Brook Square
GM Service Parts Operation
Genesee Valley Meadows Golf Club
Ross Plaza
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

City of Flint Landfill Location

City of Flint Landfill at Bishop Intl. Airport

G-3425 West Bristol Rd., Flint MI

NORTH

Map inset

Approximate investigation area

Sampled monitoring well

Monitoring well

P+P = combined PFOS & PFOA

DRAFT

W. Bristol Rd.

Linden Rd.

INTERSTATE 69

MW-6-07
P+P 57 ppt

MW-4-07
P+P 810 ppt

MW-7-07
P+P 112 ppt

MW-8-07
P+P 38 ppt

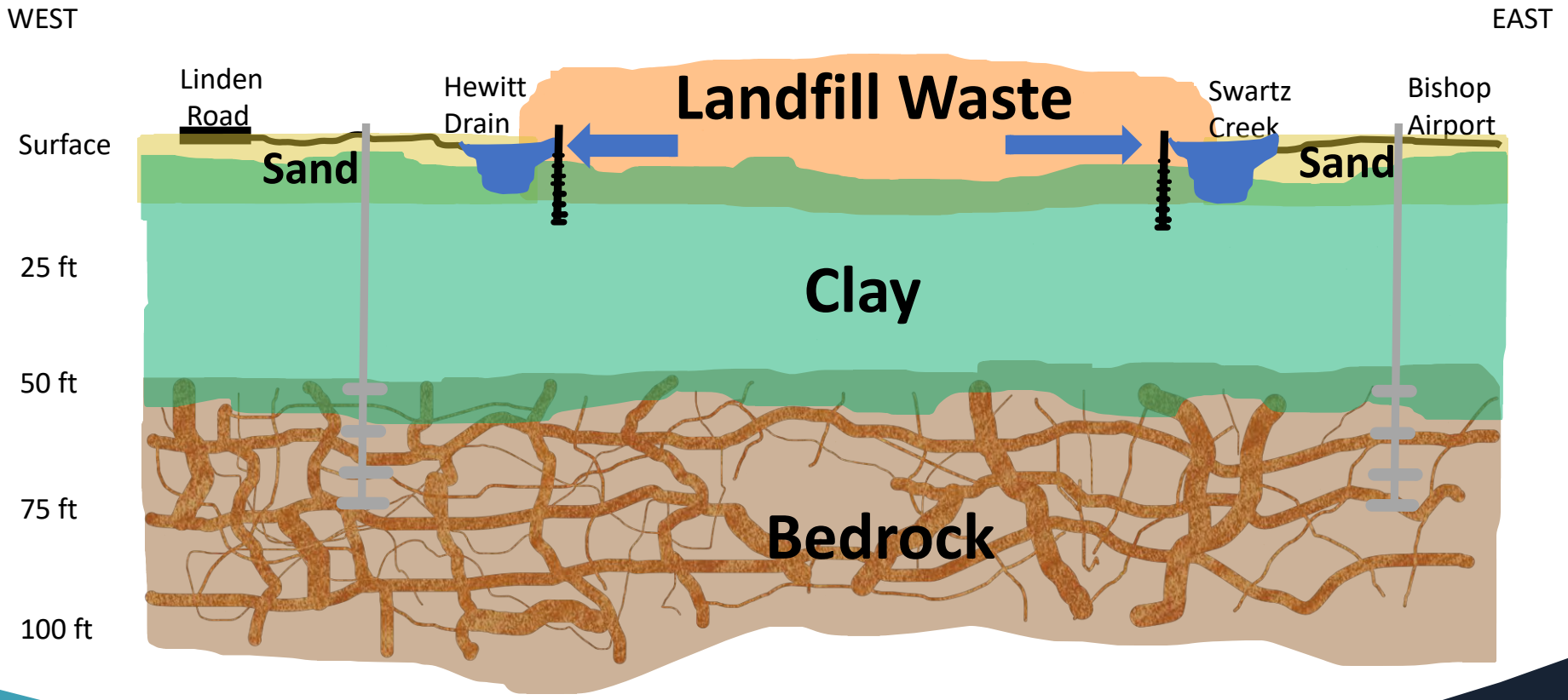
MW-1-07
P+P 146 ppt

MW-10-07
P+P 0 ppt

Google

DEQ Location Map received by MGS 1-24-19

Conceptual Site Model



Key Points

- City of Flint Investigated the site for 2013 report
- The groundwater monitor wells look at shallow water atop the clay (from 2-25 feet)
- DEQ sampled groundwater wells in summer 2018
- Results: 3 of 6 wells exceeded 70 ppt PFOS+PFOA
- DEQ cleanup criteria is:
  - 70 ppt PFOS + PFOA for drinking water protection
  - 12 ppt PFOS + PFOA for surface water protection
- The highest concentration was 810 ppt PFOS + PFOA

Related Data

- Drinking water wells in the area are 60-210 feet down.
- There is a clay layer 50-70 feet deep between the shallow wells and the deep wells
- Swartz Creek was sampled above and below the landfill.
- All Swartz Creek samples were below the water quality standard

Next steps

- Continued coordination with local partners
- DEQ will install deep monitoring wells at the base of the clay layer
- Sampling will help determine:
  - Whether there is PFAS in deeper aquifer
  - G.W. flow direction
- Timing: Targeting spring for field activities
- Bishop International Airport Authority will be investigating areas of fire fighting foam use

Per and Polyfluorinated Alkyl Substances (PFAS)

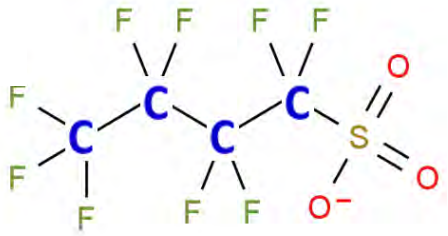
Deb MacKenzie-Taylor
Michigan Department of Health and Human Services
March 08, 2019

PFAS

- Synthetic class of compounds
- About 4600 chemicals
- Well studied – PFOA and PFOS (1940's – 2002)
  - Incredibly Stable
  - Highly soluble and mobile
  - Grease, soil and water-repellant properties
  - Bioaccumulate in Biota

Short-chain

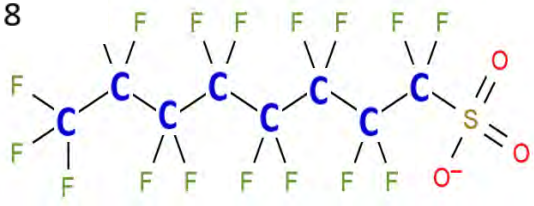
PF**B**S n = 4
PF**Pe**S n = 5



PFBS

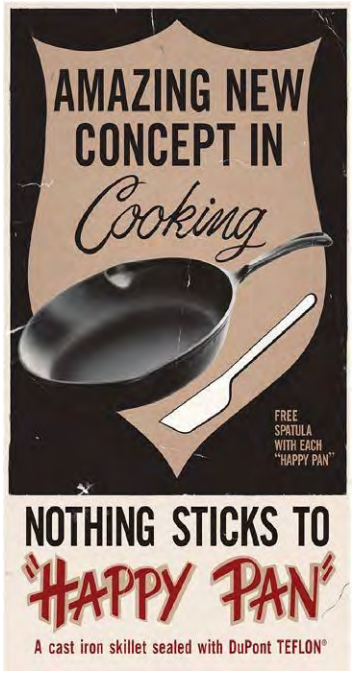
Long-chain

PF**Hx**S n = 6
PF**Hp**S n = 7
PF**O**S n = 8



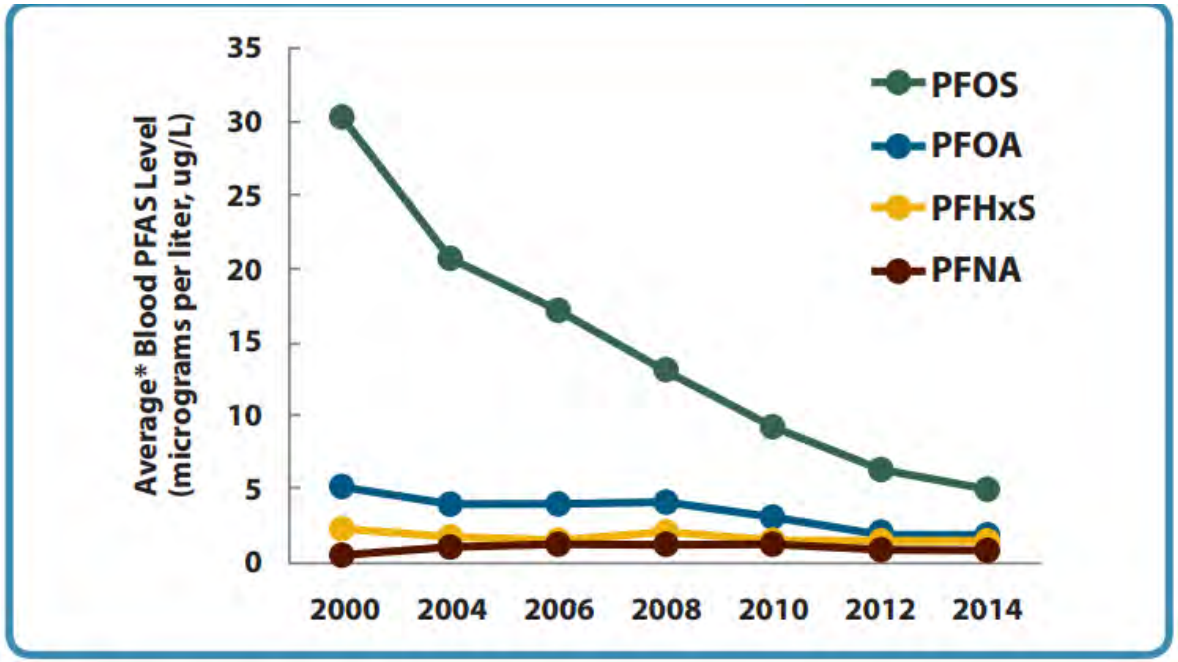
PFOS

Sources


AMAZING NEW
CONCEPT IN
Cooking
FREE
SPATULA
WITH EACH
"HAPPY PAN"
NOTHING STICKS TO
"HAPPY PAN"
A cast iron skillet sealed with DuPont TEFLON®


PFAS
Sources
Shampoo
Non-stick
Cookware
Stain Resistance
Product
Photography
Firefighting
Foams
Fast Food
Packaging
Pesticides
Paints

Blood Levels of the Most Common PFAS in People in the United States from 2000-2014



* Average = geometric mean

Data Source: Centers for Disease Control and Prevention. Fourth Report on Human Exposure to Environmental Chemicals, Updated Tables, (January 2017). Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.

Exposure to PFAS Chemicals

Health problems are not immediate

If you drink high levels of PFAS chemicals over time you could be more likely than the average person to develop some health problems in the future

Associated Health Outcomes – PFOA and/or PFOS

Humans

- Lowering a woman's chance of getting pregnant
- Increasing the chance of high blood pressure in pregnant women
- Increasing the chance of thyroid disease
- Increasing cholesterol levels
- Changing immune response
- Increasing chance of cancer, especially kidney and testicular cancers

Animals

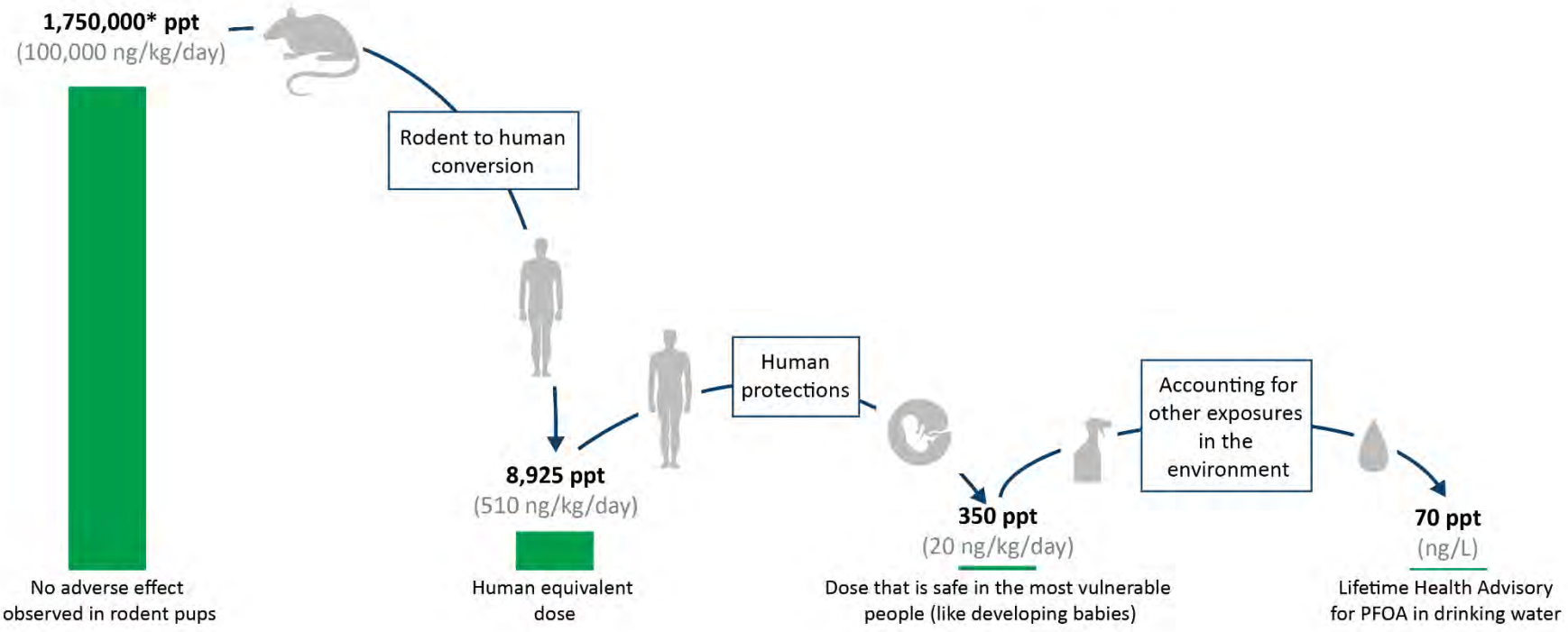
- Developmental effects
- Immune effects
- Liver effects
- Endocrine effects (thyroid)
- Reproductive effects
- Tumors (liver, testicular*, pancreatic)

USEPA's "Lifetime Health Advisory"

- Based on developmental toxicity study in rats
- Lifetime Health Advisory for Drinking Water
  - PFOA + PFOS = 70 ppt
  - Short-term (during pregnancy) and long-term (lifetime) exposure
- Protective of unborn baby against developmental effects
- Protective of all against non-cancer and cancer effects

Illustrating the concept behind a Lifetime Health Advisory: Perfluorooctanesulfonic acid (PFOS)

* Exact numbers have been generalized for illustration
ppt = Parts per trillion



Genesee County PFAS Sites

RACER Buick City

- There are no drinking water wells in the area. This information has been confirmed by both the DEQ and the Genessee County Health Department.

Genesee County PFAS Sites

Richfield Landfill

- Contamination found in the upper aquifer. Residents are pulling water from the lower, protected aquifer, and all residential well samples were non-detect for PFAS.

- No further residential well sampling is planned.

Genesee County PFAS Sites

Coldwater Road Landfill

- Residential properties located south and west of the landfill are on the municipal water supply.
- Eleven residential properties were sampled, all residential well results are no-detect except for two:
  - One well with exceedance (73 ppt PFOS)
  - One well with detection of PFOS at 8 ppt
- A point of use filter has been provided for the well with exceedance.

Genesee County PFAS Sites

Gilkey Creek

- A Type II non-community well supply serving Applewood Estates – Ruth Mott Foundation was sampled.

- Samples from the well were non-detect for all PFAS analytes tested except for PFHxDA (0.5 ng/L).

The Michigan Fish Consumption Advisory Program

Michigan Department of Health and Human Services

www.mi.gov/EatSafeFish.com

Fish Guidelines for the Flint River

Flint River (downstream of Mott Dam) - Genesee County

Type of Fish	Chemicals causing MI Serving Guideline	Size of Fish (length in inches)	MI Servings per Month
Carp	PCBs	Any	Limited
Largemouth Bass	PFOS	Any	6 per Year
Rock Bass	PFOS	Any	1
Smallmouth Bass	PFOS	Any	6 per Year

Fish Guidelines for the Flint River

Flint River (upstream of Mott Dam, including the Mott and Holloway Reservoirs) - Genesee County

Type of Fish	Chemicals causing MI Serving Guideline	Size of Fish (length in inches)	MI Servings per Month
Black Crappie	Mercury	Any	4
Carp	PFOS	Any	2
Catfish	Mercury	Any	4
Largemouth Bass	PFOS	Any	6 per Year
Rock Bass	PFOS	Any	1
Smallmouth Bass	PFOS	Any	6 per Year
Walleye	PFOS	Any	1
White Crappie	Mercury	Any	4

Fish Guidelines for the Flint River

Flint River (upstream of Mott Dam, including the Mott and Holloway Reservoirs and North and South Branches of the Flint River) – Lapeer County

Type of Fish	Chemicals causing MI Serving Guideline	Size of Fish (length in inches)	MI Servings per Month
Black Crappie	Mercury	Any	4
Carp	PFOS	Any	2
Catfish	Mercury	Any	4
Largemouth Bass	PFOS	Any	6 per Year
Rock Bass	PFOS	Any	1
Smallmouth Bass	PFOS	Any	6 per Year
Walleye	PFOS	Any	1
White Crappie	Mercury	Any	4

Fish Guidelines for the Flint River

Flint River (downstream of Mott Dam) - Saginaw County

Type of Fish	Chemicals causing MI Serving Guideline	Size of Fish (length in inches)	MI Servings per Month
Carp	PCBs	Any	Limited
Largemouth Bass	PFOS	Any	6 per Year
Rock Bass	PFOS	Any	1
Smallmouth Bass	PFOS	Any	6 per Year

Type of Fish	Chemical of Concern	Size of Fish (length in inches)	MI Servings per Month*
Black Crappie	Mercury	Any Size	4
Bluegill	Mercury	Any Size	8
Carp	PCBs	Any Size	2
Catfish	PCBs & Mercury	Any Size	4
Largemouth Bass	Mercury	Under 18"	2
		Over 18"	1
Muskellunge (Muskie)	Mercury	Any Size	1
Northern Pike	Mercury	Under 30"	2
		Over 30"	1
Rock Bass	Mercury	Any Size	4
Smallmouth Bass	Mercury	Under 18"	2
		Over 18"	1
Suckers	Mercury	Any Size	8
Sunfish	Mercury	Any Size	8
Walleye	Mercury	Under 20"	2
		Over 20"	1
White Crappie	Mercury	Any Size	4
Yellow Perch	Mercury	Any Size	4

Statewide Safe Fish Guidelines

- These general guidelines are based on the typical amount of chemicals found in fish filets tested from around the state. Some fish may be higher or lower.
- These general guidelines can be used for lakes, rivers, and fish species not included in the Eat Safe Fish Guide.

Fish collected in 2018

Recreational Use and PFAS-Containing Foam

- Based on available PFAS results for the Flint River, recreational use (e.g., swimming, boating, kayaking, etc.) of the Flint River is not a public health concern.
- MDHHS Toxicologists have evaluated incidental exposures (ingestion and skin contact) to PFAS-containing foam during recreational activities

MDHHS has concluded that PFAS-containing foam may pose a human health risk.

→

Avoid swallowing foam that might be on the river. Wash your hands after touching the foam in order to avoid swallowing PFAS or other contaminants that might be in the foam.

PFAS contaminated foam:

- Can be bright white coloring
- Tends to pile up like shaving cream
- Is usually lightweight
- May blow inland
- Can be sticky

Naturally occurring foam:

- Is off-white and/or brown
- Often accumulates in bays, eddies, or river blockages
- May have an earthy or fishy aroma

What you can do?

Reduce your exposure to PFAS:

- Use a filter if it is recommended
  - Point-of-Use (POU) – NSF Certified
  - Point-of-Entry (POET)
- Follow MI's Eat Safe Fish guidelines
- Read consumer product labels and avoid using those with PFAS

PFAS found in some…

- outdoor clothing
- carpets
- cleaning products
- cosmetics
- leather goods
- ski waxes
- "perfluoro…"
  "polyfluoro…"
  "polyperfluoro…"

General Process For Consumption Guideline Development

Sampling & Analysis

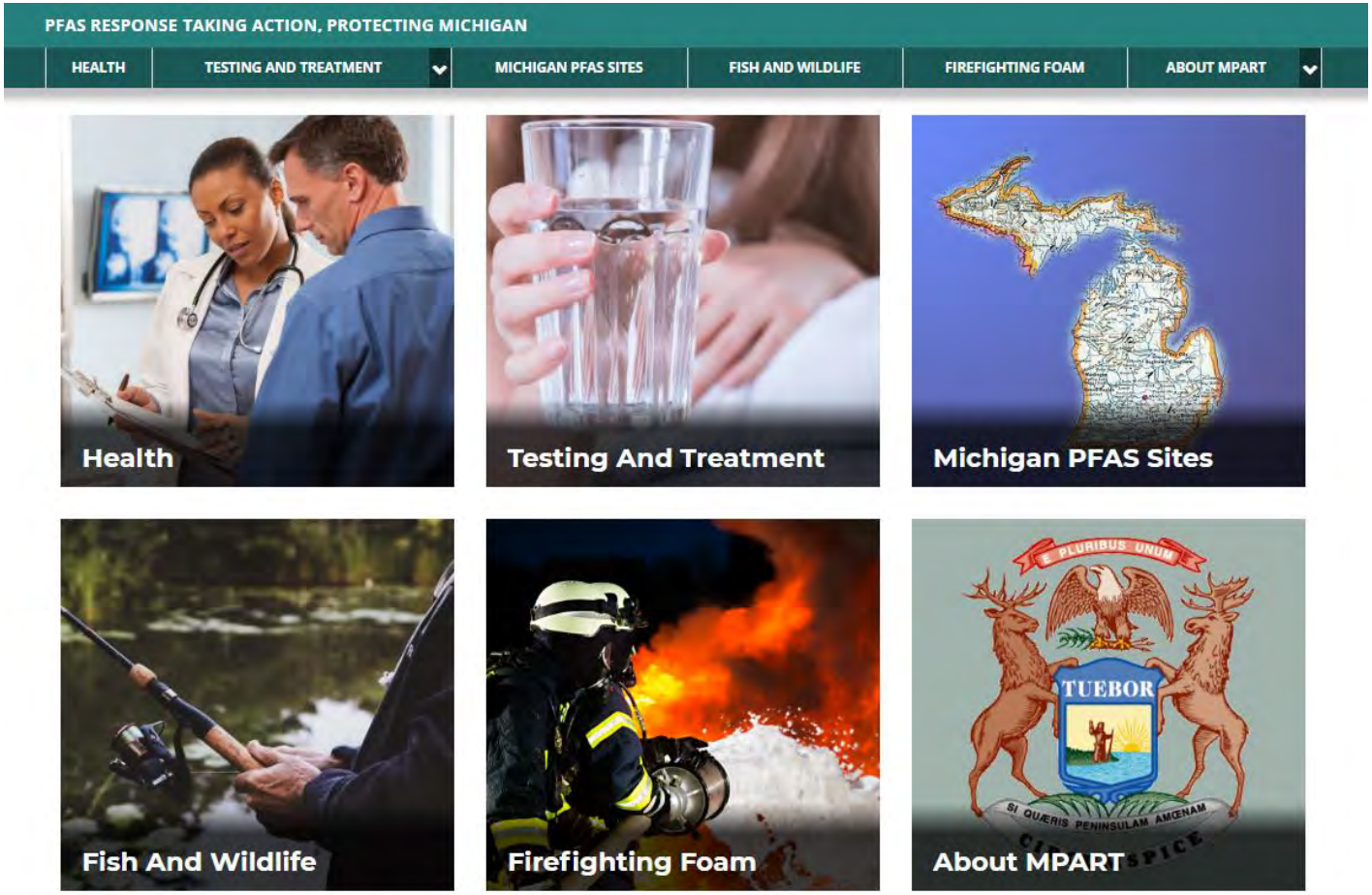
- Planning
- Fish collection (DNR/DEQ)
- Fish processing (filets)
- Analysis of filets for the ESF Guides (MDHHS Analytical Chemistry Laboratory)

Data Evaluation

- Comparing fish tissue chemical levels to screening levels
- Additional considerations

Issuing a guideline

- Outreach products – ESF Guides and others (statewide and site-specific)
- Michigan Public Health Code – Act 368



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