ARCADIS Design & Consultancy for natural and built assets

Ms. Amanda Armbruster
Saginaw Bay District Office
Michigan Department of Environmental Quality
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Bay City, Michigan 48708

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Subject:

2016 Supplemental Investigation Work Plan
RACER Trust Saginaw Malleable Industrial Land, Green Point Landfill, and Peninsula Property
Saginaw, Michigan

ENVIRONMENT

Date:
September 6, 2016

Contact:
Scott Clearwater

Phone:
810 225 1921

Email:
scott.clearwater@arcadis.com

Our ref:
B0064434.2016

Dear Ms. Armbruster:

Arcadis of Michigan, LLC (Arcadis) is pleased to provide this scope of work and plan to collect supplemental groundwater, surface water, soil, and sediment samples at the RACER Trust, Saginaw Malleable Industrial Land (SMI), Green Point Landfill (GPL), and Peninsula Property in Saginaw, Michigan (Site). Based on the review of historical data and the review of the proposed 2016 Michigan Department of Environmental Quality (MDEQ) cleanup criteria, there is potential that there are data gaps in the previously collected data. Additionally, a pending property transaction will allow for recreational use of the property, and current analytical results are necessary to adequately evaluate potential risk.

## SCOPE OF WORK

### Groundwater and Surface Water

The locations of the proposed groundwater and surface water samples are provided on **Figure 1**. Groundwater samples will further characterize potential impacts based on historical data. Surface water samples will be collected to obtain current analytical data and allow for evaluation of historical exceedances in relation to the proposed 2016 MDEQ criteria and potential risks associated with a passive recreational land use. Arcadis proposes the following scope of work:

- Collect five groundwater samples using low-flow sample methods. Analysis will include volatile organic compounds (VOCs) via United States Environmental Protection Agency (US EPA) Method 8260, 1,4-dioxane via US EPA Method 8260SIM, and cyanide via amenable cyanide. Samples will be submitted to TestAmerica Laboratories in North Canton, Ohio. Decontamination procedures will avoid the use of Alconox, which has been known to contain 1,4-dioxane, and will use a non-phosphate detergent such as TSP, or similar. The proposed analyses and details on sampling rationale are provided in **Table 1**.
- Collect 11 grab surface water samples. All surface water samples will be analyzed for pH via US EPA Method 9040C and hardness via US EPA Method SM2340B, including one surface water sample from the Saginaw River as the receiving body of water for the Site. The Saginaw River sample location will be determined by field staff in order to locate a safe sample location. Furthermore, all surface water samples will be analyzed for zinc, copper, or thallium via US EPA Method 6010 or mercury via US EPA Method 7470, depending on location to evaluate current conditions based on historical exceedances of MDEQ criteria. In addition, samples from surface water locations SW-1 and SW-20 will include analysis for cyanide via amenable cyanide, and SW-4 will be analyzed for phenanthrene via US EPA Method 8270. Cyanide was added for analysis to evaluate an exceedance of Rule 57 criteria at SW-1 and SW-20. Phenanthrene was added for analysis to evaluate a historical exceedance of phenanthrene at SW-4. The proposed analyses are provided in **Table 2**.

## Soil

Speciated chromium data were not available, with the exception of two samples on the SMI plant property. Therefore, total chromium concentrations were compared to the draft 2016 residential criteria for hexavalent chromium. Additional sampling is recommended at SMI, GPL, and the Peninsula Property, as shown on **Figure 2**, to determine if hexavalent chromium is present at concentrations exceeding residential criteria. Soil samples need to be analyzed for total chromium and hexavalent chromium to determine what fraction of the total chromium is made up of hexavalent chromium. Soil samples will be collected from the top foot of soil and submitted to TestAmerica Laboratories in North Canton, Ohio for analysis. The proposed analyses are provided in **Table 3**.

## Sediment

The locations of the proposed sediment samples are provided on **Figure 3**. Due to exceedances of the proposed 2016 MDEQ criteria and the potential for passive recreational use, samples are proposed to be analyzed for total and hexavalent chromium, vanadium, polynuclear aromatic hydrocarbons (PAHs), and/or total organic carbon (TOC). Speciated chromium data were not available, with the exception of two soil samples on the SMI plant property. Therefore, total chromium concentrations were compared to the draft 2016 residential criteria for hexavalent chromium. Additional sampling is recommended, as shown on **Figure 3**, to determine if hexavalent chromium is present at concentrations exceeding residential criteria. Sediment samples need to be analyzed for total chromium and hexavalent chromium to determine what fraction of the total chromium is made up of hexavalent chromium. Additionally,

sediment sampling is recommended to obtain data to evaluate current conditions and to address potential risk concerns based on the potential for passive recreational use at the Site. Arcadis proposes the following scope of work:

- Collect up to 14 sediment samples throughout the Site as identified on **Figure 3**. Grab sediment samples will be collected from 0 to 1 foot below the top of the sediment. Samples will be homogenized at the surface and submitted to TestAmerica Laboratories for analysis of chromium, or vanadium via US EPA Method 6010 and/or hexavalent chromium via US EPA Method 7196A, and PAHs via US EPA Method 8270SIM, depending on the location. All sediment samples will be analyzed for total organic carbon via the Walkley Black Method as a first step in screening for ecological risks. A summary of the proposed sample analysis is provided in **Table 4** and shown on **Figure 3**.

Sediment sample locations may be modified as necessary to address potential recognized health and safety concerns.

## SCHEDULE

Arcadis will prepare to mobilize to the Site upon approval for the additional sampling. We anticipate completing the sampling during the third quarter 2016.

Please contact me at 810-225-1921 if you have any questions regarding the enclosed report or its attachments.

Sincerely,

Arcadis of Michigan, LLC

Scott Clearwater

Certified Project Manager

Enclosures:

**Tables**

1 Groundwater Supplemental Sampling Summary

2 Surface Water Supplemental Sampling Summary

3 Soil Supplemental Sampling Summary

4 Sediment Supplemental Sampling Summary

**Figures**

1 Proposed Groundwater and Surface Water Sample Location Map

2 Proposed Soil Sample Location Map

3 Proposed Sediment Sample Location Map

# TABLES

**Table 1.**
**Groundwater Supplemental Sampling Plan Summary**
**RACER Trust**
**Saginaw, Michigan**

| Well to Sample | Plant | 2013 Exceeded Criteria [1] | Constituents to be analyzed and methods | Comments including why we recommend the wells to sample | Reason why well was not included in RAP Sampling Plan (ie. Greater than historical criteria, less than historical risk evaluation, etc.) |
|---|---|---|---|---|---|
| MW-117WT | Green Point Landfill | Drinking Water, GSI | 1,4-Dioxane by 8260SIM | Sample for current data and delineate downgradient of well X-6B; X-3AR. Delineate 1,4-D downgradient of X-3AR. | Not sampled after detections were identified. |
| MW-128WT/S1 | Green Point Landfill | GSI | 1,4-Dioxane by 8260SIM and Cyanide via Amenable Cyanide | Sample for current data and to delineate 1,4-D downgradient of well X-5A/B. | Not sampled after detections were identified, and not delineated prior to surface waters. |
| MW-108WT | Saginaw Malleable Industrial | Drinking Water, GSI | Cyanide via Amenable Cyanide; Volatile Organic Compounds (VOCs) by 8260 | Not delineated-continue to monitor. Downgradient well for delineation upgradient from the Saginaw River<br><br>Delineate UST7-2, UST7-5 , BBL-MW-1, BBL-MW-2, delineate B-4AR/CAUG/BR, MW-109WT, MW-5A. | Both TMBs and cyanide went from not having GSI criteria in 2008 to having low GSI criteria for 2013; significant drops in criteria for GSI and drinking water for ethylbenzene and xylene and GSI for benzene |
| MW-110WTR | Saginaw Malleable Industrial | Drinking Water, GSI | VOCs by 8260 | Sample to collect current data and delineate MW-152WT. Downgradient well for delineation upgradient from the Saginaw River | Vinyl chloride GSI criteria is 13µg/L |

**NOTES:**
1. All groundwater data were compared to draft 2016 non-residential criteria.
2. Penisula Property- VOC and SVOCs are delineated by wells MW-129WT and X-20 located on Green Point Landfill Property. Arsenic, sodium, and iron impacts are only greater than drinking water criteria and will be addressed with Restrictive Covenants.

**Table 2.**
**Surface Water Supplemental Sampling Summary**
**RACER Trust**
**Saginaw, Michigan**

| Historic Location | Status | Plant | Constituents to be analyzed and methods (total and dissolved for inorganics) |
|---|---|---|---|
| SW-1 | Available ** | Saginaw Malleable Industrial | Zinc by 6010, Cyanide by Amenable Cyanide, pH by 9040C, and hardness by SM2340B |
| SW-2 | No Surface Water Present * | Saginaw Malleable Industrial | -- |
| SW-3 | No Surface Water Present * | Saginaw Malleable Industrial | -- |
| SW-4 | Available | Saginaw Malleable Industrial | Copper and Zinc by 6010, Phenanthrene by 8270, pH by 9040C, and hardness by SM2340B |
| SW-5 | Available ** | Saginaw Malleable Industrial | Zinc by 6010, pH by 9040C, and hardness by SM2340B |
| SW-6 | Available | Saginaw Malleable Industrial | Zinc by 6010, pH by 9040C, hardness by SM2340B, and 1,4-Dioxane by 8260SIM |
| SW-7 | No Surface Water Present * | Saginaw Malleable Industrial | -- |
| SW-8 | No Surface Water Present * | Saginaw Malleable Industrial | -- |
| SW-9 | Available | Green Point Landfill | Mercury by 7470, pH by 9040C, hardness by SM2340B, and 1,4-Dioxane by 8260SIM |
| SW-20 | Available ** | Green Point Landfill | Cyanide by Amenable Cyanide, pH by 9040C, hardness by SM2340B, and 1,4-Dioxane by 8260SIM |
| SW-27 | Unknown (wetland) | Green Point Landfill | Thallium by 6010, pH by 9040C, and hardness by SM2340B |
| SW-28 | Unknown (wetland) | Green Point Landfill | Thallium by 6010, pH by 9040C, and hardness by SM2340B |
| SW-29 | Unknown (wetland) | Green Point Landfill | Copper by 6010, pH by 9040C, and hardness by SM2340B |
| SW-32 | Unknown (wetland) | Green Point Landfill | Thallium by 6010, pH by 9040C, and hardness by SM2340B |
| Saginaw River | River | Saginaw River | pH by 9040C, and hardness by SM2340B |

**NOTES:**

1. All surface water data were compared to Rule 57 criteria.
2. * = No surface water is likely present at this location. If water is encountered, the location will be evaluated for sampling.
3. ** = Surface water may no longer be present at this location, but will be field verified prior to sampling.

**Table 3.**
**Soil Supplemental Sampling Summary**
**RACER Trust**
**Saginaw, Michigan**

| Historic Soil Boring | Plant | Exceeded Criteria[1] | Constituents to be Analyzed and Methods |
|---|---|---|---|
| SB-393 | Green Point Landfill | Residential Direct Contact | Chromium (Total and Hexavalent) by 6010 and 7196A |
| SB-399 | Green Point Landfill | Residential Direct Contact | Chromium (Total and Hexavalent) by 6010 and 7196A |
| SB-389 | Green Point Landfill | Residential Direct Contact | Chromium (Total and Hexavalent) by 6010 and 7196A |
| SB10-109 | Peninsula | Residential Direct Contact | Chromium (Total and Hexavalent) by 6010 and 7196A |
| SB10-117 | Peninsula | Residential Direct Contact | Chromium (Total and Hexavalent) by 6010 and 7196A |
| SB10-123 | Peninsula | Residential Direct Contact | Chromium (Total and Hexavalent) by 6010 and 7196A |
| RS-2 | Saginaw Malleable Iron | Residential Direct Contact | Chromium (Total and Hexavalent) by 6010 and 7196A |
| BH-12 | Saginaw Malleable Iron | Residential Direct Contact | Chromium (Total and Hexavalent) by 6010 and 7196A |
| BH-10 (1997) | Saginaw Malleable Iron | Residential Direct Contact | Chromium (Total and Hexavalent) by 6010 and 7196A |
| SB-341 | Saginaw Malleable Iron | Residential Direct Contact | Chromium (Total and Hexavalent) by 6010 and 7196A |
| SB-363 | Saginaw Malleable Iron | Residential Direct Contact | Chromium (Total and Hexavalent) by 6010 and 7196A |
| PL -1 | Saginaw Malleable Iron | Residential Direct Contact | Chromium (Total and Hexavalent) by 6010 and 7196A |

**NOTES:**

1. Speciated chromium data were not available, with the exception of two samples on the Saginaw Malleable Industrial plant. Therefore, total chromium concentrations were compared to the draft 2016 residential criteria for hexavalent chromium, which is a mutagen. Additional sampling is recommended to determine if hexavalent chromium is present at concentrations exceeding residential criteria.

**Table 4.**
**Sediment Supplemental Sampling Summary**
**RACER Trust**
**Saginaw, Michigan**

| Historic Sediment Location | Plant | Exceeded Criteria [1,2] | Constituents to be Analyzed and Methods |
|---|---|---|---|
| SD-5 | Saginaw Malleable Industrial | Residential Direct Contact | Chromium (Total and Hexavalent) by 6010 and 7196A and total organic carbon by Walkley Black |
| SD-7 | Saginaw Malleable Industrial | Residential Direct Contact | Chromium (Total and Hexavalent) by 6010 and 7196A and total organic carbon by Walkley Black |
| SD-9 | Saginaw Malleable Industrial | Residential Direct Contact | Chromium (Total and Hexavalent) by 6010 and 7196A and total organic carbon by Walkley Black |
| SD-10 | Saginaw Malleable Industrial | Residential Direct Contact | PAH by 8270SIM and total organic carbon by Walkley Black |
| SD-13 | Saginaw Malleable Industrial | Residential Direct Contact | PAH by 8270SIM and total organic carbon by Walkley Black |
| SD-14 | Saginaw Malleable Industrial | Residential Direct Contact | PAH by 8270SIM and total organic carbon by Walkley Black |
| SD-18 | Saginaw Malleable Industrial | Residential Direct Contact | PAH by 8270SIM, and total organic carbon by Walkley Black |
| SD-21 | Saginaw Malleable Industrial | Residential Direct Contact | PAH by 8270SIM, and total organic carbon by Walkley Black |
| SD-28 | Green Point Landfill | Non-Residential Direct Contact | Vanadium by 6010, and total organic carbon by Walkley Black |
| SD-32 | Green Point Landfill | Non-Residential Direct Contact | Vanadium by 6010 and total organic carbon by Walkley Black |
| SD-33 | Green Point Landfill | Non-Residential Direct Contact | Vanadium by 6010 and total organic carbon by Walkley Black |
| SD-39 | Green Point Landfill | Residential Direct Contact | Chromium (Total and Hexavalent) by 6010 and 7196A and total organic carbon by Walkley Black |
| SD-62 | Green Point Landfill | Residential Direct Contact | Chromium (Total and Hexavalent) by 6010 and 7196A and total organic carbon by Walkley Black |
| SD-64 | Green Point Landfill | Non-Residential Direct Contact | Vanadium by 6010 and total organic carbon by Walkley Black |

**NOTE:**

1. All sediment data were compared to the draft 2016 non-residential criteria, except for mutagenic compounds, which were compared to residential criteria.
2. Speciated chromium data were not available, with the exception of two samples on the Saginaw Malleable Industrial plant. Therefore, total chromium concentrations were compared to the 2016 residential criteria for hexavalent chromium. Additional sampling is recommended to determine if hexavalent chromium is present at concentrations exceeding residential criteria.

# FIGURES

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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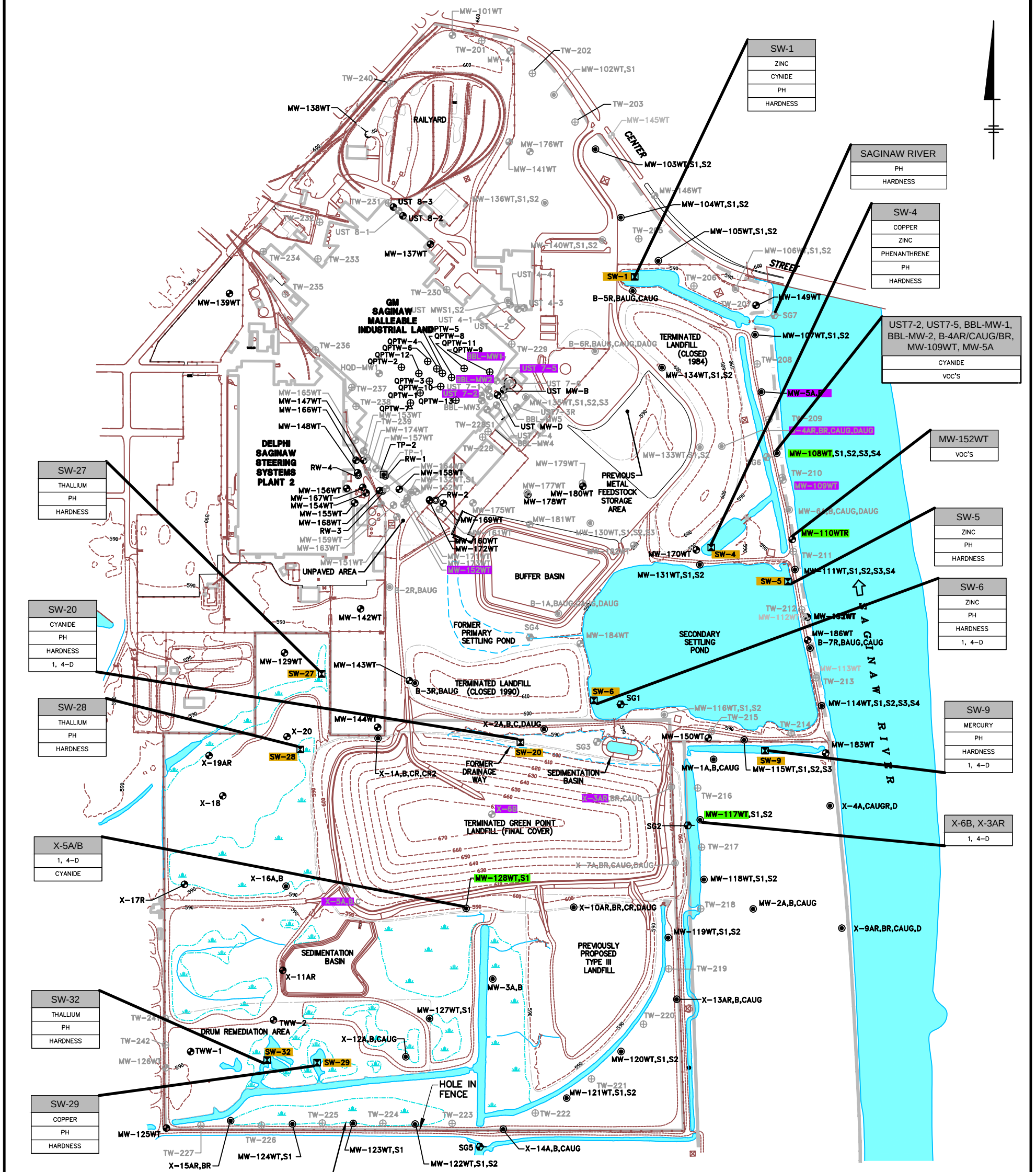


## LEGEND

- SAGINAW MALLEABLE INDUSTRIAL LAND PROPERTY LINE (APPROX.)
- GREEN POINT LANDFILL PROPERTY LINE (APPROX.)
- UNPAVED ROAD
- GROUND SURFACE ELEVATION CONTOUR (10 FT INTERVAL)
- FENCE LINE
- SWAMPY AREA
- MW-4 — MONITORING WELL
- MW-102WT,S1 — MONITORING WELL CLUSTER
- SG5 — STAFF GAGE
- TW-203 — TEMPORARY MONITORING WELL
- TP-2 — PIEZOMETER
- RW-4 — RECOVERY WELL
- SW-1 — SURFACE WATER SAMPLE
- X-6 — ABANDONED MONITORING WELL
- SG3 — ABANDONED STAFF GAGE
- RECOMMENDED WELLS TO BE SAMPLED
- HISTORIC SAMPLE LOCATION WITH EXCEEDANCES ABOVE DRAFT 2016 GSI CIRTERIA THAT REQUIRE DELINEATION
- RECOMMENDED SURFACE WATER SAMPLE LOCATION

## NOTES:

1. THIS PHOTOGRAMMETRIC BASE MAP FOR THE GM SAGINAW MALLEABLE INDUSTRIAL LAND AND DELPHI SAGINAW STEERING SYSTEMS PLANT 2 PROPERTIES WAS PREPARED BY LOCKWOOD MAPPING, INC. OF ROCHESTER, NEW YORK. AERIAL PHOTOGRAPHY WAS CONDUCTED ON 11/11/94. ORIGINAL LOCKWOOD MAP WAS AT A SCALE OF 1"=100' AND WAS INTERPRETED FOR TWO-FOOT CONTOURS.
2. SAMPLING LOCATIONS SURVEYED BY ATWELL-HICKS, INC. UTICA, MICHIGAN, FILE NO. M1014SU2, FILE DATE 3/22/96, REVISED 8/8/96, OR SPICER GROUP.
3. VERTICAL DATUM REFERENCED TO NGVD OF 1929, HORIZONTAL DATUM REFERENCED TO MICHIGAN SPC-NAD 1983.
4. BASE MAP HAS BEEN MODIFIED TO INCORPORATE BUFFER BASIN, SEDIMENTATION BASINS, WETLANDS MITIGATION AREA, AND GREEN POINT LANDFILL (GPL) FINAL COVER FROM THE FINAL ENGINEERING DESIGN REPORT PREPARED BY BBL FOR THE GPL, DATED JANUARY, 1998.
5. PROPERTY BOUNDARY FOR GREEN POINT LANDFILL DIGITIZED FROM SPICER GROUP DRAWING NO. A-21854-1, DATED 3/27/98.
6. SOIL BORING LOCATIONS FOR SOUTHERN PROPERTY DIGITIZED FROM ECOLOGICAL RISK ASSESSMENT BY EXPONENT, DATED 9/18/00.

SW-1 — HISTORICAL IMPACTED WELL
ZINC — PROPOSED ANALYSIS
CYNIDE
PH
HARDNESS

SAGINAW MALLEABLE INDUSTRIAL LAND,
GREEN POINT LANDFILL
SAGINAW, MICHIGAN

# PROPOSED GROUNDWATER AND SURFACE WATER SAMPLE LOCATION MAP

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FIGURE 1

CITY: SYRACUSE DIV/GROUP: 141 DB: GMS LD: GMS PM:(Reqd) LYR:ON=*;OFF=*REF
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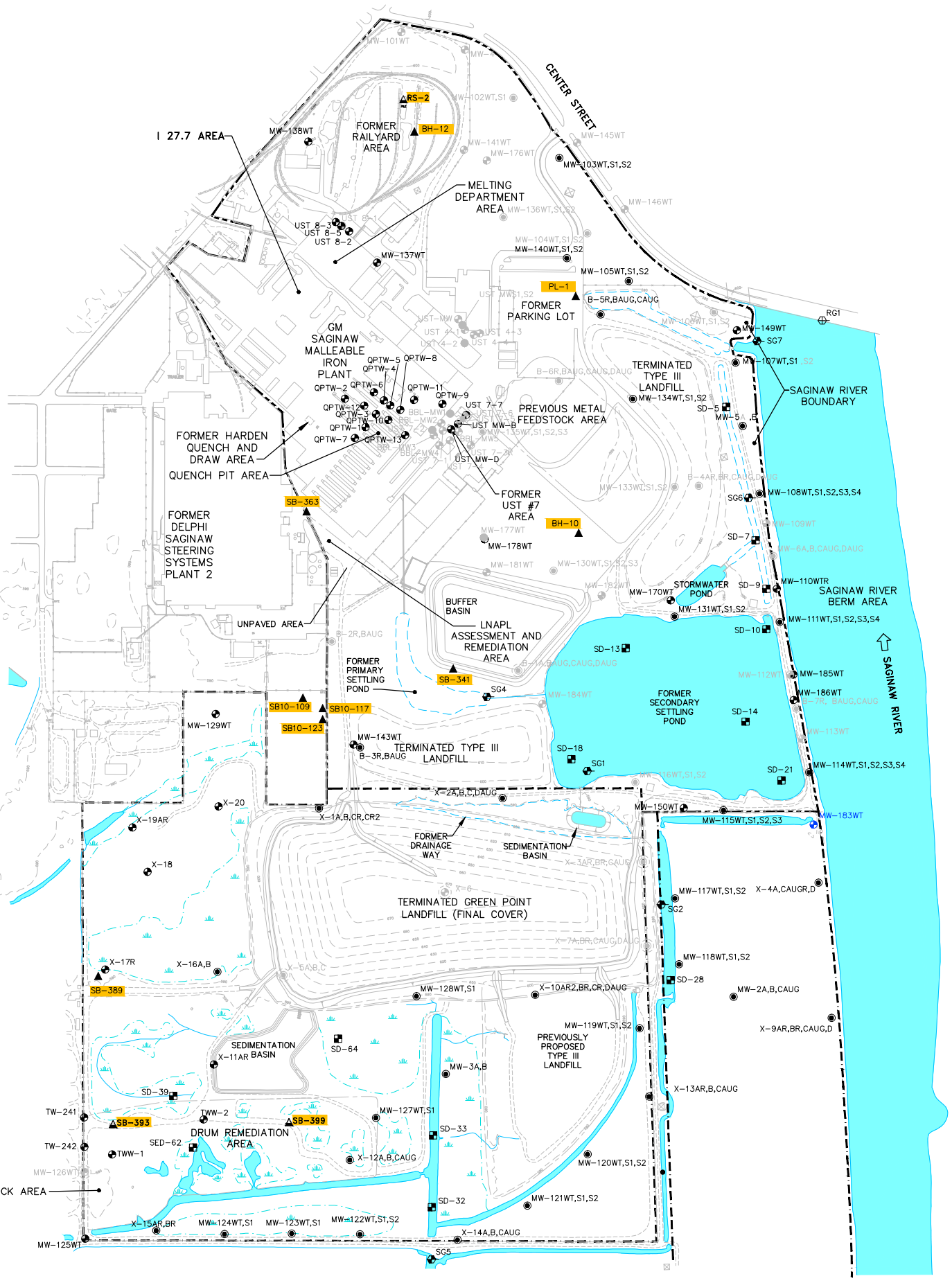


**LEGEND:**

- SAGINAW MALLEABLE INDUSTRIAL LAND PROPERTY LINE (APPROX.)
- GREEN POINT LANDFILL PROPERTY LINE (APPROX.)
- UNPAVED ROAD
- GROUND SURFACE ELEVATION CONTOUR (10 FT INTERVAL)
- FENCE LINE
- SWAMPY AREA
- MW-125WT — MONITORING WELL
- MW-2A,B,CAUG — MONITORING WELL CLUSTER
- SG5 — STAFF GAUGE
- TP-1 — PIEZOMETER
- RW-1 — RECOVERY WELL
- X-6 — ABANDONED MONITORING WELL
- X-5A,B,C — ABANDONED MONITORING WELL CLUSTER
- RG1 — RIVER GAUGE
- MW-152WT — WELL NOT FOUND
- PROPOSED SOIL SAMPLING LOCATION

**RAP (7/31/08)**
**MONITORING PROGRAM; REVISED 12/08**

SAMPLING AND GROUNDWATER ELEVATION MEASUREMENT LOCATION

LNAPL AND/OR GROUNDWATER ELEVATION MEASUREMENT LOCATION

0 300' 600'
GRAPHIC SCALE

**NOTES:**

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2. BASE MAP HAS BEEN MODIFIED TO INCORPORATE BUFFER BASIN, SEDIMENTATION BASINS, WETLANDS MITIGATION AREA, AND GREEN POINT LANDFILL (GPL) FINAL COVER FROM THE FINAL ENGINEERING DESIGN REPORT PREPARED BY BBL FOR THE GPL, DATED JANUARY 1998.
3. VERTICAL DATUM REFERENCED TO NGVD OF 1929, HORIZONTAL DATUM REFERENCED TO MICHIGAN SPC-NAD 1983.
4. PROPERTY BOUNDARY FOR GREEN POINT LANDFILL, DIGITIZED FROM SPICER GROUP DRAWING NO. A-21854-1, DATED 3/27/98.
5. BASE MAP INFORMATION SOUTH OF MAIN GREEN POINT LANDFILL PROPERTY LINE FROM AIR-LAND SURVEYS, INC. PHOTO DATE 11/90, MAPPING DATE 10/91.
6. SOIL SAMPLES WILL BE COLLECTED FOR CHROMIUM (TOTAL AND HEXAVALENT) BY 6010 AND 7196A

SAGINAW MALLEABLE INDUSTRIAL LAND,
GREEN POINT LANDFILL
SAGINAW, MICHIGAN

# PROPOSED SOIL SAMPLE LOCATION MAP

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FIGURE
2

CITY: SYRACUSE DIV/GROUP: 141 DB: GMS LD: GMS PM:(Reqd) LYR:ON=*;OFF=*REF
X:\Lansing-MI\ENVCAD\Lansing-MI\ACT\B0050096\SOIL\SWSEDIMENTSAMPLING.dwg LAYOUT: 3 SAVED: 9/1/2016 3:49 PM ACADVER: 19.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: BLACKGRAY.CTB PLOTTED: 9/2/2016 3:50 PM BY: DAVIS, GLENN II
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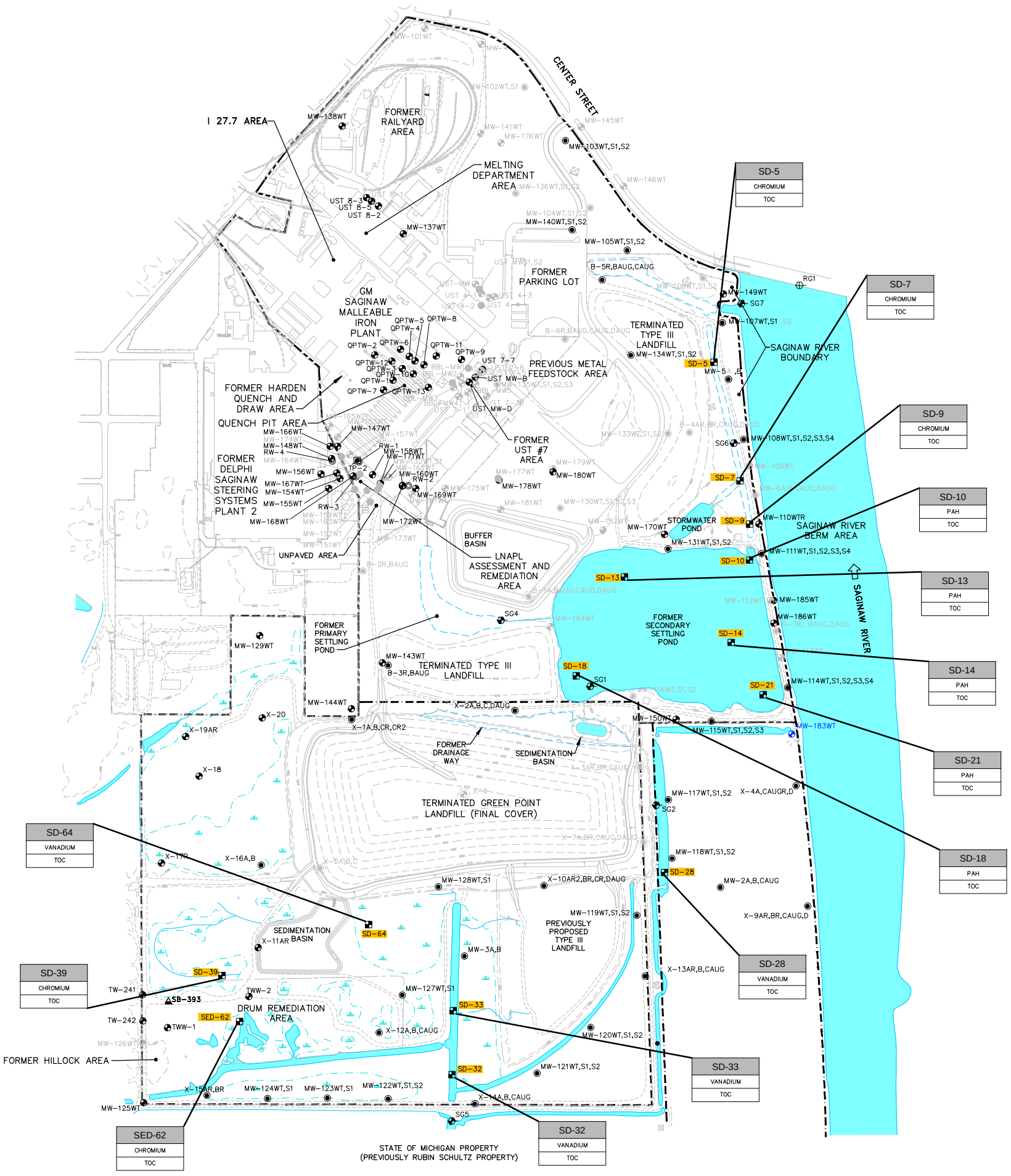


**NOTES:**

1. THIS PHOTOGRAMMETRIC BASE MAP FOR THE GM SAGINAW MALLEABLE INDUSTRIAL LAND AND DELPHI SAGINAW STEERING SYSTEMS PLANT 2 PROPERTIES WAS PREPARED BY LOCKWOOD MAPPING, INC. OF ROCHESTER, NEW YORK. AERIAL PHOTOGRAPHY WAS CONDUCTED ON 11/11/94. ORIGINAL LOCKWOOD MAP WAS AT A SCALE OF 1"=100' AND WAS INTERPRETED FOR TWO-FOOT CONTOURS.
2. BASE MAP HAS BEEN MODIFIED TO INCORPORATE BUFFER BASIN, SEDIMENTATION BASINS, WETLANDS MITIGATION AREA, AND GREEN POINT LANDFILL (GPL) FINAL COVER FROM THE FINAL ENGINEERING DESIGN REPORT PREPARED BY BBL FOR THE GPL, DATED JANUARY 1998.
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**LEGEND:**

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- GREEN POINT LANDFILL PROPERTY LINE (APPROX.)
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- GROUND SURFACE ELEVATION CONTOUR (10 FT INTERVAL)
- FENCE LINE
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- MW-125WT — MONITORING WELL
- MW-2A,B,CAUG — MONITORING WELL CLUSTER
- SG5 — STAFF GAUGE
- TP-1 — PIEZOMETER
- RW-1 — RECOVERY WELL
- X-6 — ABANDONED MONITORING WELL
- X-5A,B,C — ABANDONED MONITORING WELL CLUSTER
- RG1 — RIVER GAUGE
- MW-152WT — WELL NOT FOUND
- PROPOSED SEDIMENT SAMPLING LOCATION
- SW-1 — HISTORIC SEDIMENT SAMPLE
- ZINC, CYNIDE, PH, HARDNESS — PROPOSED ANALYSIS

**RAP (7/31/08)**
**MONITORING PROGRAM; REVISED 12/08**

SAMPLING AND GROUNDWATER ELEVATION MEASUREMENT LOCATION

LNAPL AND/OR GROUNDWATER ELEVATION MEASUREMENT LOCATION

SAGINAW MALLEABLE INDUSTRIAL LAND,
GREEN POINT LANDFILL
SAGINAW, MICHIGAN

# PROPOSED SEDIMENT SAMPLE LOCATION MAP

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FIGURE
3